AMAZON MALARIA INITIATIVE (AMI) COMMUNICATION COMPONENT

ANNUAL SUMMARY REPORT

Reporting Period: October 1, 2015 — September 30, 2016

Contract No. AID-527-C-13-00004

USAID FROM THE AMERICAN PEOPLE

LINKS MEDIA
Creating a Culture of Learning

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About Links Media

Links Media, LLC is a management consulting company based in the Washington D.C. metropolitan area, specializing in information technology and marketing communications. We provide advanced management consultation services to governments and private sector clients in the areas of health, environment, science and technology, biotechnology, governance, human rights, economic prosperity, conflict resolution, education, public engagement, risk and crisis management, and social entrepreneurship.

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Abbreviations and Acronyms

ACT	Artemisinin-based Combination Therapy
AMI	Amazon Malaria Initiative
ASTMH	American Society for Tropical Medicine and Hygiene
BCC	Behavior change communication
CDC	United States Centers for Disease Control and Prevention
DIRESA	Regional Health Directorate
FAQs	Frequently Asked Questions
FY	Fiscal Year
INS	National Institute of Health
IR	Intermediate Result
IRI	Intermittent Rice Irrigation
LAC	Latin American and the Caribbean
MOH	Ministry of Health
MSH	Management Sciences for Health
NMCP	National Malaria Control Program
PAHO	Pan American Health Organization
PQM	Promoting the Quality of Medicines Program
PY	Performance Year
QA/QC	Quality Assurance/Quality Control
RAVREDA	Amazon Network for the Surveillance of Antimalarial Drug Resistance
RDT	Rapid Diagnostic Test
SIAPS	USAID-funded Systems for Improved Access to Pharmaceuticals and Services Program
SOD	Strategic Orientation Document
TA	Technical Assistance
TOR	Terms of Reference
UN	United Nations
USAID	United States Agency for International Development
USP	United States Pharmacopeial Convention
VCS	Vector Control Services
WHO	World Health Organization

I. Executive Summary

Links Media provided targeted technical assistance to Amazon Malaria Initiative (AMI) supported countries on the basis of the country and regional communication strategies developed in the previous fiscal year. Technical assistance activities were designed and implemented in alignment with the objectives, indicators and results presented in the strategies. In coordination with AMI countries and partners, Links Media produced and disseminated documents and collateral materials with the goal of increasing malaria awareness between a myriad of influential stakeholders and contributing to the development of more inclusive and better informed policies. Work was conducted by adhering to a rigorous process of product assessment, strategic implementation, harmonization of technical recommendations, and virtual or in-person discussion meetings with technical partners. The coordinated production and distribution of documents, tools, and collateral materials via traditional, digital, and social media networks allowed for an increase in the amount and quality of technical information shared. In all, Links Media conducted fourteen technical assistance activities, strengthened nine institutions, led multiple dissemination activities, and produced a variety of documents and tools reaching a large audience of stakeholders with messages about malaria in the Americas.

This report summarizes the activities, outputs and results achieved by Links Media during the third performance year (PY3) of the contract for fiscal year (FY) 2016. It provides details of the processes, inputs and outputs, tasks completed, benchmarks achieved, performance standards fulfilled, and recommendations for addressing current and potentially emerging challenges for the Amazon Malaria Initiative beyond FY 2016.

II. Background

The United States Agency for International Development (USAID) launched the Amazon Malaria Initiative (AMI) in 2001 to improve the prevention and control of malaria in partner nations of the Amazon basin. The initiative's mission is to (i) ensure that national malaria control programs (NMCPs) in the Amazon basin and selected Central American countries substantially incorporate best practices and (ii) promote evidence-based policy changes in the partner countries. From inception, AMI has maintained a comprehensive view of malaria prevention and control. Its initial focus was to build the evidence base to support the introduction of artemisinin-based combination therapy (ACT) for *P. falciparum* malaria in all Amazon basin countries, and to improve access to and quality of malaria diagnosis. As progress was made in introducing ACT, the areas of epidemiological surveillance, vector control and systems strengthening received further attention.

USAID established AMI as a collaborative partnership among organizations (AMI implementing partners) that provide technical and scientific expertise and collaborate with the nations' ministries of health (MOHs) and NMCPs grouped in the Amazon Network for the Surveillance of Antimalarial Drug Resistance (RAVREDA) to proactively address malaria prevention and control in a sustainable manner. The partner countries also collaborate with one another and maintain an ongoing exchange of information and expertise promoted and supported by AMI. Countries currently supported by AMI include Belize, Brazil, Colombia, Ecuador, Guatemala, Guyana, Honduras, Nicaragua, Panama, Peru, and Suriname.

The initiative's regional approach benefits partner countries through (i) training and technical assistance

(TA), (ii) the development of standardized guidelines and protocols, (iii) the comparability of research and monitoring results within and across countries, and (iv) coordinated approaches to addressing shared problems.

III. Summary of Progress and Key Achievements

Links Media has guided the development of numerous communication tools in order to support malaria prevention, control and elimination efforts in the Latin American and the Caribbean (LAC) region. During PY3, Links Media used strategic and targeted communication to craft and disseminate messages to better inform policies and reach a wide audience including AMI partner governments, donors, cooperation agencies, research institutions, and the general public. Highlights of Links Media's contributions to AMI during PY3 are described in this section.

In collaboration with AMI partners PAHO/WHO, United States Center for Disease Control and Prevention (CDC), Management Sciences for Health/System for Improved Access to Pharmaceuticals and Services (MSH/SIAPS) Program, and United States Pharmacopeial Convention/Promoting the Quality of Medicines (USP/PQM) Program, we developed the AMI initiative-wide annual report covering all partner's progress and activities during FY 2015 and the first quarter of FY 2016, which included performance indicators, new success stories, and summaries of research findings. This report is an important vehicle for disseminating the knowledge base generated through AMI within the global health and development community.

Technical assistance provided to AMI partners to finalize and disseminate important communication tools included editing PAHO/WHO's AMI *Strategic Orientation Documents* (originally published in Spanish in 2011) into six publications, in both English and Portuguese, which were disseminated via email and social media throughout the LAC region. Links Media also provided assistance to the MSH/SIAPS program to modify and re-illustrate five materials for training collateral and job aids. Validation process with end-users in Guatemala's malaria-endemic areas helped to culturally adapt the documents and better reflect current guidance on pharmaceutical and malaria case management.

Links Media also provided AMI-supported countries with technical assistance to support their malaria control efforts. At a regional level, we provided technical input for the five-year *Strategy and Plan of Action for Malaria in the Americas 2016-2020*, finalized the *Strategic Malaria Communication Guide for Central America* and held a virtual event on *Good Practices for Collaborating with Indigenous People on Malaria Prevention and Control.* At a country level, we provided technical assistance to Guyana's Vector Control Services (VCS, as the NMCP is known locally) for the development of messages and materials about the integrated management of vector-borne diseases and the limited roll-out of malaria rapid diagnostic tests (RDTs). We also collaborated with Suriname's NMCP for the development of an advocacy tool for promoting stakeholders engagement in support of a *"Health in All Policies"* approach to malaria elimination. In addition to providing the Panama's NMCP with recommendations regarding realistic objectives, indicators, and expected results of planned communication activities, Links Media provided technical advice on the delivery of messages, layout, and illustrations of an educational manual for indigenous students in the country's indigenous *comarcas*. Lastly, we supported the implementation of Peru's communication strategy by providing the NMCP with technical advice and guidance in support of the emergency response to malaria, and collaborating in the development of collateral materials for training and job aids.

We researched, conceptualized, produced and disseminated an array of information and communication products that were conceived together with other implementing partners and NMCPs to better inform decision-making processes and keep malaria on the public policy agenda. Links Media presented a poster on malaria elimination at the American Society of Tropical Medicine and Hygiene (ASTMH) 64th Annual Meeting, reaching an audience of over 4,500 technical attendees from 98 countries. We held a regional webinar with over 70 participants in order to provide a space for sharing knowledge, best practices, and lessons learned from successful interventions with indigenous communities and the implication of intercultural communication to malaria control and elimination. We developed new AMI fact sheets including: *Malaria Elimination FAQs*, *Selected References on Malaria Elimination*, *Intermittent Rice Irrigation: A Sustainable Strategy for Malaria Control Efforts in Peru*, and the series *Malaria in Low-Incidence Settings* for use by NMCPs, AMI's technical audience, and the public outside the health sector. We also developed and disseminated a case study based on Brazil's successful implementation of a regulatory framework to engage the private sector in malaria control in the country's malaria-endemic Amazon states, and a success story on Peru's adoption and expansion of a systemic approach to medicine quality assurance and quality control (QA/QC) throughout the country. Lastly, we developed and circulated two AMI quarterly bulletins to enhance stakeholder coordination. We made these and other materials available electronically via the AMI project website, social media, and external websites such as the United Nations (UN) website ReliefWeb.int and the global scientific and social network for malaria professionals, MalariaWorld.org.

All in all, we reached stakeholders in the LAC region through a variety of information products and venues:

- Quarterly news bulletins
- Brochures and fact sheets
- News releases
- Project website
- Social media
- Electronic clearinghouses

Outputs and contributions to long-term outcomes

The following points provide an overview of Links Media's outputs under the AMI Communication Component during FY 2016:

- AMI initiative-wide annual report covering all partners' activities
- AMI Strategic Orientation Documents
- Input for the *Strategy and Plan of Action for Malaria in the Americas 2016-2020* on a Communication and Knowledge Management Line of Action
- Fourteen (14) virtual and in-person TA sessions with six (6) countries and a region-wide session: Brazil, Guatemala, Guyana, Panama, Peru, Suriname, and a regional webinar
- New AMI fact sheets for diverse stakeholders: *Malaria Elimination FAQ's, Selected References on Malaria Elimination, Intermittent Rice Irrigation: A Sustainable Strategy for Malaria Control Efforts in Peru,* and the series *Malaria in Low-Incidence Settings*
- A case study: *Private Sector Engagement Helps to Interrupt Malaria Transmission in Brazil*
- A success story: *Peru Strengthens Its Medicine Quality Control Approach*

- A regional webinar on *Good Practices for Collaborating with Indigenous People on Malaria Prevention and Control* with a complementary presentation on *Lessons Learned and Best Practices for Health Communication*
- Media pitching to selected US and international news outlets on topics related to malaria in Latin America and the Caribbean
- Weekly maintenance of the AMI project website and social media
- Development and dissemination of two (2) AMI quarterly bulletins to over 667 email subscribers
- Promotion of AMI implementing partner publications using electronic alerts, social media and external websites such as ReliefWeb.int, MalariaWorld.org, and others

The development of numerous communication and information products for use by AMI technical partners and audiences, countries' NMCPs, cooperation agencies, research institutions, and the general public contributed to sustainable outcomes in several ways. The immediate outcome from this work has been the consolidation of the AMI webpage as an important repository of information that does not only serve as a reference, but as a regional collaborative platform. The technical assistance provided through AMI has helped to equip NMCPs with the tools and information they need to improve their decision-making processes and capacities to support malaria prevention, control, and elimination efforts in the region. In the long term, the enhanced effectiveness of collaborative efforts made by many partners and stakeholders, as well as the dissemination of research findings, tools, and approaches will help to establish the knowledge base for improved malaria policy and case management.

The AMI website and social media platforms are important contributions to fostering regional and national policy processes as they serve as important repositories of information and channels for knowledge dissemination. The use of information technologies and virtual channels has not only increased information sharing among partners, but also served as mediums for reaching external audiences. An event like the regional webinar on *Good Practices for Collaborating with Indigenous People on Malaria Prevention and Control* is the perfect example of the use of information technologies for enabling knowledge-sharing, technical discussions and regional collaboration.

Links Media contributed to malaria communication and knowledge management at a regional level by providing input on objectives, strategic approaches, and indicators for the *Strategy and Plan of Action for Malaria in the Americas 2016 – 2020*. The dissemination of AMI's strategic orientation documents (SODs) throughout the region provided guidance on malaria decision-making processes for NMCPs, decentralized health managers, and other technical staff. Similarly, AMI's series of fact sheets on malaria in low-incidence settings contributed to better inform diverse stakeholders on technical areas such as vector surveillance and control, maintaining laboratory capacity for diagnosis, ensuring access to quality medicines, carrying out epidemiological surveillance, and monitoring the efficacy of and resistance to antimalarial medicine. Moreover, the dissemination of case studies, success stories and news releases allowed NMCPs to learn about the multiple benefits of engaging in multi-sectoral collaboration at decentralized levels, as well as contributed to advocate for the institutionalization of sustainable practices for malaria prevention, control, and elimination.

Targeted technical assistance (TA) to AMI supported countries emphasized the essential role of communications in sustaining malaria efforts through the design and development of relevant and accessible communication tools and resources. TA to Guyana's VCS supported the integrated management of vector-borne diseases by incorporating Behavior Change Communication (BCC) into the design of messages and materials to be used in the country's malaria-endemic regions. Links Media adapted existing standard operating procedures and scientifically accurate instructions provided by

PAHO/WHO and VCS into a user-friendly trilingual *Pocket Guide on RDT* (Pf.Pan) *use and storage*. This collateral material will be used in forthcoming training sessions with non-health professionals in order to expand the public network for malaria diagnosis in remote locations. Likewise, Links Media supported Peru's NMCP in sustaining malaria diagnosis capacities by providing assistance in the development of a *Thick and Thin Blood Smear Guide*. This collateral material will be used in forthcoming training sessions with health professionals and distributed throughout the country's health centers as a job aid. In the long term, the development and dissemination of these tools will help to establish regional standardized materials for NMCPs capacity building activities and training programs.

Sustaining malaria prevention, control, and elimination depends on the institutionalization of proven control efforts and a greater understanding of the role of communications in such efforts. Links Media's technical assistance contributed to better inform NMCPs decision-making process at decentralized levels through the development and dissemination of products designed to strengthen their knowledge base and guide malaria policy processes in the region. This work in support of the implementation of country and regional malaria strategies seeks to further NMCPs' malaria prevention and control efforts for years to come.

Progress against expected results

Communication strategies for each of the six Amazon countries, and one communication strategy for the bloc of Central American countries were completed. The NMCPs of seven countries (Guyana, Peru, Suriname, Brazil, Panama, Honduras, and Guatemala) gained improved decision-making capacities through Links Media's contributions in the field of communications. Quarterly newsletters and other information products were developed on behalf of AMI, and broad dissemination was achieved.

The development of targeted TA products and activities were carried out including a series of six fact sheets, two news releases and several other communication tools. A regional training to improve knowledge management on indigenous health issues specifically related to malaria was conducted. Additional targeted training and technical support on malaria prevention and control with affected populations (I.e.: miners and indigenous peoples) was carried out.

Links Media is confident that countries are gradually improving their communication abilities to promote good malaria prevention, control, and elimination practices based on the scientific evidence. In addition, scientists in the region have better articulated and disseminated new research findings for use by program managers and other decision-makers. Links Media has contributed to bridging the gap between scientists and program managers, as well as contributed to bringing countries closer to meeting their control and elimination objectives through the TA provided in malaria communication and advocacy.

With respect to the primary performance indicator "Number of institutions with improved decision-making capacities as a result of USG assistance," Links Media's FY 2016 target was to work with 11 AMI-supported countries' institutions. Links Media nearly reached this target by improving the decision-making of six NMCPs with the implementation and updating of communication strategies, as well as by advising three decentralized institutions. This year, Links Media directly advised decentralized authorities in Peru (the Regional Health Directorate of Loreto and the National Institute of Health) and Guyana (VCS, Region 8); in total, Links Media helped to improve the decision-making capacities of 9 institutions.

Impact of host country commitment, challenges, and synergies with other donors' activities

Numerous challenges were encountered that impacted the level of host country commitment to develop and implement communication strategies for malaria control: low prioritization of malaria as a result of low disease incidence and competing diseases (Chikungunya, Dengue, and Zika); limited resources available for communication activities; greater focus on technical interventions than on political sustainability. However, nearly all NMCPs in AMI-supported countries recognized the value of communication for malaria control. Another challenge were the requests received from countries for Links Media to implement more TA than our contract with USAID allows, such as by guiding behavior change communication interventions with affected populations. Regarding the disconnect over the level of TA to be provided, Links Media's solution has been to communicate clearly and consistently about the limitations of our scope of work in order to manage countries' expectations of communication TA. Throughout FY16, Links Media stayed focused on the original contract scope of work and remained consistent in communicating the purpose and goals of our work.

Activities and Products

During the performance year from October 1, 2015 – September 30, 2016, Links Media provided strategic-level advising in the area of communication as well as targeted operational support to USAID and AMI partners.

Activities were carried out in the following categories according to Links Media's scope of work:

a) **Dissemination and Communication of information –** implementation or support for implementation of activities to influence policy changes and implementation of malaria prevention and control in Latin America and the Caribbean; to mobilize support for malaria prevention and control in the AMI geographic areas of interest; and to convey critical information about AMI to various audiences, including but not limited to the host country, governments, cooperation agencies, donors, key decision-makers, media, researchers, academic institutions, healthcare professionals, and the general public.
b) **Technical Assistance** – provision of technical assistance to USAID, USAID implementing partners, and selected country-level partners to strengthen capacity for communication and outreach planning; as well as to support the design and/or implementation of selected strategies and/or activities and materials to inform and change behaviors among health professionals, care providers, policy makers, communities at risk for malaria infection, and other stakeholders in malaria prevention and control.
c) **Product Development** – writing and editorial services to develop publications and other communication materials needed by the partners in achieving AMI objectives.
d) **Graphic Design** – provision of services including but not limited to graphic design and layout, production planning, desktop publishing, and printing and/or production of materials in electronic formats.

Product development and technical assistance activities were oriented towards achieving AMI Intermediate Results (IR), as depicted in the Figure 1 (below).

Figure 1: Communication of the Evidence Base to Achieve USAID's Strategic Objective for Malaria Control

Links Media researched, conceptualized, produced, and disseminated an array of information and communication products. Due to significant crossover between the above categories of communication TA that was provided by Links Media during FY 2016, our progress is presented below according to key deliverables, essential activities, and TA provided to partners.

Key Deliverables

AMI Annual Report

Information collected from implementing partners PAHO/WHO, CDC, MSH/SIAPS, USP/PQM, and Links Media led the foundation for the development of the AMI *Annual Report* (*Deliverable 3.13)*. Writing and editing was carried out in a collaborative fashion, with input from AMI implementing partners on their respective technical sections (i.e. diagnosis and treatment, pharmaceutical supply chain, antimalarial medicine quality, antimalarial efficacy and resistance monitoring, vector surveillance and control, and communication). Phone calls and in-person meetings were held with international technical partners to supplement file sharing. Final edits and revisions continued during the first two quarters of FY 2016. The complete umbrella report was shared with USAID via Google Drive in May 2016 and was approved for layout.

AMI Quarterly News Bulletin

Three quarterly news bulletins were developed and distributed by Links Media to increase information-sharing among AMI partners (*Deliverable 3.5*). Bulletins detailed partners' activities, achievements, upcoming events, and global malaria news. Bulletin updates were obtained from all implementing partners, and from selected external malaria stakeholders. As a periodic deliverable, the bulletins effectively summarized the partners' disparate but complementary lines of action. This product issued on behalf of USAID/AMI helped to raise awareness, promote timely coordination of activities, and provide an overall perspective to partners on the cumulative effect of their parallel technical interventions. The bulletins also served as a tool for partners to reach external audiences including the international donor community, decision-makers in participating AMI countries, and the general public. Distribution of the bulletins was done via an email listserve, the project website, and social media.

Information and Communication Products

By the first quarter of FY 2016, Links Media translated the technical fact sheets on *Malaria Elimination FAQs* and *Selected References on Malaria Elimination* into Spanish and Portuguese. Links Media's annual work plan included the development and translation of six (6) new fact sheets on *Malaria in Low Incidence Settings* (*Deliverable 3.9.a and 5.1.a*), the translation of one (1) fact sheet on Intermittent Rice Irrigation (IRI) (*Deliverable 3.10*) and one (1) success story on Brazil's private sector involvement in malaria control (*Deliverable 3.8 and 5.1.c*). However, the level of effort associated with the fact sheet on IRI implied the development of a whole new fact sheet with a unique complementary infographic; at the same time, Brazil's success story was reshaped into a case study. In addition to what was established in the work plan, one (1) previously developed success story on Peru's medicine QA/QC was translated to Spanish (*Deliverable 3.7 and 5.1.b*).

The development of the series of fact sheets *Malaria in Low-Incidence Settings* required a significant level of effort and collaboration between PAHO/WHO, USAID/Peru and Links Media. During this process, the SODs provided important guidance regarding AMI's technical recommendation for the NMCPs. In a similar manner, Links Media worked closely with Peru's NMCP, other MOH's programs and USAID/Peru on the development of a fact sheet and infographic outlining the effects of IRI on malaria control. In Peru, IRI has had a significant impact on vector control efforts and the farmers that practice it, as it reduces vector production while increasing productivity; thus, the new fact sheet highlighted the economic, environmental, and health benefits of IRI to stakeholders outside the health sector, advocating for the adoption of this technology throughout the country. Following USAID/Peru's advice, Links Media transformed Brazil's success story into a case study, highlighting the effective implementation of a regulatory framework to engage the private sector in malaria control in Amazon states. For Brazil's NMCP, disseminating this case study provides other countries in the region with an example of private sector collaboration for mitigating potential health and environmental impacts of large infrastructure projects. Lastly to ensure a wider reach, Links Media in collaboration with USP/PQM translated the success story on Peru's adoption and expanded application of the Three Level Approach to medicine QA/QC.

Regional Collaboration

Following a 2014 AMI needs assessment conducted by Links Media and in partial fulfillment of PAHO/WHO Resolution CD47.R18 on the Health of Indigenous Peoples in the Americas, we held a webinar on *Good Practices for Working with Indigenous Peoples on Malaria Prevention and Control* (*Deliverable 4.2.h*) on April 5, 2016. In planning the virtual event, Links Media coordinated with PAHO/WHO to identify countries in which malaria incidence had decreased in the indigenous population as a result of improved collaboration between the NMCP and affected populations. In-depth interviews were pre-recorded via web video with Guatemala', Honduras', and Panama's NMCP representatives who had been integrally involved in the implementation of successful approaches that were applied in indigenous communities. Based on the findings from this exercise, we systematized lessons learned about the application of intercultural communication for malaria control and elimination and presented them during a virtual knowledge-sharing activity (*Deliverable 3.1*). The webinar addressed the information gaps on how to work effectively with indigenous populations on malaria prevention and control.

The webinar's goal was to improve the working relationships between NMCPs and indigenous peoples by creating a virtual space for the exchange of information and successful experiences that could be

adapted to different country contexts. Over 70 participants from Bolivia, Brazil, Colombia, Costa Rica, Ecuador, Guatemala, Guyana, Honduras, Nicaragua, Panama and Peru, including health professionals, civil society organizations, PAHO/WHO and USAID participated in the event. The event included presentations and lessons learned by Guatemala's, Honduras', and Panama's NMCPs on the development of more inclusive and better-informed malaria policies and programs. Overall, this activity served to share information on the process and impact of designing malaria interventions tailored to indigenous populations.

Essential Activities

Links Media carried out numerous project-related activities, which at times entailed the development of other products as collateral in addition to those listed above. The essential activities consisted of: dissemination and communication of information, stakeholder engagement and mobilization of support, media outreach and monitoring, validation of materials, and provision of editorial and graphics support.

Dissemination and Communication of Information

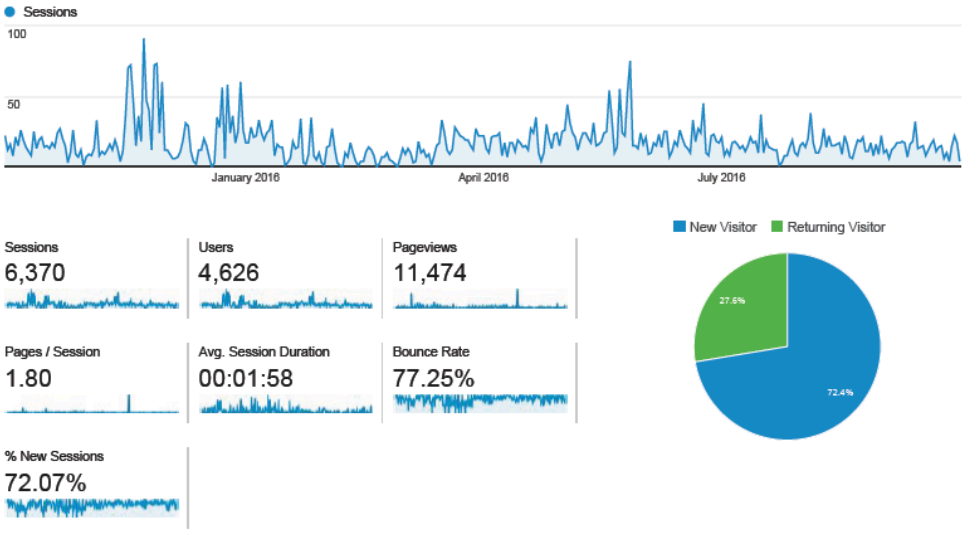
In October 2015, Links Media attended the *Science of Eradication: Malaria Course* and the *XIV National Malaria Research Meeting* in São Paulo, Brazil, participating in dialogue and sharing valuable information on malaria communication efforts in the region, including important considerations as countries move towards elimination. Links Media representatives invited all 100 participants to follow and actively participate on AMI social media platforms. Also in October 2015, Links Media presented the poster: *So you say you want elimination? Using communication and advocacy to advance malaria elimination in the Americas* at the American Society of Tropical Medicine and Hygiene (ASTMH) 64TH Annual Meeting in Philadelphia, USA. The ASTMH poster presentation allowed Links Media to present unique findings and highlight the communication work performed through the initiative to approximately 4,500 attendees from 98 countries, including public health officials, researchers, physicians, and military personnel who work with malaria and other infectious diseases (*Deliverables 3.12.a*). In May 2016, Links Media presented at the AMI/RAVREDA *Annual Evaluation Meeting* in Bogota, Colombia on Links Media's achievements since the last Annual Evaluation Meeting held in March 2015, and provided input on communication and advocacy activities within the region. Links Media also attended the AMI/RAVREDA *Annual Steering Committee Meeting* in Washington, USA in August-September 2016 (*Deliverables 3.12.b*).

On a weekly basis, Links Media updated the AMI project website (*Deliverable 3.2*) with relevant news, publications (*Deliverable 3.4*), and events at the official project URL (usaidami.org). Good knowledge management practices were applied to maintain a robust central repository of updated manuscripts, data, reports, and other important materials on the website. The new version of the AMI project website allowed users to access information in English, Spanish and Portuguese from any type of electronic device, including mobile phones and tablets. Google Analytics is the measurement tool embedded on the site that allows website usage results to be tracked, analyzed, and reported to USAID on a quarterly basis.

During FY 2016, digital engagement on the AMI website showed a slight decrease with 6,244 sessions, a 1.98% decrease from the previous year. Despite the decrease in sessions, according to website metrics, new visitors constituted 72.4% of the 4,518 total visitors, showing a consistency in user behavior from the previous year, when returning visitors accounted for nearly 72.6% of the 4,626 visitors. We are able

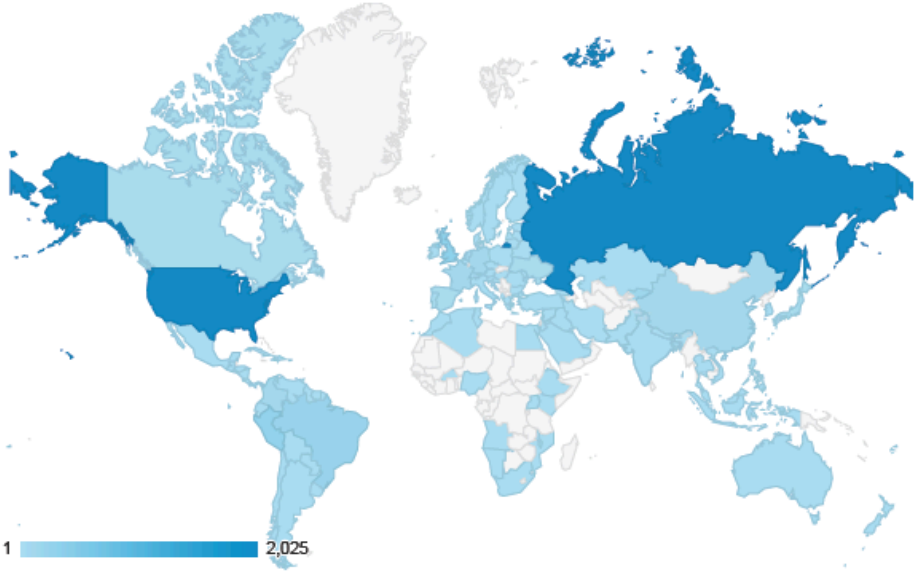
to determine that approximately 1,265 website visitors were returning visitors during FY 2016, a larger number than the approximately 1,250 returning visitors from the previous year.

Figure 2. Daily usage of the usaidami.org project website



Geographic coverage continues to be broad, and during FY 2016 the website had visits from all countries in the LAC region, as demonstrated on the map below. In the region of the Americas, the United States remained the country with the highest number of visitors, followed by Peru, Brazil and Colombia. The website also had visitors from other regions, including countries in Africa, Asia, and Europe. This indicates a high likelihood that reach and exposure have expanded beyond the originally intended LAC region, as a result of wider dissemination of malaria prevention and control information produced and disseminated through AMI support.

Figure 3. Geographic reach of AMI project website



Links Media's management of AMI social media platforms continued to promote the project website at strategic intervals, as well as through electronic alerts sent to the AMI email listserve. In-person and

virtual events were used as an opportunity to raise awareness and inform event participants of the AMI website and social media platforms, including the *Science of Eradication: Malaria Course,* the *Workshop on Education and Social Mobilization for Malaria Surveillance and Control,* and the AMI/RAVREDA annual meetings. However, peak website visits during the performance year occurred in conjunction with social media engagement around *Malaria Day in the Americas* on November 6, 2015, the release of the *World Malaria Report* in December 2015, *World Malaria Day* in April 2016, and other regional and global events. Likewise, website viewership also increased following the distribution of each AMI quarterly bulletin.

AMI social media platforms represented an important contribution to fostering a more inclusive policy process as they were used to promote the release of key products. Pre-existing Facebook, Twitter, Instagram, and LinkedIn accounts grew during the performance year. The Facebook group page remains to be the most active channel, where users from across the region share articles, news, and other resources through an organic process, serving as an online Community of Practice.

Social Media Platform	Following by End of Q4 FY15	Following by End of Q4 FY16	% Change
Facebook institutional page	586	712	21.5%
Facebook group page	383	451	17.7%
Twitter	821	965	17.5%
LinkedIn group page	47	90	91.4%
Instagram	230	237	3%

Electronic alerts were issued via email as a way to make AMI technical partners, NMCP staff, and individuals at relevant external organizations aware of new website content and notable events. Alerts were issued on October 26 and 30, November 10, February 10, March 8, 17 and 23, April 11, and June 9, 2016; moreover, the distribution list included 667 email recipients by end of FY 2016 (*Deliverable 3.3*). Links Media used MailChimp statistics to track the percentage of recipients who opened the alerts or clicked on links. We also tracked the geographic reach of the electronic alerts; on average, the United States, Colombia, Brazil, and Peru were among the top countries where recipients opened email alerts. Links Media also disseminated information products developed with support from AMI on international development sharing platforms including:

- The scientific and social network for malaria professionals Malaria World – malariaworld.org
- United Nations Office for the Coordination of Humanitarian Affairs (OCHA)'s ReliefWeb – reliefweb.int
- USAID's Development Experience Clearinghouse – dec.usaid.gov

Stakeholder Engagement and Mobilization of Support

In alignment with new strategies for engaging with stakeholders and interested parties, including guidance from the USAID Bureau for Global Health Communication team, Links Media has reached out to AMI partners and stakeholders to expand support for malaria prevention and control efforts in the LAC region by using the following social media channels:

- Twitter feed with 965 followers
- Facebook fan page with 712 likes

- Interactive Facebook group with 451 members
- Email list serve with approximately 667 recipients
- Micro-targeting via the AMI LinkedIn Group, with 90 members
- Project website at usaidami.org with 4,626 unique users during FY 2016

Internal audiences reached through these channels included MOHs, NMCPs, and the initiatives technical partners. External audiences reached consist of public opinion leaders, journalists, civil society groups and professional associations, health sciences students, and the general public. Recent research has shown that social media users are more politically engaged as compared to other Internet users.[1] Thus, social media has proven to be a valuable tool to be able to disseminate information to influential voices and to capture information on malaria in the region.

On November 2015, Links Media attended and live-tweeted a Capitol Hill briefing entitled *Defeating Malaria in the Americas* as an opportunity for stakeholder outreach and awareness. For *Malaria Day in the Americas* 2015, Links Media developed a social media toolkit with key messages related to malaria in the region and assisted PAHO/WHO with media pitching and stakeholder outreach. Likewise, upon the release of the *World Malaria Report* 2015, Links Media developed key messages about the LAC region, disseminating the report's highlights in English, Spanish, and Portuguese via the AMI website and a variety of social media platforms. In March 2016, Links Media participated in the 15th annual Global Health Mini-University. In coordination with PAHO/WHO, and following World Malaria Day 2016's theme *End Malaria for Good*, Links Media developed a social media toolkit with key messages related to malaria in the region and updated an infographic detailing AMI's areas of intervention in English, Spanish, and Portuguese for use by NMCPs, AMI implementing partners and journalists in the region. Links Media also published the opinion editorial *End Malaria for Good in the Americas* and disseminated PAHO/WHO's call for nominations for *Malaria Champions 2016* (*Deliverable 3.1.a, 3.1.b,* and *3.1.c*).

Media Outreach and Monitoring

In order to put malaria on the public agenda, Links Media used six (6) media outreach opportunities during FY 2016 (*Deliverable 3.6).* On World Malaria Day 2016, Links Media published an on-line regional opinion editorial about malaria in the Americas reinforcing social media engagement following USAID GH/LPA guidance. Additional media outreach included:

- A news release in October 2015 about the ASTMH conference held in Philadelphia, USA
- A media advisory issued in November 2015 about the PAHO/WHO forum for *Malaria Day in the Americas*
- A regional editorial opinion in Spanish and English on malaria in the Americas for *World Malaria Day 2016*
- Dissemination of a PAHO/WHO news release in May 2016 on the call for nominations for *Malaria Champions of the Americas 2016*
- A news release on AMI's regional webinar on *Good Practices for Working with Indigenous Peoples on Malaria Prevention and Control* for International Day of the World's Indigenous People 2016

[1] How does social media use influence political participation and civic engagement? A meta-analysis. URL: http://journalistsresource.org/studies/politics/digital-democracy/social-media-influence-politics-participation-engagement-meta-analysis. Accessed on September 9, 2016.

Fourteen (14) media mentions of AMI/RAVREDA or malaria prevention and control efforts in the Americas appeared in electronic sources in English, Spanish, and Portuguese. Links Media pitched to journalists with Agencia EFE, BBC Mundo, Univision, Globo International, El Comercio Peru, NPR, The Economist, Telemundo and TeleSUR with information in advance of Malaria Day in the Americas. Links Media pitched to selected journalists with messages regarding countries commitments and efforts to eliminate malaria in the region of the Americas. Some journalists were interested and a piece was drafted to be published by El Comercio Peru, but USAID clearance was not obtained in time to write a news story. This is an important lesson learned. For the future, Links Media recommends that AMI partners such as PAHO identify these opportunities ahead of time for specific awareness days.

Validation of Materials

Links Media considers it is important to align instructional materials with audience information needs, in order to ensure materials are effective at achieving the intended results with target audiences. For this reason, after supporting the development of the Pocket Guide on RDT Use and Storage (*Deliverable 4.2.b*) for use in Guyana, we created a learner verification tool (*Deliverable 4.2.c*). The tool will be implemented by Guyana's VCS staff in the field with members of the target audience to assess their understanding of the RDT guide's messages.

Provision of Editorial and Graphics Support

Links Media provided support for the graphic development, revision, and copyediting of AMI publications. We performed copy editing and translation for AMI's SODs (*Deliverable 5.2*), the series *Malaria in Low-Incidence Settings*, the success story on Peru's adoption of the Three Level Approach, the fact sheet on IRI for malaria control, and the case study on Brazil's private sector involvement in malaria control. Links Media also provided graphic design support to SIAPS/MSH and Guatemala's NMCP materials on malaria diagnosis and pharmaceutical management (*Deliverable 5.7*). All these documents were later disseminated on the AMI program website, social media, as well as via an electronic alert to the AMI listserve.

Communication Technical Assistance (TA) Provided to Partners

In follow-up to the provision of technical assistance (TA) to AMI-supported countries that was delivered in PY2, Links Media focused PY3 on providing technical support and guidance to accompany partner's malaria control efforts. TA deliverables included the following activities and products:

- In October 2015, Links Media participated in the 1st Workshop on Education and Social Mobilization for Malaria Surveillance and Control organized by the Brazilian NMCP in Brasilia, Brazil. During the workshop, Links Media provided technical advice on the development of a national education and social mobilization strategy for malaria, including the development of malaria communication strategies tailored to populations in special circumstances (*Deliverable 4.2.a*).
- In October 2015, during the regional consultation organized by PAHO/WHO in the Dominican Republic, Links Media provided technical input for the *Strategy and Plan of Action for Malaria in the Americas 2016-2020*. By December 2015, we complemented our TA with a document on

communication and knowledge management that included recommended objectives, strategic approaches, and indicators for the strategy (*Deliverable 4.1*).

- Links Media collaborated with Guatemala's NMCP and MSH/SIAPS to modify and re-illustrate five materials previously designed as training collateral and job aids for the management of antimalarial medicines, diagnostic supplies, and malaria symptoms. These communication tools were distributed to health managers, clinicians, and community health workers throughout the country (*Deliverable 5.7*).
- During the first two quarters of FY 2016, Links Media provided quality control and graphic design support to PAHO/WHO on the draft SODs. These products were finalized and disseminated via AMI/RAVREDA websites and social media in English, Portuguese, and Spanish.
- Links Media provided technical guidance to Guyana's VCS for the layout and message development of a billboard on the integrated management of vector-borne diseases. In addition, Links Media provided technical assistance for the development of a Pocket Guide on RDT use and storage in English, Spanish, and Portuguese. These documents were created adapting existing standard operating procedures from PAHO/WHO for use in Guyana's malaria-endemic regions 7, 8, and 9 (*Deliverable 4.2.b, 5.3 and 5.4*).
- In collaboration with Suriname's NMCP, Links Media supported the development of an "Advocacy Letter for Involving Malaria Stakeholders for Elimination." We provided research support and advocacy recommendations for refining communication strategy messages for malaria elimination in a letter targeted to national decision-makers on World Malaria Day 2016 (*Deliverable 4.2.g*).
- Links Media worked closely with Peru's NMCP, Loreto's DIRESA (Regional Health Directorate, by its acronym in Spanish) and INS (National Institute of Health, by its acronym in Spanish) on the development of various technical documents. In response to Loreto's malaria epidemic and the country's prioritization of indigenous people we crafted the Terms of Reference (TOR) for an Education, Communication, and Social Mobilization Specialist. Moreover, we developed manuals on Thick Blood Smear and RDT use to be used in future trainings with health workers and distributed as job aids in health centers (*Deliverable 4.2.d, 4.2.e, and 4.2.f*).
- In addition to providing the Panamanian NMCP with recommendations regarding realistic objectives, indicators, and expected results of planned communication activities, Links Media provided the office of health promotion with technical advice on an educational manual developed in collaboration with Panama's Ministry of Education and Communication Secretary from the Guna People's Congress. The manual on malaria prevention was developed in the Guna language for students living in the country's *comarcas (Deliverable 4.2)*.

The status of all Links Media deliverables scheduled for FY 2016 is presented below, whether deliverables consisted of products, essential activities, and TA provided.

Task	Deliverable	Status
Task 3. Develop and disseminate messages and communication materials.	**3.1** - Messages and materials for special events or activities	Completed
	3.1.a. Promotion of Malaria Day in the Americas via traditional and social media	Completed
	3.1.b. Malaria Champions 2015 dissemination	Completed
	3.1.c. World Malaria Day 2016	Completed
	3.2 - AMI website updates	Completed
	3.3 - Electronic and printed alerts for promotion of AMI and its materials	Completed
	3.4 - At least 4 technical documents disseminated through the AMI	Completed

	Website, electronic alerts, AMI e-newsletter, media, etc.	
	3.5 - 3 quarterly bulletins distributed on website and electronic mailing list	
	Q4 - FY 15	Completed
	Q1 - FY 16	Completed
	Q2 - FY 16	Completed
	3.6 – Up to 4 press releases in three languages for media placement and coverage of published technical documents related to AMI's activities and achievements targeted to partners, stakeholders, and policymakers	
	3.6.a. Pitching on the attainment of MDG #6 for Malaria Day in the Americas	Completed
	3.6.b. News release on Indigenous Peoples Day 2016	Completed
	3.6.c. World Malaria Day 2016	Completed
	3.6.d. Release of World Malaria Report 2015	Completed
	3.6.e. Malaria Champions of the Americas 2016	Completed
	3.7 - Success Story: Peru CNCC Three Level Approach	Completed
	3.8 - Case Study: Brazil Private Sector Involvement for Malaria Control	Completed
	3.9 – New fact sheets:	
	3.9.a. – Six (6) technical fact sheets on malaria in low-incidence settings	Completed
	3.10 – Updated fact sheet on Peru's Intermittent Rice Irrigation	Completed
	3.11 - Portfolio of AMI products	Completed
	3.12 – Participation in and/or assistance with planning of:	Completed
	3.12.a. – Scientific conferences & lectures -- ASTMH Annual Meeting	Completed
	3.12.b. – International partners' meeting	Completed
	3.13 – Initiative-wide annual report	Completed
Task 4. Provide technical Assistance (TA) for partners in the design and implementation of dissemination/communication strategies.	**4.1** - TA activities conducted with partners	Completed
	4.2 - TA activities conducted with countries	Completed
	4.2.a. - Communication TA to **Brazilian** NMCP regarding the itinerant mining population, including participation in a Workshop on Education and Social Participation for Malaria Surveillance and Control in Brasilia	Completed
	4.2.b. - Develop Pocket Guide on RDT Use and Storage for non-health professionals in **Guyana**	Completed
	4.2.c. - Develop Learner Verification Tool for the field validation of the Pocket Guide in **Guyana**	Completed
	4.2.d. – Terms of reference for a malaria communication specialist in **Peru** in charge of developing a communication channel to support stakeholders coordination for malaria control in Loreto	Completed
	4.2.e. – RDT, Thick Blood Smear Manual for health professionals in **Peru**	Completed
	4.2.f. - Thick Blood Smear Manual for health professionals in **Peru**	Completed
	4.2.g. – Provide TA for national-level malaria advocacy in **Suriname**	Completed
	4.2.h. – Webinar on best practices for working with indigenous peoples (for NMCPs in 11 AMI countries)	Completed

	4.3 – Reports on TA provided to AMI partners	Completed
Task 5. Support the development, revision, and copyediting of partner publications and provide graphics services.	**5.1** - Translation of at least 2 new technical publications into 2 additional languages	
	5.1.a. Translation of 6 Fact Sheets on Malaria in Low-Incidence Settings	Completed
	5.1.b Translation of success story: Peru CNCC Three Level Approach	Completed
	5.1.c Translation of Brazil success story on private sector involvement in malaria control	Completed
	5.2 - Editorial support and graphic design for translations of 6 Strategic Orientation Documents (3 in English, 3 in Portuguese, plus minor changes to 1 Spanish document)	Completed
	5.3. - Graphic design support for Pocket Guide on RDT Use and Storage for non-health professionals in **Guyana**	Completed
	5.4. - Graphic design support for BCC billboard in **Guyana**	Completed
	5.5. – Graphic design support for RDT, Thick Blood Smear Manual for health professionals in **Peru**	Completed
	5.6. - Graphic design support for Thick Blood Smear Manual for health professionals in **Peru**	Completed
	5.7. - Design support for 5 Guatemalan MOH materials on malaria diagnosis and pharmaceutical management	Completed

IV. Monitoring and Evaluation

Under the AMI Communication Component, Links Media's activities were designed to strengthen AMI's role in improving malaria prevention and control in the Amazon basin and Central America through the application of strategic communication, outreach, and dissemination approaches. Links Media contributed to all of the AMI's intermediate results in FY 2016, advancing all of the three IR's that are of vital importance for the future of the initiative. Links Media created and disseminated information based on scientific evidence for use by AMI partners and supported countries, nurturing more inclusive and better-informed policy processes. We have achieved this by developing and disseminating information products throughout the region in order to better inform and engage an array of stakeholders.

IR 1 – Evidence base increased

The analysis of qualitative data collected in the process of conducting communication assessments with 11 countries' NMCPs in 2014 allowed Links Media to craft a poster on malaria elimination in the LAC region that was presented at the 64TH ASTMH Annual Meeting. Links Media's participation at the meeting enabled the dissemination of unique findings on malaria in the Americas to approximately 4,500 attendees from 98 countries, including public health officials, researchers, physicians, and military personnel who work with malaria and other infectious diseases. In collaboration with Brazil's NMCP, Links Media developed a case study detailing how the Brazilian MOH had effectively implemented a regulatory framework to engage the private sector in malaria control in the country's malaria-endemic Amazon regions. In cooperation with Peru's NMCP, Links Media developed a fact sheet highlighting the economic, environmental, and health benefits of expanding intermittent rice irrigation in agricultural areas, providing evidence to the multi-sectoral commission in charge of the program. Lastly, Links Media held a regional webinar showcasing successful interventions with indigenous communities in order to

improve health manager's knowledge of indigenous health and intercultural communication as they pertain to malaria.

IR 2 – Evidence base communicated and used

Links Media disseminated numerous information products that were conceptualized together with other implementing partners through a variety of communication channels, reaching decision-makers, public health officials, researchers, and international donors with evidence-based messages about malaria prevention, control, and elimination. In this sense, the project website served as the main hub for relevant information and materials, keeping multiple stakeholders abreast of the developments related to malaria in the Americas.

Links Media developed the AMI initiative-wide annual report covering all partners' progress and activities during FY 2015 and the first quarter of FY 2016. This report is an important vehicle for disseminating the knowledge base generated through AMI within the global health and development community. Likewise, the quarterly activities bulletins provide updates on the partner's work throughout the region. Technical documents were developed to strengthen NMCP staff, as well as regional public health professionals; some of these documents were presented in distinct formats such as strategic orientation documents, fact sheets, reading lists, case studies, success stories, presentations, and video-recordings.

IR 3 - More inclusive and better informed policy process promoted

Links Media facilitated and promoted regional collaboration between AMI partners, PAHO/WHO, and NMCPs as a means for exploring strategies to improve working relationships between AMI collaborators and share experiences and technical expertise on developing more inclusive and better informed policies and programs. Moreover, Links Media developed frameworks and tools that could be adapted to different country contexts.

In Brazil, Links Media provided TA to the NMCP on the development of an education and social mobilization strategy for malaria by participating in a workshop attended by decentralized malaria actors and diverse government agencies representing a variety of sectors. In Guyana, Links Media worked with the country's VCS to develop messages and materials about malaria for non-health professionals in the country's endemic regions in order to support the public network for diagnosis in remote locations. Likewise, in Peru, Links Media worked with the NMCP, DIRESA Loreto, and the INS to draft terms of reference and manuals for health professionals in order to implement and sustain local malaria control and diagnosis efforts.

Table 1. AMI Links Media Malaria Indicators

		Completed/Target (Fiscal Year)		
Task	Indicator Name	2014	2015	2016

T1	Completed dissemination/communication plan includes strategies to target new audiences and build sustainability (e.g., institutionalization) after AMI period	1/1	1	1
	Completed dissemination/communication plan considers gender roles, indigenous populations, populations of African descent, and people with disabilities	1/1	1	1
T2	Number of completed dissemination/communication plans for Amazon countries that include a strategy to target new audiences, as well as a strategy to build sustainability	4/6	6	6
	Number of completed dissemination/communication plans for the group of Central American countries that include a strategy to target new audiences, as well as a strategy to build sustainability	1/1	1	1
	Number of dissemination/communication plans that consider gender roles, indigenous populations, populations of African descent, and people with disabilities	5/7	7	7
	Number of countries that have implemented their dissemination/communication strategies developed with assistance from Links Media (as evidenced by qualitative activity review)	0/2	6	6
T3	Number of fact sheets developed or updated	2/6	2	7
	Number of press releases issued (English, Spanish, and Portuguese)	5/8	4	6
	Number of media mentions of AMI (English, Spanish, and Portuguese)	10/10	10	10
	Number of AMI annual achievement reports produced	0	1	1
	Number of quarterly AMI bulletins distributed	3/4	4	3/3
	AMI website updated weekly	52/52	52	52
T4	TA provided to USAID and AMI partners to aid in the design of dissemination/communication strategies and/or in the implementation of activities	3/3	2	3
	Number of institutions with improved decision making capacities as a result of USG assistance	**9/8**	**10**	**9**
	Number of people trained with USG funds in malaria treatment or prevention	**0/16**	**20**	**70**
	Number of partners for which Links Media has tracked roles, status, and involvement in communications planning, implementation, and evaluation activities and interventions by gender	5/7	7	7
	Number of countries that show an increased adoption of products, materials, or approaches acquired during Links Media TA	1/2	6	11
T5	Number of completed priority dissemination/communication materials developed by AMI partners that have been translated into other AMI languages (English, Spanish, and Portuguese)	1/2	2	11

	Number of scientific articles submitted for publication	0/1	1	0

V. Challenges to Implementation and Solutions

Links Media experienced challenges to meeting the required contract and work plan deadlines with a few products. This challenge was addressed through enhanced communication and work plan monitoring to ensure the delivery of materials. External challenges were encountered, impacting the level of host country commitment to develop and implement communication strategies for malaria control. The presidential elections of some countries, including Guyana and Peru impacted coordination and collaboration efforts with NMCPs. The health system reform of Ecuador limited work with NMCPs as their former ministry of health staff was replaced. Moreover, the emergence of competing diseases such as Zika throughout the region shifted the attention and resources away from malaria prevention and control efforts. Despite these circumstances, Links Media was able to successfully coordinate communication activities with six out of the eleven (6/11) AMI-supported countries. Throughout FY16, Links Media stayed focused on the original contract scope of work and remained consistent in communicating the purpose and goals of our work.

VI. Financials

Report on accrued expenditure will be submitted separately.

VII. Environmental Compliance

All activities under the contract fall within those covered by the categorical exclusion as per ETD LAC-IEE-11-60.

USAID
FROM THE AMERICAN PEOPLE

Annual Report FY 2015

AMAZON MALARIA INITIATIVE

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Cover photos: PAHO/WHO

AMAZON MALARIA INITIATIVE

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ACRONYMS AND ABBREVIATIONS

ACS	Community Health Agent
ACT	Artemisinin-based Combination Therapy
AMI	Amazon Malaria Initiative
ARCSA	Ecuador's National Medicines Regulatory Agency
ASAZGUA	National Sugar Cane Association
CDC	United States Centers for Disease Control and Prevention
CHAI	Clinton Health Access Initiative
CNCC	Peru's National Center for Quality Control
CQ	Chloroquine
EMMIE	Elimination of Malaria in Mesoamerica and the Island of Hispaniola
EQAP	External Quality Assurance Program
GFATM	The Global Fund to Fight AIDS, Tuberculosis and Malaria
HRP2	Histidine-rich Protein 2
HRP3	Histidine-rich Protein 3
ICEMR	International Centers of Excellence for Malaria Research
INS	Peru's National Institute of Health
IRS	Indoor Residual Spraying
ITN	Insecticide-treated Net
IVM	Integrated Vector Management
K13	Kelch 13
LAC	Latin America and the Caribbean
LLIN	Long-lasting Insecticidal Net
MDG	Millenium Development Goal
MEI	Malaria Elimination Initiative
MRA	Medicines Regulatory Authority

MOH	Ministry of Health
MSH	Management Sciences for Health
MSPS	Colombia's Ministry of Health and Social Protection
NMCP	National Malaria Control Program
OMCL	Official Medicine Control Laboratory
PAHO	Pan American Health Organization
PCR	Polymerase Chain Reaction
PfHRP2	*P. falciparum* Histidine-rich Protein 2
PMI	United States President's Malaria Initiative
PQ	Primaquine
PQM	Promoting the Quality of Medicines Program
PRAIS	Regional Platform on Access and Innovation for Health Technologies
PRS	Pharmaceutical Reference Standards
QA/QC	Quality Assurance/Quality Control
RAAN	North Atlantic Autonomous Region of Nicaragua
RAAS	South Atlantic Autonomous Region of Nicaragua
RAVREDA	Amazon Network for the Surveillance of Antimalarial Drug Resistance
RBM	Roll Back Malaria
RDT	Rapid Diagnostic Test
SBCC	Social and Behavior Change Communication
SIAPS	Systems for Improved Access to Pharmaceuticals and Services Program
SOD	Strategic Orientation Document
SOP	Standard Operating Procedure
TA	Training and Technical Assistance
USAID	United States Agency for International Development
USP	United States Pharmacopeial Convention
VCS	Vector Control Services
WHO	World Health Organization

EXECUTIVE SUMMARY

Photo: CIFOR

This Annual Progress Report covers Amazon Malaria Initiative activities completed from October 1, 2014 to February 28, 2016, which corresponds to all of Fiscal Year 2015 (FY 2015) and the first two quarters of Fiscal Year 2016 (FY 2016); and it is organized as follows:

1. Epidemiological Overview of Malaria in Latin America and the Caribbean (LAC)
2. Technical Areas of Intervention
3. Challenges and Opportunities

The Amazon Malaria Initiative (AMI) is a United States Agency for International Development (USAID) program, started in 2001 and for that reason the report provides context on the epidemiological trends in the Americas from 2000 to the present. AMI represents a collaborative effort between 11 countries' ministries of health (MOH) and implementing partners: Pan American Health Organization/World Health Organization (PAHO/WHO), the U.S. Centers for Disease Control and Prevention (CDC), Management Sciences for Health (MSH), the U.S. Pharmacopeial Convention (USP), and Links Media. This document functions as an overarching report that highlights AMI partners' contributions to improve malaria prevention and control in LAC from 2014–2016.

Implementing partners have provided training and technical assistance (TA) in the areas of efficacy of and resistance to antimalarials, diagnosis and treatment, quality assurance and control of pharmaceuticals and other supplies, vector control, epidemiological surveillance, networking, health systems strengthening, communication, advocacy, and information dissemination.

AMI's Strategic Objective is to assist malaria control programs in the Amazon basin and Central America to substantially incorporate selected best practices. AMI-supported countries in the LAC region during the reporting period included Belize, Brazil, Colombia, Ecuador, Guatemala, Guyana, Honduras, Nicaragua, Panama, Peru, and Suriname. AMI partners work to ensure that countries can effectively and efficiently address malaria through evidence-based activities, adoption and sharing of best practices, and collaboration through a regional network.

Six lines of work, or technical areas of intervention, have been carried out by AMI implementing partners, with cross-cutting support in communication focusing on advocacy, outreach, and dissemination of information. Principal highlights from FY 2015 to FY 2016 that are featured in this report include:

Monitoring of Efficacy and Resistance to Antimalarials, and Prevention of the Emergence of Resistance to Antimalarials

Under risk of decreased parasite sensitivity to artemisinin-based therapies, *in vivo* studies were conducted in Brazil, Guyana, and Suriname in order to monitor changes in parasite clearance rates. AMI partners also followed WHO guidelines in the application of *in vitro* and molecular surveillance techniques to study the efficacy of other first line treatments currently in use. No evidence of artemisinin resistance was found in the region, however a decline in parasite sensitivity to the drug was observed in Suriname. Regional evidence review meetings and consultations led to the development of a *Framework for Artemisinin Resistance Containment and Elimination in South America.* Teams of local health professionals gained training and developed their research capacities by conducting antimalarial resistance and efficacy monitoring with support from AMI and the Amazon Network for the Surveillance of Antimalarial Drug Resistance (RAVREDA), and these teams are now capable of conducting efficacy trials in malaria-endemic countries.

Access to Quality Diagnosis and Treatment

In the area of quality-assured malaria diagnosis, four rounds of a regional External Quality Assurance Program (EQAP) were carried out by the end of 2015 in order to develop and maintain national laboratory capacity for diagnosis via microscopy. A regional slide bank was established at the National Reference Laboratory in Honduras, which became available for lending to other countries in the region for microscopy trainings and refresher courses. Also, a multi-country survey of the prevalence of histidine-rich protein 2 (HRP2) gene deletion was supported in order to orient the procurement of accurate rapid diagnostic tests (RDTs) for malaria.

Regarding treatment, pharmaceutical programming and procurement criteria were developed to ensure maintenance of adequate antimalarial stock levels, including minimal strategic stock-levels in regions of endemic countries without active malaria transmission. PAHO/WHO also established a strategic warehouse in Panama that provided life-saving antimalarial treatments in case of urgent needs within the LAC region and beyond.

Quality Assurance and Control of Pharmaceuticals and Other Supplies for Malaria Prevention and Control

Countries expanded and institutionalized pharmaceutical quality control protocols such as the Three Level Approach, which helps to guarantee the continuous availability of quality-assured medicines for malaria. Workshops for improved South–South collaboration among LAC countries, as well as engagement of academia and the private sector, were held to augment national pharmaceutical quality assurance networks beyond Medicines Regulatory Authorities (MRAs) and Official Medicines Control Laboratories (OMCLs).

Vector Surveillance and Integrated Vector Management (IVM)

A regional assessment of entomological surveillance and control needs was completed, followed by the provision of TA on the development of national vector surveillance information systems in Brazil and Colombia. Countries performed data analysis with technical support from AMI partners, following country-level assessments of insecticide resistance monitoring and long-lasting insecticidal net (LLIN) efficacy and durability. National insecticide resistance management plans, such as one developed with Peru's National Institute of Health (INS), were designed with PAHO/WHO and CDC support.

Epidemiological Surveillance

Improvements were made to national health information systems, including case notification at the decentralized level in Brazil, Guatemala, and other countries. PAHO/WHO mobilized a team to assess Guyana's national malaria surveillance system. This on-the-ground assessment informed the development of a regional data validation tool to be used in other countries. In accordance with WHO guidelines, individual case investigation was enhanced in a variety of countries; this included the incorporation of molecular diagnosis techniques such as polymerase chain reaction (PCR) into routine surveillance activities in select countries pursuing malaria elimination.

Networking and Systems Strengthening

Annual AMI/RAVREDA evaluation and semi-annual Steering Committee meetings were held to share evidence and disseminate best practices among participating countries. Led by Brazil, epidemiological data sharing began amongst Guiana Shield countries with the purpose of addressing mobile populations in border regions. Panama

and Colombia, Honduras and Nicaragua, Peru and Brazil, and other pairs of countries coordinated surveillance and control activities along their shared borders. A regional antimalarial stock monitoring system was institutionalized, and transfers of antimalarial medicines among countries were made possible through facilitation by PAHO/WHO.

Since 2001, the use of the evidence base to make decisions about malaria policies and programs has become the norm across the region, and country-level capacity in technical areas supported through AMI has increased. This has largely been possible, thanks to an enhanced coordination and dissemination of operational research results. Further, in terms of coordination and systems strengthening, the design of national communication and advocacy strategies for malaria was completed in Brazil, Colombia, Ecuador, Guyana, Peru, and Suriname, and a regional communication strategy was also developed for the bloc of five Central American countries (Belize, Guatemala, Honduras, Nicaragua, Panama). Reactivation of Brazil's national-level education, communication, and social mobilization component for malaria occurred with AMI support in 2015, and the country officially joined with several others in the region in the pursuit of malaria elimination.

As of December 2015, after the region as a whole reached an estimated 67 percent reduction in morbidity compared to the year 2000 baseline, 14 countries in the LAC region had made a political commitment to eliminating malaria in the coming years.[1] Operational, technical, and financial factors will play a role in whether or not countries meet the WHO requirements to certify malaria elimination. Despite the region's substantial reductions in malaria cases, some countries (Guyana, Nicaragua, Panama, Peru and Venezuela) face challenges as they record an increase in the number of malaria cases. Nonetheless, the fact that the WHO's Global Malaria Program, the Bill and Melinda Gates Foundation, the Clinton Health Access Initiative (CHAI), and numerous countries have deemed malaria elimination in the Americas feasible is a testament to health system improvements in malaria surveillance and case management in the region.

Now that significant progress has been made to reduce local malaria transmission with improved access to diagnosis and treatment across large portions of the Americas, another of the remaining challenges is to extend the same consistent health services to key populations that experience heightened vulnerability to malaria. Key populations such as migrant workers and indigenous populations that experience higher incidence of malaria are not only socially marginalized, but also have significantly lower access to government health services in general.[2] In countries supported by AMI, the populations that are considered most vulnerable to malaria infection are itinerant miners, loggers, remote or mobile populations, pregnant women, and indigenous peoples, who are notoriously hard to reach. However, the stratified approach recommended in the WHO's *Global Technical Strategy* and the forthcoming *Strategy and Action Plan for Malaria in the Americas 2016–2020* indicate that new, targeted strategies will be needed to detect and treat new cases among these populations in order to meet the countries' ambitious elimination goals. AMI partners have begun to turn their attention to these key populations, but success depends on the strength of the region's health systems, the use of innovative approaches, and the assurance of long-term political commitment to end malaria in the Americas region.

1 WHO. December 2015. *World Malaria Report 2015*. URL: http://www.who.int/malaria/media/world-malaria-report-2015/en/

2 Global Fund to Fight AIDS, Tuberculosis and Malaria. *Key Populations Action Plan 2014–2017*. URL: http://www.theglobalfund.org/documents/publications/other/Publication_KeyPopulations_ActionPlan_en/

MALARIA IN LATIN AMERICA AND THE CARIBBEAN

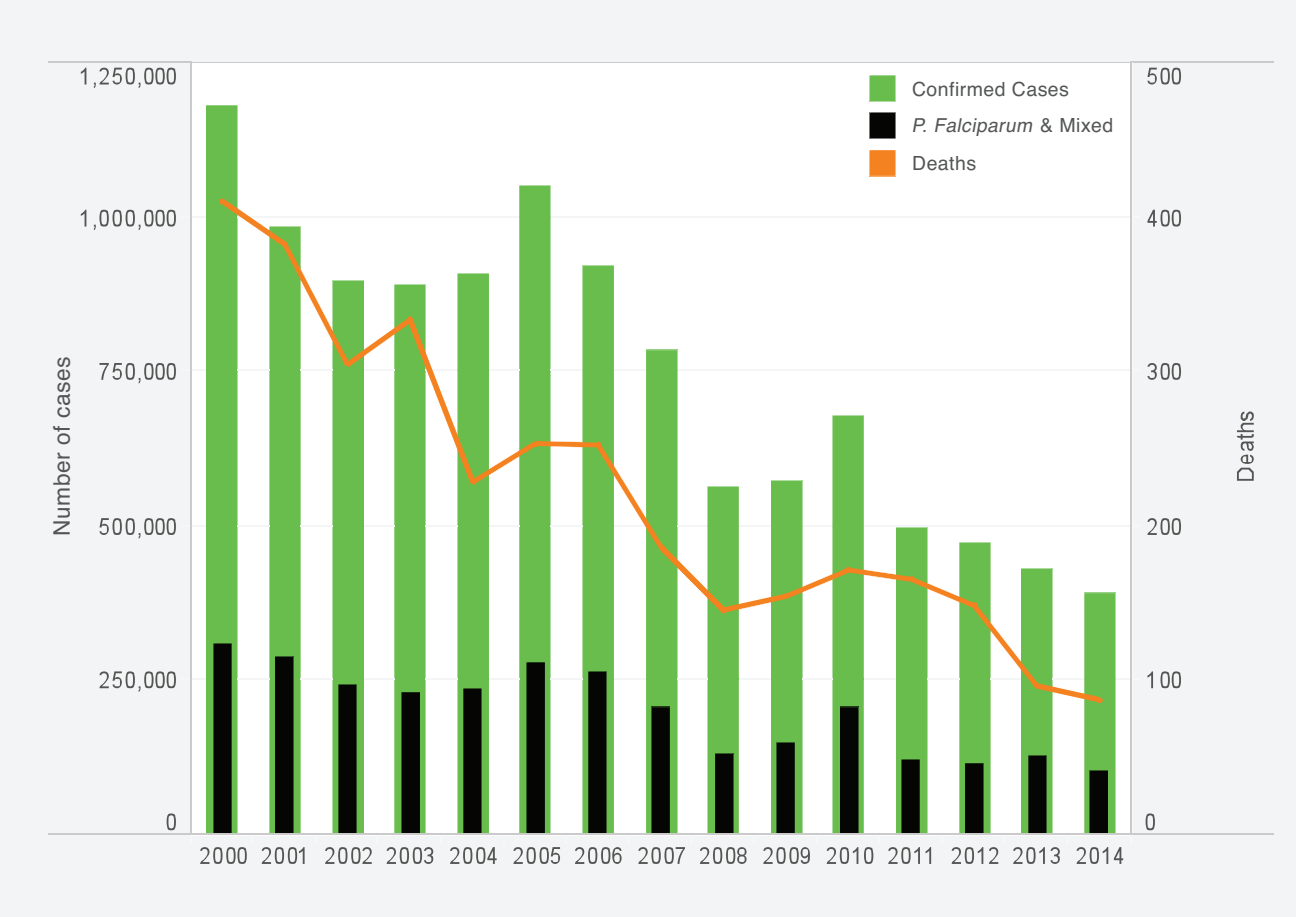
Chapter 1

Photo: PAHO/WHO

1.1 EPIDEMIOLOGICAL CONTEXT AND TRENDS

In 2014, malaria-endemic countries in the LAC region reported 390, 000 confirmed malaria cases, a 67 percent reduction in cases since 2000. *Plasmodium vivax* infections accounted for nearly 69 percent of cases in endemic countries, *Plasmodium falciparum* and mixed infections accounted for 24 percent, and the share of *Plasmodium malariae* infections was only 0.1 percent (present in Brazil, Colombia, Costa Rica, French Guiana, Guyana, Peru, and Venezuela). Countries also reported 87 malaria deaths, which represented a 79 percent reduction in mortality since 2000.[3] Nineteen out of 21 endemic countries in the region recorded lower numbers of annual malaria cases during the same period, and only Venezuela and Haiti saw increased cases.[4] Many countries in the LAC region are on track to achieve international targets: 14 of the 21 endemic countries have reached the United Nations 2015 Millennium Development Goal 6 (MDG 6) of reducing malaria incidence by at least 75 percent compared to the year 2000 baseline.

Figure 1. Declining Malaria Burden in the LAC Region

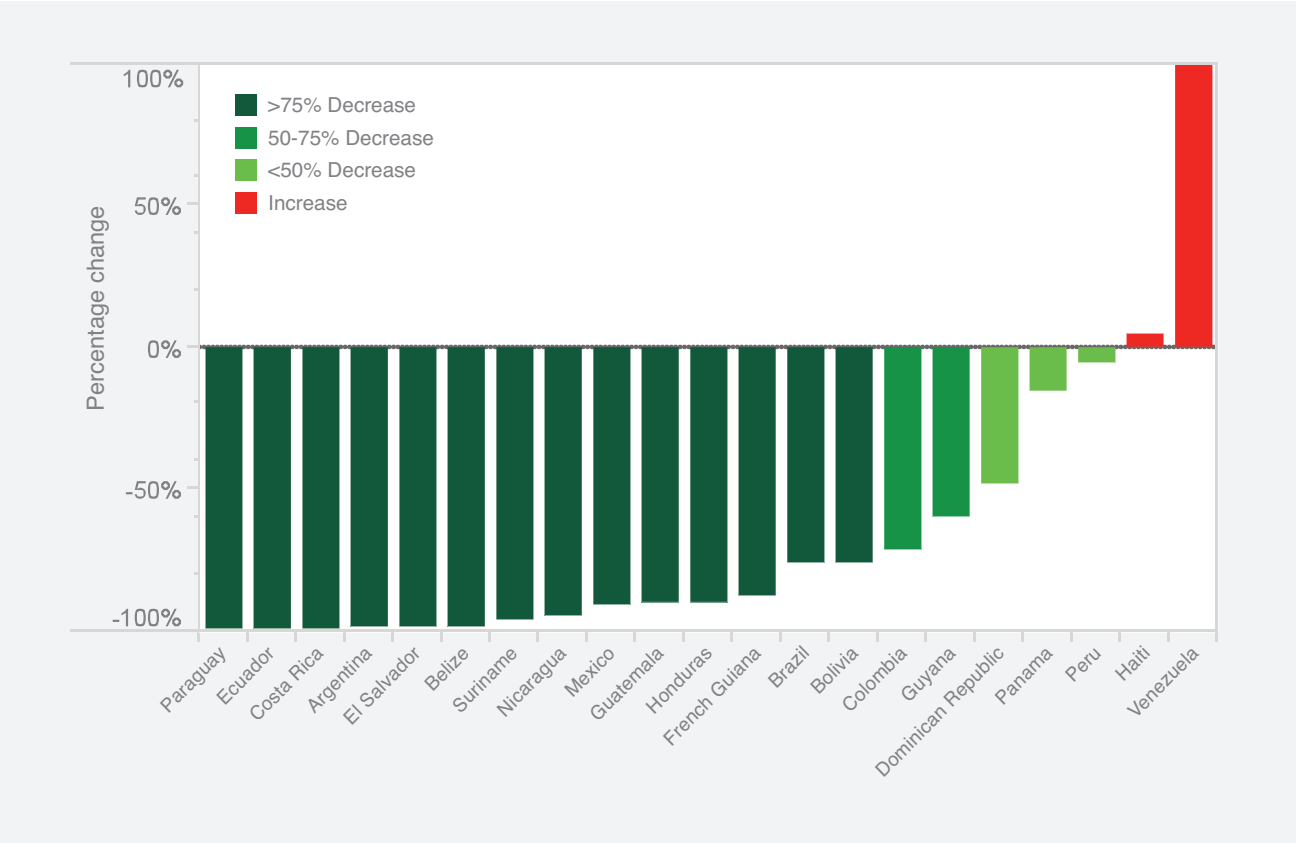


3 Ibid 1.

4 Ibid 1.

According to official country-level data reported to PAHO/WHO, Brazil remains the country with the most cases in the region, but had nearly 40 percent fewer cases in 2014 as compared to 2012. Bolivia, Mexico, Venezuela, Peru, and Panama were the only five countries that had an increase in malaria cases in 2014 compared to 2012; malaria has been increasing in Venezuela since 2009. In Peru, specifically in the Loreto Region, malaria nearly tripled between 2011 and 2014, with 60,566 reported cases in 2014.[5] Another 2,234 malaria cases imported from endemic countries were reported by 11 non-endemic countries in the LAC region in 2014. Argentina is pursuing malaria elimination and has formally requested that WHO commence the process to certify malaria elimination. Seven other countries are classified to be in the elimination and pre-elimination phase: Belize, Costa Rica, the Dominican Republic, El Salvador, Ecuador, Mexico, and Paraguay.

Figure 2. Decrease in Malaria Morbidity in LAC Countries, 2000–2014

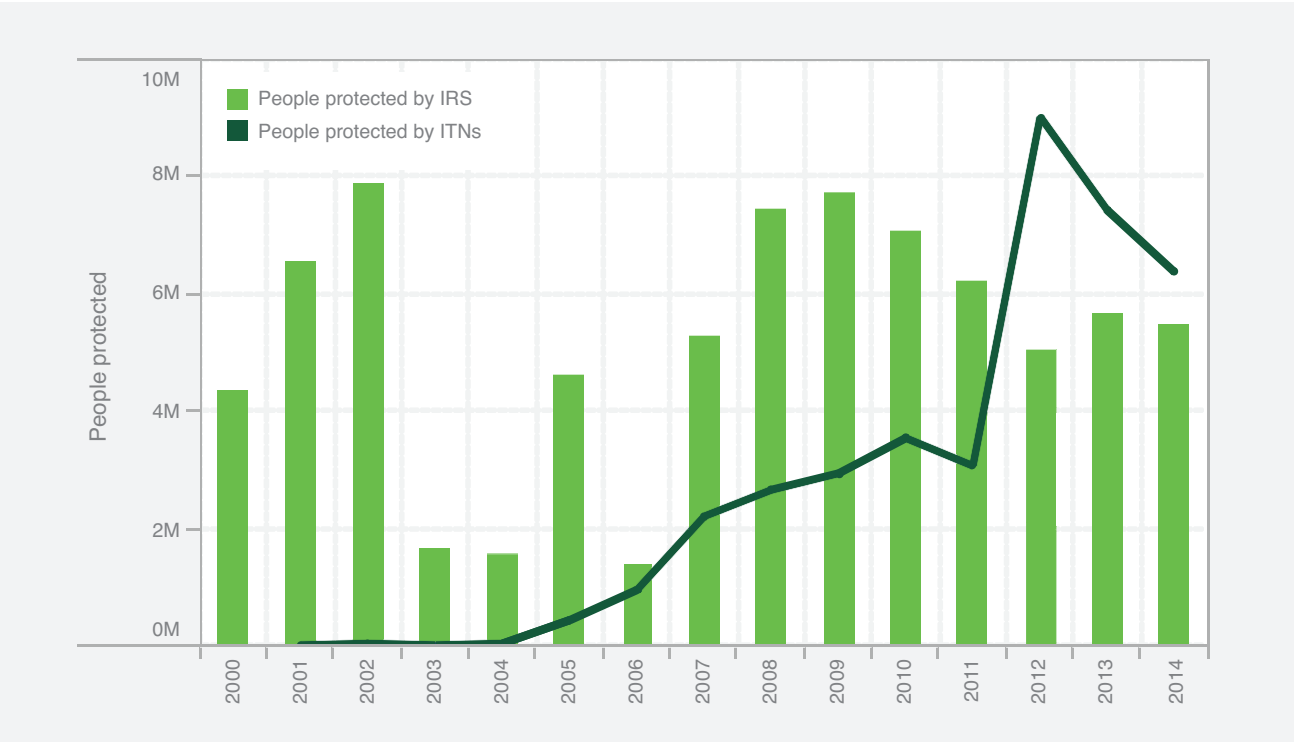


Laboratory confirmation of diagnosis and prompt treatment remain the focus of malaria control in the LAC region. Microscopy remains the standard for diagnosing malaria in the region, with some countries using RDTs in remote areas. In all LAC countries, chloroquine (CQ) and primaquine (PQ) are used as the first-line treatment for *P. vivax.* For *P. falciparum,* seven countries in Central America, in addition to the Dominican Republic, Haiti, and Mexico rely on CQ as the first-line of treatment for *P. falciparum,* as they have no known resistance to this medicine. However, in South America, 11 countries rely on an artemisinin-based combination therapy (ACT) as the first-line of treatment for *P. falciparum.* The ACTs used are combinations of artemether + lumefantrine or artesunate + mefloquine, formulated as a fixed dose combination in all countries except Peru, where implementation of a fixed dose combination is pending.

5 Peru's Ministry of Health. 2015. URL: http://www.dge.gob.pe/portal/docs/vigilancia/sala/2015/SE01/malaria.pdf

Countries use indoor residual spraying (IRS) of insecticide to kill the *Anopheles* mosquitoes that transmit malaria, but the share of the population that is protected by this measure varies from country to country. Compared to the previous year, in 2014 an increase was reported in the number of people protected by IRS in Colombia (519,000), Honduras (106,000), and Peru (107,000). IRS coverage decreased in Belize (21,000), Brazil (287,000), and Nicaragua (94,000). The number of people protected by insecticide-treated nets (ITNs) also varies from country to country. In 2014, a significant annual increase was reported in Brazil (884,000), Guyana (298,000), and Peru (68,000). A remarkable annual decrease in people protected by ITNs was reported in Colombia (741,000), Guatemala (994,000), and Suriname (6,000). In addition to a decrease in protection due to the normal wear and tear of ITNs, several countries did not distribute ITNs from 2011–2014.[6]

Figure 3. IRS and LLIN/ITN Coverage



Total financing available for malaria declined in 2014, including a decrease in external funding to the LAC region. Decentralization and shifts in funding at the national level have contributed to this, as have the emergence of competing priorities such as Dengue and Chikungunya. In addition, government budgets for malaria decreased in seven countries. This may reflect the success experienced as a result of malaria control efforts in the region, which is now composed of areas of moderate-to-low or low malaria transmission, as well as areas with no transmission but that remain at risk. Meanwhile, AMI partners are concerned with localized re-emergence (an increase in the number of cases as compared to previous years) and/or re-establishment of malaria transmission (cases begin to occur after a period with no cases). The observed rise in cases in countries such as Venezuela, Panama and Peru may pose a threat to neighboring countries due to population migration. Country programs will need to adapt and employ appropriate measures in response to the changing epidemiology of the disease in the region, especially as more countries transition towards elimination. Country-led efforts including the maintenance of quality of surveillance systems, along with the smooth transition from vertical to horizontal and top-down to decentralized malaria programs, will be vital to sustain the progress and avoid setbacks in the coming years.

6 PAHO-USAID AWARD NO. 627-A-12-00006. 2016. Final Report. *Amazon Malaria Initiative (AMI) and South American Infectious Diseases Initiatives (SAIDI) Components of the South America Regional Infectious Diseases Program (SARI).*

1.2 AMAZON MALARIA INITIATIVE

USAID launched AMI in 2001 to improve the prevention and control of malaria in partner nations of the Amazon basin. The initiative's mission is to: (1) ensure that national malaria control programs (NMCPs) in the Amazon basin and selected Central American countries substantially incorporate best practices, and (2) promote evidence-based policy changes in the partner countries. From inception, AMI has maintained a comprehensive view of malaria prevention and control. Its initial focus was to build the evidence base to support the introduction of ACTs for *P. falciparum* malaria in all Amazon basin countries, and to improve access to and quality of malaria diagnosis. As progress was made in introducing ACTs, areas such as epidemiological surveillance, vector control, and systems strengthening received further attention.

Map 1. AMI Partner Countries

USAID established AMI as a collaborative partnership among organizations (the AMI implementing partners) that provide technical and scientific expertise and collaborate with the countries' MOHs and NMCPs grouped in the RAVREDA network to proactively address malaria prevention and control in a sustainable manner. Partner countries also collaborate with one another and maintain an ongoing exchange of information and expertise through South–South cooperation promoted and supported by AMI. Countries supported by AMI in FY 2015 included Belize, Brazil, Colombia, Ecuador, Guatemala, Guyana, Honduras, Nicaragua, Panama, Peru, and Suriname.

Countries optimize their approaches through shared TA provided by AMI implementing partners, through the development of standardized guidelines and research protocols allowing the comparability of research and monitoring results within and across countries, and through the development of coordinated approaches to address shared problems.

Six technical areas of intervention are carried out by AMI implementing partners, with transversal support in communication focusing on advocacy, outreach, and information dissemination:

1. Monitoring of efficacy and resistance to antimalarials, and prevention of the emergence of resistance to antimalarials;
2. Access to quality diagnosis and treatment;
3. Quality assurance and control of pharmaceuticals and other supplies for malaria prevention and control;
4. Vector surveillance and IVM;
5. Epidemiological surveillance; and,
6. Networking and systems strengthening.

With a regional five-year strategy and plan of action as their guide, countries coordinate work plans and budgets for priority activities. Through South–South collaboration within the LAC region, AMI-supported countries share best practices, learn from other country experiences in the region, leverage technical and financial resources for TA, and are better able to coordinate their malaria control programs with their neighbors.

Through TA from implementing partners, AMI seeks to ensure that NMCPs adaptively respond to the local malaria context with differentiated strategies for moderate and low-transmission areas, as well as for key populations at greater risk of malaria infection due to remoteness, population mobility, or social marginalization. Additionally, AMI helps to coordinate technical interventions to monitor medicine efficacy and to prepare to respond to the emergence of antimalarial resistance, particularly artemisinin derivatives. Participating countries receive support to address the risk of malaria reemergence and reintroduction. All in all, countries benefit from AMI/RAVREDA by strengthening their capacity to select, implement, monitor, and evaluate malaria prevention and control interventions in a sustained manner.

Considering that AMI represented an investment of only $3.5 million from USAID in FY 2015, AMI/RAVREDA has resulted in a cost-effective, coordinated regional approach to malaria prevention and control. Strategic coordination and integration of implementing partners through the AMI Steering Committee have led to a far greater impact than the project budget would suggest, informing the decisions made around significant national-level budgets and leveraging funds from international donors in LAC.

Monitoring AMI's Progress

AMI's Strategic Objective is to assist malaria control programs in the Amazon basin and Central America to substantially incorporate selected best practices. AMI partners work to ensure that countries can effectively and efficiently address malaria through evidence-based activities, adoption and sharing of best practices, and collaboration through a regional network.

Primary impact indicators are: (1) the number of confirmed malaria cases in each country, and (2) the number of malaria deaths each year. Progress since 2001 is detailed below, in Table 1.

Table 1. Changes in Malaria Morbidity and Mortality in AMI Partner Countries[7]

Country	Confirmed Cases			Deaths		
	2001	2014	Change %	2001	2014	Change %
Belize	1,162	19	-98.36%	0	0	0.00%
Brazil	388,303	143,145	-63.13%	142	36	-74.64%
Colombia	231,233	40,768	-82.36%	58	17	-70.68%
Ecuador	108,903	241	-99.77%	16	1	-93.75%
Guatemala	35,824	4,931	-86.23%	0	1	100.00%
Guyana	27,122	12,353	-54.45%	30	11	-63.33%
Honduras	24,149	3,380	-86.00%	0	2	200.00%
Nicaragua	10,482	1,163	-88.90%	2	0	-200.00%
Panama	928	874	-5.81%	1	0	-100.00%
Peru	78,544	64,676	-17.65%	25	3	-88.00%
Suriname	16,003	401	-97.49%	23	0	-100.00%
Totals	**922,653**	**271,951**	**-70.52%**	**297**	**71**	**-76.09%**

*All countries started receiving AMI support in 2002, with the exception of Belize, Guatemala, Honduras, Nicaragua, and Panama, which began receiving AMI support in late 2007.

Between 2001 and 2014, malaria morbidity decreased by 71 percent overall in AMI-supported countries, and mortality decreased by 76 percent. Nonetheless, progress has not been evenly spread across all countries. For instance, annual malaria cases in Peru have increased steadily since reaching their lowest point in 2011, reaching 64,676 confirmed malaria cases in 2014, which amounts to a decrease of only 5 percent since the year 2000. Although malaria-related deaths fell by 80 percent from 2000 to 2014, Peru is no longer on track to meet the MDG 6 targets for malaria morbidity.

The Initiative's intermediate results (IRs) are:

IR 1 — Evidence base for malaria prevention and control increased

IR 2 — Evidence base for malaria prevention and control communicated and used

IR 3 — More inclusive and better informed policy process promoted for malaria prevention and control

In terms of expected results, AMI has sought to achieve: (1) more reliable and standardized surveillance information on malaria drug resistance and vector control used to monitor trends and more effectively target disease control efforts; (2) laboratory diagnosis of malaria improved; and (3) tools and approaches developed, adapted, tested in local settings, and disseminated.

For performance management purposes, each technical and country partner has a unique set of objectives, milestones, outcomes, and indicators related to progress made in the program's six technical areas. PAHO/WHO's reported outcomes and indicators for each line of work follow below.

- **Proportion of Amazon countries that have an updated, evidence-based strategy for monitoring the efficacy of and resistance to antimalarials that consider different epidemiological situations**
  Baseline: 11/11
  Final: 11/11

7 Ibid 6.

- **Proportion of AMI countries on track to achieving reduction of malaria morbidity by 75%, as compared to the baseline year 2000**
  Baseline: 10/11
  Final: 9/11

- **Proportion of AMI countries that adopt and implement strategies for maintaining capacities to diagnose and treat malaria, considering different epidemiological scenarios**
  Baseline: 11/11
  Final: 11/11

- **Proportion of AMI countries that adopt and implement a strategy to assure and control quality of antimalarials, considering different epidemiological scenarios**
  Baseline: 11/11
  Final: 11/11

- **Proportion of AMI countries that adopt and implement a vector surveillance strategy to ensure availability of malaria vector information, considering different epidemiological scenarios**
  Baseline: 10/11
  Final: 11/11

- **Proportion of AMI countries that adopt and implement a vector surveillance strategy to ensure availability of malaria vector information, considering different epidemiological scenarios**
  Baseline: 10/11
  Final: 11/11

- **Proportion of AMI countries that adopt and implement a vector control strategy based on IVM, considering different epidemiological scenarios**
  Baseline: 8/11
  Final: 10/11

- **Proportion of countries that adopt and implement an epidemiological surveillance strategy to ensure availability of malaria epidemiological surveillance information and its integration or articulation with vector surveillance and control and monitoring and evaluation of other malaria control activities considering different epidemiological scenarios**
  Baseline: 11/11
  Final: 11/11

- **Proportion of countries that report malaria based on individual records (data disaggregated by sex, age, ethnicity, and other variables that facilitate appropriate analysis)**
  Baseline: 11/11
  Final: 11/11

- **RAVREDA countries promote and support activities through national financing**
  Baseline: 11/11
  Final: 11/11

- **RAVREDA countries adopt and support implementation of tools (e.g. communication and others) for strengthening effective and efficient malaria prevention and control activities in the Amazon region and Central America**
  Baseline: 11/11
  Final: 11/11

- **Countries adopt and implement plans for improving national malaria control program's effectiveness and efficiency in a decentralized health sector**
  Baseline: 11/11
  Final: 11/11

Photo: PAHO/WHO

1.3 OTHER REGIONAL INITIATIVES

AMI/RAVREDA seeks to improve stakeholder coordination in the region and avoid duplication of efforts in order to make a complementary contribution to the shared goal of reducing morbidity and mortality due to malaria. Independent country activities are coordinated through PAHO and RAVREDA. Regionally, AMI has championed the implementation of PAHO's *Strategy and Plan of Action for Malaria in the Americas for 2011–2015,*[8] and during the first quarter of FY 2016 USAID provided support for the development of a forthcoming *Strategy and Plan of Action for Malaria 2016–2020.* The new strategy will focus on characteristics unique to the evolving malaria context in the Americas, in alignment with the WHO's *Global Malaria Technical Strategy (GTS)* and *Action and Investment to Defeat Malaria (AIM) 2016–2030.*

Besides national budgets, the Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM) is one of the largest external funding sources in the region. In 2013, GFATM committed $10.2 million to the regional Malaria Elimination Initiative for Central America and Hispaniola (EMMIE) using a cash-on-delivery approach to catalyze progress towards malaria elimination. Ten MOHs in the Central America sub-region, the Dominican Republic, and Haiti, together with bilateral and multilateral agencies, research centers, and other partners, embarked on an effort to achieve no local transmission of malaria by 2020 and seek certification of malaria elimination by 2025. Among the 11 countries that are supported by AMI, during the 2015 and 2016 fiscal years, GFATM provided country-specific malaria grants in Guatemala, Honduras, Nicaragua, Suriname, and Guyana.

GFATM has shared information, tools, and approaches generated with support from AMI implementing partners in the preparation and execution of their GFATM projects. AMI/RAVREDA has provided technical advising to NMCPs to promote national institutionalization of these approaches and sustainability of gains achieved through GFATM support.

A Regional Coordinating Mechanism (MCR, by its Spanish acronym) for Central America and Hispaniola, which is formally responsible for integrating technical efforts for the implementation of EMMIE, supported the creation of a Regional Civil Society League for Malaria in February 2015. The Regional Civil Society League aims to support advocacy, improved collaboration, increased outreach to remote communities where transmission persists, enlistment of behavior change expertise, and mobilization of additional resources to increase and sustain the activities for prevention and elimination of malaria. AMI partner Links Media joined the league in the fourth quarter of FY 2015 in order to collaborate with the league's partners and members.

8 PAHO. 2011. 51st Directing Council - 63rd Session of the Regional Committee. *Strategy and Plan of Action for Malaria.* URL: http://www.paho.org/hq/index.php?option=com_docman&task=doc_view&gid=15005&Itemid

Table 2. Other Organizations and Initiatives Active in Malaria Control or Elimination in the Americas Region

Malaria Zero – The Alliance for a Malaria-Free Haiti

Malaria Zero is an alliance of partners that have united to eliminate local transmission of malaria on the island of Hispaniola by 2020. The consortium was launched in February 2015, with a $29.9 million grant from the Bill & Melinda Gates Foundation. During FY 2015, as part of an effort to help AMI coordinate with other initiatives in the region, PAHO/WHO collaborated with USAID, the CDC, and Links Media to develop a malaria elimination training curriculum to assist Haiti's National NMCP reorient and move beyond routine control activities.

Clinton Health Access Initiative (CHAI)

CHAI works in partnership with governments to help strengthen malaria programs, reduce the burden of disease, and accelerate progress toward sustainable malaria elimination. As of 2014, CHAI has been working to develop multi-sectoral partnerships in Guatemala, Honduras, Panama, Costa Rica, and Hispaniola. CHAI is currently exploring possible collaboration with private corporations, such as cell phone companies, agribusiness in Guatemala and Honduras, and the beverage industry in Haiti. In Guatemala, CHAI forged a relationship between the malaria program and the National Sugar Cane Association (ASAZGUA, by its Spanish acronym). This partnership led to ASAZGUA's participation in the National Strategic Plan for Malaria Elimination 2015-2020 consultation held in October 2014. Additional activities are in development.

Mesoamerican Initiative on Malaria in Vulnerable Populations

The Mesoamerican Initiative works to improve malaria control with the goal of elimination in the following countries: Belize, Colombia, Costa Rica, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, and the Dominican Republic. Its purpose is to guide the countries of the sub-region towards pre-elimination and subsequent elimination of the disease, giving special consideration to vulnerable populations (defined as indigenous, Afro-descendant, mobile populations, plantation workers, and day laborers, among others).

UCSF Global Health Group's Malaria Elimination Initiative (MEI)

The University of California San Francisco (UCSF)'s MEI works with partner organizations at the global, regional, and national levels to develop new tools and advocate for greater attention and international support for malaria-eliminating countries.

International Centers of Excellence for Malaria Research (ICEMR)

In 2010, the U.S. National Institutes of Health established ICEMR in seven major geographic regions where malaria is endemic. Latin America has two ICEMRs, the Latin American Center for Malaria Research and Control (Guatemala, Panama, Colombia, and Peru) and the Peruvian/Brazilian Amazon Center of Excellence in Malaria (Peru and Brazil). AMI's coordination with the Latin American Center for Malaria Research and Control aims to strengthen operational research and further contribute to malaria elimination in the region.

Naval Medical Research Unit 6 (NAMRU-6)

The US NAMRU-6 conducts surveillance and research on malaria and other infectious diseases that are of military or public health significance in the region. AMI implementing partners have worked with NAMRU-6 on the publication and dissemination of research findings on molecular epidemiology in Peru.

TECHNICAL AREAS

Chapter 2

Photo: Jorge Escobedo/Peru's MOH

2.1 DIAGNOSIS

Laboratory diagnosis of malaria through microscopy remains the regional standard for confirming malaria cases. One of AMI's priorities has been to strengthen and maintain the existing network for microscopic diagnosis that exists in LAC and improve laboratory diagnosis in *all* epidemiological settings. PAHO/WHO and other partners have evaluated the quality of malaria supplies including rapid diagnostic testing products and materials used for the preparation of blood slides. AMI has also worked with countries to maintain proper distribution and good storage practices in order to uphold the quality of supplies for malaria. From October 2014 to February 2016, AMI partners strengthened and expanded the region's diagnostic capacity related to malaria and introduced RDTs in Honduras and Guyana in order to meet the need for prompt diagnosis in hard-to-reach areas where microscopy has been unavailable. By and large, AMI has made significant contributions to improving the ability of health systems to guarantee that populations have access to early, quality malaria diagnosis, no matter the epidemiological context. During FY 2015 alone, USAID support through AMI enabled the training of 599 people on malaria diagnosis, including 342 female and 257 male training participants.

Microscopy Diagnosis

With decreasing malaria cases, countries need to prioritize the quality of diagnosis in order to detect each and every case. Maintaining high performance standards for microscopists helps to ensure accurate malaria surveillance and evidence-based control measures. With malaria cases becoming less frequent in many countries, laboratory staff have fewer opportunities to practice their microscopy skills for reading thick blood slides and thin film. The NMCP in Peru addressed this challenge in FY 2015 by developing the diagnostic capacity of an additional 33 microscopists to perform malaria diagnosis. Brazil's NMCP has also been working to maintain the capacity of its 4,900 microscopists in all areas of the country who collectively carry out two million malaria tests each year.[9]

Peru and Honduras' national laboratories lead the way in maintaining the existing network of national laboratory facilities in the LAC region. The laboratories participate in the global external evaluation for malaria diagnosis that is coordinated by the WHO regional office for Africa (EQAP/WHO/AFRO). Honduras' national laboratory took on the task of creating a regional slide bank with 1,066 sample slides of *P. falciparum* and *P. vivax* malaria by the end of FY 2015. All samples were tested using PCR prior to their inclusion in the slide bank, following standard operating procedures (SOPs) adapted from WHO's South East Asia Regional Office (WHO/SEARO) and with assistance from PAHO. Other malaria-endemic and non-endemic countries in the region will be able to borrow panels from Honduras' slide bank to sustain their national diagnostic capacity for malaria through trainings and periodic evaluations following quality assurance procedures.

In 2011, PAHO's Regional Malaria Program established an EQAP to improve the quality of malaria diagnosis across countries. The evaluation program serves to standardize microscopy processes and protocols regionally. The National Malaria Reference Laboratories of Honduras and Peru, in their role as supranational reference laboratories, prepare standardized panels of slides for distribution to participating laboratories in other countries.

9 Santelli, Ana Carolina Faria e Silva. 2015. Avanços e Desafios: Controle de Malária no Brasil. Apresentação à XIV Reunião Anual de Avaliação da AMI/RAVREDA em 24 de março de 2015. Rio de Janeiro, Brasil: Coordenação Geral do Programa Nacional de Controle da Malária DEVIT/SVS/Ministério da Saúde – Brasil.

Four rounds of evaluation were undertaken from 2011 to 2015, with 21 national reference laboratories from 20 different LAC countries participating in the fourth round during FY 2015.

From May 11–22, 2015, PAHO carried out a second regional training workshop and certification of South American microscopists, following on the first such workshop that had been conducted with laboratory staff from Central American and Caribbean countries in 2014. Facilitators from PAHO, along trainers from Mexico, Honduras, and Peru strengthened the regional capacity for malaria microscopy diagnosis by certifying 19 staff from Bolivia, Brazil, Chile, Colombia, Ecuador, Paraguay, Suriname, and Venezuela in diagnostic techniques. The training was tailor-made to address knowledge and skill gaps specific to the South American countries. Participants were trained in the theoretical processes and practical skills needed for microscopy diagnosis and quality assurance, in accordance with PAHO/WHO guidelines to strengthen diagnostic quality assurance/quality control (QA/QC) for malaria. Although Mexico does not receive support from AMI, the Mexico's MOH played a key role in collaborating with the PAHO/Mexico office to make the 2015 regional microscopy workshop a reality.

In order to disseminate conclusions about the quality of malaria microscopy diagnosis in the region, PAHO presented a poster with the EQAP results at the 64th American Society of Tropical Medicine and Hygiene (ASTMH) Annual Meeting from October 25–29, 2015.[10] Compared with previous rounds, microscopy performance in 2015 showed a satisfactory improvement and achievement of a high concordance percentage for diagnosis and parasite morphology. However, parasite density estimation and species identification still needed reinforcement. Given different treatment regimens for *P. falciparum* and *P. vivax* throughout the Americas, AMI partners have recommended that countries focus on species identification and parasite density estimation in order to move towards malaria elimination.

A further expansion of the EQAP in its role of strengthening diagnosis quality assurance processes in the region is likely, given that French Guiana and Puerto Rico have requested to be involved in the upcoming fifth round. Whereas the 2015 workshop for 23 participants from nine South American countries was hosted at Mexico's Institute of Epidemiological Diagnosis and Reference (InDRE), EQAP exemplifies the sort of sustainable regional collaboration that AMI/RAVREDA fosters.

Rapid Diagnostic Tests

RDTs for malaria can be important point-of-care tools because they are simple to use and easy to transport. RDTs are recommended in special circumstances in the LAC region. Following PAHO/WHO and CDC guidelines, RDTs are only used in AMI-supported countries when laboratory diagnosis with microscopy is not possible, such for diagnosing malaria in remote, indigenous, and mobile or migrant populations.

Remote and mobile populations are an important source of new malaria infections in many LAC countries. For example, Honduras' difficult to reach malaria-endemic region of La Mosquitia shares a border with Nicaragua, where the predominantly Miskito indigenous population moves between the two countries on a daily basis, making it difficult to provide timely microscopy diagnosis. For that reason, in FY 2015 Honduras' NMCP launched RDT use by community health workers in La Mosquitia. With PAHO/WHO and Links Media's support, Guyana's NMCP also began an RDT field validation to test the clinical sensitivity and prepare for the use of RDTs with mobile populations in Region 8 during the first quarter of FY 2016. During the RDT launch that

10 Results are available at: http://www.paho.org/hq/index.php?option=com_topics&view=readall&cid=5525&Itemid=40757&lang=en

began in November 2015, PAHO/WHO also provided training on the preparation of thick smear blood slides to confirm the results of each RDT administered, through microscopy. In preparation for RDT selection, MOHs such as that of Guyana have obtained updated evaluations of RDT cost, sensitivity, and specificity through PAHO/WHO.

Rather than detecting malaria parasites, RDTs work by detecting specific antigens derived from parasites, whether HRP2, lactate dehydrogenase (pLDH), or aldolase enzyme. The majority of commercial RDTs used in the region are based on the detection of *P. falciparum* histidine-rich protein 2 (PfHRP2), but as researchers from Peru reported in 2010 that the deletion of the gene encoding HRP2 was frequent among natural *P. falciparum* parasite populations can lead to false negative test results,[11] several countries undertook molecular analysis to survey the deletion of HRP2 and histidine-rich protein 3 (HRP3) genes in parasites collected in six South American countries between 2009 and 2012, with AMI support (see Table 3 with current "cumulative" data on HRP2 and HRP3[12] deletion per country). Five countries found evidence of HRP2 gene deletion in *P. falciparum* isolates. Preliminary results showed gene deletion in Peru, Brazil, Bolivia, Colombia, and Suriname. Gene deletion was frequent in various parts of Peru, while it was found in high proportions only in some regions of Brazil and Colombia. Guyana was the only country assessed that did not show deletion of HRP2 and HRP3.

11 Gamboa D, Ho M-F, Bendezu J et al. 2010. A Large Proportion of *P. falciparum* Isolates in the Amazon Region of Peru Lack *pfhrp2* and *pfhrp3*: Implications for Malaria Rapid Diagnostic Tests. *PLoS ONE*. 5(1): e8091.

12 XII AMI/RAVREDA Meeting Report, Lima, Peru, April 9–12, 2013

Photo: PAHO/WHO

Table 3: Current Data on HRP2 and HRP3 Gene Deletion per Country

Country	HRP2 deletion (%)	HRP3 deletion (%)
Brazil	27/198 (13.6)[13]	71/198 (35.8)[13]
Colombia	18/100 (18)[14]	52/100 (52)[14]
Guyana	0/97 (0)[15]	0/97 (0)[15]
Honduras	0/68 (0)[16]	50/68 (73.5)[16]
Peru	31/93 (33.3%)[17]	50/93 (53.8)[17]
Suriname	11/78 (14)[18]	3/78 (4)[18]

*Numbers collected from a variety of technical studies.

The results of the AMI supported regional assessment of the frequency of HRP2 and HRP3 deletion, has allowed for the publication of several articles in scientific journals in 2015.

Guyana and Suriname's NMCPs, working in conjunction with local scientists and researchers from the CDC's Malaria Branch, published in the May 2015 issue of *PLOS ONE:* "Variation in PfHRP2 and PfHRP3 Gene Deletions in Guyana and Suriname." In this article, authors reported no PfHRP2 or PfHRP3 deletion was found in Guyana or among samples collected in Suriname between 2009 and 2010, but that PfHRP2 was detected in samples collected in Suriname in 2011. The latter provides additional basis to implement the monitoring of the prevalence of HRP2 gene deletion at regular intervals.

Honduras' NMCP, in collaboration with CDC, PAHO/WHO, and local researchers, published an article on the "Prevalence of PfHRP2 and PfHRP3 gene deletions in Puerto Lempira, Honduras" in *Malaria Journal* in January 2015. Findings showed that no PfHRP2 gene deletion existed in samples collected during 2008–2009. Nevertheless, considering its frequent deletion reported elsewhere in the Amazon region, the authors considered useful to monitor for it.

National laboratory personnel in LAC countries have benefited from CDC training on the use of molecular analysis techniques and the CDC's validation of country-level analyses. Numerous countries have the technical capacity to carry out molecular analysis in national laboratories, as was the case in Brazil, Honduras, and Suriname. However, increased logistical planning and dedication of national resources to collect and store parasite samples at regular intervals will be necessary in order for molecular analysis to become more widely used. NMCPs are responsible for ensuring that parasite samples are collected regularly.

13 Udhayakumar V. 2014. Revised Protocol and Follow-up Actions to Monitor the HRP2 Gene Deletion in the Region. Presentation. Managua, Nicaragua.

14 Murillo, SC et al. 2015. Deletion of *Plasmodium falciparum* Histidine-Rich Protein 2 (pfhrp2) and Histidine-Rich Protein 3 (pfhrp3) Genes in Colombian Parasites. *PLoS ONE.* 2015 Jul 7;10(7):e0131576.

15 Akinyi Okoth, S et al. 2015. Variation in *Plasmodium falciparum* Histidine-Rich Protein 2 (Pfhrp2) and *Plasmodium falciparum* Histidine-Rich Protein 3 (Pfhrp3) Gene Deletions in Guyana and Suriname. *PLoS ONE.* 10(5).

16 Abdallah, JF et al. 2015. Prevalence of pfhrp2 and pfhrp3 gene deletions in Puerto Lempira, Honduras. *Malaria Journal.* 14(19).

17 Akinyi, S et al. 2013. Multiple Genetic Origins of Histidine-Rich Protein 2 Gene Deletion in *Plasmodium falciparum* Parasites from Peru. *Scientific Reports.* Sep 30;3:2797.

18 Ibid 15.

Molecular Surveillance and Case Investigation in Malaria Elimination/Post-Elimination Scenarios

Molecular markers can help to tell a more detailed story about how malaria outbreaks occur. They are useful for targeting responses to outbreaks, and they become essential in elimination and post-elimination scenarios. The level of precision achieved by diagnosing cases with molecular methods such as PCR exceeds that of traditional epidemiological methods; the tests are much more sensitive to parasite presence in the blood. Molecular tools such as microsatellites and genetic sequencing make it possible to distinguish between re-infections and relapses of *P. vivax* malaria in patients, which is important given that *P. vivax* accounts for the majority of malaria infections in LAC countries.

NMCPs can use molecular amplification methods for mass blood surveys aimed at mapping the prevalence of malaria, including submicroscopic infections, as well as to increase the power of surveys in low-transmission contexts. Some evidence shows that detecting and targeting asymptomatic malaria infections may be key to eliminating the disease from a defined geographic area. Rapid, accurate detection and treatment of infected individuals can prevent outbreaks from spreading and can help avoid the re-establishment of malaria in areas that have achieved zero incidence.

Introducing Innovative Diagnostic Tools based on Molecular Methods

Improved technologies for conducting PCR include Loop-Mediated Isothermal Amplification (also known as the LAMP method) and the RealAmp kit that has been developed by the CDC as a portable and simple-to-use piece of field equipment. From 2014–2015, the Brazil's MOH and the Evandro Chagas Institute began validating RealAmp with training and supervision from the CDC. One thousand samples were collected from patients presenting with febrile illness by the end of 2015. RealAmp has been used for the laboratory processing of the samples in Brazil's Acre and Pará states. The CDC will provide quality control testing.

Highlights

- Honduras created a malaria slide bank for use in microscopy trainings and research across the region.
- South American countries received training in proper malaria diagnosis and quality assurance processes in Mexico.
- Peru reinforced microscopists' capacity to perform malaria diagnosis in all areas of the country, with special emphasis on the Loreto Region where disease incidence is highest.
- Researchers from AMI supported countries and CDC published articles based on information produced through a regional survey of the prevalence of PfHRP2/HRP3 gene deletion in malaria parasite populations in the Americas.
- Countries received PAHO/WHO technical support on the selection and use of RDTs for malaria, according to data provided by WHO reports on RDT performance.
- Honduras implemented and evaluated RDTs in the remote, malaria-endemic area of La Mosquitia.
- Guyana prepared for the roll-out of RDTs in Region 8, in order to extend diagnostic capacity to areas where microscopy is not available.

Implementation Challenges

The laboratory networks at the national and supranational levels need to be preserved in the LAC region in order to ensure capacity strengthening, quality assurance, and access to quality microscopy and RDT diagnosis. What is more, the maintenance of laboratory networks supports LAC countries' ability to conduct routine surveillance, monitor antimalarial efficacy, track antimalarial resistance, and build knowledge on parasite ecology. Unfortunately, after the conclusion of a successful five-year GFATM project in Colombia in 2015, laboratory capacity at the sub-national level began to decline in at least one malaria-endemic department. As a result, the country's ability to detect and treat all malaria cases may have been compromised. Colombia will need to do more to further institutionalize quality-assured diagnosis using microscopy at the decentralized level; the Colombia's Ministry of Health and Social Protection (MSPS, by its Spanish acronym) requires the buy-in of governors and mayors to ensure that malaria diagnostic capacity is made a priority within local health structures.

The need to maintain the capacity to diagnose and manage malaria cases in those territories with very low to no incidence remains as surveillance systems rely on case detection and treatment in order to respond rapidly to malaria re-emergence or re-introduction. Moving forward, innovative strategies need to be devised and implemented to ensure diagnostic capacity in these areas. Unfortunately, securing the resources needed to refresh or to strengthen microscopists' skills for malaria diagnosis has been difficult in light of competing health priorities such as outbreaks of Dengue, Chikungunya, and Zika.

Delivering primary health care to dispersed and /or remote populations is an ongoing challenge in the LAC region. Malaria RDTs are an attractive option to serve such populations for whom coverage with quality microscopy is low. However, factors such as the sensitivity, cost, and adequate performance of RDTs under difficult operational conditions may limit their use and scale-up.

Molecular tools such as PCR, microsatellites, and genetic sequencing are useful, but investing in them could divert resources away from more essential malaria prevention, diagnosis, and treatment services because of their high cost. This is a concern in countries with regions that still have a significant amount of active disease transmission.

There is a need for improved strategies to make the best use of microscopy and RDTs, and for making more sensitive tools available for routine use in the diagnosis of malaria infection.

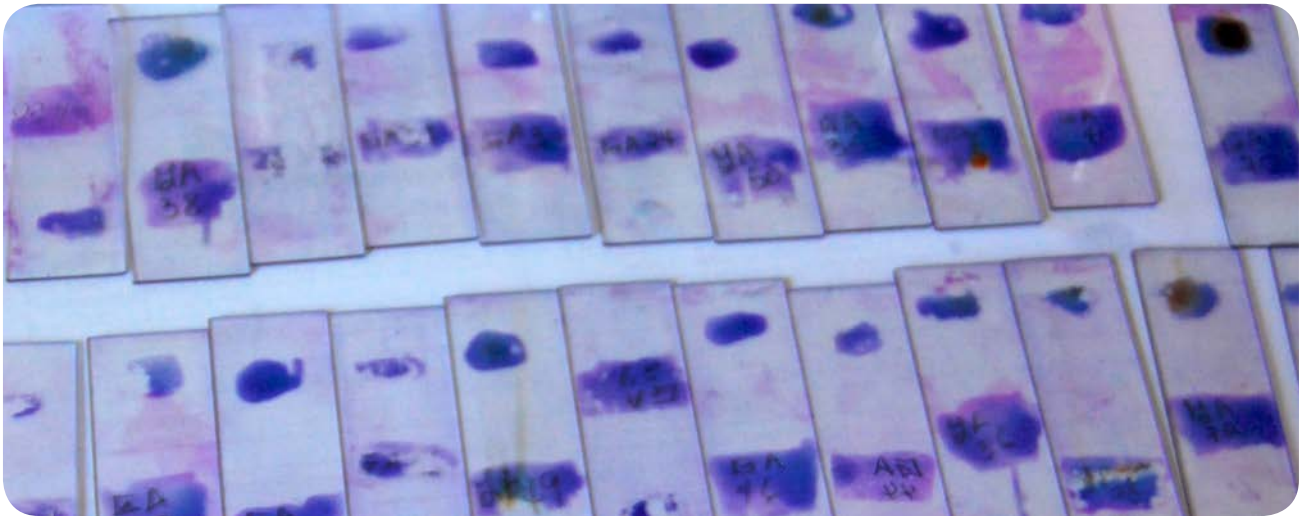


Photo: PAHO/WHO

2.2 TREATMENT

2.2.a Pharmaceutical Supply Chain Management

Improving access to lifesaving antimalarial medicines and essential commodities in the LAC region is one of the key interventions supported through AMI. Countries' antimalarial procurement and distribution systems have been strengthened by PAHO's Regional Malaria Program, Essential Medicines Program, and Strategic Fund unit, along with the USAID-funded Systems for Improved Access to Pharmaceuticals and Services (SIAPS) program. Critical deficiencies in countries' pharmaceutical supply chains have been corrected with support from AMI implementing partners in order to meet regional, national, and local needs for antimalarial medicines and supplies. AMI partners work with MOHs in the region to: 1) monitor and report on antimalarial medicine stocks, 2) plan and manage antimalarials supplied for serving low incidence and at risk areas, 3) jointly procure essential medicines and supplies, 4) maintain a strategic regional stock of antimalarials to be provided in response to countries' special needs, 5) facilitate requests and donations of medicines among participating countries, 6) improve the management of central and decentralized medicines warehouses, and 7) develop strategies for access to malaria diagnosis and treatment for key populations.

While challenges remain in the LAC region, antimalarial stock availability improved from 57% to 85% in countries' central warehouses between 2010 and 2014,[19] it is unclear if AMI support has also improved medicine availability throughout the entire supply chain, since the countries participating in regional reporting do not include information at the health facilities level. However, it is assumed that countries are better prepared to supply medicines to all regions of the country once antimalarials are available in the national and sub-national levels (i.e. region, department or state).

Regional Inventory Monitoring and Reporting

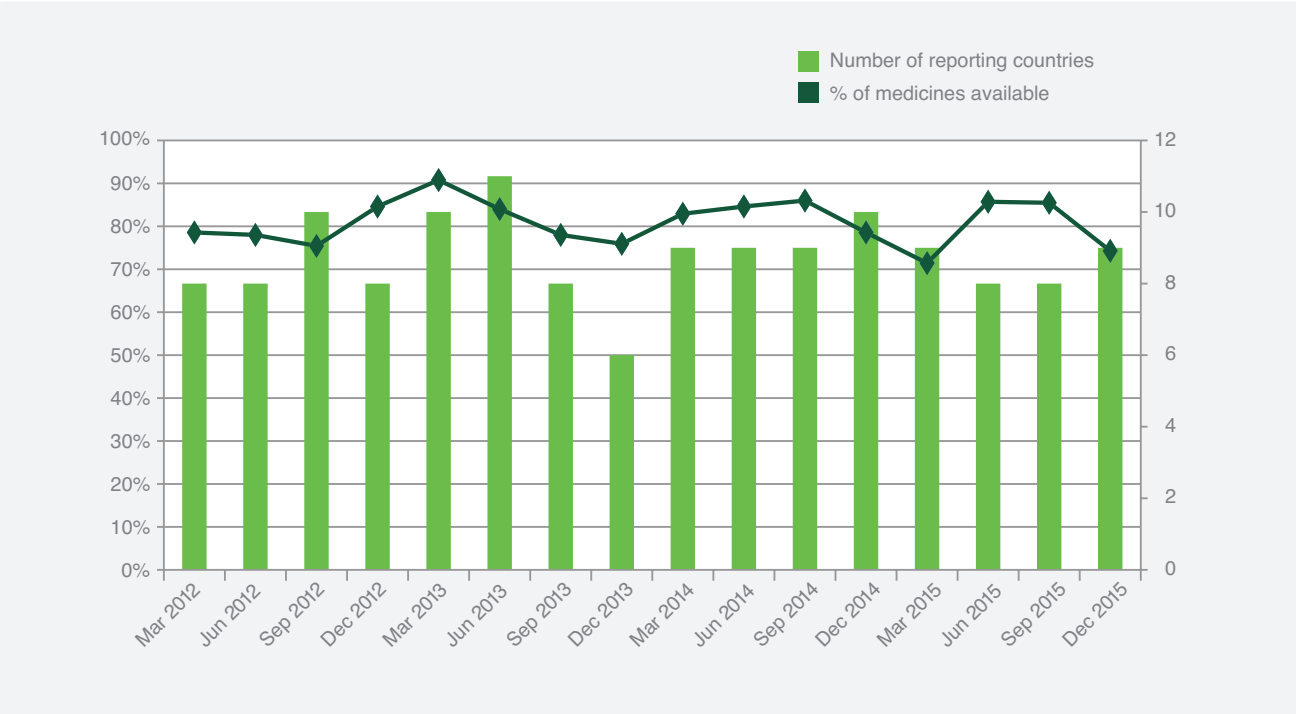
In FY 2015, countries continued to monitor and report on stock levels of antimalarial medicines via the Regional Platform on Access and Innovation for Health Technologies (PRAIS, by its Spanish acronym), with support from PAHO's Strategic Fund unit and the MSH/SIAPS program. The PRAIS e-platform, which serves as a virtual reporting and information hub, enables MOH staff in LAC countries to share and retrieve information about medicines. On a quarterly basis, countries submit inventory data for dissemination via a *Regional Bulletin for the Availability of Antimalarial Medicines,* which has become a valuable monitoring tool to help prevent stock-outs and enable medicines to be exchanged between countries. The quarterly bulletin has given the NMCPs and PAHO/WHO immediate decision-making information, helped identify problems, and enabled medicines to be redistributed within the region. Eight to ten countries reported antimalarial stock data in each quarter of FY 2015. Analysis showed that the availability of antimalarials in central warehouses fluctuated around 85% between quarter one of FY15 and quarter one of FY16.

Country data on the consumption of antimalarials was added to the bulletin in FY 2015, given the fact that some discrepancies had occurred between the variations in antimalarial stocks and numbers of confirmed malaria cases

19 Marmion, J, Barillas, E., Echalar, R., de Carvalho, J., and Sánchez, M. (2014, November). *How low can we go? Lessons from an integrated partnership for malaria control.* Poster presented at the 63rd Annual Meeting of the American Society of Tropical Medicine and Hygiene, New Orleans, LA with support from the USAID-funded Amazon Malaria Initiative.

reported. As such, the *Regional Bulletin for the Availability of Antimalarial Medicines* has also made it possible to point out potential deviations in prescribing and dispensing practices in countries of the Americas. For instance, presumptive treatment, i.e. the dispensing of antimalarial medicines without a proper laboratory diagnosis, has been suspected.

Figure 4. Number of Reporting Countries and % of Antimalarial Medicine Stocks at Central Warehouses



*MSH/SIAPS country reported data for the period 2012-2014.

Special Considerations for Countries with Low Incidence

Maintenance of adequate stocks of medicine is particularly important in low-incidence settings and for countries pursuing malaria elimination. Countries with low malaria incidence continued to benefit from assistance provided by the MSH/SIAPS program on needs forecasting, overcoming bottlenecks, and maintaining adequate antimalarial medicine stocks. A minimum level of medicine stocks need to be maintained in locations with few to no cases of malaria, in order to mitigate the risk of outbreaks and avoid the reintroduction of malaria. Pharmaceutical supply management criteria have been developed for low-incidence areas in seven countries, and the criteria have been institutionalized in Colombia, Brazil, and Nicaragua, with Honduras and Nicaragua considering the criteria in procurement planning. The MSH/SIAPS program led a workshop in Colombia that resulted in an agreement on the criteria for programming and distributing antimalarials in low-incidence areas, which in turn helped to determine procurement estimates and distribution of medicines to departmental warehouses. Colombia also made updates to its antimalarial requisitioning and dispatch tool.

Joint Procurement of Antimalarial Medicines

Countries that have a low incidence of malaria experience challenges with the supply chain for essential medicines because pharmaceutical manufacturers are no longer interested in participating in tenders or other procurement

processes when very small quantities of medicines are solicited. To alleviate this issue, countries in the LAC region have worked with PAHO/WHO and its Strategic Fund unit towards jointly procuring antimalarial medicines. This mechanism allows countries to acquire medicines through standardized ordering procedures, as part of a pooled order, and to benefit from quality assurance and lower prices. Currently, this is the only mechanism through which certain countries can access medicines for malaria. As of FY 2015, a long-term agreement was made for PAHO to procure antimalarials as a result of a tender process completed in collaboration with United Nations Children's Emergency Fund (UNICEF) and WHO. A reference laboratory in Uruguay was hired to perform quality control tests of medicines procured regionally through the Strategic Fund.

As an additional measure, PAHO/WHO has established a fully operational stand-alone regional warehouse in Panama where an emergency stock of antimalarial medicines is stored. The warehouse operates 24 hours a day, seven days a week, and can provide treatments to countries upon request. It has been instrumental in supplying ACTs for malaria cases imported to Central America from areas where resistance to CQ is known, as well as in rapidly mobilizing lifesaving antimalarials for severe cases. In FY 2015, PAHO/WHO facilitated the donation of antimalarials from Brazil to treat severe cases elsewhere, and met urgent requests from Nicaragua, Guatemala, El Salvador, and Belize, including an emergency procurement of antimalarials for Guatemala due to a stock-out in the second quarter of FY 2015. At the end of FY 2015 and beginning of FY 2016, ACTs were distributed from the regional warehouse to 11 countries. Intravenous artesunate and quinine for severe cases were distributed to six countries, including two outside of LAC, whereby the United Nations (UN) system provided lifesaving antimalarial medicines for severe cases in Somalia and Swaziland.

Strategies for Improving Access to Malaria Diagnosis and Treatment

MSH/SIAPS worked with endemic states in Brazil's Amazon region to assess the implementation of malaria control strategies following an "adequacy" approach.[20] Over the course of 2014, MSH/SIAPS conducted a study of the adequacy of the implementation of: 1) diagnosis and treatment, 2) IRS, and 3) ITNs. During a meeting organized in December 2014, Brazil's MOH and nine malaria-endemic states met to validate and discuss the results of the assessment, with MSH/SIAPS support. States' authorities identified next steps that were incorporated into work plans to close performance gaps for control strategies that had been ranked as deficient. They also scheduled a follow-up monitoring exercise using the same approach for FY 2016.

With regard to ensuring access for key populations, workshops were held with Roraima state authorities and microscopists in April and August 2015. A rapid survey instrument was developed to collect additional information about the mobile and migrant population, including miners, indigenous groups, and others transiting through the state. Through a survey initiated in September 2015, MSH/SIAPS systematized interventions to provide malaria diagnosis and treatment to gold miners in the Brazilian state of Pará. This systematization served as a basis for the *Proposed Intervention to Improve Access to Malaria Diagnosis and Treatment in Mining Areas of Pará, Brazil*.[21]

Colombian officials developed the first draft of a research protocol to estimate the under-reporting of malaria cases at diagnosis and treatment posts in high-burden departments in FY 2015, together with MSH/SIAPS. The data collection protocol and instruments were set for testing at a few health facilities. In addition, in the second quarter of FY 2016, MSH/SIAPS and Colombia's Vector Borne Diseases Control Program completed an evaluation of the implementation of their Integrated Management Strategy for Malaria Control (EGI, by its Spanish acronym) using the adequacy approach.

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20 For a description of the adequacy approach, see: Habicht, J et al. 1999. Evaluation designs for adequacy, plausibility and probability of public health program performance and impact. *Int J Epidemiol,* 28: 10-18.

21 URL: http://siapsprogram.org/publication/proposta-de-intervencao-para-melhorar-o-acesso-ao-diagnostico-e-ao-tratamento-de-malaria-em-areas-de-garimpo-no-estado-do-para-brasil/

Guatemala's MOH took advantage of MSH/SIAPS and Links Media's technical assistance with the introduction of guidelines to support malaria pharmaceutical management at primary health facilities and to monitor the availability of antimalarials for use by health volunteers. One poster and four instructional guides on the proper pharmaceutical and case management protocol for malaria cases were created or updated for district-level supervisors, health center staff, and community-level volunteer collaborators. The five materials would later be used at trainings, and subsequently, serve as illustrated job aids.

In March 2015, as part of an AMI site visit to Iquitos in the Loreto Region of Peru, PAHO/WHO and MSH/SIAPS met with national counterparts to identify the areas in which health authorities needed support to respond to the malaria emergency in Loreto. Peru's MOH, with support from MSH/SIAPS, agreed to work on developing a strategy to introduce a new fixed-dose combination treatment of artesunate + mefloquine (an ACT) for *P. falciparum* malaria. In collaboration with national regulatory authorities and NMCP counterparts, the MOH planned for local introduction of this new fixed-dosed combination therapy. This activity began with a pilot test in selected counties of the Loreto Region towards the end of FY 2015. During the first two quarters of FY 2016, Peru received MSH/SIAPS' support for the drafting of an operational plan to scale-up malaria pharmaceutical management interventions in the country.

Best Practices for the Management, Storage, and Supply of Malaria Pharmaceuticals

As part of its continued support to promote best practice guidelines for the management, storage, and supply of malaria pharmaceuticals, MSH/SIAPS provided decentralized assistance to counterparts in Peru's Loreto Region to strengthen their capacity for the proper management and storage of key commodities at medical warehouses. This is highlighted in two success stories below. As a result, the Loreto warehouse became only the second warehouse to receive Peru's nationally conferred Certificate of Good Storage Practices (BPA, by its Spanish acronym).

Photo: Links Media

Success Story

Certification of the regional medicines warehouse in Loreto (Peru)[1]

Staff that achieved certification, led by Dr. Yuri Cabello, director of DIREMID-Loreto, and Chemist-Pharmacist Ivonne Navarro.

Background Information

Loreto, in northeastern Peru, is the country's largest region. Traversing the region is a vast network of rivers that empty into the Amazon River Basin. Loreto is characterized by a low population density with 45% of its slightly more than one million inhabitants residing in rural areas.[2] There are 19 indigenous ethnicities in the region. It has a hot, humid, and rainy climate with high temperatures reaching 98°F from October to January and 84% humidity.

The Loreto Regional Health Directorate (*Dirección Regional de Salud*, DIRESA) relies on a network of 374 primary-level health care facilities and three hospitals. Since 2004, medicines and other supplies for malaria control have been distributed to these facilities by the Regional Directorate of Medicines, Supplies and Drugs (*Dirección Regional de Medicamentos, Insumos y Drogas*, DIREMID) from a space that was originally built as a private home and had been modified to serve as a regional warehouse.

An assessment carried out by USAID-funded SIAPS through the Amazon Malaria Initiative (AMI) in May 2012[3] revealed that the storehouse met only 56% (49/88) of the requirements of the national Good Storage Practices regulations (BPA, by its Spanish acronym).[4] This meant that conditions were still deficient, despite DIREMID's efforts. Some of the main problems included: a) insufficient storage capacity; b) lack of organization within indoor areas; c) absence of standard operating procedures and norms for training, organization, and job descriptions; d) untrained staff; e) non-standard work practices that were unsafe for staff, and f) insufficient and inadequate equipment and materials.

Interventions

In the months following the assessment, SIAPS provided technical assistance to improve the conditions and practices in the regional warehouse, though the implementation of a work plan that required an investment of approximately USD 13,557 of AMI resources.

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[1] Technical assistance provided by Henrry Espinoza, Senior Technical Advisor, and Edgar Barillas, Portfolio Manager.

[2] Peru: The projected population is 1,028,968, according to the region on June 30, 2014. Source: National Institute of Statistics and Informatics (INEI) - Peru: Population Estimates and Projections by Sex, according to Region, Province, and District, 2000 - 2015 - Special Bulletin Nº 18.

[3] Espinoza, Henrry. 2012. Baseline assessment of the supply of medicines, materials, and laboratory reagents for malaria control in DIRESA-Loreto, Peru (*Evaluación del suministro de medicamentos, insumos y reactivos de laboratorio para el control de la malaria en la DIRESA Loreto, Perú – Línea de Base*). Submitted to the United States Agency for International Development by the Systems for Improved Access to Pharmaceuticals and Services (SIAPS) Program. Arlington, VA: Management Sciences for Health.

[4] Ministerial Resolution Nº 585-99-SA/DM approving the Manual of Good Practices for the Storage of Pharmaceutical Products and Related Supplies.

USAID FROM THE AMERICAN PEOPLE

SIAPS Systems for Improved Access to Pharmaceuticals and Services

Before

After

Activities included:

1. Development, validation, and implementation of a standard operating procedures manual, training guidelines, security guidelines, and a manual with organization and job descriptions.

2. Training of staff on warehouse operations through the creation of apprenticeships at a certified warehouse and training on the implementation of procedures and guidelines.

3. Supervision of adherence to the BPA regulations and adoption of corrective measures.

   For its part, DIREMID invested USD 101,028 towards expansion of the storage capacity, improvements to organization within the warehouse, optimization of climate control, and the provision of work equipment and material to facilitate operations and ensure greater safety for people and products. It is important to note that this investment was seven times greater than that provided in technical assistance by USAID/SIAPS.

PERÚ Ministerio de Salud

DECENIO DE LAS PERSONAS CON DISCAPACIDAD EN EL PERU

Nº 528-2014

CERTIFICADO

BUENAS PRÁCTICAS DE ALMACENAMIENTO

La que suscribe, Directora Ejecutiva de la Dirección de Control y Vigilancia Sanitaria de la Dirección General de Medicamentos, Insumos y Drogas.

CERTIFICA:

Que el ALMACEN ESPECIALIZADO – DIREMID, con razón social DIRECCION DE ADMINISTRACION GENERAL DE SALUD, con oficina administrativa y almacén N° 1 ubicados en Calle Faning N° 164 - Iquitos - Maynas - LORETO - PERÚ y almacén N° 2 ubicado en Av. 28 de Julio N° S/N - Punchana – Maynas - LORETO - PERÚ, cumple con las Buenas Prácticas de Almacenamiento para sus: Productos Farmacéuticos: Especialidades Farmacéuticas, Productos Dietéticos, Agentes de Diagnóstico, Productos de Origen Biológico, Productos Galénicos; Productos Cosméticos y de Higiene Personal, Productos Sanitarios y de Higiene Doméstica; Insumos (Reactivos de Diagnóstico), Instrumental y Equipos de Uso Médico - Quirúrgico y Odontológico almacenados a temperatura controlada y temperatura refrigerada, consignadas en la R.M. N° 585-99 SA/DM, para vender o distribuir en el país y/o para la exportación, tal como consta en las Actas de Inspección para Establecimientos que Almacenan y Distribuyen Productos Farmacéuticos y Afines N° 1188-I-2014 de fecha 29 de diciembre del 2014 y N° 1189-I-2014 de fecha 30 de diciembre del 2014.

Se expide el presente Certificado a solicitud del interesado según el Expediente N° 14-101966-1 de fecha 20 de noviembre del 2014 y Expediente N° 14-111671-1 de fecha 22 de diciembre del 2014.

Este Certificado es válido a partir del 30 de diciembre del 2014 hasta el 30 de diciembre del 2017.

Lima, 31 de diciembre del 2014.

Q.F. MARIA IRENE CHEA WOO
Directora Ejecutiva
Dirección de Control y Vigilancia Sanitaria
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Impact

In December 2014, the General Directorate of Medicines, Supplies and Drugs inspected the regional warehouse in Loreto and gave it a Certificate of Good Storage Practices for complying with 100% of the requirements. Loreto's specialized warehouse is only the second warehouse that has been certified in the whole country.

See also: Success Story: Decentralized technical assistance from the Amazon Malaria Initiative improves antimalarial supply management in Loreto, Peru

2

Decentralized technical assistance from the Amazon Malaria Initiative improves antimalarial supply management in Loreto, Peru[i]

"We do not view the increase in the number of malaria cases as a problem of supply, because we have available adequate inventories." (SISMED Director, DIRESA-Loreto)

Background

The region of Loreto, in northeastern Peru, is the country's largest. Traversing the region is a vast network of rivers that empty into the Amazon River Basin. Loreto is home to just over 1 million inhabitants,[ii] some 45% of whom reside in rural areas characterized by low population density. Poverty and illiteracy (35% and 6%, respectively, in Loreto)[iii] are greatest among the 19 indigenous ethnic groups who call this region home. A variety of environmental, geographic, and socioeconomic conditions make malaria a prevalent problem here—and one that has proved difficult to control. In 2013, this region accounted for almost 90%[iv] of Peru's total cases. Cases reported in that year showed an increase of 73% over 2012.

To control this epidemic, the Loreto Regional Health Directorate (Dirección Regional de Salud; DIRESA) relies on a network of 374 primary-level health care facilities and three hospitals, all of which provide both individual and group health care. Medicines and other supplies[v] used to control malaria are distributed by the Regional Directorate of Medicines, Supplies and Drugs (Dirección Regional de Medicamentos, Insumos y Drogas; DIREMID) using its Integrated Supply System for Medicines and Medical Supplies (Sistema Integrado de Suministro de Medicamentos e Insumos; SISMED). Antimalarials and other medicines used in public health interventions are procured and distributed nationally by the Directorate for Supply of Strategic Resources (*Dirección de Abastecimiento de Recursos Estratégicos*) pursuant to programming prepared by DIREMID.

Because of the increase in the number of cases, particularly in the region of Loreto, Peru's National Health Strategy for the Control of Vector-Borne Diseases (Estrategia Sanitaria Nacional de Control de Enfermedades Metaxénicas) requested technical assistance from SIAPS[vi] to assess the current status of antimalarial supply and support the implementation of corrective measures.

The baseline study carried out in May 2012 revealed the following: (a) inadequate programming of medicines, with a failure to take into account not only the increase in the number of malaria cases but also antimalarial use by itinerant health brigades for additional interventions seeking out passive cases; (b) delays in medicine purchases resulting from a lack of national providers and regulatory restrictions affecting purchases made on a sole-source basis and all international purchases; (c) poor

June 2015

storage conditions and practices affecting medicine quality and inventory management; (d) absence of a standardized distribution procedure, which led to inconsistencies between amounts ordered and amounts dispatched, quantities delivered insufficient to meet demand, increased frequency of emergency orders, and delays in delivery; and (e) low levels of personnel trained in the supply of medicines and medical supplies (particularly in areas located at some distance from the capital city), absence of self-instructional materials, and lack of a training strategy based on staff characteristics and geographic accessibility within the region. All of these problems led to medicine shortages: six of nine antimalarials showed shortages of between 8 and 157 days during the 12-month period prior to the study. Mean availability[vii] in health facilities was 50%.

Interventions

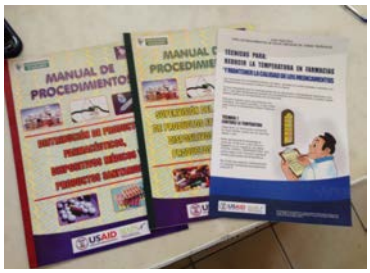
Based on these results, starting in July 2012, SIAPS began providing support to various interventions that led to improvements in regional medicine supply.

1. The implementation of standardized forms and procedures for placing orders and dispensing medicines and medical supplies, maintaining reserve stocks, and periodically monitoring inventories
2. The development and application of new programming and distribution criteria
3. The coordination of donations from Brazil, Ecuador, and Colombia (313,700 units, valued at USD 28,004) to mitigate problems with national procurement
4. The improvement in storage conditions and practices in the regional warehouse[viii] and in subregional warehouses and health facilities
5. Development of graphic self-instructional materials based on malaria technical standards and appropriate medicine distribution procedures

Results

An impact assessment carried out in March 2014[ix] showed a fourfold increase (411%) in the units needed required to be purchased from 2011 to 2013; an increase in availability of distribution procedures in health facilities from 8% to 60%; an increase from 62% to 80% in the number of facilities that received the quantity of medicines they ordered and an increase from 62% to 100% in the number that received supplies on the anticipated date. Emergency orders dropped from 38% to 20%, and the number of facilities with expired products decreased from 33% to 8%.

Although six of the nine antimalarials were affected by stock-outs (of between 8 and 157 days) in the regional warehouse during the 12 months preceding the baseline study (May 2012), only one reflected a stock-out following the intervention, and this was attributable to problems with national procurement. Mean availability of drugs in health facilities increased from 50% to 72%.



Conclusion

Decentralized interventions in Loreto decreased stock-outs from the second half of 2012 through the first quarter of 2014.

Even in geographically remote areas, the management of antimalarial supplies can quickly be improved by means of a systematic

2

intervention combining the introduction of improved programming criteria, purchases made on a timely basis and in appropriate amounts, optimization of the distribution network, establishment of strategic stock levels, and improvements in training using selctional materials.

See also: Success Story: Certification of the regional medicines warehouse in Loreto (Peru)

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[i] The Amazon Malaria Initiative (AMI) is financed through support from the US Agency for International Development. The Systems for Improved Access to Pharmaceuticals and Services (SIAPS) program, an AMI member, supported this decentralized technical assistance initiative.

[ii] Projected population totals 1,028,968, by department, as of June 30, 2014. Instituto Nacional de Estadística e Informática (INEI), *Perú: Estimaciones y Proyecciones de Población por Sexo, según Departamento, Provincia y Distrito, 2000-2015,* Boletín Especial Nº 18 (Lima, Diciembre 2009).

[iii] INEI, Evolución de la pobreza monetaria en el Perú al 2013 (Mayo 2014).

[iv] Ministerio de Salud, Dirección General de Epidemiología, *Boletín Epidemiológico* 52 (2013).

[v] Supplies include slides, lancets, alcohol, and cotton.

[vi] Since 2002, Management Sciences for Health has been an AMI partner, providing technical assistance through its RPM Plus and SPS programs, and now through SIAPS (Systems for Improved Access to Pharmaceuticals and Services).

[vii] Defined as the mean percentage of medicines available in a given health facility, based on the medicines required for the type of malaria frequent in that area (adults, children, pregnant women, and if appropriate for severe malaria) and medicines for adult treatment of the bacterial strain that is not frequent.

[viii] In December 2014, the Loreto regional warehouse received certification in Good Storage Practices from the Ministry of Health's General Directorate for Medicines, Supplies and Drugs.

[ix] Espinoza, Henrry. 2014. S*uministro de medicamentos, insumos y reactivos de laboratorio para el control de la malaria en la DIRESA Loreto, Perú – Evaluación post intervención.* Submitted to the US Agency for International Development by the Systems for Improved Access to Pharmaceuticals and Services (SIAPS) Program. Arlington, VA: Management Sciences for Health.

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FY2015 Highlights

- Belize, Colombia, Guyana, Nicaragua, Panama, and Peru received PAHO/WHO technical support to revise their national treatment guidelines.
- MOHs received Pharmaceutical Reference Standards (PRS) for antimalarial medicines from PAHO/WHO and USP.
- Countries submitted additional data on antimalarial consumption for inclusion in the quarterly bulletin on medicine stock-levels at central warehouses.
- Peru's regional warehouse in the Loreto Region obtained the national BPA.
- A regional "Rapid Assessment of Malaria Pharmaceutical Management in AMI Countries" was completed and disseminated by MSH/SIAPS in Spanish. The report was based on data collected in seven countries from January–August 2014. Data covered the performance of distribution systems, the percentage of medicine availability versus stock-outs, and the time to fulfill requests. This followed up on a previous regional assessment disseminated in 2012.
- PAHO secured a long-term antimalarial procurement agreement with collaboration from UNICEF and WHO.
- In Panama, a stand-alone regional warehouse with an emergency stock of antimalarial medicines became fully operational 24 hours a day, seven days a week. In the fourth quarter of FY15, the warehouse distributed:
  - ACTs to 11 countries;
  - Antimalarials for severe cases to six countries, including Somalia and Swaziland.

Implementation Challenges

The number of countries reporting antimalarial stock data oscillated between quarters, with nine out of 11 countries reporting in the first quarter of FY 2016. This fluctuation could impact regional monitoring of antimalarial medicines and result in a decreased utility in preventing stock-outs; indeed, stock-outs were reported at the central level in three countries in quarter two of FY 2016. Country focal points may need to be re-trained on the PRAIS e-platform or given additional assistance to ensure that data is submitted through the system. Moreover, PAHO/WHO focal points in AMI countries need to continue to coordinate with NMCP staff on data collection regarding antimalarial stocks. In the long term, PAHO will continue to play an important role in encouraging countries to dedicate sufficient time and resources to regional reporting.

Now that countries in the RAVREDA network have experience in collecting and reporting on stock data, the challenges are to better analyze the data and to utilize the resulting information. Doing so could help predict issues that may arise in antimalarial management, such as health professionals' compliance with treatment guidelines, including the possibility of treatment being prescribed or dispensed without a laboratory diagnosis; or the risk of artemisinin mono-therapy due to a stock-out of mefloquine, as noted in Peru.

A few countries continue to pursue local procurement of antimalarials, despite all AMI-supported countries are eligible to use PAHO's Strategic Fund and participate in the joint procurement of these essential medicines. In fact, many countries have taken advantage of this mechanism, though their adherence to procurement procedures and timeframes have not always been adequate. For example, a late submission of purchasing requests by a country may result in failure to participate in the pooled procurement and stock-outs in prejudice of patients.

In FY 2015, some ministers of health did not make use of a line of credit extended to them by PAHO/WHO to facilitate (by avoiding anticipated payment) procurement through the Strategic Fund of essential medicines for AIDS, tuberculosis and malaria. There may be a lack of awareness among these key decision-makers about the functioning of the Strategic Fund, which could be addressed through more effective provision of information by AMI partners.

Finally, following Peru's achievement of the good storage practices certification of a regional medicines warehouse in Loreto, it is now up to the regional authorities to maintain the conditions (infrastructure, equipment, staff, etc.) that made the certification possible. This warehouse and other similar decentralized warehouses play an important role in the national system to address malaria and other diseases; therefore, they will require continual support from health authorities.

2.2.b Antimalarial Medicine Quality

Successful control and elimination of malaria depend on safe and effective antimalarial medicines. National health systems are responsible for guaranteeing the quality of antimalarials and other supplies. MRAs and OMCLs have recently done more to institutionalize evidence-based practices like the Three Level Approach that was first introduced by PAHO/WHO and the Promoting the Quality of Medicines (PQM) Program implemented by USP. The Three Level Approach to medicine quality control is a cost-effective, fast, and reliable methodology that allows the assessment of a large number of medicines in the field. This methodology consists of sequential and complementary levels of quality control of increasing complexity.

The three levels of medicine quality control are:

- Level 1 – Visual and physical inspection
- Level 2 – Rapid analytical screening tests that can be performed in the field
- Level 3 – Registration methodologies that require an established laboratory and trained personnel

USAID's support to countries through AMI has emphasized strengthening the capabilities of OMCLs to perform analytical tests according to compendial methods, and assisting them to ensure that their quality management systems comply with internationally recognized standards of operation. This is important for Level 3 in the context of implementing the Three Level Approach to quality monitoring carried out by MRAs and decentralized health areas in support of malaria program goals.

PAHO/WHO and USP/PQM regularly coordinate on activities that contribute to the quality of antimalarial medicines by strengthening countries' QA/QC systems. For example, PAHO/WHO collected a random sample of antimalarial drugs procured by Belize, Brazil, Colombia, Ecuador, and Guyana and confirmed that medicines procured for these countries through the Strategic Fund met the required quality standards. In one country where locally-procured medicines showed inconsistent quality, PAHO/WHO and USP worked to correct the problem. Additionally, PAHO/WHO has facilitated communication between AMI-supported countries and USP to procure PRS for antimalarial medicines through the Regional Malaria Program and country offices. USP's sending of PRS enables countries' OMCLs to analyze medicines on a routine basis.

During FY 2015 and the first two quarters of FY 2016, the PAHO/WHO Essential Medicines unit provided support to strengthen laboratory QA in AMI-supported countries. The installed capacity will serve to control the

quality of antimalarials procured through the PAHO/WHO Strategic Fund and disseminate medicine quality testing results to participating countries.

Regional Workshop on Medicine Quality

In collaboration with PAHO/WHO, USP/PQM organized a regional workshop on medicine quality in Lima, Peru from November 11–13, 2014. The workshop's objective was to identify sustainable mechanisms to continue South–South collaboration for the quality assurance of medicines. Sixteen LAC countries were represented, with officers of MRAs, OMCLs, and academia in attendance. As a result, a survey instrument was developed by country representatives and PQM, through which regional OMCLs and MRAs subsequently reported their medicine QA/QC capabilities and needs.

The following are highlights and conclusions drawn from the survey responses USP/PQM obtained from 9 MRAs and 18 laboratories (14 OMCLs and 4 Schools of Pharmacy) with regard to regional collaboration for medicine quality:

1. Most MRAs (67%) and OMCLs (67%) are compliant with one or more internationally recognized standards of operation (e.g. Reference PAHO, PIC/S, ISO 9001:2008, ISO 17025:2005, WHO Prequalification).
   - This finding not only indicates that many LAC countries have the expertise to support other countries in the region to attain compliance, but also shows the overall good standing of the region as a whole in its compliance with internationally recognized operational standards.
2. The region has the expertise to provide assistance in all (27/27) technical areas identified as necessary by the OMCLs and most (6/7) of those considered for the MRAs. The only one not identified in the region, Good Distribution and Transportation Practices, is not critical for MRA functioning.
   - This indicates that South–South collaborations are a plausible mechanism through which countries can receive technical assistance according to their needs.
   - The results also show the good standing of the labs in the region as a whole, since more than 40% of the laboratories are proficient in more than 50% of the tests (14/27; 52%). Note: This statistic includes the responses of 14 OMCLs and 4 university labs. The assistance provided by AMI partners over the years has contributed to this high level of proficiency.
   - No single country has expertise in all the technical areas. This result shows that using a regional approach supports all countries in the region to some extent.
3. Collaborations with universities are widespread among MRAs (56%) and OMCLs (64%).
   - Strengthening partnerships with academia promotes not only the technical support to OMCLs and MRAs, but also contributes to universities having a better understanding of public health needs on the frontlines of care, which helps them to tailor their curricula to satisfy these needs.

Survey responses validated the premise that identifying a sustainable mechanism for South–South collaboration could offer the LAC region the means to advance in establishing or maintaining proper QA/QC systems in all countries and ensure the quality of medicines for public consumption. After receiving input from a multi-country, multi-sectoral committee formed at the Lima workshop, USP/PQM sent a concept note entitled "Exploring Sustainable Mechanisms for South–South Collaboration on Medicine Quality" to the MOHs of participating countries as a follow-up action in May 2015.

Decentralized Support in Peru

In follow-up to an AMI partners' meeting in Iquitos, Peru, the Loreto and Madre de Dios regional health authorities coordinated with USP/PQM to perform Level 2 analyses on all medicines using Minilab™ methodologies. In addition, from April to May 2015 PAHO/WHO conducted an internal study of how intravenous artesunate was being used to treat severe malaria cases in Loreto. Physicians' and nurses' practices at the main hospitals in Iquitos were investigated, and PAHO recommended a capacity building exercise for health professionals in FY 2016. Colombia also received targeted support to ensure that treatments for severe cases were used appropriately.

Photo: USP/PQM

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AMAZON MALARIA INITIATIVE

SUCCESS STORY

PERU STRENGTHENS ITS MEDICINE QUALITY CONTROL APPROACH

Poor quality medicines that fail to meet official standards pose a significant threat to patients in need of quality-assured medicines to combat diseases such as malaria, for which proper treatment is essential to eliminate parasites from the blood effectively. Lack of quality-assured medicines can delay progress towards malaria control and eventual elimination.

From January to June 2015, 60% of 124 counterfeit products that were analyzed under orders from Peru's General Directorate of Medicines, Supplies and Drugs (DIGEMID) did not contain an active ingredient. These medicines could have been identified rapidly in the field with screening tests, allowing more prompt regulatory action.

In order to strengthen the capacity of Regional Health Directorate (DIRESA) staff and university labs, in August 2015 DIGEMID and the National Center for Quality Control (CNCC) convened a training workshop in Cuzco with the participation of six universities and six DIRESAs. Of the six DIRESAs in attendance, five (La Libertad, Ayacucho, Loreto, Tacna and Cuzco) had reported the highest rates of substandard and counterfeit medicines in the country.

During the workshop, CNCC trained participants on the use of rapid field tests. The head of Peru's National Institute of Health (INS) pointed out that field screening tests drastically reduce the time needed to assess medicine quality, from several months down to a few hours or days, depending on the number of samples to be analyzed. Expanding the use of rapid field tests for the monitoring of medicines at the decentralized level would allow for more prompt regulatory action and a larger volume of medicines screened.

Photo Credit: CNCC

Workshop participants received training on Level 2 of the Three Level Approach for medicines quality control, at the National University of San Antonio Abad's Pharmaceutical Technology Laboratory.

The methodology that Peru chose to adopt and began to scale up with the critically important August 2015 workshop is known as the Three Level Approach to medicine quality control. The Three Level Approach is a globally-proven methodology to detect substandard and counterfeit

Pan American Health Organization | World Health Organization Americas | CDC | SIAPS Systems for Improved Access to Pharmaceuticals and Services | USAID FROM THE AMERICAN PEOPLE | USP PROMOTING THE QUALITY OF MEDICINES

medicines in a rapid and cost effective manner. It consists of preliminary visual and physical inspection (Level 1), rapid screening field tests (Level 2), and compendial or other validated laboratory tests (Level 3).[1] It was first introduced in the Americas through the Amazon Malaria Initiative (AMI), by implementing partner USP's Promoting the Quality of Medicines Program.

Starting with the workshop in Cuzco, the six participating universities began the process of being integrated into a network to support the CNCC with supplemental technical and human resources for the decentralized quality control of medicines at the DIRESAs. The inclusion of university laboratories to cooperate with medicine quality monitoring in the field is intended to enhance Peru's capacity to ensure the quality of medicines on the market.

Also in 2015, Peru developed an annual timeline for the DIRESAs in Loreto and Madre de Dios to analyze the quality of a list of medicines. Medicine samples that fail field tests will be sent to the CNCC immediately to expedite confirmatory testing.

The involvement of universities in the August 2015 workshop demonstrates DIGEMID and CNCC's commitment to nationwide implementation of the Three Level Approach and to further strengthening the country's capacity to survey medicine quality in the field. Peru now has concrete plans to invest in long-term, sustainable solutions to facilitate the identification and removal of poor quality medicines from its territory, made possible with technical support provided through AMI.

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The Three Level Approach

The Three Level Approach applies sequential and complementary levels of quality control of increasing complexity, which are:

Level 1 – Visual and physical inspection

Level 2 – Rapid analytical screening tests that can be performed in the field

Level 3 – Registration methodologies that require an established lab and trained personnel

Photo Credit: PAHO/WHO

The Three Level Approach, developed by PQM to support countries' post marketing surveillance programs, was introduced and implemented initially in AMI countries through PQM assistance. Countries' implementation of Level 2 analysis helped to assess more than 1600 malaria medicines from 2005-2010.[2]

1. Pribluda VS, Barojas A, Coignez V, Brady S, Dijiba Y, et al. (2014) The Three Level Approach: A Framework for Ensuring Medicines Quality in Limited-Resource Countries. *Pharmaceut Reg Affairs* 3:117

2 Pribluda VS. Barojas A, Añez A, López CG, et al. (2012) Implementation of basic quality control tests for malaria medicines in Amazon Basin countries: results for the 2005–2010 period. Malaria Journal 11:202.

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Institutionalization of Medicine Quality Control Procedures in Peru, Colombia, and Ecuador

In August 2015, Peru's DIGEMID developed an annual timeline for two DIRESAs to verify the quality of pharmaceutical products using the Three Level Approach. In addition to the monitoring of official medicines, counterfeit antimalarial medicines were to be analyzed using rapid tests as well. CNCC trained six universities and six additional DIRESAS on the use of rapid field tests. This represents a significant expansion of the country's capacity to monitor medicine quality in the field.

In order to expand the range of medicines that can be tested in the field, USP/PQM supported Peru and Colombia to develop protocols for medicines of interest not included among those that could be analyzed with the standard equipment for rapid field tests (Minilabs™). In August 2015, USP/PQM delivered advanced trainings to Peru and Colombia's OMCLs to support the development of new analytical methods for medicine quality control. USP trained personnel from MRAs and OMCLs on the validation of analytical procedures, in order for those procedures to be recognized by national health systems. Validation of new rapid testing methods and procedures will enable regulatory agencies to adopt protocols for regular quality monitoring. Further expansion of screening programs is planned with the involvement of the Global Pharma Health Fund, which produces the rapid testing equipment known as Minilabs™.

In Ecuador, The National Medicine Regulatory Agency (ARCSA, by its Spanish acronym) created in 2013, included the Three Level Approach as one of its modalities for post-registration medicine quality monitoring in FY 2015. As a result, Level 2 rapid analytical tests for pharmaceutical quality control began to be used as tools for ARCSA's regular activities on a semi-annual basis. A detailed implementation plan was developed for field testing of all classes of medicines in Ecuador, including drugs for malaria, tuberculosis, and other diseases. To support this reinstatement of the Three Level Approach in Ecuador, USP/PQM provided PRS and guidelines for Level 2 tests, as well as donated a number of the supplies that were needed. Finally, ARCSA developed a semi-annual implementation program for conducting Level 2 quality monitoring.

Through a USP/PQM initiative in early 2016, Peru's CNCC began collaborating with the Global Pharma Health Fund, producers of the Minilab™ rapid field tests, for the development of field screening technologies to assess medicines currently in use in Peru. The thin layer chromatography (TLC) protocols developed would later be included in the Minilab's manual of analytical procedures. This was the first collaboration established between an OMCL and the Global Pharma Health Fund for the development of new methods for the Minilab™; this work represented important cooperation, resulting in the enhancement of not only the analytical capabilities of Peru, but also wherever Minilabs™ are used in the world.

Innovation: Digital Application to Assist in Level 1 Testing of Medicines

The process of developing a web-based application as an innovative tool to augment QA/QC capacity in the field by strengthening regulators' ability to perform visual and physical inspection of medicines (Level 1) continued to advance in FY 2015 and the first two quarters of FY 2016. The tool will allow in situ access to a pharmaceutical database that includes registration specifications and images of registered medicines. Moreover, the database is to be accessible through computers and mobile devices. Deployment of a prototype of the tool in selected pilot countries, including Peru and Ecuador, was planned for FY 2016. Since this tool could also be utilized in other regions as well, support for its development was provided through outside funding streams.

FY2015 Highlights

- Representatives of 16 LAC countries convened at a regional workshop on sustainable South–South collaborations for the quality assurance of medicines, organized by USP/PQM in Lima, Peru in November 2014. Data on national capacity and needs were collected and analyzed, resulting in a concept paper that was sent to the region's MOHs in May 2015.
- Brazil's NMCP signed an agreement with PAHO/WHO and the Federal University of Minas Gerais to provide Level 3 compendial tests as part of the country's new medicine quality program, known as PROVEME. This built on the prior implementation of Level 1 and 2 tests in selected malaria-endemic states. Per the agreement, sampling of medicines will be done at the central warehouses, as well as at decentralized warehouses in Acre, Amapá, and Roraima states.
- Ecuador reinstated the Three Level Approach with knowledge transfer and donation of materials from PAHO/WHO and USP/PQM.
- At a workshop in Cuzco in August 2015, Peru advanced the institutionalization of the Three Level Approach to medicine quality control. The approach promoted by USP/PQM under AMI was set for expansion to new DIRESAs with participation from Peruvian universities.
- Guatemala's OMCL received ISO 17025 accreditation from the National Accreditation Board (ANAB, by its Spanish acronym) in September 2015, moving from a product-based to a method-based accreditation. The expanded scope of this accreditation includes high-performance liquid chromatography (HPLC) testing, as well as spectrophotometry and dissolution tests, strengthening the country's capacity to ensure the quality of medicines, including antimalarials. PQM's support to earn accreditation was initially provided through AMI, and was later financed through USAID/Guatemala.

Challenges to Implementation

While involving numerous actors such as university laboratories and schools of pharmacy in national medicine QA/QC systems has a clear sustainability benefit, the distinct agendas of each institution participating in medicine quality control partnerships may introduce difficulties. Priorities and interests need to be aligned in order to ensure the smooth operation of medicine quality assurance processes. In addition, the laboratory capacity of partners at the decentralized level remains uneven in many countries, and requires strengthening to ensure optimal performance of routine testing.

Medicine quality improvements and knowledge management should be maintained at the institutional level; however, this is difficult due to the frequent turnover in health authority, MRA, and OMCL personnel. National health reforms such as those that have taken place in Guatemala, Honduras, and Ecuador can also result in the disappearance of entire divisions within MOHs. This presents an obstacle to sustaining good practices for antimalarial medicine quality monitoring in the long term.

Photo: PAHO/WHO

2.3 MEDICINE EFFICACY AND RESISTANCE MONITORING

Systematic monitoring of parasite resistance to antimalarial medicines has been a focus of AMI and RAVREDA since their inception. Standardized resistance surveillance guidelines and protocols have been in place in AMI/RAVREDA countries for years, in order to assess current first-line treatments for malaria. *In vivo* and *in vitro* studies have been conducted in AMI-supported countries periodically to test the therapeutic efficacy of standard treatment regimens and changes have been made when necessary. In the early 2000s, study results that confirmed CQ resistance led eight Amazon basin countries to make ACTs the first-line treatment for *P. falciparum* malaria.

Antimalarial medicine resistance surveillance is currently done in areas with varying transmission levels. AMI emphasizes the constant updating of national treatment guidelines based on the scientific evidence and the proper dissemination of those guidelines to health professionals. Ongoing antimalarial medicine efficacy studies allow for the evaluation of alternative treatments for the guidelines. AMI partners PAHO/WHO and CDC have provided significant technical assistance to NMCPs, both to assess antimalarial resistance patterns and to revise national treatment guidelines.

Artemisinin Resistance Monitoring Using *in Vivo* Studies

Emergence of resistance to artemisinin in Southeast Asia has caused major concern in global malaria control efforts, prompting AMI partners to take a proactive approach to prevent or contain the emergence of artemisinin resistance in LAC. Preliminary signs of reduced sensitivity to artemisinin in the Guiana Shield sub-region of South America in 2012 spurred a multi-country response to strengthen antimalarial resistance surveillance. In 2013–2014, Guyana and Suriname carried out confirmatory *in vivo* studies conducted according to the WHO's Global Malaria Program protocol, with the benefit of PAHO/WHO supervisory visits during the study period, and, of CDC later performing a review of the slides from the studies.

PAHO/WHO organized a meeting in Paramaribo, Suriname from November 11–13, 2014 to follow up on these efficacy studies confirming the sub-regional parasite response to artemisinin. AMI partners attended this and other high-level meetings on the topic of artemisinin resistance in the sub-region. No evidence of artemisinin resistance was found as it is currently defined by the WHO, and it was concluded that in both Guyana and Suriname the ACT artemether+lumefantrine remained efficacious for treating *P. falciparum* malaria.

Currently, all AMI countries that use ACTs implement Day 3 surveillance on *P. falciparum* positive patients as an early warning system to detect any possible loss in sensitivity to ACTs. Patient cure rate data are collected at sentinel surveillance sites throughout the Amazon basin. Selected South American countries have also begun measuring the therapeutic efficacy of ACTs by quantifying the proportion of treatment failures in patients at 28- or 42-day follow-up, depending on the specific ACT. Planning has commenced in French Guiana and Brazil to implement *in vivo* studies in areas that border Suriname and Guyana. Meanwhile, an *in vivo* clinical trial to test the efficacy of artemether+lumefantrine for the treatment of *P. falciparum* malaria commenced in Cruzeiro do Sul, Brazil, in December 2015.

Central American countries that receive AMI support follow a routine surveillance system for all positive *P. falciparum* cases, using the Day 3 monitoring approach and molecular markers to detect possible resistance to CQ as the first-line treatment.

PAHO/WHO and the CDC continued to provide the region with technical assistance to monitor the therapeutic efficacy of antimalarial medicines in FY 2015.

Genetic Markers of Resistance

Beginning in FY 2015, AMI supported analyses of *P. falciparum* parasite samples from Guyana and Suriname for the presence of the Kelch-13 (K13) genetic mutation that has been identified as a marker of artemisinin resistance in Southeast Asia. The goal of the analyses was to establish a sub-regional baseline and subsequently document the emergence of artemisinin resistance, should it occur. If *P. falciparum* parasites develop resistance to artemisinin and partner drugs used in ACTs, the region will be hard-pressed to find a suitable alternative. In Southeast Asia, it has been shown that antimalarial resistance can either spread, or arise independently.[22]

In a retrospective review of *P. falciparum* samples collected in Guyana, mutations were found in the K13 gene associated with resistance to artemisinin. CDC tested 98 *P. falciparum* samples collected in Guyana in 2010 using Sanger sequencing, and preliminary results showed that five samples (5.1%) carried the K13 mutation. This finding raised concerns, in spite of the fact that it is not conclusive without clinical data. However, no K13 mutations were detected among samples from Guyana collected in 2014. Meanwhile, the CDC also tested 40 *P. falciparum* samples collected in Suriname from 2013–2014. The K13 propeller domain was PCR-amplified using established laboratory protocols, and sequencing was also done using the Sanger method. None of the samples from Suriname had the artemisinin resistance-associated K13 mutant alleles. Nevertheless, an analysis of neutral microsatellite data showed that haplotypes found in parasite samples from Suriname were similar to those previously reported in Guyana, Venezuela, and Brazil, which indicated an apparent mobility of the parasite populations in this area.

Another finding was that resistance alleles that the CDC found circulating in Guyana and Suriname differed from the ones found in Southeast Asia, but were similar to one another. This suggests that the parasite strains may have a common origin. It has not yet been confirmed that K13 mutant alleles are associated with artemisinin resistance in the Americas. Regardless, the independent emergence of K13 mutations in different geographic areas is a trend that AMI partners see the need to monitor continuously using molecular analysis techniques. AMI partners have recommended regular molecular surveillance and *in vivo* assessments of artemisinins, as well as of other partner drugs used in ACTs.

Finally, PAHO/WHO led the development and validation of *The Framework for Artemisinin Resistance Containment and Elimination in South America.*[23] As a result, AMI aims to inform decision-makers in South America about the benefits of taking action to eliminate *P. falciparum* malaria, given the likelihood of parasites developing resistance to ACTs. To support outreach to such audiences, an AMI fact sheet on Antimalarial Medicine Resistance in LAC was developed and disseminated by Links Media in January 2015.

22 Takala-Harrison, S et al. 2015. Independent emergence of artemisinin resistance mutations among *Plasmodium falciparum* in Southeast Asia. *J Infect Dis* 5:211.

23 Editing currently in progress. Publication is expected in 2016.

P. vivax Efficacy Studies

Patient follow-up for an *in vivo* efficacy study in the municipality of Cruzeiro do Sul, Acre state, Brazil ended in December 2014. The CDC made a final supervisory visit and subsequently helped local investigators to prepare a manuscript on the results of an *in vivo* therapeutic efficacy study of the current first-line treatment for *P. vivax* in the Brazilian Amazon. The implementation of the study helped to develop the local capacity to follow WHO protocols with MOH and CDC assistance, and in December 2015 the same personnel were engaged to initiate a new *P. falciparum* efficacy study in Cruzeiro do Sul as described above.

In the Central America sub-region, the WHO recommends using molecular markers of resistance due to very low malaria transmission. Blood samples have been collected from patients being treated for *P. falciparum* malaria in Guatemala, Honduras, Nicaragua, and Panama for routine monitoring of antimalarial resistance. During FY 2015, PAHO/WHO assisted with the collection of filter paper samples and sent those samples to the CDC for molecular analysis of resistance markers. A percentage of the slides taken at the same time as the filter paper samples also received microscopy quality control readings at the CDC.

FY2015 Highlights

- Belize, Colombia, Guyana, Honduras and Nicaragua received PAHO/WHO technical support to revise their national treatment guidelines. In addition, Honduras and Nicaragua aligned their national treatment guidelines to help address the issue of population mobility along the border.
- Guyana received assistance from AMI partners to review and update its national strategic plan in order to ensure the continued efficacy of antimalarial medicines used in the country.
- CDC conducted K13 artemisinin-resistance associated gene testing on *P. falciparum* isolates from Guyana and Suriname; samples from 2013-2014 showed no K13 mutant alleles, however 5.1% of a set of 2010 samples from Guyana had the K13 mutation associated with resistance in Southeast Asia. Filter paper samples have been collected in Guyana to follow up on K13 molecular markers in collaboration with WHO, CDC, and the Pasteur Institute in Cayenne, French Guiana.
- Antimalarial medicine efficacy and resistance protocols were incorporated into Colombia's surveillance system.
- PAHO/WHO prepared SOPs in collaboration with Honduras' National Reference Laboratory for collection of blood samples on filter paper, as well as for correct packing and shipping of samples. The SOPs were subsequently shared with AMI countries.
- In Nicaragua and Honduras, parasite samples were collected and analyzed as part of prospective antimalarial resistance monitoring using molecular markers. PAHO/WHO and CDC provided support for quality control.

Implementation Challenges

More studies are needed to validate K13 as a molecular marker of artemisinin resistance in the LAC region. To confirm the validity of this marker in the region, the WHO requires establishing a correlation between K13 mutant alleles with slow clearance in clinical studies, reduced drug sensitivity in *ex vivo* or *in vitro* assays, or reduced *in vitro* sensitivity in transfection studies involving insertion of the mutant K13.

Some countries in the region still struggle to meet the minimum WHO requirements for activities conducted as part of the routine monitoring of antimalarial medicine efficacy, such as:

- Use of WHO templates and data analysis programs, microscopy guidelines, and training tools;
- Standardized microscopy readings by two experts and one layer of internal or external quality control;
- Difficulty of recruiting participants for *in vivo* efficacy trials, accompanied by an increased number of variables that require attention as part of routine surveillance of antimalarial efficacy and resistance;
- Following a standard *in vivo* study protocol, including respect for patient confidentiality and other ethical standards that satisfy institutional review board or ethics committee approval for human subjects research;
- Systematic monitoring to detect the presence of K13 mutant alleles, and their association with emergence of resistance to artemisinin;
- Use of molecular markers in very low-transmission settings.

Greater capacity building and supervision of *in vivo* trials are needed where deficiencies exist. In addition, a reinforcement of routine microscopy capacity is also recommended.

The WHO no longer recommends Day 3 parasite clearance protocols because partner drug resistance is as much of a concern as artemisinin resistance. Depending on the ACT used, full 28- or 42-day follow-up is recommended. However, loss to follow-up is a serious concern given the remote and mobile populations most at risk for malaria in the Guiana Shield sub-region of South America and elsewhere in the LAC region. It is therefore a challenge to improve beyond the Day 3 protocols.

Photo: PAHO/WHO

2.4 VECTOR SURVEILLANCE AND CONTROL

Vector surveillance and control remain important interventions for the region. AMI provides technical assistance to countries to improve local capacity and knowledge of IVM through partners PAHO/WHO and the CDC. Country-level assistance has included support for monitoring, detection, and management of insecticide resistance, with technical assistance for improved vector surveillance, evaluation studies on the implementation and efficacy of vector control interventions such as LLINs and IRS, promoting and implementing the AMI Strategic Orientation Document (SOD) for vector surveillance and control, and providing follow-up results from insecticide resistance sentinel sites.

PAHO/WHO and CDC have collaborated on providing assistance to partner countries, such as by undertaking a regional needs assessment for vector surveillance and control. Both partner organizations have been working closely to establish the terms of reference for Vector Control Needs Assessments (VCNAs) in Belize and Brazil, which are scheduled for FY 2016. In Guyana, PAHO is working to provide training on IVM for regional focal points in November 2015. In addition, PAHO/WHO and CDC have formulated a response to Peru's request to assist in the development of a national insecticide resistance management plan.

In Peru, PAHO/WHO and CDC have provided in-country support continuing to collaborate with counterparts in the INS on vector control and insecticide resistance management. This has included a demonstration project, site visits in the Loreto Region, and a PAHO-led training in May–June 2015. Additional support from the CDC included an evaluation of LLIN efficacy in San Juan Bautista, Loreto together with INS and US NAMRU-6, with the aim of improving vector control strategies. Furthermore, the CDC hosted an entomologist from Peru's INS at their headquarters in Atlanta, USA from August–September 2015 for additional training on the molecular detection of insecticide resistance mechanisms in malaria vectors. CDC also provided assistance to INS in the interpretation of insecticide resistance data to make recommendations for vector control. Peruvian and CDC researchers published in the *Malaria Journal,* in February 2015, the article "Novel Mutations on the ace-1 gene of the malaria vector *Anopheles albimanus* provide evidence for balancing selection in an area of high insecticide resistance in Peru."

In Guatemala, the CDC completed an evaluation of GFATM-procured LLINs in operational conditions that had begun in 2014. Data analysis is ongoing. Additional activities included the characterization of insecticide resistance, in which CDC has provided assistance to the Guatemalan authorities and partners with data interpretation and outlining of next steps for resistance monitoring. Guatemala is working to develop a country-specific version of the AMI SOD for vector surveillance and control. The CDC is providing additional support to partners in Guatemala in developing PCR assays to detect knockdown resistance mutations (KDR) in four new world *Anopheles* mosquitoes, which is one of the mechanisms of resistance against dichlorodiphenyltrichloroethane (DDT) and pyrethroid-based insecticides.

The CDC and PAHO/WHO have been supporting Honduras and Brazil's NMCPs on the characterization of insecticide resistance mechanisms. In Brazil, the CDC has supported data analysis and interpretation. In Nicaragua, data collection for an ITN evaluation has been completed. PAHO has provided further assistance on training activities based on the AMI/RAVREDA strategy and country work plans, including site visits to Colombia in April–May 2015 and to Belize in June–July 2015.

FY2015 Highlights

- Data from Peru was published in *Malaria Journal* in February 2015: "Novel Mutations on the ace-1 gene of the malaria vector *Anopheles albimanus* provide evidence for balancing selection in an area of high insecticide resistance in Peru."
- A Guatemala study on LLINs was completed and data analysis got underway.
- PAHO/WHO and the CDC held a coordination meeting in November 2014 to improve and facilitate technical assistance to partner countries.

Implementation Challenges

Within the LAC region, the use of evidence-based decision-making for vector control is not yet commonplace in public policy. Significant knowledge gaps exist and difficulties in disseminating research findings hinder officials' ability to make evidence-based vector control decisions. In addition, the region has limited tools available for vector control, and of those in use, many uncertainties remain as to their acceptability and impact among target populations, especially with regard to the vector behavior and biting patterns that may impact the effectiveness of IRS and LLINs.

Outbreaks as a result of other vector-borne diseases including Dengue, Chikungunya, and Zika continue to weigh on countries' vector control programs, resulting in a shift of resources and personnel away from malaria-specific vector surveillance and control. Countries should use an integrated approach to address these emerging and ongoing threats.

Although countries have strengthened their capacity to conduct routine insecticide resistance surveillance, their ability to manage insecticide resistance remains limited. The development and implementation of an SOP for insecticide resistance management is vital and should be prioritized for the coming year, so that countries have an established strategy for managing this threat.

Photo: PAHO/WHO

2.5 COMMUNICATION AND INFORMATION DISSEMINATION

Communication, information dissemination, and advocacy play a pivotal role in the continuation of efforts for malaria prevention and control. As malaria incidence decreases throughout the region, communication and advocacy efforts are required to take on a more targeted approach to malaria elimination, addressing the most at risk populations to ensure that there is not a rollback of achievements. These efforts are crucial to advance actions towards elimination by keeping malaria on the agendas of policy-makers, key stakeholders, and the public as a critical issue that impacts multiple segments of society.

Effective communication and information dissemination rely on parallel efforts to reach target audiences at the regional, national, decentralized, and community levels. In FY 2015 AMI partners PAHO/WHO and Links Media supported the development, adoption, and implementation of communication tools designed to inform policies for efficient and sustainable interventions to prevent, control, and eliminate malaria in LAC.

AMI communication partner Links Media: 1) conducted a rigorous assessment of the information and communication needs of 11 NMCPs and their various audiences, environmental factors, and specific policy requirements; 2) conceptualized and crafted realistic strategies for malaria communication and advocacy to address multiple audiences and consider the current epidemiological context of each country and specific areas of disease; 3) obtained strategy reviews and input from key stakeholders at the national and international levels; 4) harmonized communication strategies to ensure that they complemented existing country and regional strategies and plans of action; 5) created a robust portfolio of tools and documents to support the mobilization of resources for implementation of the malaria communication strategies; 6) helped to link NMCPs, MOHs, the donor community, mass media, and other key stakeholders with communication resources and local entities that could help them; 7) provided targeted technical assistance to NMCPs to enhance their capacity to communicate with their constituents and advocate for better malaria control with stakeholders; 8) fostered regional discussion and knowledge exchange on improved approaches for effective malaria prevention and control action with remote/rural, mobile/migrant, and indigenous populations; and 9) informed the regional consultation to develop a new *Strategy and Plan of Action for Malaria in the Americas: 2016–2020* to ensure strategic interventions in advocacy, communication, and knowledge dissemination.

Communication Strategy Development

In FY 2015 Links Media collaborated with the NMCPs of Brazil, Colombia, Guyana, Ecuador, Peru, and Suriname to develop national communication strategies for malaria, and together with Belize, Guatemala, Honduras, Nicaragua, and Panama designed a regional strategy for the bloc of Central American countries. All strategies were designed to support NMCPs to systematically use a range of communication approaches to ensure the durability of technical, operational, and financial support from relevant stakeholders in the context of declining cases and deaths due to malaria. Brazil, Colombia, Guatemala, Guyana, Panama, Peru, and Suriname received ongoing technical assistance from Links Media during FY 2015 and FY 2016 to plan and implement previously developed communication interventions.

Specifically, the *Strategic Communication Guide for Malaria in Central America* aims to facilitate the mobilization of resources from MOHs, the donor community, and private funding sources to support the sustained functioning of malaria control programs for years to come. The document has served as an innovative roadmap for countries in the region to synchronize their communication efforts, and was used as a reference by other actors preparing for malaria elimination in the Asia-Pacific region.

Forums for Coordination and Communication

PAHO/WHO and Links Media have established in-person and virtual communication forums to enhance and improve the frequency of interactions between AMI/RAVREDA network partners. In order to facilitate better coordination and establish a common understanding among actors and stakeholders, AMI has supported semi-annual Steering Committee meetings, a regional malaria partners meeting, annual AMI/RAVREDA evaluation meetings, the use of digital media, social networks, electronic correspondence, webinars, and quarterly bulletins. The AMI quarterly activities bulletins produced by Links Media highlight partner progress and have been shared with a wide audience in the region to enhance coordination.

Virtual forums play an important role in sustaining communication and information exchange among AMI partners throughout the year. Links Media continued to manage the AMI website (usaidami.org) and social media platforms including Twitter, Facebook, Instagram, and LinkedIn in FY 2015. The AMI website in English, Spanish, and Portuguese serves as a repository for publications across technical interventions. Its "Resources" page also serves as a knowledge management tool for products developed by AMI-supported countries themselves; Colombia's MSPS provided GFATM Project Malaria Colombia materials for upload to the site to aid in the transition process following project close-out. Digital engagement by malaria stakeholders from the region and the world increased on all platforms, as evidenced by growth in interactions, followers, and unique users that visited these communication channels.

Technical Assistance for Implementation of Communication Approaches, Including Targeted Interventions for Key Populations

Key populations are defined as groups that experience a higher epidemiological incidence, risk, or burden of disease, combined with significantly lower access to services, at the same time that they belong to a criminalized or marginalized sub-population.[24] These populations are considered more vulnerable to malaria infection in certain situations or contexts, as is the case with itinerant miners, loggers, remote and mobile populations, and indigenous peoples. AMI partners have previously referred to these key populations as living in "special circumstances," and have acknowledged that differentiated communication approaches are required to reach them with messages about malaria prevention and control.

From 2015–2016 Links Media advised the Guyana's NMCP, known as vector control services (VCS), to develop multi-channel communications about malaria prevention and case management. Formats included a billboard, social media, and multi-lingual Information, Education and Communication (IEC) self-instructional materials on RDTs for use by the mobile mining and logging populations.

24 Ibid 2.

In FY 2015, Peru's Loreto Region experienced a resurgence of malaria that resulted in the declaration of a health emergency. AMI technical partners including Links Media traveled to the city of Iquitos in March 2015 to provide technical assistance on the planning of key interventions in response to the emergency. During subsequent capacity building and training, special attention was provided to this region, where disease incidence is highest in Peru. The communication strategy developed for malaria in Peru focused on Loreto, and included recommendations for working with indigenous populations and improving the coordination and communication between national and local-level health actors. In all, the Peruvian MOH trained 371 community health workers on best practices for malaria control in Loreto, including 105 indigenous health workers.[24]

Following the conclusion of a five-year GFATM grant in early 2015, the Colombia's MSPS sought to urge the continuation of community-level efforts at the decentralized level in order to prevent the resurgence of malaria. The grant funded Project Malaria Colombia, and supported five malaria-endemic departments on the country's Pacific Coast, and included the use of communication and social mobilization to raise community awareness and promote healthy behaviors conducive to malaria prevention and control. With support from Links Media, the MSPS drafted a policy paper calling on decentralized authorities to sustain behavior change communication and social mobilization efforts by dedicating sufficient departmental and municipal health resources to community-level activities.

Also during FY 2015, Brazil's NMCP initiated the development of a national social mobilization strategy to address gaps in population coverage with continuous prevention, diagnosis, and treatment services. Malaria endemic states in Brazil and Links Media provided input to Brazil's NMCP on communication interventions that could help address high malaria incidence among itinerant gold miners (*garimpeiros),* riverside communities, and indigenous populations in the Amazon region. Links Media provided guidance and recommendations for working with vulnerable groups in a technical assistance document that was delivered in June 2015.

In Suriname, Links Media provided research and recommendations for letters that were drafted to the president, vice president, and cabinet members on the topic of malaria. The letter requested additional support for the Ministry of Public Health's Malaria Program goal of reaching malaria elimination by 2020, as a measure to help prevent the emergence of artemisinin resistance.

Dissemination of the Evidence Base

Links Media and PAHO/WHO have worked with other implementing partners to collect, summarize, and disseminate technical guidance and operational research findings that help to inform national decision-makers and managers of malaria control strategies. Originally published in Spanish in 2011, SODs on the topics of vector surveillance and control, the management of pharmaceuticals and supplies for malaria, and antimalarial resistance and efficacy monitoring were made available in English and Portuguese through collaboration between PAHO/WHO and Links Media.

Dissemination of scientific studies is done continuously through the virtual communication channels mentioned above, as well as with targeted communication activities such as an annual Malaria Day in the Americas forum. The celebration of Malaria Day in the Americas serves as an additional platform for reaching decision-makers. PAHO/WHO collaborates with partners outside of AMI to highlight successes and needs within the region

25 Indigenous health workers who were trained in Peru were of the Bora, Cocamas, Cocamilla, Ikitu, Quichoa, Ticunas, Urarinas, and Yaguas ethnicities.

and recognizes three Malaria Champions of the Americas each year, which normally include key programs and interventions that have resulted in decreased malaria incidence. Links Media supported the 2014 and 2015 celebrations by providing guidance on social media outreach and coordinating efforts with USAID social media channels such as the USAID Global Health and President's Malaria Initiative (PMI) accounts, as well as documenting social media engagement.[26]

In addition, Links Media has conducted media outreach to highlight new research and noteworthy events related to malaria in LAC. A news release issued in November 2014 alerted stakeholders to a budding regional partnership for the provision of technical assistance on medicine quality following a workshop that USP/PQM organized with AMI support. For World Malaria Day in April 2015, Links Media promoted news releases about malaria in pregnancy and PAHO's call for nominations for the next Malaria Champions of the Americas. In June 2015, Links Media placed an article in the Spanish-language edition of SciDev.net about findings of Peruvian health officials, NAMRU-6, and the CDC related to the effective management of malaria outbreaks.

Communication, information dissemination, and advocacy will play an even larger role in educating malaria actors and stakeholders about important definitions and requirements for malaria elimination going forward. To that end, AMI has supported the development of fact sheets summarizing PAHO/WHO technical guidance including Frequently Asked Questions (FAQs) on Malaria Elimination, a list of selected resources for malaria elimination, and a series of fact sheets for interventions in low-incidence settings. Links Media has designed these communication tools in multiple languages for use by NMCPs and malaria advocates in the region.

FY2015 Highlights

- Brazil's NMCP initiated the development of a national social mobilization and participation strategy for malaria control in collaboration with decentralized authorities and numerous other government ministries during a workshop with decentralized staff in October 2015.
- Guyana's NMCP worked with the Gold and Diamond Miners Association to prepare for RDT roll-out in Regions 7 and 8, and reached out to the Ministry of Indigenous People's Affairs to request the inclusion of malaria on the agenda during Indigenous Heritage Month festivities.
- Following a field validation, Links Media and MSH/SIAPS collaborated on the adaptation of illustrated job aids for a range of audiences in Guatemala, from regional managers to voluntary collaborators, on the topics of diagnosis, treatment, pharmaceutical management and malaria case management.
- Malaria communication strategies were presented for Peru, Suriname, and the Central America region.
- Malaria research conducted by Peru's NMCP, US NAMRU-6, and the CDC was disseminated via a Spanish-language article on SciDev.Net.
- Colombia's MSPS received Links Media's support to draft a policy paper for decentralized decision-makers in order to improve local ownership of communication and social mobilization efforts related to malaria at the community level.
- Letter about malaria elimination to national-decision makers in Suriname was drafted with Links Media's input, with the goal of mobilizing additional support for malaria elimination as a means of preventing the emergence of artemisinin resistance.

26 See: https://storify.com/AmazonMalaria/malaria-day-in-the-americas

Implementation Challenges

Limited budgets and personnel with which to implement communication interventions have prevented many NMCPs from conducting strategic planning for malaria communication. Links Media and other AMI partners have encouraged NMCPs to, besides planning and budgeting for communications, aim to overcome the lack of resources by pursuing partnerships outside the health sector and from private industry groups, based on mutual interests in achieving malaria control. Countries will have a continuing need for capacity building and TA in communication in the coming years, in order to implement the malaria communication strategies that they developed with Links Media's technical support.

NMCPs and/or MOHs need to designate appropriate liaisons to carry communication strategy implementation forward. Having a communication liaison for malaria is vital for sustainability as well as to help keep malaria on the public policy agenda. Countries that lack a specific liaison for communication and advocacy related to malaria are at a disadvantage when it comes to strategy development and implementation, as well as in conducting outreach and building alliances with non-traditional partners.

Moreover, country partners continue to face difficulties in working with key populations including rural, indigenous, mobile and migrant workers that often experience a greater share of the disease burden. National malaria strategies must account for these populations and plan to work with social scientists on tailored communication interventions to reach them.

Finally, the demand exists for more in-language communication products on malaria prevention, control, and elimination. Links Media has placed an emphasis on providing communication tools in Spanish and Portuguese to help NMCPs reach decision-makers with timely, useful information about malaria. It has been helpful to translate important documents and research findings, or summaries of the same, in order to share and apply best practices locally.

Photo: PAHO/WHO

2.6 REGIONAL NETWORKING AND SYSTEMS STRENGTHENING

AMI benefits countries by addressing shared problems through a coordinated regional approach that allows for the comparison of operational research and monitoring of results across countries. AMI/RAVREDA is distinguished from other malaria initiatives by the regional collaboration, coordination, and sharing of lessons learned that take place among countries. Countries in the LAC region take advantage of AMI/RAVREDA as a regional mechanism to jointly develop capacity related to the technical areas of antimalarial resistance monitoring, diagnosis, treatment, vector control, disease surveillance, and communication. Partners maintain an ongoing exchange of information and expertise through South–South collaboration.

Cross-border collaboration between Colombia and Panama

AMI partner PAHO/WHO has identified the need for regional and cross-country collaboration with specific attention to border areas in the design of surveillance systems. Stemming from this need, Panama has initiated activities and strengthened cooperation with Colombia through interventions in the shared border, where access to health services is challenging and costly for affected populations. During FY 2015, national authorities of both countries signed a cross-border cooperation agreement. Between July–September 2015, Panama and Colombia held a cross-border training workshop on operational protocols for malaria surveillance for 24 personnel working in border areas. Colombia's and Panama's MOH personnel discussed malaria surveillance along the border and facilitated joint training exercises, one of which was an exchange program for Panamanian entomologists to receive instruction with their Colombian counterparts. Plans exist to continue this bi-national collaboration.

USP/PQM workshop on sustainable regional collaborations for medicine quality

During FY 2015, USP/PQM coordinated a regional workshop in Lima, Peru that was attended by officials from MRAs, OMCLs, and selected schools of pharmacy from 16 LAC countries. The workshop served as a forum to explore possible sustainable mechanisms to implement South–South collaboration for the quality assurance of medicines. Subsequently, selected country representatives collaborated with PQM and PAHO in writing a concept note to countries' ministers of health. USP/PQM disseminated the concept note with conclusions and recommendations from the workshop, in addition to surveillance information on capabilities and needs of countries' MRAs and OMCLs. Existing resources that could contribute to the provision of South–South TA were highlighted.

Malaria Partners Meeting and AMI/RAVREDA Annual Evaluation Meeting

From March 23–27, 2015, AMI/RAVREDA technical partners, country officials, and representatives of other malaria initiatives in the region convened in Rio de Janeiro, Brazil for a Malaria Partners Meeting and AMI/RAVREDA Annual Evaluation Meeting. The meetings provided an opportunity for participants to share lessons learned, results, and best practices to help countries within the region improve control and move towards elimination. Major themes included guaranteeing access to prompt, quality diagnosis and treatment in light of the reduced number of cases, the threat of antimalarial drug resistance, the quality of essential medicines, and vector surveillance and control.

The Malaria Partners Meeting allowed for knowledge sharing among multiple malaria initiatives, technical partners, and country-level actors such as representatives of MOHs and NMCPs. This meeting sought to undertake malaria prevention, control, and elimination in a more coordinated and effective manner, as well as to identify a mechanism for better coordination of all relevant stakeholders within the region. The meeting catalyzed efforts within LAC to form a Technical Advisory Group (TAG) with the objective of bringing together experts to provide guidance on regional malaria control and elimination efforts, and help validate a new multi-year strategy for the region.

Regional Malaria Leadership Course

From September 21–October 2, 2015, AMI supported the participation of partners from Belize, Brazil, Honduras, Nicaragua, Panama, Peru, USAID, PAHO/WHO, and Links Media in the regional edition of the "Science of Eradication: Malaria" course in São Paulo, Brazil. The course was administered to approximately 100 program managers and members of the research community in malaria-endemic countries. It was hosted at the University of São Paulo's School of Public Health and co-sponsored by the Harvard T.H. Chan School of Public Health, the Swiss Tropical and Public Health Institute (Swiss TPH), and the Barcelona Institute for Global Health (ISGlobal), with logistical and financial support from PAHO/WHO under AMI, the São Paulo Research Foundation (FAPESP, by its Portuguese acronym), the Bill & Melinda Gates Foundation, and the Coordination for the Improvement of Higher Education Personnel Foundation (CAPES, by its Portuguese acronym).

Regional Bulletin on Imported Malaria Cases

Brazil's NMCP has developed a regional bulletin on malaria cases imported from the following neighboring countries: Bolivia, Colombia, Peru, Guyana, French Guiana, Suriname and Venezuela. The bulletin provides an analysis of the number of cases disaggregated by sex, age, parasite species, and occupational activity of infected individuals. It has been updated monthly and circulated among all countries that border Brazil. AMI partners encourage other countries in the region to develop and disseminate similar bulletins on the origin and number of imported malaria cases by country, following the Brazilian model.

Photo: William Miller

CONCLUSION—CHALLENGES AND OPPORTUNITIES

Chapter 3

Photo: PAHO/WHO

3.1 CHALLENGES, NEEDS AND OPPORTUNITIES

Even in the context of significantly reduced malaria cases and mortality, improved prevention and control practices, wider availability of diagnosis and quality-assured medicines, increased surveillance, and regional collaboration, a number of challenges remain for the LAC region. In the path towards malaria elimination, maintaining the gains and continuing to improve in terms of capacities to detect and manage malaria is of paramount importance. Paradoxically, in spite of the long-standing commitment of LAC governments to combat malaria, many NMCPs have experienced ongoing instability of human, financial, and other material resources.

In addition, important factors that threaten the gains made to date are:

- Deficiencies or delays in reporting to national surveillance systems
- Health system reorganization and decentralization
- Loss of capacity to perform laboratory diagnosis of malaria and manage cases
- Remote and disenfranchised status of affected populations, leading to neglect
- Competing priorities due to emerging diseases such as Zika and Chikungunya, as well as epidemics of well-established diseases like Dengue
- Achievement of higher-income status in the region, together with a decreasing burden of disease, which may cause some countries to lose their eligibility to receive external financing from GFATM, USAID, or other donors
- Emergence of new types of antimalarial drug resistance, as a result of constant parasite mutations and mobility of both human and parasite populations
- Mosquitoes' development of resistance to available insecticides, and/or changes in anopheline behavior in response to insecticides
- Reintroduction of malaria from outside the LAC region to areas that remain receptive
- Disengagement of affected populations, leading to under-utilization of available prevention measures (IRS and LLINs), diagnosis, and treatment services offered by the public sector

As the LAC region moves towards malaria elimination, greater emphasis must be placed on continued regional coordination and collaboration among countries. Population, vector, and parasite mobility patterns between countries will need to be monitored and addressed through country-supported collaboration mechanisms like RAVREDA. Regional networks will remain relevant in order to sustain the gains and avoid backsliding. Moreover, regional networks for malaria may even play a more significant role in improving communication, bringing multiple partners and stakeholders together to enhance collaboration, share epidemiological information, mobilize additional resources, and achieve sustainable actions in the long term.

Diagnosis and treatment of cases are fundamental malaria control interventions. However, some areas within endemic countries have limited diagnostic capabilities due to lack of resources or lack of trained microscopists. The use of RDTs can provide a stopgap solution, but availability and reliability of RDTs vary, especially in light of

recent research regarding HRP2 and HRP3 gene deletion in *P. falciparum* parasite strains in the region. As a result, surveillance systems may not be able to capture all infections, which taken together with asymptomatic cases, poses a challenge to prevention and control efforts in the region. Another challenge related to ensuring reliable disease surveillance is the need to improve information sharing with private health service providers, which must provide laboratory confirmation and notification of 100% of the malaria cases detected to the public sector in order to achieve elimination.

With regard to treatment, recent studies have shown no artemisinin resistance in the Americas, but the possibility for it to emerge remains a concern. In observing the impact of artemisinin resistance in Southeast Asia, the possible consequences in South America could negate significant advances made in malaria control, as most countries rely on an ACT to treat *P. falciparum* infections as their essential tool. Countries must continue to promote the proper treatment of confirmed cases, while also monitoring for delayed parasite clearance in infected patients.

In order to treat all cases, countries need to ensure that they maintain minimum stock levels of antimalarial medicines at both the central and decentralized levels. As noted above, this may be difficult, as pharmaceutical companies lack a financial incentive to supply essential medicines in the small quantities that are needed. Countries should continue to monitor, track, and report on their inventories of medicines to foresee possible shortages, prevent stock-outs, and identify and resolve issues in the pharmaceutical supply chain.

The threat of poor quality and counterfeit drugs to malaria prevention and control efforts is well known, and a country's ability to address this issue is essential. The region has made strides in its ability to ensure medicine quality as countries have strengthened their regulatory capabilities. Collectively, the region has excellent laboratory capacity to perform compendial tests and other key functions. However, as of 2014 no single country in the LAC region was fully able to address all facets of medicine quality within its health system. Instead, countries must work together or forge partnerships with local universities to address gaps in capacity and implement routine testing of antimalarial medicines.

In the area of vector surveillance and control, insecticide resistance management poses a challenge to controlling mosquito populations, in addition to shifting to address other vector-borne diseases such as Dengue, Chikungunya, and Zika. Field entomologists have been trained to monitor and detect insecticide resistance, however managing and responding to resistance at the national level can vary between countries. SOPs to manage insecticide resistance need to be developed to guide program managers in the region. An additional gap is that only a limited number of insecticides can be used to control *Anopheles* mosquitoes; few new insecticides have been produced for public health purposes in the last 30 years.

Communication and information dissemination are valued by program managers in the region, however NMCPs require greater commitment and resources both human and financial to reach affected communities and policy-makers in order to mobilize more resources for malaria. Malaria diagnosis, treatment, and vector control must include Social and Behavior Change Communication (SBCC) and health promotion interventions, as well as advocacy and stakeholder outreach in order to be more effective. Inter- and intra-agency coordination and collaboration across different sectors of the economy need to be articulated through effective strategic communication. A lack of commitment to strengthen and invest in communication as a component of the strategy against malaria will greatly constrain MOHs' and NMCPs' progress against malaria. Resources for malaria control and elimination risk to be reduced over time if NMCPs fail to engage at the policy level to educate leaders about the need for sustained investment. Communication should be assumed as a line of work of its own, with concrete objectives and measurable indicators in alignment with the overall goals of AMI/RAVREDA.

3.2 BEST PRACTICES TO BE EXPANDED OR REPLICATED

Multi-sectoral engagement

Partnering with private infrastructure projects in the Amazon to mitigate malaria transmission is a model from Brazil that may serve as an example to other countries with the potential for increased malaria due to economic development projects. In Brazil, since 2006–2007 companies building hydroelectric dams in malaria-endemic states have been required to develop and execute malaria control plans as part of their environmental licensing requirements.[27] In the example of the Santo Antônio and Jirau hydroelectric dams built in Rondônia state, an investment totaling more than $12 million was made by builders and malaria control activities were executed by the Porto Velho Municipal Health Secretariat. Now that the dams are operational, the communication and coordination between the MOH and the Ministry of the Environment for engaging the private sector have led to a significant reduction in malaria cases. The same policy model could be employed elsewhere by way of using cross-sector collaboration to leverage novel sources of funding to address priority areas for malaria control.

Systematic monitoring of HRP2/HRP3 gene deletion

Progress has been made with the selection and introduction of RDTs, thanks in part to USAID's support for a systematic survey of HRP2 and HRP3 gene deletion patterns in the Americas. Now that a regional baseline exists, countries' NMCPs should monitor the prevalence of HRP2 gene deletion at three-year intervals due to the possibility for spontaneous genetic mutations and the migration of parasites over time. Molecular surveillance of parasite populations should be a routine activity in countries throughout LAC, in order to observe and respond to trends in constantly evolving malaria parasites. Accurate diagnosis of all cases depends on the ability to gather and interpret this data.

Regional collaboration to strengthen the Three Level Approach

The Three Level Approach to medicine quality control is cost-effective, fast, and a reliable methodology for executing antimalarial quality control tests in malaria-endemic regions. It consists of sequential and complementary levels of quality control of increased complexity. The Three Level Approach has been adopted in Peru and Colombia; a regional workshop sponsored by AMI in FY 2015 resulted in a concept paper on how to build capacity regionally using South–South collaboration and promote its formal adoption to strengthen other countries' national pharmaceutical quality control systems. One of the key factors has been the involvement of universities in antimalarial medicine QA/QC, as evidenced by Peru and Brazil's recent partnerships with universities. Other countries could examine university laboratory capacity for similar collaborations.

27 Per Brazilian Ministry of Health Regulation N° 001 in 2014 and Inter-Ministerial Regulation N° 60 in 2015, following the issuance of Regulation N° 47 in 2006.

Good pharmaceutical supply management practices at primary level health facilities

AMI partner MSH/SIAPS has developed best-practice guidelines for the management, storage, and supply of malaria pharmaceuticals for primary health facilities. As of FY 2014, Brazil and Ecuador were using the best-practice guidelines fully, according to preliminary results of a regional assessment. Colombia and Guatemala have piloted the guidelines with local-level staff in specific areas with elevated malaria transmission to positive outcomes, but have not yet extended the pharmaceutical management practices to other areas beyond the pilot sites.

Quality assurance network for microscopy diagnosis

National laboratories in Honduras and Peru have a strong role in the network supporting quality assurance of malaria microscopy in AMI-supported and other countries in the Americas. The regional EQAP has been made possible in part by their leadership. A slide bank was developed in Honduras with microscopy blood slides that can serve as a resource for training and the maintenance of national capacity throughout the region. Meanwhile, external quality assurance methods still need to be implemented at the decentralized level in many countries in the LAC region.

Targeted actions with remote/rural, mobile, and indigenous populations

Key populations have been reached with success in a few cases, but little has been done to scale up or replicate these isolated positive experiences. Mobile populations in mining areas have been reached with SBCC efforts in parts of Brazil, Guyana, and Suriname, and migrant sugarcane workers have benefited from private sector cooperation in Guatemala. Differentiated health services have been provided in the indigenous communities of Bisira, Panama, Wampusirpi, Honduras, the Alto Rio Solimões indigenous health district in Amazonas state, Brazil, and in the department of Alta Verapaz, Guatemala. Examples that have been identified should be shared and lessons learned should be applied more widely across the region. The sharing of successful experiences for adaptation elsewhere is increasingly feasible at a low cost, given the proliferation of information and communication technologies for virtual collaboration.

Photo: PAHO/WHO

3.3 FUTURE DIRECTIONS

The coming years will be pivotal to implement a strategy for the sustainability of malaria prevention, control, and elimination efforts in the LAC region. As they move towards elimination and beyond, countries will need to have sustained capacities to: detect and manage malaria, particularly among key populations; detect and contain malaria re-emergence and re-introduction; monitor and—eventually—address resistance to antimalarials; implement, monitor and evaluate vector control interventions; effectively use communications; and continuously improve program performance in a decentralized health sector. Needless to say, countries also need to continue to build on previous efforts, using new evidence and incorporating new tools and approaches, as they become available, to strengthen their programs.

The regional network, RAVREDA, must be expanded to include all countries that are stakeholders in malaria elimination, and should serve as a reference for all donors and agencies interested in supporting malaria elimination in the region, while the national malaria strategic plans are considered the guidance for country level cooperation.

By the end of 2016, the next iteration of the *Strategy and Plan of Action for Malaria in the Americas 2016–2020* will be finalized and approved by the 55th Directing Council of PAHO. This document will outline the key interventions for the LAC region following the WHO's *Global Technical Strategy* and *AIM* documents, which were released in 2015 and reflect a reorientation of efforts towards elimination. To achieve elimination in the region, AMI partners will need to ensure that good practices for prevention and control are leveraged and sustained past the goalpost of zero incidence.

Photo: William Miller

COUNTRY PROFILES AND COUNTRY CONTEXT

Appendix I

Photo: PAHO/WHO

BELIZE

Belize has surpassed the MDG 6 objective and is currently moving towards elimination. The country has experienced a dramatic decline in malaria cases, reporting reductions of over 95% since 2000. Residual and active areas of disease transmission are primarily found in the southern state of Stann Creek; however, a recent resurgence of malaria cases has been identified in northern Belize.

Malaria transmission occurs from February to April during the dry season, and from August to October during the rainy season. The majority of cases are *P. vivax* infections. Both *P. falciparum* and *P. vivax* infections are treated with CQ and PQ. In 2013 and 2014, patients reportedly received treatment more than 72 hours after onset of symptoms.

The primary malaria control strategy in Belize has been IRS. In recent years, the country has also implemented ITNs, and has prioritized larval control, surveillance, cross-border collaboration, and timely diagnosis and treatment of malaria cases.

Belize has come to focus on improving the accuracy of malaria diagnosis, strengthening surveillance and conducting joint trainings on the proper use of diagnostics with Mexico, with support from AMI. As a result of the recent resurgence of cases in the north, Belize aims to expand its national diagnosis network to the northern part of the country.The country has also updated its national treatment guidelines, with technical support from PAHO/WHO. The country's new national treatment guidelines have incorporated ACTs for *P. falciparum* cases and encompass other strategic areas including surveillance and case follow-up. Additional measures to prevent imported cases include the distribution of ITNs to travelers going to areas with reported CQ resistance, and screening them upon their return.

Given the limited number of antimalarials procured for the country, Belize has conducted periodic quality control tests on randomly selected antimalarial drugs with support from PAHO/WHO.

In 2015, Belize completed an analysis of vector behavior and distributed a new manual on IVM for community health workers and voluntary collaborators. This manual will make it possible to formulate evidence-based interventions and target them to geographic areas that are particularly at-risk.

BRAZIL

Although malaria continues to be a major public health problem in Brazil, the country has made significant progress in reducing malaria incidence and mortality and had officially met the MDG 6 target of reducing the malaria burden by 75% as of 2014. That same year, the country also reported its lowest number of malaria cases in 35 years.

Established in 2003, Brazil's NMCP's aim is to reduce mortality from malaria, reduce severe cases, reduce the incidence of the disease and interrupt transmission. The country's NMCP is part of the MOH's Department of Health Surveillance, and collaborates with the ministry's Community Health Outreach Programs and Family Health Strategy.

Malaria transmission in Brazil is present throughout the year and is seen to be highest during both the dry season and the peak of the rainy season, April–May. With the vast majority of malaria concentrated in the Amazon region of Brazil (99.8%), the Brazil's NMCP has concentrated its efforts on endemic states in that region. The primary vector in the Amazon region is *An. darlingi*. In 2014, 82.9% of all cases were caused by *P. vivax*, while *P. falciparum* caused only 15.6% of cases, and <2% were caused by other species and mixed infections. Microscopy is the main method for diagnosing malaria in the country. In the Amazon region, first line treatment for *P. vivax* infections is CQ and PQ, while *P. falciparum* infections are treated with artemether-lumefantrine and artesunate-mefloquine.

Between 2013 and 2014, malaria cases among gold miners decreased by 47% and loggers decreased by 19%. Malaria also disproportionately affects indigenous populations and plantation workers, especially in the states of Amazonas and Roraima. Despite the high number of laboratories in the state of Amazonas, only half of their patients were treated in less than 48 hours.

In FY 2015, Brazil worked to make its approach to improving and sustaining malaria prevention, diagnosis, and treatment services more inclusive by specifically targeting key populations in malaria endemic states (pregnant women, itinerant gold miners, migrant workers, and indigenous and riverside populations) with differentiated communication and social mobilization strategies. The country most recently focused its efforts on distributing LLINs as a method of vector control, and established sentinel sites in remote parts of the country to complement antimalarial resistance surveillance efforts.

The country's nine malaria-endemic states have been executing strategies to close the gaps for adequate implementation of standard malaria control

interventions. Diagnosis units have been established in remote locations of the country and will have personnel trained to diagnose patients with RDTs. Brazil has worked to ensure that its network of 4,900 laboratory technicians, including in the Amazon region and other regions of the country, maintain their capacity for malaria diagnosis. To reduce the country's annual deaths attributed to malaria, Brazil has adjusted its surveillance system to incorporate the reporting of malaria outbreaks, which will allow for an immediate response. The country has also increased efforts to eliminating *P. falciparum* malaria and recently launched a National Elimination Plan with the goal of reducing cases by 90% by the year 2030. The elimination plan provides important technical guidance for Brazilian municipalities, and defines differentiated strategies for diagnosis, treatment, vector control, health education and social mobilization. In November 2015, the country's NMCP was recognized as the 2015 Malaria Champion of the Americas.

COLOMBIA

Colombia reported a 71.8% decrease in malaria cases between 2000 and 2014. Despite being the second country with the largest number of malaria-related deaths in the region overall, mortality has decreased by 86.3% since 2000 and the country is on track to meet the MDG 6 objective by 2015.

Malaria transmission in Colombia is concentrated in the northwestern region of the country, near the Panamanian border. The months of March–June are the peak transmission period. Although the majority of malaria cases in Colombia occur in rural areas, the Colombian Pacific coast has been reporting increasing urban and peri-urban malaria transmission.

Various vector species exist in Colombia, including *An. darlingi*, *An. psuedopunctipennis*, *An. albimanus*, *An. nunestovari*, *An. neivai*, and *An. punctimacula*. The majority of cases have been due to *P. vivax*, although in 2014 the country reported an increase in *P. falciparum* infections. Microscopy is the most common method to diagnose malaria in the country, however RDTs are also used. The first line treatment for *P. vivax* infections is CQ and PQ, while *P. falciparum* infections are treated with artemether–lumefantrine. In 2014, only 36% of all malaria patients waited more than 72 hours before receiving treatment.

Colombia hosts regular roundtable meetings composed of experts and stakeholders from the country's universities, research centers, and public health authorities. During these meetings, new data from antimalarial efficacy and resistance monitoring is reviewed and policy recommendations are made.

Colombia's experience certifying and training operational technicians and entomologists continues to serve as a model for South–South cooperation. During FY 2015, the country strengthened cross-border cooperation with Panama in a variety of areas, including insecticide resistance surveillance and monitoring the efficacy of prescribed antimalarial drugs along the border with Panama. A new sentinel site in Chocó is one component of a binational project with Panama.

During FY 2015, the country's OMCLs participated in a training to support the development and validation of new analytical methods for medicines not currently included in the Minilabs™. Colombia developed pharmaceutical supply management criteria for low-incidence areas and a system for tracking stock availabilities.

Colombia's NMCP collaborated with USAID-funded MSH/SIAPS to develop the first draft of a research protocol to estimate the under-reporting of malaria cases at diagnosis and treatment posts in high-burden departments in Colombia. In an effort to ensure quality diagnosis for all patients, Colombia's recently developed *Manual on Malaria Diagnosis Quality Assurance in Colombia* is being adapted to international guidelines.

ECUADOR

Ecuador has surpassed the MDG 6 objective and is currently in the pre-elimination phase. Between 2013 and 2014, the country reported a decrease of locally transmitted cases, from 544 to 368. As part of the country's health system reorganization, the Ministry of Public Health (MSP, by its Spanish acronym) has absorbed Ecuador's National Control Service for Vector-Borne Diseases (SNEM, by its Spanish acronym).

Ecuador's malaria transmission differs in the Eastern and Western regions of the country. While the Eastern region experiences malaria transmission during the rainy season (October–May), the Western region experiences transmission year-round. The vector control methods used in Ecuador are IRS and the distribution of ITN's.

The most common vector in the Amazonian area is *An. darlingi*, while *An. albimanus* is found on the Pacific coast. *P. vivax* is the main malaria-causing species; however the country also reports *P. falciparum* infections. The first line treatment for *P. vivax* infections is CQ and PQ, while *P. falciparum* infections are treated with artemether-lumefantrine. As of 2013, 83.1% of patients diagnosed with malaria were treated within 24 hours of the onset of symptoms.

Ecuadorian and Colombian national counterparts have initiated discussions to coordinate joint trainings for the improvement of surveillance on the border. As a result, Ecuador has expanded its antimalarial surveillance to areas of disease transmission in San Lorenzo, with the implementation of a tool for following up on *P. falciparum* cases along the northern border between Colombia and Ecuador. In order to reduce the malaria burden in high-transmission areas and improve the country's allocation of resources to this effort, Ecuador integrated a malaria module into the country's epidemiological surveillance system.

Regarding the implementation of quality assured diagnosis, Ecuador created a network for the diagnosis of malaria using microscopy. This network has been integrated into the country's National Institute of Public Health Research (INSPI, by its Spanish acronym), through the National Reference Center for Parasitology (CNRP, by its Spanish acronym).

Improving antimalarial drug management has been a priority for Ecuador. With support from PAHO/WHO and the MSH/SIAPS program, antimalarial medicines are now part of the country's supply chain management system. To strengthen drug quality control, the medicines regulatory agency created in 2013, ARCSA, has included the Three Level Approach as one of its modalities for post-registration medicine quality monitoring. Consequently, ARCSA will now use Level 2 rapid analytical tests for pharmaceutical quality control.

GUATEMALA

Over the past 15 years, Guatemala has reduced its malaria burden by over 75%. The country achieved the MDG 6 target in 2008. Most malaria cases are concentrated in the southern coastal departments of Escuintla, Retalhuleu, and Suchitepéquez. Transmission is perennial, mostly occurring between May and October. As of 2014, two adjacent municipalities in Escuintla, La Gomera and Masagua, accounted for 48% of all cases.

The Malaria Sub-Program of the Guatemala's MOH handles operational responsibilities for malaria control in the country, with support from technical officers for malaria in each department. In July 2015, the Malaria Sub-Program finalized the country's *National Malaria Strategic Plan 2016–2020*, providing strategic direction to efforts to achieve malaria elimination.

The main malaria vectors present in Guatemala are *An. darlingi*, *An. albimanus* and *An. psuedopunctipennis*. *P. vivax* is the predominant malaria-causing species, however *P. falciparum* infections are present as well. The country experiences high transmission during the dry season, from January to March, and experiences a constant migration of agricultural workers in and out of malaria-endemic areas; this has led to increased malaria importation into non-endemic areas.

Microscopy is the principal means of diagnosis, however RDTs are also used. CQ and PQ are used to treat both *P. falciparum* and *P. vivax* malaria, because there is no evidence of CQ resistance among locally transmitted parasite strains. Guatemala's vector control methods include use of ITNs, cleaning breeding sites, and engaging community members in vector control efforts.

Guatemala's malaria burden is highest among rural, indigenous populations such as the Q'eqchi Maya of Alta Verapaz, and among migrant agricultural workers. Under a national-level grant from the GFATM, the country has focused interventions on the mobilization of community volunteers to access, educate, and treat these high-risk populations. Guatemala's network of volunteer collaborators has received additional training and job aids to improve diagnosis, case management, and effective management of the antimalarial supply chain with support from AMI.

Additionally, Guatemala has obtained technical assistance from AMI to improve supply chain management, quality monitoring of drugs, and insecticide resistance. As part of an evaluation of the efficacy of insecticides approved for vector control interventions in the country, 28 individuals were trained, and field visits to Escuintla and Alta Verapaz were organized. During the field visits, test results indicated that mosquitoes in both areas remain susceptible.

GUYANA

Between 2000 and 2014, annual malaria cases in Guyana decreased by 48.6% and deaths decreased by 62.1%. Despite these achievements, the country has yet to meet the MDG 6 target.

Malaria is endemic to the interior tropical rainforest regions of the country, including Regions 1 (Barima-Waini), 7 (Cuyuni-Mazruni), 8 (Potaro-Siparuni) and 9 (Upper Takutu-Upper Essequibo). Transmission rates are particularly high in the regions bordering Venezuela and Brazil. Regions 1, 7, and 8 are popular among migrant workers due to gold mining and logging opportunities, which present a challenge for the country's malaria control efforts. Indigenous groups that live near the country's mining areas are among the most affected by malaria. In 2014, indigenous people accounted for 37% of all reported cases, although they represented less than 10% of the country's population.

An. darlingi is the primary malaria vector found in Guyana. In 2014, 58.1% of all cases were caused by *P. vivax*, with the remainder being *P. falciparum*, other species, and mixed infections. First line treatment for *P. falciparum* is still the artemesinin combination artemether + lumefantrine. First line treatment for *P. vivax* is CQ and PQ. IRS and ITNs are used as vector control methods in the country.

Microscopy is the principal method of diagnosis in Guyana. In FY 2016, in order to ensure timely diagnosis where microscopy is currently unavailable, Guyana's VCS trained health professionals in priority regions for a field validation of RDTs prior to a pilot launch with support from GFATM. Regions 1, 7, and 8 have been identified as priority areas for the deployment of RDTs; training and other preparation for their roll-out have been supported through AMI by PAHO/WHO and Links Media.

The threat of antimalarial drug resistance is especially concerning to Guyana and other countries in the Guiana Shield sub-region of South America (Suriname, French Guiana, Brazil, and Venezuela). Results of efficacy trials in 2014 indicated that ACTs remain effective for the treatment of *P. falciparum* malaria in Guyana. Given these results, in FY 2015 the country updated its *National Malaria Strategic Plan* and has expressed a commitment to eliminating *P. falciparum* in the coming years.

HONDURAS

Honduras has made significant progress in reducing malaria transmission since 2000, reporting a 78% decline in malaria cases between 2000 and 2015 and achieving the MDG 6 objective. The country is also working towards the regional goal of eliminating malaria by 2020, and is committed to reducing locally transmitted malaria cases by 45%, with zero new cases of *P. falciparum* by 2017.

Honduras' malaria program focuses on reducing transmission among key populations with greater epidemiological vulnerability to malaria. The Health Surveillance Unit works with communities to install LLINs, carry out surveillance, expand diagnostic coverage, and ensure access to treatment. Strong community involvement has resulted in successful malaria control and prevention interventions. The vast majority of malaria cases occur in the eastern part of the country, in difficult-to-reach, remote areas where the highest numbers of *P. falciparum* cases have been detected. Nonetheless, the country's Health Surveillance Unit has reduced malaria cases by an average of 56% in the six departments that account for over 90% of the country's cases in recent years.

The main vector in Honduras is *An. albimanus* and *P. vivax* is the predominant malaria-causing species. Notably, Honduras has the highest number of *P. falciparum* cases in the Central American sub-region. The most affected populations in Honduras are indigenous peoples, especially those of the Miskito ethnic group who reside in Gracias a Dios department, and those that move across the Nicaragua–Honduras border.

Microscopy is the predominant method of diagnosis; the number of slides read through active case detection more than doubled in 2014. To improve the quality of microscopic diagnosis and South–South collaboration, the country held a microscopist certification workshop in coordination with Guatemalan counterparts.

Given the absence of CQ resistance, CQ and PQ are used to treat both *P. falciparum* and *P. vivax* infections. Treatment times from the onset of symptoms cannot be compared reliably in Honduras, because measurements of time to treatment have changed over the years to include a confirmed diagnosis.

Honduras has expanded malaria diagnosis by RDTs in 23 remote areas where microscopy is unavailable. These areas include La Mosquitia and the northeastern department of Gracias a Dios, where more than 80% of all

P. falciparum cases are reported. Volunteer collaborators have been trained to use RDTs in these areas.

Following assessments of programmatic limitations, the country has updated its National Malaria Strategic Plan (PEN, by its Spanish acronym) for 2014–2017. The updated plan focuses on surveillance activities and case detection as well as expanded diagnosis, prompt treatment, and improved health promotion and communication. The country has also collaborated with Nicaragua to align its national treatment guidelines for the La Mosquitia region, ensuring that mobile populations in this area are able to continue the same treatment scheme regardless of where they are diagnosed.

In order to overcome bottlenecks and maintain adequate antimalarial medicine stocks, Honduras has institutionalized pharmaceutical supply management criteria for low-incidence areas developed with support from MSH/SIAPS, and considers the criteria in procurement planning.

Vector control methods used in Honduras include IRS and the distribution of ITNs. Honduras' national-level grant from GFATM, funds the distribution of ITNs and IRS, increased testing, early diagnosis and treatment, as well as regional surveillance strengthening. The use of IRS has increased in recent years, and currently protects more than 100,000 people.

The country's national reference laboratory has played a critical role in the EQAP for microscopy diagnosis, serving as the primary quality assurance laboratory for countries in Central America and the Caribbean. As a regional and sub-regional reference point, to which other countries can send filter paper with *P. falciparum* malaria samples, Honduras' laboratory has conducted testing for antimalarial resistance using molecular markers and in FY 2015 published the results of such testing.

NICARAGUA

Malaria cases have decreased considerably in Nicaragua in the last two decades. The country achieved the MDG 6 objective in 2005.

Currently, the country's highest risk communities are concentrated in the remote La Mosquitia rainforest region of the North Autonomous Atlantic Region (RAAN, by its Spanish acronym) along the border with Honduras. The Miskito indigenous population that lives in this area accounts for a significant number of cases in the Central American sub-region. Malaria is also present in the northern Pacific coast and in the South Autonomous Atlantic Region (RAAS, by its Spanish acronym). Together, RAAN and RAAS account for 75% of the country's malaria cases, of which 90% are *P. falciparum*. Malaria transmission has historically been highest during the rainy season, which lasts from May to October. However, recently malaria transmission has been reported throughout the year.

Nicaragua's first line treatment for both *P. falciparum* and *P. vivax* infections is CQ and PQ. The vector control methods used in Nicaragua consist of IRS and ITNs. With the recent decrease in the use of IRS, more people are estimated to be protected by ITNs. The country regularly evaluates insecticide efficacy using the CDC bottle bioassay to ensure that recommended policies are effectively preventing malaria cases. Results from Waspan, Prinzapolka, and Chichigalpa during FY 2015 showed that the vector is still susceptible to insecticides etofenprox, alfacipermethrin, and deltamethrin.

The National Epidemiological Surveillance Program within Nicaragua's MOH tracks malaria at all levels of the country and has developed a national malaria surveillance information system for case reporting. The MOH foresees the need to strengthen diagnosis and treatment to ensure that municipalities that are certified as free of malaria are equipped to prevent reintroduction of the disease. In addition, Nicaragua institutionalized pharmaceutical supply management criteria for low-incidence areas in the country and considers them in procurement planning.

Cross-border collaboration has improved, as Nicaragua and Honduras joined efforts to mitigate the malaria burden in La Mosquitia on their common border. The countries have aligned their national treatment guidelines to guarantee mobile populations' access to treatment. Nicaragua continues to monitor for signs of antimalarial resistance through the collection of *P. falciparum* samples from sentinel sites, which are subsequently sent to the supranational laboratory in Honduras for molecular testing.

To ensure quality diagnosis in difficult-to-reach locations, Nicaragua periodically evaluates RDT use. Results from 12 locations were confirmed microscopically and indicated that RDT results are indeed accurate with 100% slide agreement. This validated the use of RDTs in remote areas.

PANAMA

Panama had a 15.6% reduction in cases from 2000–2014. As of 2014, the MDG 6 objective had not been met, yet progress has been made.

Malaria transmission in Panama is concentrated in the Darién department, the country's Eastern region that borders Colombia and is home to several of Panama's indigenous ethnicities. Malaria surveillance and successful prevention efforts in this highly endemic region are considered critical to achieving the country's elimination goals. Although transmission occurs year-round, there is increased transmission during the rainy season from June–November.

An. albimanus is the primary malaria vector in Panama and *P. vivax* is the predominant plasmodium species, causing 99% of cases in the country. Panama's indigenous peoples are the most affected population, accounting for an estimated 78% of all cases in 2014. *P. vivax* infections are treated with CQ and PQ. The ACT artemether + lumenfantrine is the first line treatment for *P. falciparum* malaria.

A majority of patients receive treatment in more than 72 hours after onset of symptoms. The main vector control method used in Panama is IRS. In 2014, IRS protected nearly 28,000 people.

In order to expand access to diagnosis in Panama's remote locations, the country has approved the use of RDTs in parts of the country with large indigenous populations living in remote areas. Local non-medical personnel are expected to receive training on RDT use to ensure their appropriate use.

To strengthen cross-border collaboration, Panama and Colombia organized a joint-workshop to build bi-national capacities to address malaria on the border. During FY 2015, the two countries met regularly to share data and mediate challenges. Building on the Colombian model for training and certifying vector control personnel, Panama held a workshop in 2014 to assess the situation and need to develop a labor standards certification program and continued vector surveillance and control training in FY 2015. The Colombian model is now being adopted in Panama to improve the country's capacities for responding to malaria.

As Panama has reoriented its efforts towards malaria elimination, the country's MOH launched a *Master Plan for the Elimination of Malaria* to improve efforts with the aim of reaching zero cases by 2020. In addition, the country's malaria surveillance system was updated to incorporate strategies and indicators recommended in the National Malaria Strategic Plan.

PERU

Malaria cases in Peru decreased by only 5% from 2000 to 2014. As a result of Peru's gradual increase in malaria cases since 2011, the country is not on track to meet MDG 6 targets for malaria morbidity. An overall increase in cases has led the regional malaria control entities to accelerate the implementation of workshops aimed at improving local-level capacities for malaria prevention, diagnosis, and control. Ninety-five percent of Peru's malaria cases are concentrated in the Loreto Region in the Peruvian Amazon, where marked seasonal transmission occurs from January to June.

Climate variables are thought to have played a key role in the recent increase of malaria cases in Peru by provoking increased mosquito breeding. *An. darlingi* is the main malaria vector in the country. *P. vivax* accounts for 83.1% of all cases in the country, while *P. falciparum* accounts for 16.9% of cases. CQ and PQ are the first line treatment for *P. vivax* infections, while artesunate + mefloquine combination therapy with primaquine is used to treat *P. falciparum* infections. Peru's regulatory agencies are currently analyzing the adoption of a fixed dose (artesunate + mefloquine) treatment scheme for uncomplicated *P. falciparum* cases. The vector control interventions used in Peru are IRS and ITNs. In 2014, its ITN coverage increased to protect more than 68,000 people, and in the same year 107,315 people were protected with IRS.

In October 2014, Peru's MOH hosted a country consultation on the Second Global Malaria Action Plan (GMAP2) for 2016–2025. The consultation meeting was organized together with the Roll Back Malaria (RBM) Partnership, PAHO/WHO and NAMRU-6, and informed the development of RBM's *Action and Investment to Defeat Malaria (AIM) 2016–2030*. That same month, a "Strengthening Malaria Microscopy Diagnosis" training workshop was conducted in Yurimaguas, Loreto Region. A total of 25 health professionals were trained in order to strengthen the Alto Amazonas-Yurimaguas Health Network's capacity to respond to the ongoing malaria epidemic in Loreto. Nationally, 33 microscopists were trained in diagnostic techniques and the various criteria needed to ensure accurate microscopy results in FY 2015.

Peru held a total of eight workshops in three priority provinces (Loreto, Maynas and Ramon Castilla) for training Community Health Agents (ACS, by its Spanish acronym) on diagnosis, case management, and other strategies to prevent and control malaria. Of the 371 ACS trained, 105 were indigenous.

In March 2015, AMI implementing partners traveled to Iquitos, Loreto as part of an expert consultation meeting. The meeting brought together national

and local-level partners from a variety of sectors to assess Loreto's situation and make policy recommendations for addressing the increased number of malaria cases. In follow-up, the country has updated and disseminated its *National Guidelines for Malaria Care and Severe Malaria in Peru* and held workshops in Loreto to provide public health personnel and volunteers with training in malaria prevention and control measures.

Peru advanced the institutionalization of the Three Level Approach to medicine quality control promoted under AMI, with a training workshop and partnership discussions with national universities in FY 2015.

SURINAME

Between 2000 and 2014, Suriname reported a decrease of approximately 95% in malaria cases. Suriname's "Decreasing the incidence of malaria in the populations of the interior of Suriname" program, started in 2006, contributed significantly to the country's reduction in cases during that period. The program has focused on case detection, IRS and LLIN interventions in the interior of the country.

Most malaria transmission occurs in Suriname's interior, specifically on the Suriname-French Guiana border. The country sees increased malaria rates at the end of the major rainy season (early August) and at the beginning of the major dry season (mid-August through October). *An. darlingi* is the primary vector in Suriname, and *P. falciparum* has been the primary species of infection.

Suriname began to use RDTs in 2007, and as of 2014 the number of RDTs examined almost equaled the number of blood slides examined microscopically. According to national guidelines, all positive RDTs need to be followed up by microscopy diagnosis. The treatment for *P. vivax* is CQ and PQ, while the treatment for *P. falciparum* cases is artemether + lumefantrine. Since 2010, the use of ITNs/LLINs has been declining in Suriname, with only 6,164 people protected by them in 2014.

Artisanal gold miners in Suriname are the population most affected by malaria. With the implementation of a new grant from GFATM that began in April 2015, Suriname's Bureau of Public Health prioritized gold mining populations, with a particular focus on the French Guiana border. Suriname's Infectious Diseases Board (formerly the National Malaria Board) serves as the country coordinating mechanism for the grant. In further efforts to improve access to malaria prevention, diagnosis, and treatment among gold miners, Suriname has increased coordination with NMCPs and national laboratories in French Guiana and Brazil.

Suriname has developed a new *Malaria Strategic Plan 2015–2020* oriented towards malaria elimination. The new strategic plan targets remote areas in the country and malaria transmission among migrant artisanal gold miners who are left without easy access to malaria diagnosis and treatment.

In 2014, Suriname completed an *in vivo* study to assess the efficacy of artemisinin. Results showed no evidence of artemisinin resistance as currently defined by the WHO, indicating that the ACT artemether+lumefantrine remained an efficacious treatment for *P. falciparum* malaria. Despite the

study's results, Suriname has continued to update and improve its laboratory capacity in order to conduct more sophisticated tests that can monitor for any signs of reduced efficacy using molecular markers. In addition, it has collected samples of *P. falciparum*, which are being stored in the country's malaria gene bank to be used for trainings in future years.

Suriname has created a new malaria information system to ensure that all cases are reported individually, in a single system. As a result of the restructuring of the malaria information system, Suriname has begun to see improved quality and timeliness of epidemiological surveillance data. Besides national surveillance system strengthening, data sharing has been prioritized. Countries in the Guiana Shield have developed a report format to foster improved information sharing.

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Amazon Malaria Initiative/ Amazon Network for the Surveillance of Antimalarial Drug Resistance

Strategic Orientation Document on Supply Management and Quality Assurance for Drugs and Supplies Used in Malaria Diagnosis and Treatment

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Amazon Malaria Initiative / Amazon Network for the Surveillance of Antimalarial Drug Resistance

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1

Acronyms and abbreviations

ACT: Artemisinin Combination Therapy
AMI: Amazon Malaria Initiative
CQ: Chloroquine
HSS/MT: Essential Medicines and Technologies project
L1: Level 1
L2: Level 2
L3: Level 3
LLIN: Long-lasting insecticide-treated net
MCM: Medicine Quality Monitoring
MSH: Management Sciences for Health
NMCP: National Malaria Control Program
OMCL: Official Medicines Control Laboratory
PAHO: Pan American Health Organization
PQ: Primaquine
PQM: Promoting the Quality of Medicines program
PRO: Procurement and Supplies Management Area
RAVREDA: Amazon Network for the Surveillance of Antimalarial Drug Resistance
RMP: Regional Malaria Program
SF: Strategic Fund
SPS: Strengthening Pharmaceutical Systems program
TLC: Thin Layer Chromatography
USAID: U.S. Agency for International Development
USP: U.S. Pharmacopeial Convention

2

Objective of the Strategic Guidelines

2.1 General

To provide elements that help ensure a continuous supply of quality-assured drugs and supplies for the diagnosis and treatment of malaria, with differentiated strategies for high- and low-incidence areas.

2.2 Specific

To describe tools for evaluating the availability of and access to quality-assured drugs and supplies.

To identify strategies with differentiated interventions for high- and low-incidence areas, within a quality assurance framework for the selection, procurement, distribution, and use components.

3

Introduction

The Amazon Malaria Initiative (AMI), which is supported by the U.S. Agency for International Development (USAID), has provided technical assistance through several partners for malaria control in the countries that share the Amazon Basin, such as Bolivia, Brazil, Colombia, Ecuador, Guyana, Peru, and Suriname.

In recent years, all the Amazon Basin countries have experienced a dramatic decline in malaria incidence. The number of cases in the AMI participant countries dropped from 962,325 in 2000 to 668,687 in 2007, a 30% decline. Of the seven countries that are part of the initiative, only Colombia had an incidence in 2007 comparable to that at the beginning of the decade. The most significant reduction (greater than 90%) has been in Ecuador and Suriname. Malaria in Suriname is concentrated in a few areas where the population generally has limited access to health services.[1]

Several factors have combined to produce this favorable epidemiological situation. They include, among others, the adoption of artemisinin combination therapies (ACT) for the treatment of *Plasmodium falciparum*, the reduction of chloroquine (CQ) and primaquine (PQ) regimens for *Plasmodium vivax* from 14 days to 7 days in some countries, the introduction of long-lasting insecticide treated nets (LLIN), more efficient management of national programs, and actions that target populations at greater risk.

In 2008, the Strengthening Pharmaceutical Systems (SPS) program of Management Sciences for Health (MSH), one of the AMI partners, conducted a study on the implications of low incidence for drug supply management.[2]

1. Malaria in the Americas Forum 2009: "Counting Malaria Out" towards the 2010 Targets and the UN Millennium Development Goals. Available at: http://new.paho.org/hq/index.php?option=com_content&task=view&id=1942&Itemid=1683&lang=en
2. Sánchez López, A. and E. Barillas. 2009. Implications of the Low Prevalence of Malaria for Managing Medicine Supplies: Technical Report. Produced by the Strengthening Pharmaceutical Systems program at the request of the United States Agency for International Development as part of the Amazon Malaria Initiative. Arlington, VA: Management Sciences for Health. http://www.usaidami.org/extras/Implications.pdf

The study was based on a logical framework that outlines the potential implications of low incidence on drug supply management (Table 1).

Table 1: **Potential of reduced incidence of malaria to impact drug supply management**

Component of supply management	High incidence	Low incidence
Selection	• Drugs in bulk • Long shelf life not a consideration	• Drugs in blister with long shelf life
Planning for needs	• According to expected morbidity • Working and buffer inventories available in all facilities and warehouses • Inventory of vital drugs (quinine in ampoule) maintained at all establishments	• Expected morbidity + emergency inventory for resurgence held in regional warehouses accordingly to vulnerability analysis • Inventory of vital drugs maintained at the regional warehouses or reference centers
Procurement	• National purchase from domestic or international suppliers	• Joint purchase of all drugs, or at least drugs for special cases
Transport and storage	• Independent (vertical) transportation and storage systems	• Integration of transportation programs and storage programs
Inventory maintenance and management	• Working and buffer inventories maintained at all levels of the supply chain according to morbidity	• Working and buffer inventories take account of vulnerability to resurgences • Probable increase in the percentage of expired products
Use	• Instructions given to patient by prescribing personnel, but drugs taken at home	• Treatment strictly supervised in every case

The key findings of the field visit to four countries (Colombia, Ecuador, Peru, and Bolivia) from 15 February to 15 March 2009 were as follows:

1. There are no differentiated strategies for control of the disease in low versus high-incidence areas, nor, as a result, specific strategies for management of drug supply in the two scenarios.
2. All the countries studied had introduced ACT for the treatment of *P. falciparum*, which may account for the fact that there has been a proportionately greater reduction in *P. falciparum* cases than in *P. vivax* cases.
3. Along with the reduction in the number of malaria cases, there has been a reduction in severe malaria cases and other "special" cases such as malaria during pregnancy and resistance to first-line therapy. A related study conducted by MSH/SPS in 2008 found that Peru reported problems procuring quinine in ampoules due to distributors' lack of interest in marketing these products in the low volumes that the country now requires.[3] A rapid evaluation done in 2009 revealed problems in first-line drug procurement for the same reasons.[4]

3. Briggs, J. and E. Barillas. 2009. Report of Study of Availability of Medicines to Treat "Special Cases" of malaria in South and Central America. Provided to the United States Agency for International Development by the Strengthening Pharmaceutical Systems (SPS) program. Arlington, VA: Management Sciences for Health. http://www.usaidami.org/extras/Informedeestudio.pdf.

4. In none of the countries studied, even those with low incidence such as Ecuador, is the risk of outbreaks analyzed in order to estimate needs and plan for the distribution of drugs and supplies. As a consequence, policies are not in place to maintain buffer stocks in provinces that have significantly reduced the incidence of malaria for areas where transmission is not occurring, but a risk of outbreaks exists.
5. Only in Peru is the transportation and storage of drugs and supplies for malaria diagnosis and treatment integrated with the other public health supplies. In Bolivia, Ecuador, and Colombia the distribution chain is vertical. The National Malaria Control Programs (NMCPs) in these countries maintain their own warehouses, and have their own inventory systems and means of transportation. Given the reduction in incidence of malaria, these operations are relatively ineffective and excessively expensive.
6. At the time of the study, all countries conducted drug quality control in their central laboratories after procurement. They also evaluated quality at sentinel sites via basic[5] tests, although this practice was neither regular nor called for by the NMCPs. The standardized procedures that these countries use, with technical assistance from AMI, include a systematic approach to drug quality control throughout the supply chain. However, no country has addressed the question of procedures for quality control of drugs that will have a low turnover in areas with reduced incidence.
7. Treatment strictly supervised by health workers is recommended, and is operationally feasible to implement in low-incidence areas. The study found the practice being applied only in Peru. In Ecuador, it has not been considered, although incidence is low.

4. Barillas, E. 2009. *Análisis de la disponibilidad de medicamentos antimaláricos en los países que comparten la Cuenca de Amazonas.* Provided to the United States Agency for International Development by the Strengthening Pharmaceutical Systems (SPS) program. Arlington, VA: Management Sciences for Health.
5. Thin layer chromatography for semi-quantitative measurement of the content of active ingredient.

4

Strategies and Tools for Evaluating the Availability of and Access to Quality-Assured Drugs and Supplies

The specific tools used for the management of the drug supply in high and low-incidence malaria scenarios depends on the geographical distribution of the disease and the level of programmatic organization in place for implementing the various control interventions. As a part of the study mentioned previously, strategic and annual plans were analyzed, as well as the proposal presented to the Global Fund by the countries of the AMI initiative. However, none of the proposals explicitly included differentiated approaches to malaria control for high- and low-incidence areas.

An overall strategy for a national program would mean classifying the different areas of the country on the basis of the current incidence of the disease, parasite studies, and potential risk, so as to deploy the particular tools of each of the program's lines of work according to precise geographical criteria.

For the supply management and quality assurance component, the following strategies are proposed:

4.1 Periodic review of therapeutic regimens

Available Amazon Basin studies show *P. vivax* to be sensitive to CQ and PQ combinations. However, studies at the beginning of the decade found *P. falciparum* resistant to these same drugs. In the wake of this evidence, all the countries changed their therapeutic regimens to ACT. The most recent sensitivity studies still show *P. falciparum* being sensitive to ACT. Thus, changes in the treatment regimens currently in place are not expected in the short term.

Although all countries have shifted from their pre-ACT regimens, there is a multiplicity of combinations of different active ingredients and presentations. It became clear at the meeting in Cartagena, Colombia on 12-15 April, 2010 that the situation fails to take into account the availability of suppliers in the local market, the logistical capacity to manage a range of products in a large number of presentations, or the most recent recommendations of the World Health Organization (WHO).[6] The impact of these omissions has been aggravated by the reduction in the incidence of malaria in the region.

6. World Health Organization. 2010. *Guidelines for treatment of Malaria*. Geneva: World Health Organization, Global Malaria Program. Second Edition.

At the meeting, it was proposed to review the regimens in use, following the scheme shown in Table 2.

Table 2: **Proposal to standardize *P. falciparum* treatment regimen in the region**

Regimen	2010	Proposal *	Presentations of drugs **
Bolivia	AS+MQ (single-drug)	AS+MQ+PQ	Fixed dose or co-blister packs
Brazil	TMJ-LUM ACE-MQ	TMJ-LUM+PQ ACE MQ+PQ	Fixed dose for both combinations
Colombia	TMJ-LUM	TMJ-LUM+PQ	Fixed-dose combination
Ecuador	AS+SP (Co-blister)	TMJ-LUM+PQ	Fixed dose
Guyana	TMJ-LUM	TMJ-LUM+PQ	Fixed-dose combination
Peru (Coast/Amazon)	AS+SP AS+MQ (single-drug)	AS+MQ+PQ	Fixed dose or co-blisters
Suriname	ATM+LUM	ATM+LUM+PQ	Fixed-dose combination

* The underlined therapeutic combination is among the suggested changes to current regimens.
** The fixed-dose combinations do not include PQ.
TMJ: Artemether; ACE: Artesunate; LUM: Lumefantrine; MQ: Mefloquine; SP: Sulfadoxine-pyrimethamine

If the countries decide to change their regimens on the basis of this proposal in the medium term, they should realize that the decision to modify should be followed by the preparation of therapeutic guidelines, staff training, and a logistical organization that makes it possible to provide the entire system with adequate working and buffer inventories. In fact, some of the countries that attended the meeting in Cartagena, Colombia in 2010 have proposed to begin modifying their therapeutic regimens.

Under the proposed strategy, there would then have to be periodic reviews of therapeutic regimens using a methodology similar to that employed at the Cartagena workshop. The criteria for review would include, among other things:

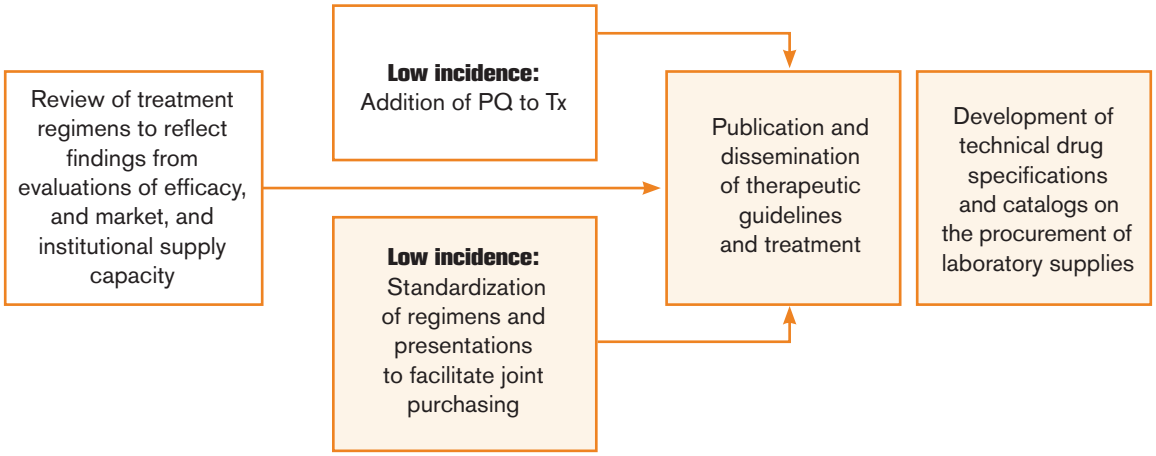
- The need for stable and easier to handle molecules and presentations, particularly for areas of low incidence where the turnover in inventory is low. Although blister presentations and long shelf life are always desirable, they are not critical for products that have high turnover. In a low-incidence scenario, however, inventories of low-turnover drugs must be maintained in health care facilities and warehouses. In these circumstances, depending on product expiration date, packaging and storage conditions and long shelf life may become more important.

- The availability of suppliers in the market, particularly suppliers of essential products that have low purchasing volumes, such as those required for severe cases.
- The possibility of standardizing regimens with that of other countries in the region to:
  - facilitate joint purchases that are coordinated regionally or through cooperation agencies, exchanges or donations
  - facilitate and supervise the treatment of patients living in border areas
  - implement resistance studies more easily and with better coordination
- The logistical capacity of local distribution systems to handle the number of presentations included in their regimens.

It is neither expected nor intended that all the countries should change their regimens frequently in light of these criteria. However, those that do make changes should take into account the fact that changing therapeutic regimens means:

- Including new drugs in national formularies and lists
- Preparing and disseminating standardized treatment guidelines
- Training staff in the use of the new formulations
- Organizing logistics for the supply of the new formulations, and withdrawing the obsolete formulations

Figure 1. **Strategic elements in drug selection**



Tx: Treatment

4.2 Planning for supply requirements in low-incidence areas

If the usual criteria for needs-based planning, such as historical consumption or expected morbidity, are followed, health care facilities in areas of low or no incidence may not receive any drugs. This may lead to hindering the treatment of patients, if and when they appear, as well as response to outbreaks and timely management of severe cases.

The recommended strategy consists of following the usual planning criteria for high-incidence areas. For low-incidence areas, planning should be based on the objective of ensuring that facilities have an inventory of drugs and supplies based on:

- the current situation and the epidemiological trends in the area
- the risk of outbreaks in light of ecological factors
- mechanisms that ensure the immediate provision of drugs and supplies in the event of need—for example, access to the closest regional drug warehouse

Facilities in very low-incidence areas that are highly populated and where access to regional warehouses is difficult should consider having a working inventory in every facility equivalent to 3-5 full treatments for each regular therapeutic category, and at least one treatment of severe cases. For areas of very low incidence with good access to departmental or regional warehouses, the strategic inventories at those warehouses can be maintained and moved to outlying locations as needed.

Maintaining an inventory of low-turnover drugs for diseases of epidemiological importance means a higher rate of loss due to expiration, even with strict and efficient management of the inventory. Thus, policies should be established to allow for the removal of expired drugs.

Changing suppliers, either because of changes in therapeutic regimens or as a result of changes in purchasing mechanisms, means a change in waiting periods, and consequently a revision of the annual planning of requirements. Reserve antimalarial stock requirements should be estimated in light of these aforementioned criteria, supply conditions, and the shelf life of the commonly used antimalarials. A buffer stock of 9-12 months may be sufficient in situations where delivery times are irregular. However, the size of the buffer stock must be established by each country based on its supply conditions and other available information. It should be distributed throughout the points of the supply chain. For example; 3 months of stock in health care facilities, 3 months in provincial warehouses, and 3 months at the central warehouse. Once a program's reserve stock levels and distribution have been established, the relevant criteria should be explicitly set forth in the program's operational procedures.

4.3 Development of strategic information systems for supply management

Supply management information systems that account for, at least, the consumption and supply at all the nodes of the delivery system (central warehouse, state provincial warehouses, and health care facilities) are complex, difficult to manage, and expensive to maintain. Information collected from MSH/SPS[8] showed that very few AMI member countries have information systems with these features.

In the absence of functioning supply information systems, whether comprehensive (covering all the drugs used by ministries of health) or those specific to the malaria program, MSH/SPS proposed the collection of data for a limited group of indicators that can foster strategic decision-making (Table 3). The source of information for these indicators in a country is its central warehouse, plus a sample of of the country's health care facilities that were supervised during the period studied, if the country has a supervision system.

Table 3. **Proposed indicators of a strategic information system for supply management**

1	Percentage of antimalarial drugs available in the central warehouse at the end of the reporting period.
2	Stocks of antimalarial drugs in the central warehouse, expressed in months of supply given consumption levels.
3	Percentage of days during the period when there was a shortage of antimalarial drugs in the central warehouse.
4	Percentage of the drugs acquired during the period that were sent to quality control.
5	Percentage of the drugs analyzed that passed the quality test.
6	Monetary Value of the drugs that expired in the central warehouse during the period studied.
7	Percentage of Provincial states that withdrew the drug from the central warehouse on a timely basis.
8	Percentage of Provincial states warehouses where a shortage of CQ, PQ, or ACT in any of their presentations was reported during the period studied.
9	Value of the drugs that expired in the provincial warehouse in the last 6 months.
10	Percentage of health care facilities that were supervised during the period studied.
11	Percentage of health care facilities that at the time of the visit did not have all the supplies and laboratory equipment needed for diagnosis.
12	Percentage of health care facilities with a shortage of at least one of the first line drugs required for malaria treatment.
13	Percentage of health care facilities where the quantity of valid antimalarials at the time of the visit was not sufficient to meet demand until the next delivery.

8. Information included in: Barillas, E. et al., 2009. *Taller para el Mejoramiento del Sistema de Información de la Gestión del Medicamentos para la Malaria. Lima, Peru, 21-23 April 2009.*

The logic behind this proposal is that if all the drugs are available at the central warehouse plus at a representative sample of peripheral warehouses and supervised establishments at the time of the evaluation, and if the working inventory is sufficient to cover needs until the next delivery, then there are no major supply problems. An approach of this type does not obviate the need for a comprehensive system with online information on all storage and dispensing points, but it does ensure that there is a necessary minimum of information for making strategic decisions on supply management.[9]

"Vertical" information systems used by public health programs to monitor the supply of private-sector drugs tend to reflect fragmented supply systems. For the sake of operational efficiency, there is a tendency to integrate "vertical" systems in national supply management systems. The integration of information systems is even more significant when reduced incidence results in a lessened flow of information.[10]

Figure 2. **Strategic elements to improve information for supply management**

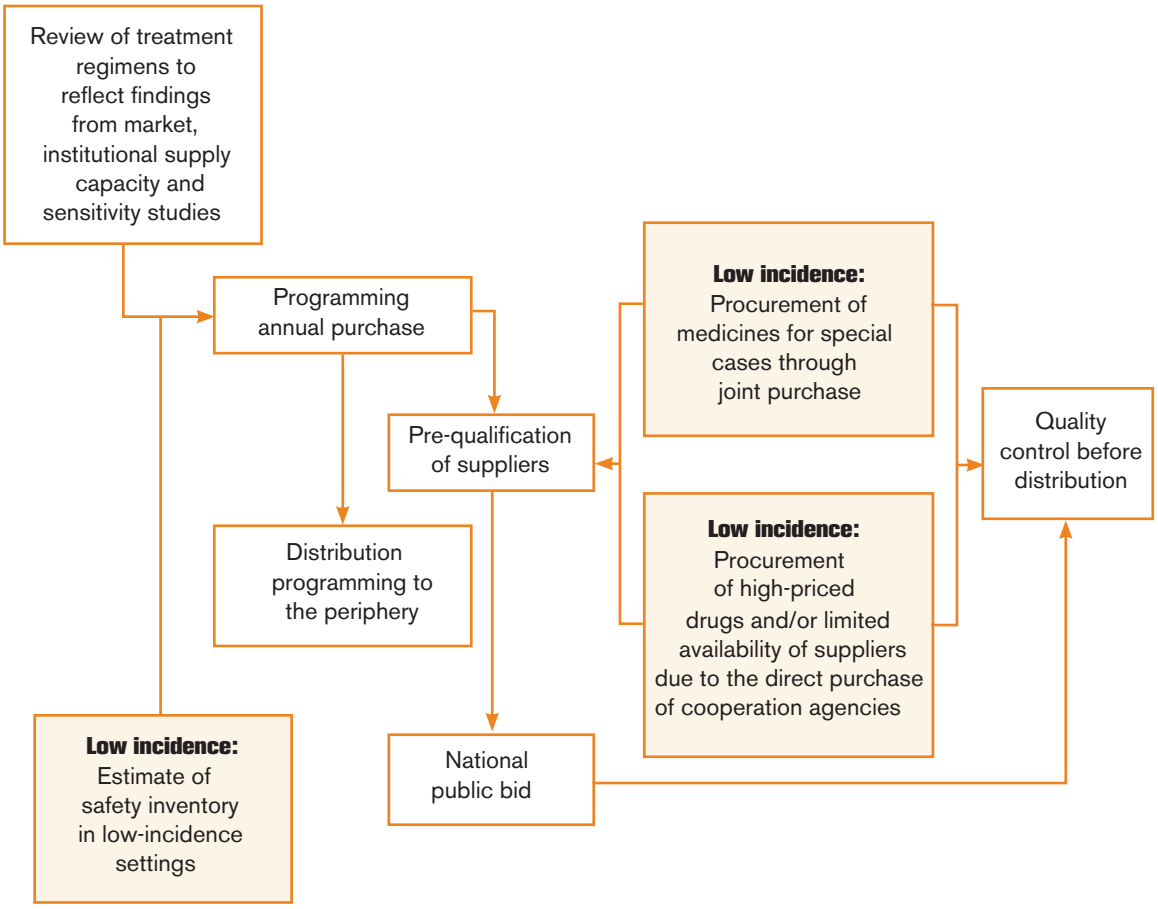
9. The collection of data for these indicators in four of the initiative's member countries and the dissemination of a technical report to decision-makers facilitated drug donations and promoted immediate purchasing in countries that faced potential shortages. (Barillas, E. 2009. *Análisis de la disponibilidad de medicamentos antimaláricos en los países que comparten la Cuenca de Amazonas.*)

10. MSH/SPS provides support to Ecuador and Bolivia for the integration of information systems.

4.4 Implementation of alternative mechanisms for drug procurement

In high-incidence situations there are commercial incentives for domestic or international suppliers to supply the public sector. When the number of cases diminishes, either the suppliers' financial interest wanes or the prices they quote rise significantly. This is the basic cause of drug shortages for the treatment of the few special cases that still occur in the region ("special" in terms of severity, malaria in pregnancy, or because of resistance to first-line therapies).[11] This problem has recently extended to first-line drug procurement in Peru, where several purchase lines remained blank in 2009 because there were not enough suppliers to declare bids legally valid.

Figure 3. **Strategic elements for programming and procurement of drugs**



11. Briggs, J. and E. Barillas. 2009. Report on Study of Availability of Medicines to Treat "Special Cases" of Malaria in South and Central America. Provided to the United States Agency for International Development by the Strengthening Pharmaceutical Systems (SPS) program. Arlington, VA: Management Sciences for Health.

An alternative to solve this problem is direct purchasing through international cooperation agencies. The Strategic Fund of the Pan American Health Organization (SF/PAHO) provides this mechanism available to the region's countries. National purchasing and contracting legislation should permit the use of this mechanism and the arrangements that may be called for by the agreements that are signed—payment before receiving product, in particular. The SF/PAHO drug procurement procedures may be found in Annex 1, and the accompanying form is in Annex 2.

The review of treatment regimens used in the region and the possible standardization of some regimens at the regional level, opens up the possibility of organizing joint purchasing systems or conducting price negotiations with international suppliers. While an efficient joint procurement system is being organized, the drugs needed for the management of special cases may be obtained through donations. In other words, either through technical cooperation with agencies like SF/PAHO or by working directly with drug manufacturers. The quantities required in each country are so small that it is inefficient to put them through a process of national bidding, particularly if suppliers are not expected to be interested in supplying the local market.

4.5 Integrating transportation, storage, and inventory management systems

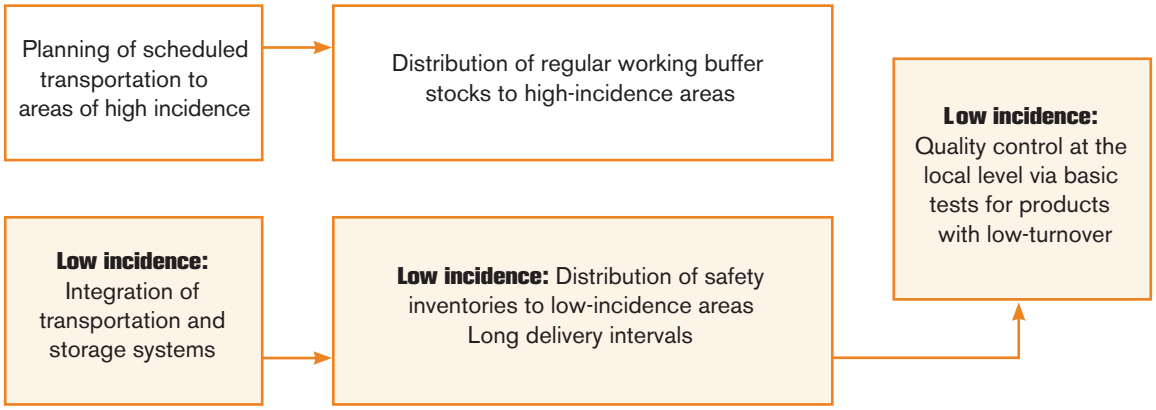
In high-incidence areas, independent vertical drug and inputs supply systems have been set up for NMCPs. Many central and State provincial warehouses in the region store products exclusively. Systems for inventory management, periodic needs, and transportation also tend to be independent of the systems governing other drugs and supplies used in public health facilities.

In low-incidence areas, vertical delivery systems are expensive and inefficient. To reduce operating costs and improve the overall efficiency of public sector logistics, it is necessary to integrate inventory storage, transportation, and management. In carrying out the integration, it should be borne in mind that some elements of the supply should continue to be handled as the responsibility of a specialized malaria control entity. This includes selection of drugs and inputs, planning for needs, and strategies for ensuring adherence to treatment.

Technical personnel from the malaria program should participate in establishing the criteria to be used in planning distribution to low-incidence areas. For example, in these areas it may be necessary to space deliveries because of low consumption, or to maintain strategic inventories in State provincial warehouses that can be moved to nearby facilities immediately.

In the process of integrating vertical delivery systems, it is important to make sure that the new procedures do not create breaks in the supply chain. One possibility is to make integration progressive, beginning at the central level and moving out from there, starting with virtual integration of inventories, information systems, and coordination of transportation to State provincial facilities, and moving if necessary to physical integration of inventories in single State provincial warehouses.

Figura 4. **Strategic elements for drug planning and procurement**



4.6 Assurance and drug quality control

In order to ensure that products acquired are of good quality and do not deteriorate before being administered to the patient, drug quality control throughout the supply chain is essential, whatever the epidemiological situation. In most countries, the institution responsible for this will be the Official Medicines Control Laboratory (OMCL). It conducts validated or compendial tests to confirm that drugs meet the specifications established during the drug registration process. However, there are certain constraints involved in using compendial tests. The main issues are:

- lack of available services at the OMCL due to factors such as limited human or financial resources, geographical barriers to access, among others, and
- urgent need for results from quality control testing, so that the time for compendial tests is not available

Considering these constraints, the Promoting the Quality of Medicines (PQM) program implemented by the U.S. Pharmacopeial Convention (USP) has developed a three-level approach to quality control. The approach is based on three levels of analysis that use different quality control methodologies. The levels involve procedures of increasing complexity and are mutually complementary. Respectively, they involve:

- Level 1 (L1): visual and physical inspection
- Level 2 (L2): basic analytical tests
- Level 3 (L3): validated or compendial tests

The elements of these procedures, which are outlined in Table 4, are designed to address specific needs within the entire process involving the drugs. The approach can be used regardless of the prevalence of the disease.[12]

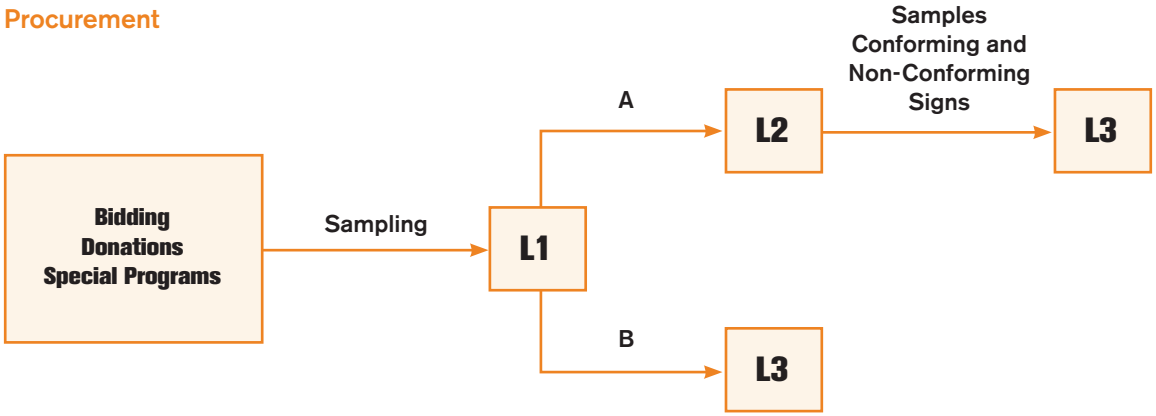
Table 4: **Features of the three levels of quality control** [13,14]

Level	Type of analysis	Type of test	Purpose	Personnel responsible for the analysis
1	Visual and physical inspection	**Visual:** • Properties of the insert and packaging **Physical:** • Drug's appearance and physical condition	• To identify expired drugs and/or drugs accompanied by insufficient, mistaken, and/or fraudulent information; damaged packaging; and damage to or alterations in the state of the drugs.	• Personnel responsible for management at each stage of the supply chain, from procurement to use, and from the local level to the central level.
2	Basic analytical test	• Disintegration • Clorimetric reactions[14] • Thin layer chromatography (TLC)	• To identify drugs that are deficient in any of four quality attributes: identity, content, purity, and (for solid presentations) disintegration.	• Personnel trained in basic tests • OMCL personnel
3	Validated or compendial tests	• As per specifications in the drug registry	• Evaluation of all critical quality attributes.	• OMCL personnel

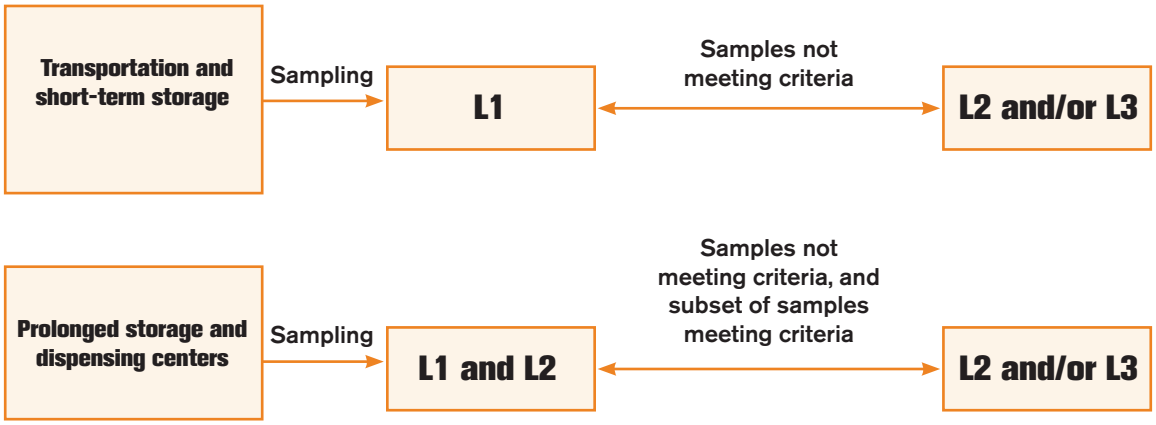
11. The article on this approach is in the process of internal revision, and the final version will be released in the course of 2011.
12. United States Pharmacopeia Convention Drug Quality and Information Program and collaborators. 2007. *Ensuring the Quality of Medicines in Resource-Limited Countries: An Operational Guide.* Rockville, MD.: The United States Pharmacopeia Convention. Available at: http://www.usp.org/pdf/ EN/dqi/ensuringQualityOperationalGuide.pdf
13. Whenever quality control processes are carried out, there should be visual and physical inspection (L1), whether or not second- and/or third-level tests are later performed.
14. Colorimetric methods are not recommended for drugs for which CCD methods exist. Colorimetric methods in the field can assess only one quality attribute (identity), whereas CCD provides information on three quality attributes (identity, content, and purity).

Figure 5 outlines the processes recommended for the implementation of the three-level approach at the various stages of the supply chain. Specific clarifications for these schemes and the use of the approach in situations of high and low incidence are detailed in the subsequent sections.

Figure 5: **Implementation of the three-level approach in the supply chain**



A -Drugs produced by reliable manufacturers with a previous history of good quality.
B -1: Lacking information on previous quality history
2: Drugs considered to represent a risk in light of the manufacturer's previous history or the product's attributes



The dissemination of quality control results at the national and regional levels is important to give the public information on products of poor quality and to prevent their use.[15]

Procurement

Regardless of the level of incidence, the quality of antimalarial drugs should always be evaluated after acquisition before they are distributed. It should also be taken into account that only L3 can ensure that a drug meets all the specifications set forth in the drug registry. As indicated in Figure 5, however, L2 will be used instead of L3 in some situations. The considerations involved are valid in both low and high-incidence areas. The decision on what level to use should be based on a risk analysis, taking into account the product's stability or other attributes, the previous history of the manufacturer, and storage conditions during shipment, among other things. For example:

- In the case of drugs for which there is already a previous history of good quality, and which are produced by reliable manufacturers, L2 can be used to confirm the quality of new lots. Included here are manufacturers prequalified by WHO and audited for the Good Manufacturing Practices publication of the U.S. Food and Drug Administration.
- In the case of drugs such as SP, where dissolution problems have frequently been documented, L3 should be used, since the basic L2 tests cannot detect that type of problem.
- In the case of drugs that are of high impact, either because the amount consumed is high or because they are used in managing severe cases, the advantage of using L3 at least in some lots should be considered, since it diminishes the risk of quality problems not detected by L2 testing.

Below are indications as to how the three-level approach can be used during procurement in specific scenarios that occur in high or low-incidence situations.

In areas with **high incidence**, L3 is advisable, but it can put a large burden on the LOCM if the volume of the drugs acquired is large. Thus, a combination of L2 and L3 is an alternative that can maximize the benefits of the process by applying quality control to a greater number of drugs or to more lots of a single drug. For products involving greater risk, for example, a limited number of batches can be subjected to L3 and the rest to L2. (See the combination of alternatives A and B in Figure 5.)

15. PQM has developed a database that, with prior consent of the countries, includes the results of quality control obtained in programs and/or initiatives with which PQM works. The information is freely available at: http:// www.usp.org/worldwide/medQualityDatabase/

In **low-incidence** areas, the volume purchased will be less, consisting of a single lot or a very small number of lots. Hence, if the product justifies it, L3 is recommended. However, in cases of low incidence it may be possible to make most of the purchases jointly as part of a group of several countries through the SF. Since quality assurance is used in selecting the manufacturers and in confirming quality before distribution, L2 may be used in these cases. (See alternative Figure 5.) In cases of outbreaks where donations are used, it is advisable to apply L3 unless the source is guaranteed, in which case quality can be confirmed through L2 testing.

Distribution

The distribution chain should have a medicine quality monitoring (MQM) program with clear guidelines for sampling and analysis protocols. The protocols established should assign specific roles and responsibilities to all those involved in the process. PQM has created guidelines for the development of MQM protocols, which can be consulted and used by health authorities where relevant. The guidelines were created to assist in the planning and execution of drug sampling and analysis.

Given the impossibility of conducting MQM in all the health facilities in a country that is involved in storage and dispensing, the sampling protocols should take account of drug volume and the number of batches received, as well as risk factors for deterioration of drug quality. Such considerations will determine the frequency of MQM, the selection of sites, the types of drugs to be monitored, and/or the number of batches of each drug that should be sampled. During prolonged storage, for example, the frequency of sampling will depend on the storage conditions and/or the risk of deterioration in drug quality. In the absence of previous information, six months can be used as the sampling interval initially, and frequency can be adjusted based on the findings. Protocols that employ sampling with statistical data, as described at the end of this section, can also be useful.

In high-incidence areas or situations, when there is rapid turnover of inventory, with short periods of storage in central and/or regional warehouses and dispensing centers, the main recommendation is to evaluate the dispensing centers through L2 testing. In this case, the drugs with highest risk of deteriorating or those in areas with inadequate storage conditions must be prioritized (ex: high temperatures and/or humidity, direct exposure to sunlight, poor cooling, etc.).

In low-incidence areas, drugs will be stored for longer periods in central and/or State provincial warehouses or dispensing centers. Because of the slow turnover, all the sites should be subject to periodic L1 monitoring to ensure that expired drugs are not being held, and that those which should be disposed of and replaced under the guidelines established by the countries for this purpose are so dealt with. Furthermore, periodic L2 quality control tests should be implemented, with emphasis on those sites where the risk of deteriorating quality are greater due to prolonged storage under poor conditions. However, the limitations of L2 in terms of detecting certain quality attributes should

be borne in mind. When products with a high risk of deterioration in quality are stored for long periods, the desirability of L3 testing should be considered. It is important to reiterate that periodic analysis will help to establish the minimum frequency with which testing should be conducted.

In this context, it can be useful to conduct statistically representative samplings that take into account storage conditions as well as type of drug. If quality problems are found, it will then be possible to apply similar preventive and/or corrective measures to all relevant sites.

Adherence studies and impact assessment

In high-incidence areas, patients tend to receive drugs at the health care facility, where the first administration is supervised, though treatment is continued and completed at home. Studies conducted by AMI show that adherence can be low, particularly in the case of prolonged therapeutic regimens such as those required for *P. vivax*. Initiatives for strict supervision of the entire treatment process in high-incidence areas have proven difficult to carry through, given the great deal of institutional, financial, and human resources required. In low-incidence areas, where eliminating the human reservoir is more important, strictly supervised treatment of the few cases diagnosed should be incorporated. In these areas, the practice is feasible with the regular institutional resources of a country's NMCP.

The countries that share the Amazon Basin have conducted multiple studies to evaluate adherence to different treatment regimens. The last round of studies, and a compilation of previous studies, were recently supported by MSH/SPS.[16]

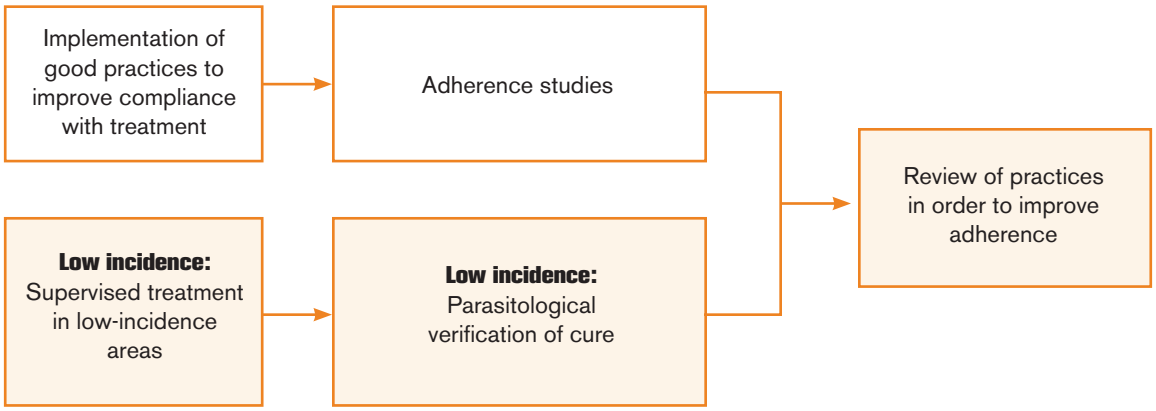
These studies pointed to difficulty in conducting field work, given the small number of cases. Since the studies conducted to date seem to agree on a group of central strategies to improve adherence (such as reducing treatment time with PQ for *P. vivax*, and giving patients graphic instructions, (see figure 6)), future studies should focus on:

- evaluating adherence to new therapeutic regimens; and
- evaluating practices that promote adherence, or that can potentially diminish it.

16. Strengthening Pharmaceutical Systems. 2009. Technical Report: *Analysis of Prescribing and Dispensing Practices and Adherence to Malaria Treatment in the Amazon Basin Countries.* Provided to the United States Agency for International Development by the Strengthening Pharmaceutical Systems (SPS) program. Arlington, VA: Management Sciences for Health.

The implementation of multicenter studies would make the inclusion of a significant sample possible, even in low-incidence situations.

Figura 6. **Strategic elements for improving drug use**

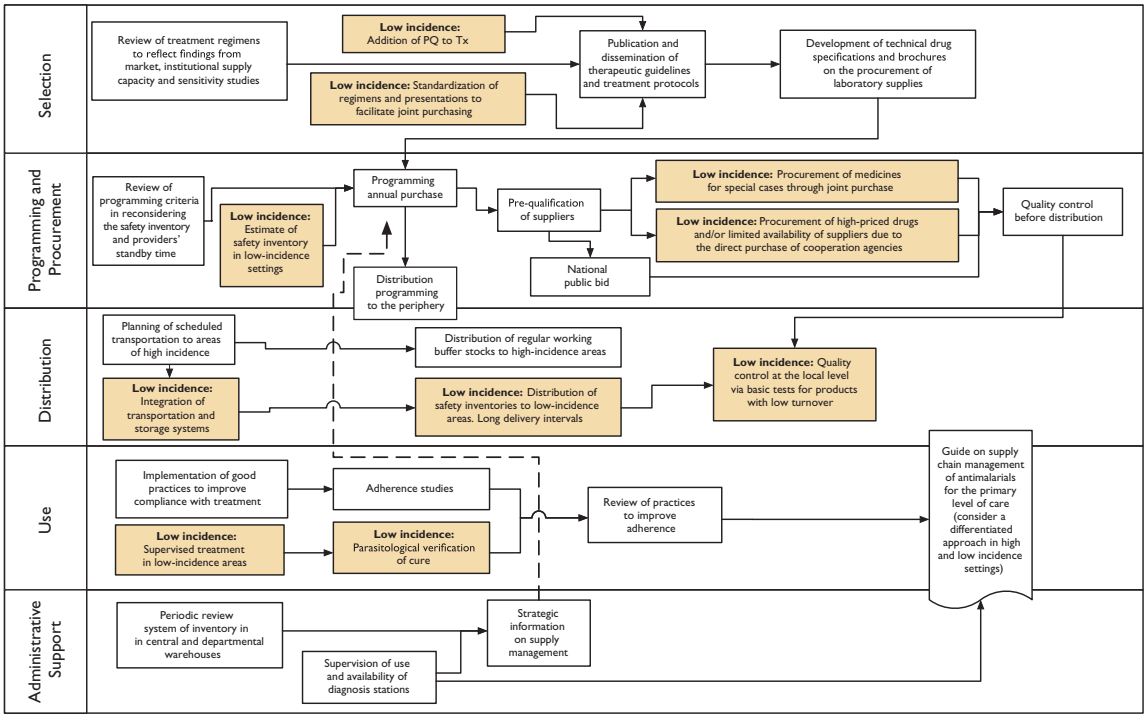


5

Strategic Approach to Improve the Management of the Antimalarial Drug Supply in High and Low-Transmission Situations

The flowchart in Figure 7 shows the strategies that can be implemented by the region's countries to improve management of the supply of antimalarial drugs and of the inputs needed for diagnosis. The shaded parts of the figure show those strategies that should be given priority in low-incidence areas.

Figure 7. **Strategic approach to improve the management of the antimalarial drug supply in high- and low-transmission situations**



6

Annexes

Annex 1: **Proposal for the Consolidated Purchase of Antimalarial Drugs by the Countries of the Region of the Americas through the PAHO Strategic Fund and the Essential Medicines and Technologies Project (HSS/MT)**

Background

Access to antimalarial drugs in the region's countries is limited by factors such as insufficient availability in the national pharmaceutical markets (in particular because commercial incentives for domestic and international suppliers are lacking), regulatory constraints on international procurement in some countries, lack of distributors at the regional level, failure to list antimalarial drugs on the drug registry because their manufacturers are not represented in the countries and thus the availability of the drugs is limited, and problems within national drug supply management systems.

The above factors are more critical in the case of drugs needed to treat special cases such as severe malaria, malaria during pregnancy, and resistance to first-line drugs. In the latter case, smaller reserves are needed, and suppliers are even more limited.

These problems were examined in 2010 at the meeting for antimalarial drug selection and planning that was held as a part of AMI-RAVREDA. The Amazon Basin countries explained the causes of their drug shortages, including the problem of unmet calls for bids, and the problem of limited availability in national markets as a result of the small volumes of drugs needed, which makes these markets of little financial interest to suppliers. This situation occurs in other subregions as well, where some countries lack local manufacturers and have reported problems of counterfeiting and illegal marketing of drugs.

One solution to these problems is joint purchasing of antimalarial drugs by the region's countries through the SF. At the meeting, PAHO proposed that the countries submit their 2011 needs for antimalarial drugs, that the regional demand be consolidated, and that international competitive

bidding be held. The intention is also to work with prequalified manufacturing laboratories to plan production, to plan purchasing and delivery in advance, to shorten delivery times, and to substantially reduce the prices of the drugs.

HSS/MT, the Regional Malaria Program (RMP), and the Procurement and Supplies Management Area (PRO) at PAHO have coordinated to prepare an action plan for supporting the countries in this process (see Table 1 of this Annex).

Through the SF, PAHO held a first annual bidding for the joint purchase of antimalarial drugs for 2011. The bidding lasted from August to October of 2010, and followed this timetable:

1. In June, PAHO sent notices to its member countries' ministries of health or whatever other institutions were responsible for managing the supply of antimalarial drugs, inviting them to participate in the consolidated purchasing process. Each country sent PAHO a list of its antimalarial drug needs for the year.
2. The needs were presented in the format shown in Annex 2, specifying the drugs required and their pharmaceutical presentations. The countries were also requested to indicate the total number of units needed, with dosage quantities, as well as their technical, regulatory and administrative requirements. Finally, they indicated whether they needed partial or total deliveries.
3. The original request form had to be approved and signed by a representative of the ministry of health or other entity responsible for the supply of antimalarial drugs, and then sent to the PAHO/WHO Country Representative before 25 July 2010.
4. All the needs were consolidated in August 2010, and the bidding conditions were prepared according to the countries' needs.
5. Bidding took place in September and October 2010, and the results, including the suppliers and prices, were reported to the countries immediately, with a view to carrying out the purchase orders in January of this year.
6. The SF focal point at the PAHO/WHO Representative Office provided technical support for reviewing the bids and the countries' requirements, and answered questions that arose in the process. Once the information was reviewed, the PAHO/WHO representative e-mailed the request to Dr. James Fitzgerald (fitzgeraldj@paho.org) with a copy to Dr. Nora Girón (gironn@hon.ops-oms.org).
7. Once the results of the bidding were in, the Procurement and Supply Management Area (PRO) sent each participating country a price estimate, the name of the supplier who had won the bid, and the delivery conditions. As soon as countries receive the price estimates, they should review them and indicate their approval if they have no objection. That information should be sent to PAHO, along with the voucher for the transfer of funds to the account established for this purpose.

8. On its web page, the SF will publish a general information bulletin with the results of the bidding, including the prices of the antimalarial drugs for 2011, in addition to sending the information to the countries through the country offices.

Table 1. **Action plan for the joint purchase of antimalarial drugs for 2011**

Activity	Timetable	Responsible
1. Invite countries in the region to present their antimalarial medicine needs and to participate in joint purchasing through the Strategic Fund	10 July 2010	• HSS/MT, regional advisory entity for the SF, in coordination with RMP and PRO. • Representative offices: SF focal point and advisors, and people responsible for communicable diseases
2. Review of the countries' needs on the basis of the parameters each has established for estimating its needs, defining its technical specifications, and establishing its quality requirements.	15 July 2010	• Representative offices: SF focal point and advisors, and people responsible for communicable diseases (malaria) control.
3 Shipment to PAHO of the antimalarials needed by the countries.	Deadline 25 July 2010	• Ministries of health. • Institutions responsible for malaria control.
4 Regional consolidation of the antimalarial drug requirements submitted by the countries.	7 August 2010	• HSS/MT, regional advisor to the SF.
5 Preparation of rules for the international competitive bidding.	Until 25 August 2010	• PRO and HSS/MT.
6 International competitive bidding.	September-October 2010	• Drugs and technology area, HSS/MT. • PRO.
7 Notification of the drugs and prices chosen.	November 2010	• HSS/MT. • PRO.
8 Price estimates sent to countries.	November 2010	• PRO and HSS/MT.
9. Purchase orders placed.	November 2010 or January 2011	• Ministries of health. • Institutions responsible for malaria control.

Annex 2: **Application Form for Requesting Antimalarial Medicines through the Strategic Fund 2011**

Planned antimalarial drugs for acquisition through the Strategic Fund (SF) in 2011		
Country:		Programming year:
Date form filled out:		
Name and position of staff member responsible:		
E-mail:		Telephone:
Description of drug	Quantity needed for the year, in dosage units (tab, KAP, ampoule, vial, etc.)	Remarks
Chloroquine Phosphate, tab 250 mg (150 mg base)		
Primaquine phosphate, tab 5 mg		
Primaquine phosphate, tab 7 .5 mg		
Primaquine phosphate, tab 15 mg		
Artesunate, tab 50 mg		
Artesunate, tab100 mg		
Artesunate, iny ., 60 mg vial		
Artesunate, tab 250 mg		
Artesunate+mefloquine 25+67 .5 (base)		
Artesunate+mefloquine 50+135 (base)		
Artesunate+mefloquine 100+270 (base)		
Artesunate+mefloquine 100/220 (base)		
Amodiaquine 200mg+artesunate 50 mg		
Artemether 20 mg/lumefantrine 120 mg (tab 1X6)		
Artemether 20 mg/lumefantrine 120 mg (tab 2x6)		
Artemether 20 mg/lumefantrine 120 mg (tab 3x6)		
Artemether 20 mg/lumefantrine 120 mg (tab 4x6)		
Hydrochloride quinine Sol, iny., 300 mg/ml (2 ml amp)		
Sulphate quinine, tab 300 mg		
Mefloquine hydrochloride, tab 250 mg		
Sulfadoxine 500/pyrimethamine, tab 25 mg		
Amodiaquine, tab 153 mg (clorhidrato)		
Amodiaquine, tab 200 mg		
Artemether iny ., 80 mg/ml (1 ml)		
Proguanil (hydrochloride), 100 mg		
Atovaquone + Proguanil 250+100 mg		
Atovaquone + Proguanil 62 .5+25 mg		
Indicate the times required for delivery of the drug, and indicate the quarter		
Quarter in which the order would be placed	T1_____T2_____T3_____T4	
Quarter in which delivery of product will be needed	T1_____T2_____T3_____T4	
b. Attach the technical specifications for each drug, the regulatory conditions that the country requires for purchase, and the requirements for importation of these drugs. Indicate whether legislation includes any exception for public health reasons applying to importation of this product.		
c. Other observations to take into account in procurement.		

Iniciativa Amazônica Contra a Malária/ Rede Amazônica de Vigilância da Resistência às Drogas Antimaláricas

Documento estratégico para a gestão do abastecimento e garantia da qualidade dos medicamentos e insumos para diagnóstico e tratamento da malária

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CDC
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msh
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USP
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Iniciativa Amazônica Contra a Malária/ Rede Amazônica de Vigilância da Resistência às Drogas Antimaláricas

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Sobre este documento: este documento é parte da Iniciativa Amazônica contra a Malária (AMI) e foi financiado pela Agência dos Estados Unidos para o Desenvolvimento Internacional (USAID).

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1 ABREVIAÇÕES E SIGLAS

AMI	Iniciativa Amazônica contra a Malária, pela sigla em inglês
CQ	Cloroquina
CCD	Cromatografia em camada delgada
FE	Fundo estratégico
HSS/MT	Projeto de medicamentos essenciais e tecnologia
LOCM	Laboratório oficial de controle de medicamentos
MILD	Mosquiteiros impregnados com inseticida de longa duração
MQM	Monitoramento da qualidade dos medicamentos
MSH	Management Sciences for Health
N1	Nível 1
N2	Nível 2
N3	Nível 3
OPAS	Organização Pan-Americana da Saúde
PNCM	Programas Nacionais de Controle da Malária
PQ	Primaquina
PQM	Programa de Promoção da Qualidade de Medicamentos
PRM	Programa Regional da Malária
PRO	Área de Gestão de Compras e Abastecimento
RAVREDA	Rede Amazônica de Vigilância da Resistência às Drogas Antimaláricas
SPS	Strengthening Pharmaceutical Systems
TCA	Terapia combinada à base de artemisinina
USAID	Agência dos Estados Unidos para o Desenvolvimento Internacional
USP	Farmacopéia dos Estados Unidos

2

Objetivos das orientações estratégicas

2.1 Geral

Contribuir com subsídios a fim de assegurar o abastecimento contínuo de medicamentos e insumos de qualidade garantida para o diagnóstico e tratamento da malária, que considerem estratégias diferenciadas em áreas de alta e baixa incidência.

2.2 Específicos

1. Apresentar ferramentas para a avaliação da disponibilidade e acesso a medicamentos e insumos de qualidade garantida.

2. Identificar estratégias com intervenções diferenciadas para áreas de alta e baixa incidência considerando a garantia da qualidade nos componentes de seleção, aquisição, distribuição e uso.

3

Introdução

A Iniciativa Amazônica contra a Malária (AMI), apoiada pela Agência dos Estados Unidos para o Desenvolvimento Internacional (USAID), vem prestando através de vários parceiros assistência técnica para o controle da malária nos países que dividem a Bacia Amazônica como Bolívia, Brasil, Colômbia, Equador, Guiana, Peru e Suriname.

Nos últimos anos, todos os países que dividem a Bacia Amazônica têm verificado uma dramática redução dos casos da malária. O número de casos da malária nos países que fazem parte da AMI caiu de 962.325 casos em 2000 a 668.687 em 2007 com uma redução de 30% neste período. Dos sete países que fazem parte da iniciativa, apenas Colômbia mantinha em 2007 uma incidência semelhante à registrada no início da década. As reduções mais significativas (acima de 90%) foram registradas no Equador e Suriname. Neste último país, a incidência se concentra em poucas áreas onde em geral a população tem acesso limitado aos serviços de saúde.[1]

Vários fatores contribuíram para se alcançar esta situação epidemiológica favorável, entre eles a adoção de terapia combinada à base de artemisinina (TCA) para o tratamento da malária por *Plasmodium falciparum*, redução de 14 para 7 dias de tratamento com esquemas de cloroquina (CQ) e primaquina (PQ) para malária por *Plasmodium vivax* em alguns países, introdução de mosquiteiros impregnados com inseticida de longa duração (MILD), gestão mais eficiente dos programas nacionais e foco das ações em populações de maior risco.

1. Foro sobre a Malária nas Américas 2009: "Counting malaria out" para realização das metas de 2010 e os Objetivos de Desenvolvimento do Milênio da ONU. Disponível em: http://new.paho.org/hq/index.php?option=com_content&task=view&id=1942&Itemid=1683&lang=en.

Em 2008, o programa Strengthening Pharmaceutical Systems (SPS) de Management Sciences for Health (MSH), um dos parceiros da AMI, realizou um estudo para conhecer as implicações da baixa incidência na gestão do abastecimento de medicamentos.[2] O estudo baseou-se num quadro de referência que descreve as potenciais implicações da baixa incidência na gestão do abastecimento de medicamentos (Tabela 1).

Tabela 1: **Potencial repercussão da redução da incidência da malária na gestão do abastecimento de medicamentos**

Componente de gestão do abastecimento	Alta incidência	Baixa incidência
Seleção	• Medicamentos a granel • Vida útil prolongada não é consideração	• Medicamentos em blíster com vida útil prolongada
Programação das necessidades	• De acordo com a morbidade esperada • Inventário de estoques de trabalho e segurança disponível em todos os serviços e almoxarifados centrais • Manutenção do inventário de estoques dos medicamentos	• Morbidade esperada + inventário de estoques de emergência para surtos nos almoxarifados regionais de acordo com as análises de vulnerabilidade • Manutenção do inventário de estoques de medicamentos essenciais nos almoxarifados regionais ou centros de referência
Aquisição	• Compra nacional de fornecedores nacionais ou internacionais	• Compra conjunta de todos os medicamentos entre os países, ou no mínimo de medicamentos para casos especiais
Transporte e estocagem	• Sistemas independentes (verticais) de transporte e estocagem	• Integração de programas de transporte e estocagem
Manutenção e gestão de inventários de estoques	• Manutenção do inventário de trabalho e segurança de acordo com a morbidade em todos os níveis da cadeia de abastecimento	• Inventários de estoques de trabalho e segurança consideram a vulnerabilidade a novos surtos • Provável aumento da porcentagem de produtos vencidos
Uso	• Paciente recebe instruções do responsável pela prescrição e leva os medicamentos para casa	• Tratamento de todos os casos com estrita supervisão

Os principais achados da observação de campo realizada em quatro países (Colômbia, Equador, Peru e Bolívia), de 15 de fevereiro a 15 de março de 2009, foram:

1. Não existem estratégias diferenciadas para o controle da doença em áreas de alta e baixa incidência e, portanto, não há também estratégias específicas para a gestão do abastecimento de medicamentos para cada cenário.
2. Todos os países estudados haviam introduzido TCAs para o tratamento da malária por *P. falciparum*, que possivelmente contribuem para a redução proporcionalmente maior de casos de malária por *P. falciparum* comparada com *P. vivax*.

2. Sánchez López, A., e E. Barillas. 2009. Implicações da baixa prevalência de malária na gestão do abastecimento de medicamentos: Informe técnico. Preparado pelo Programa Strengthening Pharmaceutical Systems, a pedido da Agência para o Desenvolvimento Internacional dos Estados Unidos, sob a Iniciativa Amazônica contra a Malária. Arlington, VA: Management Sciences for Health. http://www.usaidami.org/extras/Implicaciones.pdf.

3. Junto com a diminuição dos casos de malária, tem ocorrido redução de suas apresentações graves e de outros dos casos "especiais" como a malária na gravidez e a resistência ao tratamento de primeira linha. Em relação a isso, um estudo realizado pelo MSH/SPS em 2008[3] documentou que o Peru registrou problemas na aquisição de quinina em ampolas devido à falta de interesse dos distribuidores em comercializar estes produtos a um pequeno volume como é necessário agora. Uma avaliação rápida realizada em 2009 revelou também problemas na aquisição de medicamentos de primeira linha pelas mesmas causas.[4]
4. Em nenhum dos países estudados, mesmo naqueles com baixa incidência como o Equador, se faz uma análise de risco de surtos para estimar as próprias necessidades e distribuição de medicamentos e insumos. Sendo assim não há políticas de manutenção do inventário de estoques de segurança em regiões ou províncias que reduziram significativamente a incidência da malária nas áreas sem transmissão mas com risco de surtos.
5. Somente no Peru o transporte e a estocagem de medicamentos e insumos para o diagnóstico e tratamento da malária estão integrados ao restante do abastecimento de saúde pública. Na Bolívia, Equador e Colômbia, a cadeia de distribuição é vertical e os programas nacionais de controle da malária (PNCM) mantêm pequenos pontos de estoque, usam sistemas particulares de inventário de estoques e meios próprios para o transporte. A redução da incidência da doença faz com que estas operações sejam pouco efetivas e excessivamente dispendiosas.
6. No momento do estudo, todos os países faziam o controle da qualidade dos medicamentos no laboratório central depois da aquisição. Além disso, a qualidade era avaliada em pontos-sentinela por meio de testes básicos [5], embora esta prática não fosse regular nem cumpria com as normas dos PNCM. Os procedimentos padronizados que estes países desenvolvem com a assistência técnica da AMI incluem uma abordagem sistematizada para o controle da qualidade dos medicamentos ao longo da cadeia de abastecimento. No entanto, nenhum país mantém procedimentos para o controle da qualidade dos medicamentos com baixa rotatividade em áreas de incidência reduzida.
7. O tratamento com supervisão estrita de profissionais da saúde é uma prática recomendada e operacionalmente viável de ser implementada nas áreas de baixa incidência. O estudo identificou que esta prática só é seguida no Peru. Não foi considerada no Equador, apesar de ter uma incidência significativamente mais baixa.

3. Briggs, J., e E. Barillas. 2009. Relatório de estudo sobre a disponibilidade de medicamentos para tratar "casos especiais" da malária na América do Sul e América Central. Apresentado à Agência dos Estados Unidos para o Desenvolvimento Internacional pelo Programa Strengthening Pharmaceutical Systems (SPS). Arlington, VA: Management Sciences for Health. http://www.usaidami.org/extras/ReportofStudyofAvailability.pdf.

4 Barillas, E. 2009. Análise da disponibilidade de antimaláricos nos países que dividem a Bacia Amazônica. Apresentado à Agência para o Desenvolvimento Internacional dos Estados Unidos pelo Programa Strengthening Pharmaceutical Systems (SPS). Arlington, VA: Management Sciences for Health.

5 Cromatografia em camada delgada para avaliações semiquantitativas do conteúdo de princípio ativo.

4

Estratégias e ferramentas para a avaliação da disponibilidade e acesso a medicamentos e insumos de qualidade garantida

O uso de ferramentas particulares para a gestão do abastecimento de medicamentos, que considera cenários de alta e baixa incidência, é dependente da distribuição geográfica da malária e do nível de organização programática para implementar as diversas intervenções de controle. Como parte do estudo citado, foram analisados planos estratégicos, planos anuais e propostas que foram apresentadas ao Fundo Global pelos países que fazem parte da iniciativa AMI. No entanto, nenhuma das propostas incluía explicitamente abordagens diferenciadas para o controle da malária em áreas de alta e baixa incidência.

Uma estratégia global para programas nacionais demandaria a classificação das diferentes áreas do país com base na incidência atual da malária, estudos parasitários e riscos potenciais. Ou seja, para que as ferramentas particulares de cada linha de trabalho do programa sejam implementadas com critérios geográficos precisos.

Para o componente de gestão do abastecimento e garantia da qualidade dos antimaláricos, são propostas as seguintes estratégias:

4.1 Revisão periódica dos esquemas terapêuticos

Na Bacia Amazônica, os estudos disponíveis demonstram a sensibilidade do *P. vivax* à combinação de CQ com PQ. No entanto, os estudos realizados no início da década demonstraram a resistência do *P. falciparum* a estes medicamentos. Diante desta evidência, todos os países mudaram seus esquemas terapêuticos para TCAs e os estudos de sensibilidade mais recentes ainda demonstram a sensibilidade do do *P. falciparum* a estes medicamentos. Por isso não se preveem a curto prazo modificações dos princípios ativos incluídos nos esquemas atualmente usados.

Embora todos os países tenham trocado os esquemas anteriores para TCAs, existe uma variedade de combinações de princípios ativos e apresentações diferentes. Na reunião realizada em Cartagena, Colômbia, de 12 a 15 de abril de 2010, verificou-se que esta situação não leva em consideração a disponibilidade de fornecedores no mercado local, a capacidade logística de fazer a gestão de vários produtos em um número maior de apresentações, nem as recomendações mais recentes da Organização Mundial da Saúde (OMS)[6]. O impacto destas omissões tem sido maior com a redução da incidência da malária na região.

Durante a reunião mencionada, se propôs uma revisão dos esquemas atualmente em uso, seguindo o plano apresentado na Tabela 2.

Tabela 2: **Proposta de padronização dos esquemas de tratamento da malária por *P. falciparum* na região**

Esquema	2010	Proposta*	Apresentações dos medicamentos**
Bolívia	AS + MQ (monofármaco)	AS+MQ+PQ	Dose fixa ou co-blisters
Brasil	ATM-LUM ÁS-MQ	ATM-LUM+PQ AS-MQ+PQ	Ambas as combinações em doses fixas
Colômbia	ATM-LUM	TMJ-LUM+PQ	Combinação em dose fixa
Equador	AS + SP (co-blíster)	TMJ-LUM+PQ	Dose fixa
Guiana	ATM-LUM	TMJ-LUM+PQ	Combinação em dose fixa
Peru (costa-Amazonas)	AS + SP AS + MQ (monofármaco)	AS+MQ+PQ	Dose fixa ou co-blísters
Suriname	ATM+LUM	ATM+LUM+PQ	Combinação em dose fixa

* A combinação terapêutica destacada está entre as sugestões de mudança dos esquemas atuais.
** As combinações em doses fixas não incluem PQ.
ATM: arteméter; AS: artesunato; LUM: lumefantrina; MQ: mefloquina; SP: sulfadoxina-pirimetamina

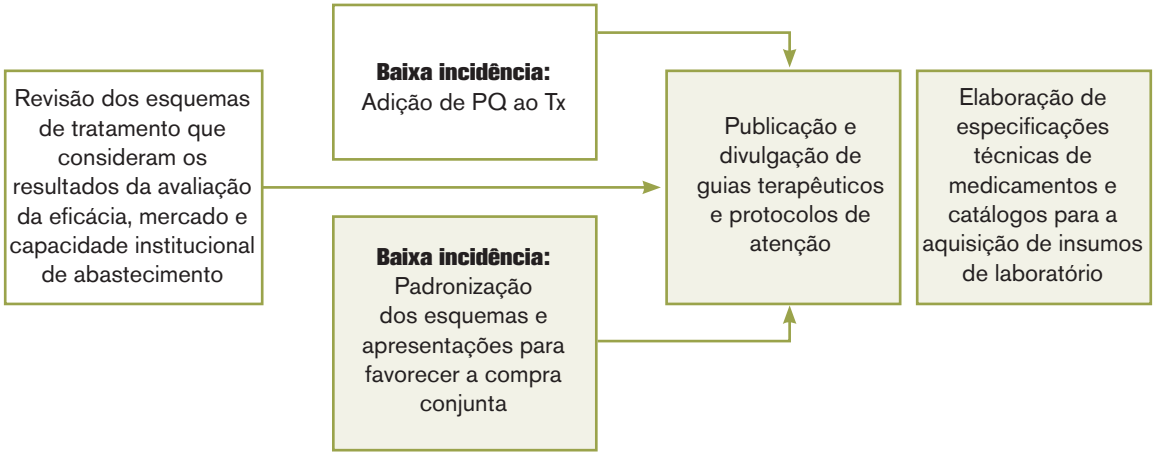
Se a médio prazo os países decidirem mudar seus esquemas fundamentados nesta proposta, devem considerar que a decisão da modificação precisa vir acompanhada da elaboração de guias terapêuticos, capacitação dos profissionais e de uma organização logística que permita suprir todo o sistema com inventários de estoques de trabalho e segurança adequados. Alguns dos países que compareceram à reunião de Cartagena, na Colômbia em 2010, propuseram iniciar a modificação de seus esquemas terapêuticos. Os planos de trabalho se encontram no relatório técnico da reunião.[7]

6. Organização Mundial da Saúde. 2010. Guidelines for treatment of Malaria. Geneva: Organização Mundial da Saúde, Programa Global de Malária. Segunda edição.
7. Strengthening Pharmaceutical Systems. 2010. Relatório técnico: Análise dos critérios de seleção, programação de necessidades e aquisição de antimaláricos nos países que dividem a Bacia Amazônica. Apresentado à Agência dos Estados Unidos para o Desenvolvimento Internacional pelo Programa Strengthening Pharmaceutical Systems (SPS). Arlington, VA: Management Sciences for Health.

Assim, na estratégia proposta, teriam de ser revisados periodicamente os esquemas terapêuticos que seguem uma metodologia semelhante à usada no seminário de Cartagena. Os critérios para a revisão incluiriam, entre outros:

- Necessidade de moléculas e apresentações mais estáveis e fáceis de manejar, principalmente nas áreas de baixa incidência onde a rotatividade do inventário é pequena. Embora as apresentações em blíster e uma vida útil prolongada sejam sempre desejáveis, esta não é uma consideração crítica nos produtos com alta rotatividade. No entanto, em um cenário de baixa incidência seria necessário manter inventários de estoques de baixa rotatividade nos serviços de saúde e almoxarifados. Neste contexto e de acordo com a data de vencimento, as condições de embalagem, de armazenamento e uma longa vida útil são importantes.
- Disponibilidade de fornecedores no mercado, principalmente de produtos essenciais de baixo volume de compra como os requeridos para casos graves.
- Possibilidade de padronizar esquemas com outros países da região para:
  - facilitar compras conjuntas que sejam coordenadas regionalmente ou através de agências de cooperação, intercâmbios ou doações;
  - facilitar e supervisar o tratamento de pacientes que vivem em áreas de fronteira;
  - implementar mais facilmente e de forma coordenada estudos de resistência.
- Capacidade logística dos sistemas locais de distribuição para gerir o número de apresentações incluídas nos seus esquemas.
- Não se espera, nem se pretende, que todos os países modifiquem de forma frequente seus esquemas levando em consideração estes critérios, mas os que optarem por isso devem levar em conta que a modificação dos esquemas terapêuticos implica:
  - Inclusão de novos medicamentos nos formulários ou listas nacionais
  - Elaboração e divulgação de normas ou guias padronizados de tratamento
  - Capacitação dos profissionais no uso das novas formulações
  - Organização logística para o abastecimento das novas formulações e a retirada das formulações que já não são usadas

Figura 1. **Elementos estratégicos para a seleção de medicamentos**



Tx: Tratamento

4.2 Programação das necessidades que consideram o abastecimento nas áreas de baixa incidência

Os serviços de saúde nas áreas de baixa incidência ou incidência nula não receberiam medicamentos se fossem seguidos os critérios usuais de programação das necessidades, como o consumo histórico ou morbidade esperada. Isto impedirá o tratamento de possíveis pacientes, resposta a surtos e o tratamento oportuno dos casos graves.

A estratégia recomendada consiste em seguir os critérios de programação usuais para as áreas de alta incidência. Para as áreas de baixa incidência, a programação seria baseada no objetivo de assegurar nos serviços a existência de medicamentos e abastecimento que leve em consideração:

- A situação presente e a tendência epidemiológica na área
- O risco de surtos considerando os fatores ecológicos
- Mecanismos que assegurem a provisão imediata de medicamentos e insumos em caso de necessidade como acesso ao almoxarifado regional mais próximo.

Por exemplo, para serviços em áreas de incidência muito baixa, densamente povoadas e de difícil acesso a almoxarifados regionais, poderia se considerar um inventário de trabalho em cada serviço equivalente a 3-5 tratamentos completos para cada categoria terapêutica regular e um número menor para casos graves. Em áreas de incidência muito baixa e de fácil acesso a almoxarifados estaduais ou regionais, elas poderiam manter um inventário estratégico a ser mobilizado imediatamente para a periferia, segundo necessário.

A manutenção de inventários de estoques de baixa rotatividade para doenças de relevância epidemiológica implicaria em uma maior taxa de perda por vencimento da validade. Isto ocorre mesmo em condições de gerenciamento estrito e eficiente do inventário, razão pela qual devem ser estabelecidas políticas de aceitação de perdas por vencimento da validade e eliminação.

A mudança de fornecedores, seja pela modificação dos esquemas terapêuticos ou do mecanismo de compra, implica uma revisão dos prazos de espera e, consequentemente, da programação anual dos pedidos. O inventário de estoques de reserva deve ser estimado com base nestes critérios, condições de abastecimento e prazo de validade dos antimaláricos normalmente usados. Um inventário de estoques de segurança de 9 a 12 meses poderia ser suficiente para cobrir situações em que o prazo de entrega é irregular. No entanto, a magnitude do inventário deve ser definida de acordo com as condições de abastecimento e as informações disponíveis em cada país. Este inventário de segurança deve ser distribuído entre os diferentes pontos da cadeia de abastecimento, por exemplo, 3 meses em serviços de saúde, 3 meses em depósitos intermediários e 3 meses no almoxarifado central.
Uma vez definidos os níveis de inventários de estoques e sua distribuição, devem-se registrar explicitamente os critérios para os procedimentos operacionais do programa.

4.3 Desenvolvimento de sistemas de informação estratégica para gestão do abastecimento

Os sistemas de informação da gestão do abastecimento que abrangem, no mínimo, o consumo e os estoques em todos os nós da rede de distribuição (almoxarifado central, almoxarifados periféricos e serviços de saúde) são complexos, de difícil administração e alto custo de manutenção. Dados coletados pelo MSH/SPS[8] demonstraram que poucos países membros da AMI dispõem de sistemas de informação com estas características.

O MSH/SPS propôs a coleta de um grupo limitado de indicadores que possibilitem a tomada de decisão estratégica (ver Tabela 3) na ausência de sistemas de informação funcionais do abastecimento, quer sejam integrais (inclusivos de todos os medicamentos usados pelos ministérios da Saúde) ou específicos ao programa da malária. A fonte de informação é o almoxarifado central de medicamentos e uma amostra dos serviços de saúde supervisados no período avaliado nos países que dispõem de sistemas de supervisão.

8. Informação incluída em: Barillas, E., et al. 2009. Seminário para Melhoria do Sistema de Informação da Gestão dos Medicamentos para Malária. Lima, Peru, 21 a 23 de abril de 2009. Apresentado à Agência para o Desenvolvimento Internacional dos Estados Unidos pelo Programa Strengthening Pharmaceutical Systems (SPS). Arlington, VA: Management Sciences for Health.

Tabela 3. **Indicadores propostos para a implementação de um sistema de informação estratégica da gestão do abastecimento**

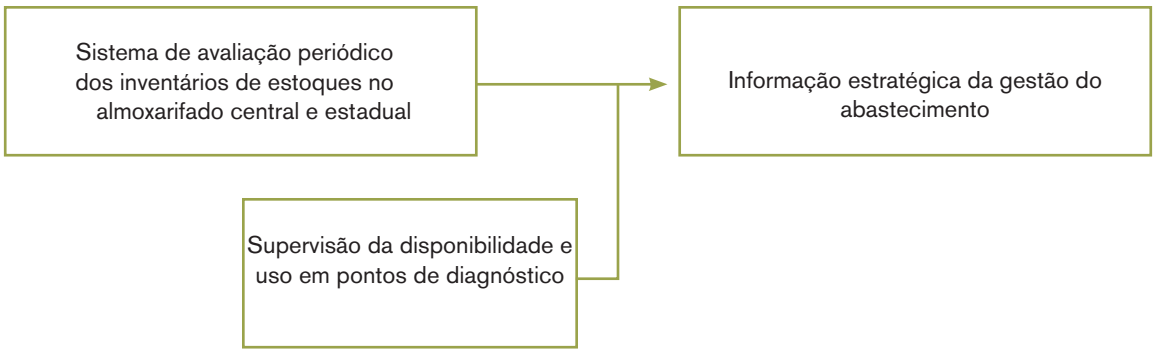
1	Porcentagem da disponibilidade de antimaláricos no almoxarifado central ao final do período avaliado.
2	Existência de antimaláricos no almoxarifado central de medicamentos, expressa em meses, de acordo com o consumo.
3	Porcentagem dos dias de desabastecimento de antimaláricos no almoxarifado central durante o período avaliado.
4	Porcentagem de medicamentos adquiridos durante o período que foi enviada para controle de qualidade.
5	Porcentagem de medicamentos analisados que passou pelo teste de qualidade.
6	Valor dos medicamentos (em dólares dos EUA) que perderam a validade no almoxarifado central durante o período avaliado.
7	Porcentagem das unidades administrativas estaduais que retiraram oportunamente o medicamento do depósito central.
8	Porcentagem dos almoxarifados estaduais nos quais se verificou desabastecimento de CQ, PQ ou TCA, em qualquer de suas apresentações, durante o período avaliado.
9	Valor dos medicamentos (em dólares dos EUA) que perderam a validade no almoxarifado estadual nos 6 meses anteriores.
10	Porcentagem dos serviços supervisados no período avaliados.
11	Porcentagem dos serviços que, no momento da visita, não dispunham de todos os insumos e equipamentos de laboratório necessários para o diagnóstico.
12	Porcentagem dos serviços com desabastecimento de pelo menos um dos medicamentos de primeira linha necessários para o tratamento da malária.
13	Porcentagem dos serviços nos quais a quantidade de antimaláricos válidos, no momento da visita, não era suficiente para cobrir a demanda até a distribuição seguinte.

A lógica desta proposta é a de que se no almoxarifado e em uma amostra representativa de almoxarifados periféricos e serviços supervisados houver disponibilidade de todos os medicamentos no momento da avaliação e o inventário de estoques de trabalho é suficiente até a distribuição seguinte, não existem grandes problemas de abastecimento. Um sistema desta natureza não descarta a necessidade de um sistema integral com informação "alinhada" de todos os pontos de estocagem e distribuição, mas pelo menos provê uma alternativa para fornecer informações mínimas para a tomada de decisão estratégica na gestão do abastecimento. [9]

Os sistemas "verticais" de informação do abastecimento de medicamentos em particular de um programa de saúde pública costumam ser o reflexo dos sistemas fragmentados de abastecimento. Por motivo de eficiência operacional, existe uma tendência de integrar os sistemas "verticais" em sistemas nacionais de gestão do abastecimento. A integração dos sistemas de informação faz mais sentido quando a baixa incidência ocasionar uma redução no fluxo de informação.[10]

9. A coleta destes indicadores em quatro países membros da iniciativa e a difusão de um informe técnico entre os responsáveis pela tomada de decisão facilitou a doação de medicamentos e promoveu a gestão imediata de compras nos países que enfrentavam potencial desabastecimento. (Barillas, E. 2009. Análise da disponibilidade de antimaláricos nos países que compartilham a Bacia Amazônica. Apresentado à Agência para o Desenvolvimento Internacional dos Estados Unidos pelo Programa Strengthening Pharmaceutical Systems (SPS). Arlington, VA: Management Sciences for Health).
10. Hoje o MSH/SPS dá apoio à integração dos sistemas de informação no Equador e Bolívia.

Figura 2. **Elementos estratégicos para melhorar a informação da gestão de insumos**



4.4 Implementação de mecanismos alternativos para aquisição de medicamentos

Em situações de alta incidência existem incentivos comerciais para que os fornecedores nacionais ou internacionais ofereçam seus produtos ao setor público. Com a redução do número de casos, os fornecedores perdem o interesse financeiro ou os preços de oferta sobem de forma significativa. Esta é a causa fundamental do desabastecimento dos medicamentos para o tratamento dos poucos casos especiais que ainda ocorrem na região como os casos graves, gravidez ou resistência ao tratamento de primeira linha.[11] Recentemente, este problema tem-se estendido à aquisição de medicamentos de primeira linha no Peru. Naquele país, em 2009, várias linhas de compras foram anuladas pela falta de fornecedores suficientes para legalmente validar as licitações.

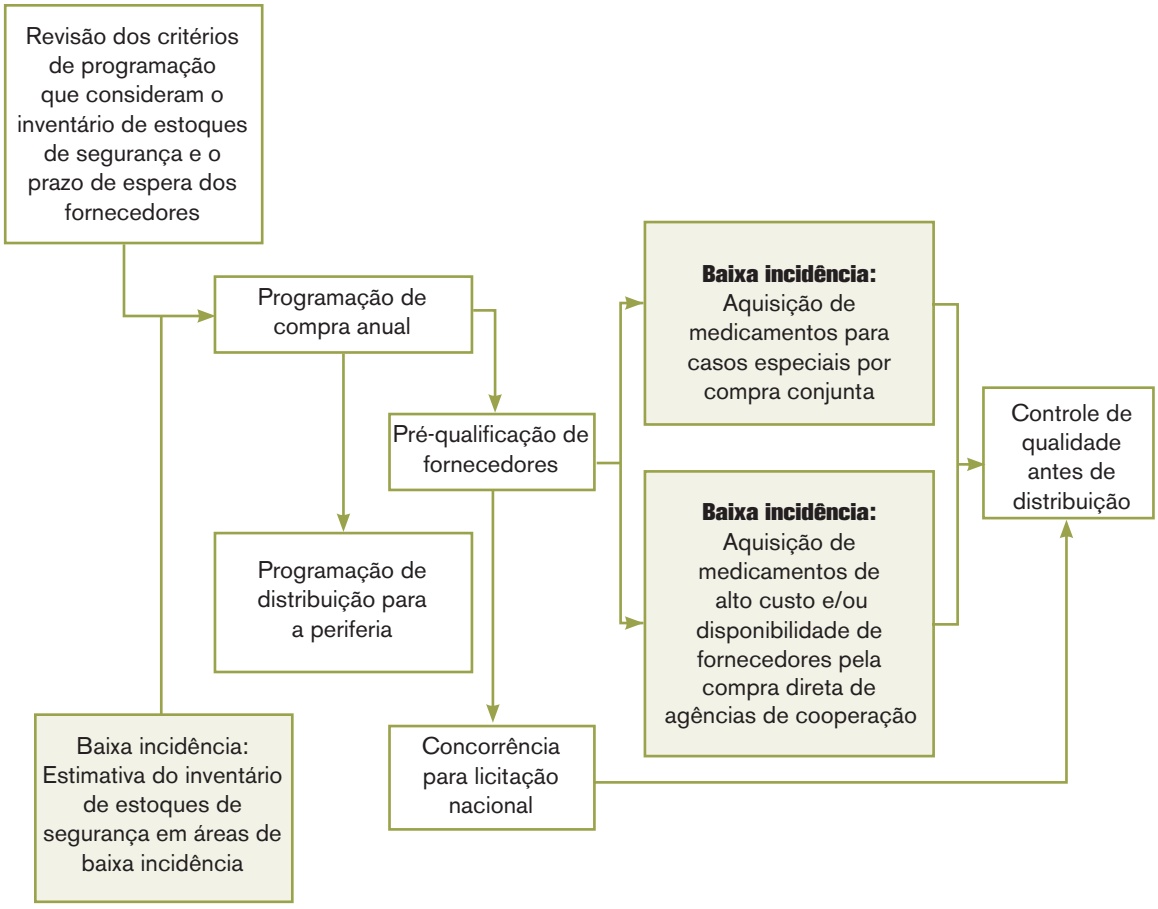
Uma alternativa para a solução deste problema é a compra direta através das agências de cooperação internacional. O Fundo Estratégico da Organização Pan-Americana da Saúde (FE/OPAS) oferece este mecanismo para os países da região. As legislações nacionais de compras e contratações devem permitir o uso deste mecanismo e gestões com base nos convênios firmados, principalmente o pagamento antecipado ao recebimento dos produtos. Os procedimentos para aquisição de medicamentos através do FE/OPAS são apresentados no Anexo 1 e o formulário a ser preenchido se encontra no Anexo 2.

11. Briggs, J., e E. Barillas. 2009. Relatório do estudo sobre a disponibilidade de medicamentos para tratar "casos especiais" de malária na América do Sul e América Central. Apresentado à Agência dos Estados Unidos para o Desenvolvimento Internacional pelo Programa Strengthening Pharmaceutical Systems (SPS). Arlington, VA: Management Sciences for Health.

A revisão dos esquemas de tratamento usados na região e a possibilidade de padronizar alguns esquemas no âmbito regional abrem a possibilidade de organizar sistemas de compras conjuntas ou negociações de preços com fornecedores internacionais.

Enquanto é organizado um sistema eficiente de aquisição conjunta, os medicamentos necessários para o tratamento de casos especiais poderiam ser obtidos mediante doações, ou seja, através das agências de cooperação técnica como o FE/OPAS ou diretamente dos laboratórios fabricantes. As quantidades necessárias em cada país são tão pequenas que não é eficiente submetê-las a um processo de licitação nacional, principalmente se se prevê que não haverá fornecedores interessados no mercado local.

Figura 3. **Elementos estratégicos para programação e aquisição de medicamentos**



4.5 Integração dos sistemas de transporte, estocagem e gestão dos inventários de estoques

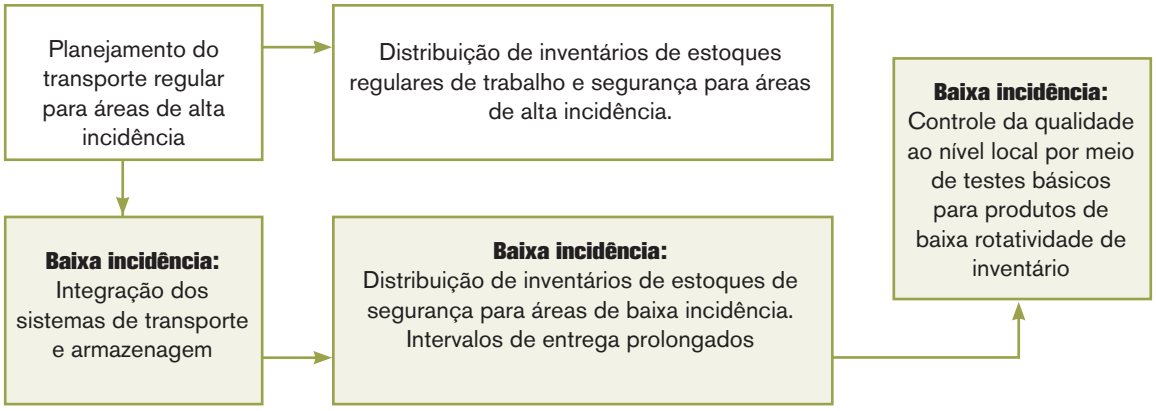
Para situações de alta incidência e programas intensivos de controle da doença, foram estabelecidos sistemas verticais independentes do abastecimento de medicamentos e insumos para o programa de controle da malária. É frequente encontrar na região depósitos centrais e periféricos que resguardam exclusivamente produtos do programa de controle da malária. Da mesma forma, os sistemas de gestão dos inventários de estoques, pedidos periódicos e transporte costumam ser independentes do restante dos medicamentos e insumos usados nos serviços de saúde pública.

Nos cenários de baixa incidência, os sistemas verticais de distribuição são dispendiosos e ineficientes. Para reduzir os custos de operação e melhorar a eficiência global do sistema de logística no setor público, será necessária a integração da estocagem, transporte e gestão dos inventários de estoques. Neste processo de integração, se deve considerar que há elementos do abastecimento que precisam ser mantidos como competências de um núcleo especializado no controle da malária, como a seleção dos medicamentos e insumos, programação dos pedidos e estratégias para promover a adesão ao tratamento.

Os critérios para programar a distribuição a áreas de baixa incidência devem ser elaborados com a participação dos técnicos do programa de malária. Nestas áreas, por exemplo, pode ser necessário espaçar as entregas diante da baixa rotatividade dos inventários de estoques ou manter inventários estratégicos nos depósitos periféricos que possam ser mobilizados imediatamente para serviços próximos.

No processo de integração dos sistemas verticais de distribuição, deve-se assegurar que os novos procedimentos não introduzam rupturas na cadeia de abastecimento. Pode-se considerar uma integração progressiva do nível central até os serviços, começando com a integração virtual dos inventários de estoques, sistemas de informação, coordenação do transporte para a periferia e, se necessário, integração física dos inventários em um único depósito.

Figura 4. **Elementos estratégicos para a distribuição de medicamentos**



4.6 Garantia e controle da qualidade dos medicamentos

Para garantir que os produtos adquiridos são de boa qualidade e que não haja deterioração até o momento de ser administrados ao paciente, é essencial realizar o controle de qualidade dos medicamentos ao longo da cadeia de abastecimento independentemente da situação epidemiológica. Na maioria dos países, a instituição responsável por fazer este controle é o Laboratório Oficial de Controle de Medicamentos (LOCM). Para esta finalidade, o LOCM realiza testes validados ou compendiais para verificar que o medicamento cumpre com as especificações estabelecidas durante o registro. No entanto, existem certas limitações no uso dos testes compendiais. Estas podem ser devidas principalmente a:

- falta de disponibilidade dos serviços por parte do LOCM, como limitação de recursos humanos e/ou financeiros ou barreiras de acesso por fator geográfico, entre outras.
- urgência que poderia existir para a obtenção de resultados de controle de qualidade, que não permitiria esperar o tempo requerido para realizar os testes compendiais.

Após levar em consideração estas limitações, o Programa de Promoção da Qualidade dos Medicamentos (PQM), implementado pela Farmacopeia dos Estados Unidos (USP), elaborou o enfoque de três níveis para controle de qualidade.

Este enfoque é baseado no uso de três níveis de análise, com metodologias diferentes para o controle de qualidade. Estes níveis usam procedimentos de complexidade crescente e complementar entre si, que consistem em:

- Nível 1 (N1): inspeção visual e física,
- Nível 2 (N2): testes analíticos básicos e
- Nível 3 (N3): testes validados ou compendiais

As características destes procedimentos, descritos na Tabela 4, são adaptadas às necessidades em particular do processo no qual são implementadas. O enfoque de três níveis de análise pode ser implementado independentemente da situação prevalente de incidência.[12]

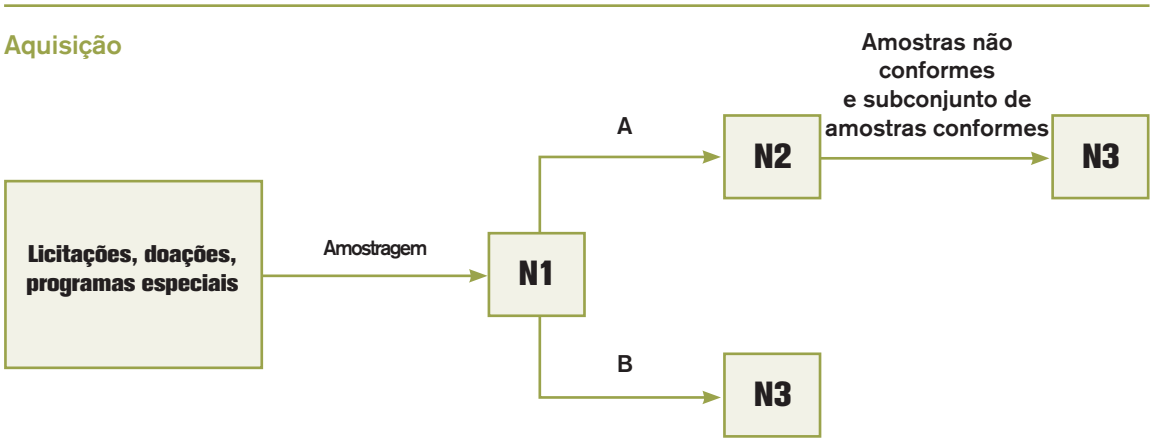
Tabela 4: **Características dos três níveis de controle de qualidade**[13,14),2]

Nível	Tipo de análise	Tipo de teste	Propósito	Pessoal responsável pela análise
1	Inspeção visual e física	**Visual:** • Propriedades do encarte e da embalagem **Física:** • Aspecto, condições e características físicas do medicamento	• Identificar os medicamentos vencidos e/ou medicamentos com informação insuficiente, equivocada e/ou fraudulenta; embalagem danificada; dano e/ou alterações no estado dos medicamentos	• Pessoal responsável pela gestão em cada etapa da cadeia de abastecimento, da aquisição ao uso, do nível local ao central.
2	Testes analíticos básicos	• Desintegração • Reações colorimétricas[15] • Cromatografia em camada delgada (CCD)	• Identificar os medicamentos com deficiências em quatro atributos de qualidade: identidade, conteúdo, impurezas e desintegração para formas farmacêuticas sólidas	• Pessoal treinado em testes básicos • Pessoal do LOCM
3	Testes validados ou compendiais	• De acordo com as especificações do registro	• Avaliação de todos os atributos críticos de qualidade	• Pessoal do LOCM

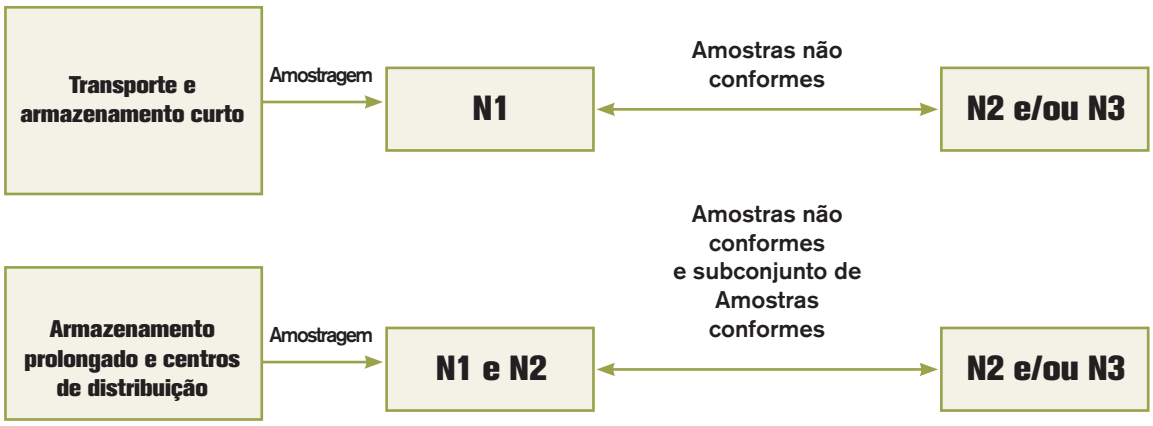
12. O artigo relacionado a este enfoque está em processo de revisão interna. A versão final será divulgada em 2011.
13. United States Pharmacopeia Convention Drug Quality and Information Program e colaboradores. 2007. Ensuring the Quality of Medicines in Resource-Limited Countries: An Operational Guide. Rockville, MD.: The United States Pharmacopeia Convention. Disponível em: http://www.usp.org/pdf/ EN/dqi/ensuringQualityOperationalGuide.pdf.
14. Sempre que são realizados processos de controle de qualidade, deve-se realizar a inspeção visual e física (N1), independentemente de serem depois realizados testes de N2 e/ou N3.
15. O uso de métodos colorimétricos não é recomendado para medicamentos para os quais existem métodos de CCD. Os métodos colorimétricos que são realizados no campo conseguem avaliar somente um atributo de qualidade (identidade), enquanto que a CCD fornece informação de três atributos de qualidade (identidade, conteúdo e impurezas).

Na Figura 5 são esquematizados os processos recomendados para a implementação do enfoque de três níveis nas diversas etapas da cadeia de abastecimento. Explicações específicas sobre estes esquemas e a aplicação do enfoque em condições de alta e baixa incidência são fornecidas nas próximas seções.

Figura 5: **Implementação do enfoque de três níveis na cadeia de abastecimento**



A - Medicamentos com histórico de boa qualidade produzidos por fabricantes confiáveis
B - 1: Falta de informação sobre o histórico de qualidade do medicamento.
2: Medicamentos considerados de risco devido a histórico do fabricante ou atributos do produto.



É importante a disseminação dos resultados de controle de qualidade em nível nacional e regional com o objetivo de dar ao público informação sobre os produtos de má qualidade e prevenir seu uso. [16]

Aquisição

Independentemente do nível de incidência, a qualidade dos antimaláricos adquiridos deve ser sempre avaliada antes de sua distribuição. Além disso, deve-se levar em consideração que somente através do N3 se pode assegurar que estes medicamentos cumprem com todas as especificações de registro. No entanto, como indicado na Figura 5, com base em considerações específicas, se optará pela alternativa de usar N2 em vez de N3. Estas mesmas considerações são válidas em condições de alta e baixa incidência. A decisão de qual nível usar deve ser feita com base em análise de risco, levando em consideração a estabilidade ou outros atributos do produto, histórico do fabricante e condições de estocagem durante o envio, entre outros. Por exemplo:

- No caso de medicamentos para os quais existe um histórico de boa qualidade e que são produzidos por fabricantes confiáveis, pode-se usar N2 para verificar a qualidade de novos lotes. Isto inclui, entre outros, fabricantes pré-qualificados pela OMS e auditados em Boas Práticas de Fabricação pela Agência Reguladora de Medicamentos.
- No caso de medicamentos como SP, para o qual foram documentadas falhas frequentes na dissolução, deve ser usado o N3, pois os testes básicos que são usados em N2 não permitiriam detectar esse tipo de deficiência.
- No caso de medicamentos de alto impacto, quer seja pelo seu alto consumo ou uso no tratamento de casos graves, deve-se considerar a vantagem de usar o N3 pelo menos em alguns lotes a fim de diminuir o risco de problemas de qualidade que podem não ser detectados através de N2.

A seguir é apresentado como o enfoque de três níveis pode ser usado durante a aquisição em situações específicas que ocorrem em condições de alta ou baixa incidência.

Em alta incidência, embora seja recomendável realizar o N3, se o volume dos medicamentos adquiridos for grande, pode representar uma carga muito grande para o LOCM. Portanto, a combinação de N2 com N3 oferece uma alternativa que pode maximizar os benefícios de realizar o controle de qualidade em um número maior de medicamentos ou de lotes de um mesmo medicamento. Por exemplo, para produtos de maior risco, pode-se analisar um número limitado de lotes com N3 e o restante com N2. (Ver na Figura 5 a combinação das alternativas A e B). As mesmas considerações para usar N2, descritas para condições de baixa incidência, podem-se aplicar quando os produtos forem provenientes de fontes garantidas.

16. O PQM desenvolveu um banco de dados que inclui, em prévia conformidade com os países, os resultados de controle de qualidade obtidos em programas e/ou iniciativas com os quais o PQM trabalha. Esta informação pode ser acessada livremente pela internet em http://www.usp.org/worldwide/medQualityDatabase/.

Em condições de baixa incidência, o volume comprado será reduzido e consistirá de um lote unitário ou um número muito pequeno de lotes. Portanto, para produtos que assim o justifiquem, recomenda-se realizar o N3. No entanto, é possível que, em baixa incidência, a grande parte das compras possa ser feita em conjunto por vários países através do FE. Nesse caso, poderia se fazer uso do N2 por implicações de garantia de qualidade no processo de seleção dos fabricantes e para verificar a qualidade antes da distribuição.Ver na Figura 5, alternativa A. No caso de surtos nos quais se faz uso de doações, é conveniente realizar o controle de N3, a menos que a procedência for de fontes garantidas e neste caso se pode verificar a qualidade por meio de N2.

Distribuição

Na cadeia de distribuição, se deve desenvolver um programa de Monitoramento da Qualidade dos Medicamentos (MQM), no qual sejam providos guias claros que permitam estabelecer protocolos de amostragem e análise. Os protocolos estabelecidos devem designar funções e responsabilidades específicas a todos os atores envolvidos no processo. O PQM criou guias para o desenvolvimento de protocolos de MQM que podem ser consultadas e usadas pelas autoridades sanitárias competentes. Elas foram elaboradas com o objetivo de assistir a programação e a execução da amostragem e análise dos medicamentos.

Dada a impossibilidade de realizar o MQM em todas as instituições envolvidas na estocagem e distribuição em nível nacional, os protocolos de amostragem devem considerar fatores como volume e número de lotes de medicamentos recebidos bem como fatores de risco para a deterioração da qualidade dos medicamentos. Estas considerações determinarão a periodicidade do MQM, a seleção dos locais, o tipo de medicamentos e/ou número de lotes de cada medicamento que deve ser amostrado. Por exemplo, durante estocagens prolongadas, a frequência com que se deve realizar as amostragens será determinada pelas condições de estocagem e/ou risco de deterioração da qualidade do medicamento. Se não existe informação prévia, pode-se começar com amostragens a cada seis meses e ajustar a periodicidade desta prática de acordo com os resultados. Também podem ser úteis protocolos que incluam amostragens com dados estatísticos como é detalhado ao final desta seção.

Em áreas ou em condições de alta incidência, quando existe nos depósitos centrais e/ou regionais e nos centros de distribuição um reabastecimento rápido do inventário com períodos de armazenamento curtos, recomenda-se nestes últimos principalmente a avaliação de N2. Nesse caso, se for necessário priorizar, deve-se considerar primeiro os medicamentos com maior risco de deterioração e os locais com condições inadequadas de estocagem (ex., alta temperatura e/ou umidade, exposição direta à luz solar, refrigeração deficiente etc.).

Em áreas ou em condições de baixa incidência, os medicamentos permanecem em depósitos centrais e/ou regionais ou em centros de distribuição por períodos mais prolongados. Devido ao reabastecimento lento do inventário, deve-se realizar em todos os locais controles periódicos de N1, a fim de assegurar que não fiquem retidos medicamentos vencidos e descartar e substituir o necessário de acordo com os guias estabelecidos nos países especificamente para este propósito. Além disso, devem ser implementados testes periódicos de controle de qualidade, por meio de N2, com ênfase nos locais nos quais o risco de alteração da qualidade sejam maiores devido à estocagem prolongada em condições inadequadas. No entanto, devem-se levar em consideração as limitações do N2 para detectar certos atributos de qualidade e, no caso de estocagem prolongada de produtos com alto risco de deterioração da qualidade, deve-se considerar a conveniência de realizar N3. É importante reiterar que as análises periódicas ajudarão a estabelecer a frequência mínima para sua realização.

Neste contexto pode ser útil realizar amostragens que sejam estatisticamente representativas e considerem as condições de estocagem bem como o tipo de medicamento. Isto permitiria, no caso do estudo identificar falhas de qualidade, estender a todos os locais pertinentes a implementação de medidas preventivas e/ou corretivas semelhantes.

Estudos de adesão e avaliação do impacto

Em situações de alta incidência, o paciente costuma receber os medicamentos no serviço de saúde onde é supervisada a primeira tomada do remédio, sendo o tratamento continuado e completado em casa. Estudos realizados pela AMI demonstram que a adesão ao tratamento pode ser baixa, principalmente em esquemas terapêuticos prolongados como os necessários para a malária por *P. vivax*. As iniciativas para supervisão estrita da tomada do tratamento em cenários de alta incidência têm sido de difícil cumprimento pela grande demanda de recursos humanos institucionais e financeiros que esta prática demanda. Em cenários de baixa incidência, onde a eliminação de reservatórios humanos é mais importante, deve-se incorporar o tratamento sob supervisão estrita dos poucos casos diagnosticados. Neste cenário, esta prática é viável com os recursos institucionais regulares dos programas de malária.

Os países que dividem a Bacia Amazônica têm realizado diversos estudos para avaliar a adesão a diferentes esquemas de tratamento. A última rodada de estudos, e o levantamento de estudos anteriores, recebeu apoio recentemente do MSH/SPS.[17]

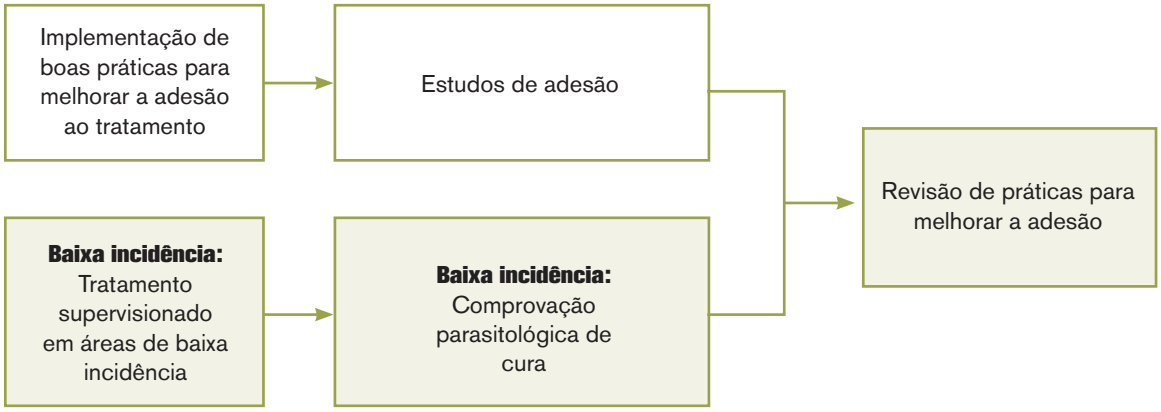
17. O PQM desenvolveu um banco de dados que inclui, em prévia conformidade com os países, os resultados de controle de qualidade obtidos em programas e/ou iniciativas que têm a colaboração deste programa de controle de qualidade. Esta informação pode ser acessada livremente pela internet em http://www.usp.org/worldwide/medQualityDatabase/.

Precisamente, esta última rodada de estudos demonstrou dificuldades na implementação do trabalho de campo devido ao reduzido número de casos. Como os estudos realizados até o momento parecem coincidir em um grupo de estratégias centrais para melhorar a adesão (ex., redução do tempo de tratamento com PQ para malária por *P. vivax*, prescrições gráficas ao paciente) (ver Figura 6), estudos subsequentes deveriam enfocar:

- A avaliação da adesão a novos esquemas terapêuticos
- A avaliação de práticas que promovam a adesão, ou que potencialmente possam diminuí-la

A implementação de estudos multicêntricos permitiria incluir uma amostra significativa, inclusive em cenários de baixa incidência.

Figura 6. **Elementos estratégicos para melhorar o uso dos medicamentos**

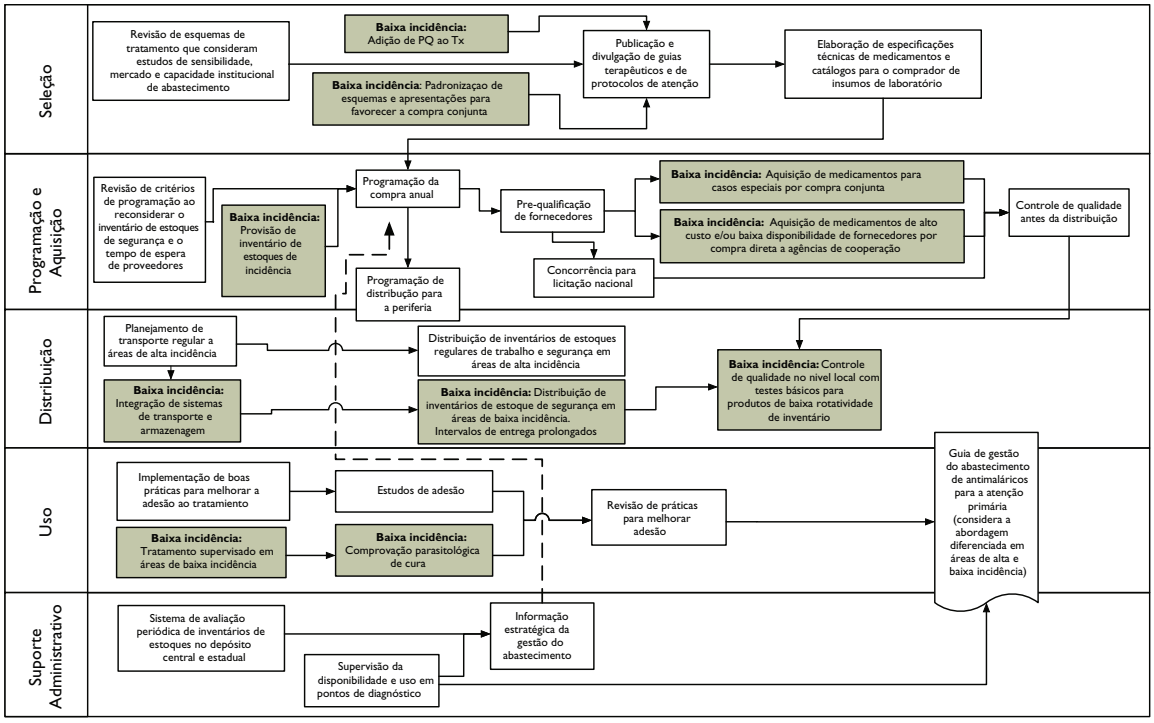


5

Abordagem estratégica para a melhoria da gestão do abastecimento de antimaláricos em condições de alta e baixa transmissão

A Figura 7 mostra em um fluxo de processos as estratégias que podem ser implementadas pelos países da região sequencialmente para melhorar a gestão do abastecimento de antimaláricos e insumos para o diagnóstico da malária. A parte sombreada do gráfico destaca as estratégias que devem ser priorizadas nas áreas de baixa incidência.

Figura 7. **Abordagem estratégica para a melhoria da gestão do abastecimento de antimaláricos em condições de alta e baixa transmissão**



6

Anexos

Anexo 1: **Proposta de compra consolidada de antimaláricos para os países da região das Américas através do Fundo Estratégico da OPAS e o projeto de medicamentos essenciais e tecnologia (HSS/MT)**

Antecedentes

O acesso aos antimaláricos nos países da região é limitado devido a fatores como disponibilidade insuficiente nos mercados farmacêuticos nacionais, especialmente por falta de incentivos comerciais para os fornecedores nacionais e internacionais; limitações regulamentares de alguns países para fazer aquisições internacionais; falta de distribuidores no âmbito regional; antimaláricos sem registro pelas autoridades de saúde por falta de representação dos fabricantes nos países, o que limita a disponibilidade deles; e problemas próprios relacionados à gestão dos sistemas nacionais de abastecimento de medicamentos.

Este último é mais crítico para os medicamentos necessários para os casos especiais como o tratamento de casos da malária grave, malária durante a gravidez e surgimento de resistência a medicamentos de primeira linha. No último caso, as reservas são reduzidas e os fornecedores são ainda mais limitados.

Esta problemática foi analisada em 2010 durante a reunião de seleção e programação de antimaláricos realizada como parte da AMI-RAVREDA. Na reunião, os países da Bacia Amazônica apresentaram as causas de desabastecimento de medicamentos, como o problema da falta de licitações e disponibilidade limitada em seus mercados nacionais, entre outras. Em particular, isto é especialmente devido aos pequenos volumes de antimaláricos solicitados pelos países que não têm sido do interesse financeiro dos fornecedores. Esta situação é semelhante em outros países, de outras sub-regiões, que não dispõem de fabricantes locais e têm notificado problemas de falsificação e comercialização ilegal de medicamentos.

Uma das alternativas para resolver a problemática estabelecida é a compra conjunta de antimaláricos por parte dos países da região através do FE. A OPAS propôs aos países apresentar seus pedidos de antimaláricos para 2011 e consolidar a demanda regional bem como fazer uma licitação internacional. Com isso, também se pretende programar a produção com os laboratórios fabricantes

pré-qualificados, planejar os processos de compra e entrega antecipada, encurtar os prazos de entrega e reduzir de maneira acentuada os preços dos medicamentos.

Nesta linha de trabalho, o HSS/MT, em coordenação com o Programa Regional da Malária (PRM) e a Área de Gestão de Compras e Abastecimento (PRO) da OPAS, vem preparando um plano de ação para apoiar os países nesta gestão (ver Tabela 1 neste anexo).

A OPAS, através do FE, realizou a primeira licitação anual para a compra conjunta de antimaláricos para o ano 2011. Este processo ocorreu durante os meses de agosto a outubro de 2010, de acordo com o seguinte cronograma:

1. No mês de junho, a OPAS enviou um convite aos ministérios da Saúde ou órgão responsável pela gestão do abastecimento de antimaláricos dos países membros para que estes participassem da compra consolidada. Cada país enviou à OPAS informes com suas necessidades de antimaláricos para este ano.
2. Os pedidos foram apresentados segundo o formato incluído no Anexo 2, em que se indicavam os antimaláricos solicitados e suas respetivas apresentações farmacêuticas. Também lhes foi pedido completar o número total de unidades requeridas onde deviam indicar as quantidades em unidades de dose, bem como os requisitos técnicos, regulamentares e administrativos que o país considerava. Por fim, foi indicado no pedido se precisavam de remessas parciais ou totais.
3. O formulário original do pedido teve de ser aprovado e assinado por um representante do ministério da Saúde ou órgão responsável pelo abastecimento de antimaláricos. Uma vez finalizado esse processo, o formulário foi enviado ao representante da OPAS/OMS em todos os países até 25 de julho de 2010.
4. Todas as necessidades foram consolidadas em agosto de 2010 e foram preparadas as bases da licitação de acordo com os pedidos dos países.
5. De setembro a outubro de 2010, foi realizada a licitação e os seus resultados, incluindo os fornecedores e preços, foram informados aos países imediatamente. Isto para que em janeiro deste ano pudessem efetuar os respetivos pedidos de compra.
6. O ponto focal do FE na representação da OPAS/OMS proporcionou apoio técnico para a revisão das estimativas e pedidos feitos e esclareceu as dúvidas que surgiram no processo. Uma vez revisada a informação, o representante da OPAS/OMS enviou o pedido por correio eletrônico e correio postal ao Dr. James Fitzgerald, fitzgeraldj@paho.org, com cópia para a Dra. Nora Girón, gironn@hon.ops-oms.org.

7. Depois que os resultados da licitação foram obtidos, a Área de Gestão de Compras e Abastecimento (PRO) enviou uma estimativa dos preços a todos os países participantes para indicarem o fornecedor estabelecido, preço e condições de entrega. Assim que os países receberem as estimativas de preços, eles devem revisá-las e aprová-las se não tiverem objeção. Essa informação, junto com o comprovante de transferência de fundos à conta estabelecida para tal fim, deve ser enviada à OPAS.
8. O FE também publicará no seu website os resultados da licitação em um boletim informativo geral que inclui os preços dos antimaláricos para 2011, além de remeter a respetiva informação através das representações de todos os países participantes.

Tabela 1. **Plano de ação para a compra conjunta de antimaláricos para 2011**

Atividade	Cronograma	Responsáveis
1. Convite aos países da região para apresentar suas necessidades de antimaláricos e participar da compra conjunta através do FE	10 de julho de 2010	• HSS/MT, assessor regional do FE em coordenação com o PRM e PRO • Representações dos países: assessores e coordenador do FE e responsável por doenças transmissíveis (malária)
2. Revisão das necessidades dos países com base nos parâmetros estabelecidos pelo país para estimativa dos pedidos e definição das especificações técnicas e requisitos de qualidade	15 de julho de 2010	• Representação do país: assessores, coordenador do FE e responsável por doenças transmissíveis (malária)
3. Envio à OPAS das necessidades de antimaláricos por cada país	Data-limite: 25 de julho de 2010	• Ministérios da Saúde • Órgãos responsáveis pelo controle da malária
4. Consolidação regional das necessidades de antimaláricos enviadas pelos países	7 de agosto de 2010	• HSS/MT, assessor regional do FE
5. Elaboração das bases para licitação internacional	Até 25 de agosto de 2010	• PRO e HSS/MT
6. Realização da licitação internacional	Setembro-outubro de 2010	• Área de medicamentos e tecnologia HSS/MT • PRO
7. Notificação da adjudicação de medicamentos e preços	Novembro de 2010	• HSS/MT • PRO
8. Envio das estimativas de preços aos países	Novembro de 2010	• PRO e HSS/MT
9. Efetuação dos pedidos de compra	Novembro de 2010 ou janeiro de 2011	• Ministérios da Saúde • Órgãos responsáveis pelo controle da malária

Anexo 2: **Formulário para solicitação de antimaláricos através do Fundo Estratégico de 2011**

Programação de antimaláricos a serem adquiridos através do Fundo Estratégico (FE) em 2011		
País:		Ano de programação:
Data de preenchimento:		
Nome e cargo do responsável:		
E-mail:		Telefone:
Descrição do medicamento	Quantidade requirida por ano, em unidades de dosagem (comp, KAP, ampola, frasco, etc.)	Observações
Cloroquina fosfato, comp. de 250 mg (base 150 mg)		
Primaquina fosfato, comp. de 5 mg		
Primaquina fosfato, comp. de 7.5 mg		
Primaquina fosfato, comp. de 15 mg		
Artesunato, comp. de 50 mg		
Artesunato, comp de 100 mg		
Artesunato, inj., frasco de 60 mg		
Artesunato, comp. de 250 mg		
Artesunato+mefloquina 25+67 .5 (base)		
Artesunato+mefloquina 50+135 (base)		
Artesunato+mefloquina 100+270 (base)		
Artesunato+mefloquina 100/220 (base)		
Amodiaquina 200mg+artesunato 50 mg		
Arteméter 20 mg/lumefantrina 120 mg (comp. 1 x 6)		
Artemether 20 mg/lumefantrine 120 mg (comp. 2x6)		
Artemether 20 mg/lumefantrine 120 mg (comp. 3x6)		
Artemether 20 mg/lumefantrine 120 mg(comp. 4x6)		
Quinina clorhidrato Sol, iny ., 300 mg/ml (amp de 2 ml)		
Quinina Sulfato, comp. 300 mg		
Mefloquina clorhidrato, comp. 250 mg		
Sulfadoxina 500/pirimetamina, comp. 25 mg		
Amodiaquine, comp. 153 mg (clorhidrato)		
Amodiaquine, comp. 200 mg		
Artemether iny ., 80 mg/ml (1 ml)		
Proguanil (cloridrato), 100 mg		
Atovaquone + Proguanil 250+100 mg		
Atovaquone + Proguanil 62 .5+25 mg		
Indicar os prazos para entrega do medicamento e o trimestre		
Trimestre em que será feito o pedido	T1_____T2_____T3_____T4	
Trimestre em que será preciso a entrega dos produtos	T1_____T2_____T3_____T4	
b. Acrescentar as especificações técnicas para cada medicamento, requisitos regulamentares requeridos pelo país para a compra e nacionalização destes medicamentos. Indicar se existe alguma exceção na legislação para importar este produto por motivos de saúde pública.		
c. Outras observações a levar em consideração na aquisição		

Amazon Malaria Initiative/ Amazon Network for the Surveillance of Antimalarial Drug Resistance

Strategic Orientation Document for Malaria Vector Surveillance and Control in Latin America and the Caribbean

USAID
FROM THE AMERICAN PEOPLE

Pan American Health Organization
Regional Office of the World Health Organization

CDC
SAFER · HEALTHIER · PEOPLE

msh
Management Sciences for Health

USP
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RTI INTERNATIONAL

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Available at http://www.usaidami.org/resources.shtml

Amazon Malaria Initiative/ Amazon Network for the Surveillance of Antimalarial Drug Resistance

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August 2011.

1 Glossary

Anthropophagic: when vectors feed preferentially on humans

Entomological inoculation rate (EIR): the number of bites from an infectious mosquito experienced by an individual per unit of time

Endophagic: when vectors preferentially feed indoors

Endophilic: when vectors preferentially rest indoors

Exophagic: when vectors preferentially feed outdoors

Exophilic: when vectors preferentially rest outdoors

Gonotrophic cycle: the egg production cycle in female mosquitoes, which includes blood meal digestion, egg maturation, and oviposition

Monitoring: systematic tracking of program actions over time

Primary vector: an arthropod that transmits a pathogen or parasite from one vertebrate host to another and that is able to sustain the organism in its natural cycle

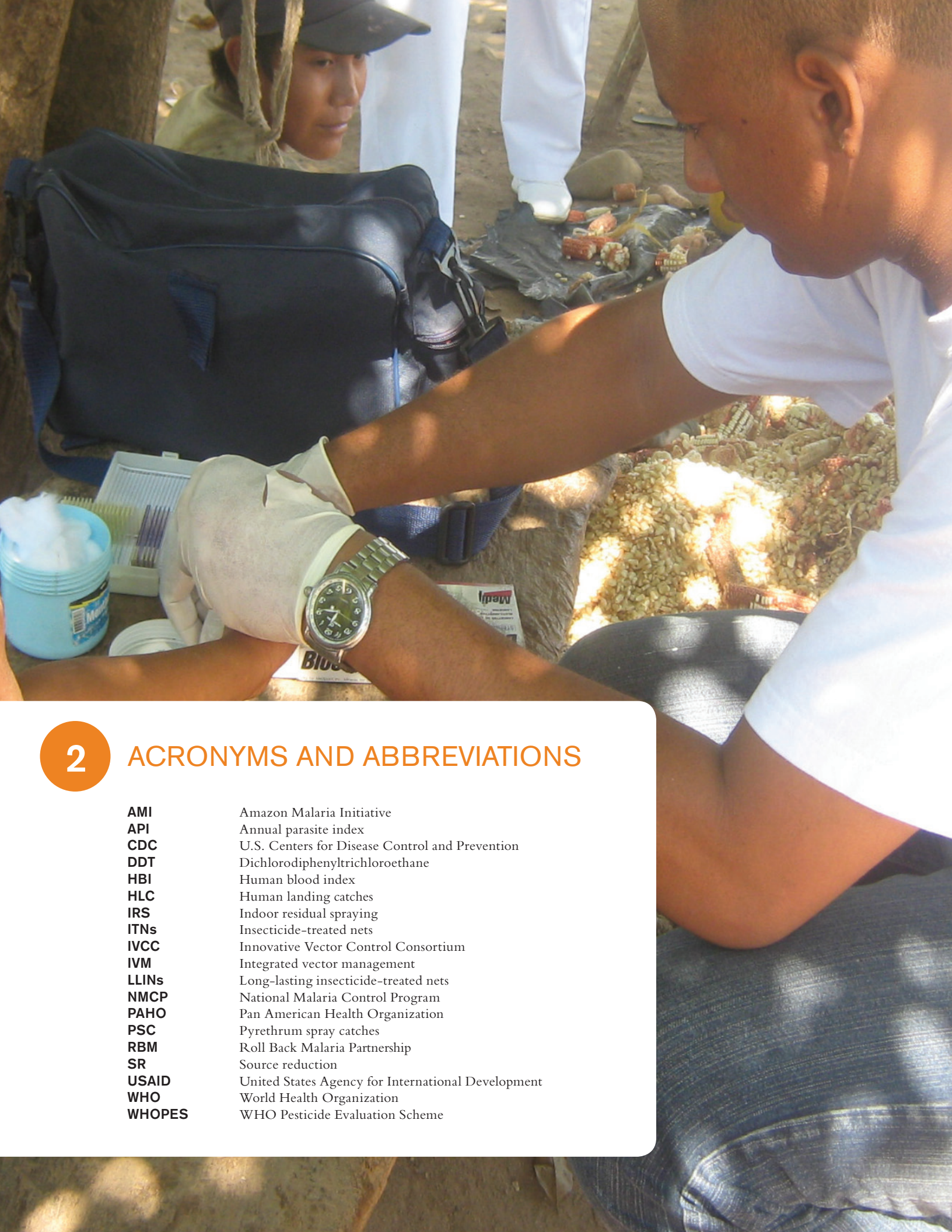
Secondary vector: an arthropod that transmits a pathogen or parasite from one vertebrate host to another but that cannot sustain the organism in a natural cycle without transmission by a primary vector

Species complex: a group of species that is reproductively isolated from each other but with very similar morphology

Surveillance: the ongoing systematic collection, analysis, and interpretation of data and the dissemination of data to those who need to know in order for action to be taken

Synergists: inhibitors of detoxification enzymes, such as esterases, oxidases and glutathione S-transferases, that are important in the metabolism of insecticides

Sympatric: populations with an overlapping distribution or that coexist



2 ACRONYMS AND ABBREVIATIONS

AMI	Amazon Malaria Initiative
API	Annual parasite index
CDC	U.S. Centers for Disease Control and Prevention
DDT	Dichlorodiphenyltrichloroethane
HBI	Human blood index
HLC	Human landing catches
IRS	Indoor residual spraying
ITNs	Insecticide-treated nets
IVCC	Innovative Vector Control Consortium
IVM	Integrated vector management
LLINs	Long-lasting insecticide-treated nets
NMCP	National Malaria Control Program
PAHO	Pan American Health Organization
PSC	Pyrethrum spray catches
RBM	Roll Back Malaria Partnership
SR	Source reduction
USAID	United States Agency for International Development
WHO	World Health Organization
WHOPES	WHO Pesticide Evaluation Scheme

3

Objective

The purpose of this document is to serve as a strategic guide to address malaria vector surveillance and control in the Americas, where malaria transmission is characterized as moderate to low. This document summarizes the discussions and recommendations of the Amazon Malaria Initiative (AMI) technical advisory group and aims to promote strategies that are evidence-based. It is intended that this document will be updated regularly to incorporate new developments, findings, input, and suggestions from partners, as well as those arising from its own implementation.

4

Introduction

Since documenting the interruption of malaria transmission in several countries in the 1960s, 23 countries in the Americas still have endemic malaria transmission: Argentina, Bahamas, Belize, Bolivia, Brazil, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Guyana, French Guiana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Dominican Republic, Suriname and Venezuela (PAHO 2010).

The region reported 524,123 laboratory-confirmed malaria cases in 2009 (representing a 56% reduction in malaria morbidity in the region as compared with 2000) and 109 deaths in 2009 (a 70% decrease relative to the 2000 baseline figures). Seventy-four percent of infections were caused by *Plasmodium vivax*, 26% by *Plasmodium falciparum*, and less than 0.1% by *Plasmodium malariae* (locally reported in Brazil, French Guiana, Guyana, Suriname, and Venezuela) (PAHO 2010). Recent trends suggest that some countries, such as Argentina, El Salvador, Mexico, and Paraguay, will likely continue to advance toward elimination of the disease in coming years.

The transmission dynamics of malaria in the Americas comprises a complex epidemiological scenario: both *P. falciparum* and *P. vivax* parasites are sympatric in the human host and in the vector population. There is wide diversity of anopheline species that are competent vectors that coexist with a temporal succession favoring sustained transmission. As a result, patterns and intensity of malaria transmission can be remarkably diverse, requiring a variety of approaches for entomological surveillance and vector control.

Entomological surveillance is a cornerstone of effective and sustained malaria control. However, the best developed malaria vector surveillance indicators and techniques are mainly applicable to areas with high malaria transmission and, in the Americas transmission levels very seldom fall within this category. Malaria endemic areas of the Americas are generally considered moderate to low transmission settings. The inadequacy of traditional entomological surveillance strategies in these transmission settings has become evident as efforts to implement them have been met with considerable challenges.

Malaria vector control programs rely on the indoor residual spraying (IRS) of insecticides and the distribution of insecticide-treated bed nets (ITNs) as primary vector control tools. However, there are significant knowledge gaps regarding their efficacy in the Americas, where different vector species vary substantially in host-seeking behaviors and respond differently to interventions. Thus, it is anticipated that a scale-up of these interventions might produce varying degrees of success, depending on local entomological and epidemiological contexts. Therefore, the use of regionally relevant entomological indicators to monitor impact will allow for vector control programs to monitor the effectiveness of these strategies and, where necessary, to seek alternatives.

5

Vector control

Interventions targeting malaria vectors are one of the most effective ways to prevent and reduce malaria transmission and are key technical elements of the World Health Organization's (WHO) Global Strategy for Malaria Control (WHO 1993). At present, vector control is one of the most important malaria control tools available, and may lower transmission to levels where elimination can be envisioned.

Vector control through the application of residual insecticides was once the mainstay of malaria control in the Americas, and considerable reductions in malaria cases and elimination of the disease in some regions was achieved. Factors that affected the efficacy of IRS included insecticide resistance, exophily, exophagy, behavioral avoidance, economic constraints, and public concerns about environmental contamination. The conclusion of the Global Malaria Eradication Program (GMEP) and the subsequent implementation of global policies and strategies for malaria control that promote the reliance on case treatment contributed to a de-emphasis on vector-based strategies (WHO, 1979, 1985, 1992). During this period, vector control activities in the Americas become reactionary, with poorly coordinated control efforts in response to increases in malaria cases.

When properly implemented, ITNs and IRS are the two malaria vector control strategies with the most proven efficacy that are currently available. These two strategies can significantly reduce the malaria burden by reducing the vector population, reducing the life of adult female mosquitoes, and preventing vector contact with humans. Larval source reduction (SR) remains as a supplemental strategy, since it can only impact disease by reducing vector abundance. Due to its high cost and low long-term effectiveness for malaria control, space spraying is used to reduce vector densities over the short term, usually only in emergency situations.

Successful malaria control and elimination in the Americas requires effective control of the *Anopheles* species that serve as malaria vectors. Several factors limit the effectiveness of vector control in this region, including: (1) the lack of knowledge of the composition of the vector system in many settings and how anthropogenic alterations of the environment influence transmission dynamics; (2) a limited number of vector control strategies and a lack of information on how vectors present in this region adapt to overcoming the effects of these strategies; and (3) the lack of evidence-based field research and rigorous evaluation of strategies to guide the effective implementation of integrated vector management (IVM).

The major malaria vectors in the Americas have a wide-scale distribution in diverse environments and show a high variability in their behavioral patterns even within populations of the same species. To date, 18 *Anopheles* species have been listed as important malaria vectors in the Americas, of which five are considered primary vectors. In addition to primary vectors, low levels of transmission are frequently maintained by a number of behaviorally and ecologically diverse secondary vectors. Annex 1 lists all primary and secondary vectors currently recognized in the Americas.

The selection of appropriate vector control tools should take into account the heterogeneity of the vector populations' behavior and environment. Given that a variety of anophelines can become infected with *Plasmodium spp.*, an assessment of epidemiological potential in different settings and/or transmission foci is required to determine which interventions are likely to deliver the greatest impact.

Vector control should be targeted to high malaria risk areas, and IRS and ITNs should be considered measures of general applicability. The process of deciding which of these two vector control strategies to implement in a given situation should be guided by an analysis of the level of malaria endemicity, vector bionomics, eco-epidemiological characteristics, operational feasibility, community acceptance, and program sustainability. Depending on the specific malaria transmission dynamics and endemicity of malaria in an area, some interventions may not be cost-effective, so vector control programs should first consider these factors before deciding which interventions to apply.

Achieving high coverage is of crucial importance to reaching maximum impact on malaria transmission within a given vector control strategy. The Roll Back Malaria Partnership (RBM) recommends at least 80% coverage of a malaria control intervention in order to achieve considerable impact on malaria transmission. Following this guidance, malaria control programs should aim to reach high levels of coverage if they are to truly have an impact on transmission.

5.1 Indoor residual spraying

Vector reduction through the indoor application of residual insecticides was once the mainstay of malaria control in the Americas. When IRS was extensively used in Latin America during the malaria eradication campaign of the mid 1900s, no quantification of its impact on malaria cases and entomological parameters was recorded (Pluess *et al.* 2010; Tanser *et al.* 2010). However, historical and program documentation has clearly established the impact of IRS on malaria control and has credited it with eliminating malaria from several parts of the world, including the United States. IRS reduces the human biting rate by both killing mosquitoes and repelling them through an irritant effect. Since IRS targets endophagic and endophilic vectors, its effectiveness may be not optimal in areas with vectors that have different feeding and resting behaviors.

According to the latest WHO report (WHO 2010), of the 23 countries and territories with endemic malaria transmission in the Americas, 14 recommend including IRS for malaria control. In 2009 eight countries used IRS for the prevention and control of epidemics and 10 countries used it in combination with ITNs. Targeted, focalized IRS has been used in at least three countries for malaria control. In 2009, an estimated 7,888,251 people at risk of malaria were protected by the use of IRS (WHO 2010).

From the 20 classes of chemicals registered for use in controlling agricultural or domestic pests, only four classes have been registered for public health use against arthropod disease vectors. Currently, 12 insecticides within these four classes are recommended by WHO for use in IRS. Information on the insecticides approved for public health use can be found on WHO websites such as: http://www.who.int/whopes and http://www.who.int/malaria/vector_control/irs/en/index.html. Annex 2 lists the insecticides currently recommended by WHO for IRS.

5.2 Insecticide-treated nets

The use of ITNs, including long-lasting insecticide-treated nets (LLINs), has shown substantial impact on malaria transmission, clinical disease, and childhood mortality in Africa. ITNs protect individuals either by killing mosquitoes that attempt to feed on persons protected by a net or by diverting host-seeking mosquitoes to search for a blood meal elsewhere. ITNs can also exert a community-wide effect, reducing mosquito density, survival, human blood indices, and feeding frequency over large areas where ITNs are in use (Gimnig *et al.* 2003).

During the last decade, through the aid of international donors, the distribution of LLINs has risen steadily and constitutes today the main activity for malaria vector control in the Americas. More than three million LLINs have been distributed throughout the South American continent to date and a rapid scale-up of ITN distribution is expected in the near future. According to the 2010 WHO Malaria Report, 15 of the 23 malaria-endemic countries in the Americas reported having a policy of providing ITNs in 2009. ITNs were distributed to all age groups in 13 countries, and two countries have undertaken mass campaigns targeting households with children under five years of age. Five countries reported the distribution of ITNs through prenatal clinics. ITNs were mainly distributed free of charge in 12 countries, and were otherwise sold at a subsidized price.

ITNs have been tested extensively on the African *P. falciparum* transmission cycle, but the information available regarding ITN efficacy in other epidemiological contexts is limited. There is little understanding of the scale of how this intervention might impact malaria transmission in other parts of the world. ITNs are particularly suitable for mosquitoes that bite nocturnally and both bite and rest indoors. It is generally perceived that ITNs are less effective against exophilic and exophagic

mosquitoes like *Anopheles darlingi*, the principal vector of malaria in the Amazon. Due to the lack of information on the dynamics of local vectors and their response to ITNs, it is difficult to predict outcomes for when ITN distributions are scaled-up. Therefore, it is important to monitor changes in mosquito populations and behavior as part of ITN distribution programs.

Under current guidelines and practices, LLINs are defined as maintaining adequate insecticidal activity after 20 standard washes or a minimum of three years under routine use in the field. The WHO Pesticide Evaluation Scheme (WHOPES) has given an interim recommendation to six net products that have met the first part of the criteria but have not had adequate time for field-testing. Two net products have met both criteria and have been given full recommendation by WHOPES. The insecticides used in all recommended LLINs and in most conventionally treated nets belong to the pyrethroid family of insecticides, which are considered particularly safe for human use due to their low mammalian toxicity. Countries considering the use of ITNs as a malaria control strategy should ensure that either conventionally treated nets are regularly retreated with insecticides or that adequate distributions of LLINs are in place, including upkeep and replacement strategies. Annex 3 shows the WHO-recommended LLINs to date. Further details can be found at http://www.who.int/whopes.

5.3 Source reduction

Source reduction (SR) is the temporary or permanent elimination of anopheline larval habitats, often by using chemical or biological larvicides. In terms of impacting the vector population and reducing malaria transmission, SR only reduces vector abundance. Reducing vector abundance has a comparatively lower impact on malaria transmission than strategies that reduce vector-human contact.

SR approaches may be feasible in areas where larval habitats are few, accessible, and can be clearly defined. For this approach to be effective, a high proportion of the breeding sites within the vector flight range must be treated. Thus, SR is usually only recommended in very specific situations, such as when outbreaks occur and in certain urban settings.

Some programs that have employed SR within their malaria vector control strategies have used environmental management as well as the application of larvicides. The outcome of these efforts has been mainly a reduction in mosquito densities, with no documented impact on reduction of malaria cases (PAHO 2006, 2010; Walker & Lynch 2007).

SR has limited applicability in the Americas due to the inaccessibility and wide range of breeding sites of the main malaria vectors in the region. Thus, SR using larvicides is not currently recommended as a tool for malaria control on its own. It remains as a potential strategy, and recent studies conducted in Africa indicate that SR targeting human-made breeding sites may significantly reduce

malaria in appropriate settings. In addition, SR may have a role as part of an integrated vector management (IVM) program, since it has been documented that SR can amplify the impact of ITNs and IRS (Walker & Lynch, 2007).

5.4 Integrated vector management

IVM has been defined as a "rational decision-making process for the optimal use of resources for vector control" (WHO 2007) and includes five key elements: 1) an evidence-based decision-making process; 2) the use of integrated approaches; 3) collaboration within the health sector and with other sectors; 4) support through advocacy, social mobilization, and legislation; and 5) capacity building.

The use of two or more vector control methods in the context of IVM is believed to be an effective strategy when each method targets different points in the transmission cycle. There is a consensus in the region of the Americas that malaria control, and eventually elimination, is far more likely if the best available tools are used in combination.

IVM has been slowly introduced for malaria control in the Americas (Feachem *et al.*, 2009; PAHO, 2006). Some programs have incorporated IVM elements but, in general, it has been insufficiently applied and evaluated in the region. However, when IVM strategies have been comprehensively implemented in African countries, they have successfully controlled malaria transmission (Beier *et al.*, 2008).

Although IRS and ITNs are effective individually and can achieve dramatic decreases in malaria prevalence, few studies have explored the synergistic effect of the combined use of IRS and ITNs. The rationale behind this approach is that transmission should decline more rapidly due to greater insecticide coverage and that the development of insecticide resistance can be delayed if different classes of insecticides are used for IRS and ITNs. Evidence resulting from this combined approach shows results varying in effect, with some studies showing a greater impact as a result of the combination, and others showing no benefit when compared with either IRS or ITNs alone (Yakob *et al.* 2010).

The current evidence is insufficient to properly quantify the additive effect of SR, or the impact of combining ITNs, IRS, and SR in malaria transmission reduction; nor is there sufficient evidence to predict the most cost-effective combination of vector control strategies. Developing a body of evidence from trials conducted through the coordinated efforts of research groups and vector control programs is necessary to address this significant gap in operational knowledge.

6

Vector surveillance

Surveillance and monitoring are integral parts of vector control and are essential prerequisites to the rational design, implementation, and evaluation of vector control programs. Surveillance provides ongoing information about the impacts that interventions have on the vector population. Monitoring of control activities provides feedback about implementation to identify problems or constraints. Both surveillance and monitoring are necessary to evaluate the efficacy and effectiveness of vector control interventions. Evaluation can provide key information on the successes and challenges of intervention strategies, and thus guide the planning of subsequent control activities.

Vector surveillance, monitoring, and evaluation should be contextualized within regional and national malaria control programs, taking advantage of the possible collaborations with other government health programs or research institutions working in this area. Central or regional reference entomology laboratories, where available, can often provide technical assistance with these activities.

An enhanced vector surveillance system tailored to moderate to low-transmission settings, which can be employed easily and routinely within a public health surveillance context, is proposed in this guidance document. The monitoring plan focuses on a limited number of indicators, which can be gathered at a reasonable cost and are operationally relevant.

The indicators selected for this document include indicators of entomological impact or risk of exposure and indicators related to the operational implementation of control strategies (ITNs and IRS). When data are systematically gathered, these indicators can provide information on where and why an intervention is or is not producing the expected epidemiological impact. Effective vector control also requires trained personnel, supervision of control operations, and periodic evaluation of the impact of the control measures on the targeted vectors and on disease incidence or prevalence.

6.1 Entomological surveillance

Goal and objectives

Entomological surveillance is an integral part of vector control and should be tailored to the types of control strategies being used and program capabilities. The goal of entomological surveillance is to monitor some of the critical vector characteristics that will guide the planning, implementation, and evaluation of malaria vector control programs.

Entomological surveillance aims to:

- Identify the vector population that will be targeted by control measures;
- Guide the optimal timing for the implementation of vector control strategies;
- Detect behavior patterns in vectors that could limit the efficacy of vector control interventions;
- Monitor the entomological impact of vector control interventions;
- Detect the development of insecticide resistance and the modes of resistance.

Overview of the vector surveillance system

A universally applicable malaria vector surveillance system does not exist, thus local entomological surveillance should be tailored according to the level of malaria risk and the resources available for surveillance. Given the complexity of malaria transmission in the Americas, surveillance programs should be planned and designed using the best available knowledge regarding the ecology of local vector species and malaria transmission dynamics.

The proposed surveillance strategy serves as a tool to document the sustained efficacy of vector control measures and provides a basis for measuring their effectiveness. As programs successfully reduce malaria transmission, the measurement of entomological indicators become increasingly difficult and insensitive, particularly when determining vector infection rates. To compensate for changes in transmission, the surveillance strategy should be continually evaluated and updated.

Several models have attempted to explain and predict the relationships between vector indices and malaria transmission. Vector abundance, infection rate, and the life expectancy of infectious mosquitoes have been identified as key elements associated with malaria transmission. Entomological surveys should be carried out at regular intervals, and in areas of higher malaria transmission, entomological indicators need to be monitored more frequently because changes in morbidity and mortality may occur in a shorter period of time. As a general approach, in areas of high to moderate transmission,

entomological surveys for vector presence and behavior should be done every month during the transmission season; in areas of moderate to low transmission, surveys should be done three or four times a year during the transmission season; in areas of low to very low transmission, surveys should be done two times a year during the transmission season; and finally, in areas with no transmission but at risk of transmission, monitoring should be done once a year. Once a general understanding of transmission dynamics is established, entomological surveillance programs can tailor the periodicity and intensity of their monitoring to particular settings and situations. Based on the reported incidence of malaria in the Americas, endemic areas may be classified into three main categories: moderate to low malaria transmission, low to very low malaria transmission, and no transmission but at risk of transmission.

Dependent upon program capabilities, it is recommended that baseline data be collected in an area before an intervention is implemented. This information can be used to monitor the impact of control measures and also help determine the frequency of future monitoring. If changes in transmission occur, the frequency of data collection may be increased to ensure adequate monitoring of the impact of remedial actions. Entomological data should be linked with ongoing epidemiological surveillance to evaluate disease transmission and the number of malaria cases.

Entomological survey sites

Surveillance that covers the entire area at risk is the best approach for understanding how vector control strategies are impacting the vector population. Such an approach is particularly challenging since it can be extremely difficult to sample mosquitoes over large areas. An alternative is to conduct surveillance at sentinel sites corresponding to areas of priority concern for entomological surveillance and vector control activities. It is assumed that the mosquito populations present at these sites are representative of larger geographical areas. This approach permits the collection of longitudinal data that, when linked to malaria incidence, can measure the sustained impact of vector control interventions. It also enables the optimal use of limited resources, making sentinel site-based surveillance a particularly attractive and recommended approach for the collection of entomological data in the Americas.

Sentinel sites should be representative of the greater area that is under surveillance. Sites should represent relevant eco-epidemiological zones and areas of ongoing vector control or areas where it is likely that vector control interventions will be used. To identify eco-epidemiological zones, regions should be delimited using determinants of malaria transmission intensity, such as (1) environmental elements (geology, vegetation, climate, rivers, etc), (2) geographical determinants (altitude, temperature, humidity, rainfall), (3) human presence and distribution of rural versus urban populations (roads,

cities, land use, etc), and (4) main vector distributions. In general, malaria programs have a sense of these major eco-regions, and several existing publications on eco-regions can serve as starting point for individual countries to better define these regions (Rubio-Palis & Zimmerman 1997; WHO 2006).

The major epidemiological strata of malaria transmission were originally defined in the context of the WHO's Global Strategy for Malaria Control (WHO 1993), and subsequently adapted by Castillo-Salgado (1992) for specific for use in the Americas. The Pan American Health Organization (PAHO) proposed the use of a stratification process using annual parasite indexes (API). Areas of high to moderate transmission are those with API ≥1 per 1,000 habitants; areas of low transmission are those with API <1 per 1,000 habitants. These latter areas correspond to areas that could be considered for pre-elimination. This system also includes areas with no current malaria transmission but where transmission could potentially occur. Other Amazon Malaria Initiative (AMI)-supported documents, particularly *Estrategia para la toma de decisiones en control racional de vectores de malaria para los países de la región de las Américas,*[1] discuss additional approaches.

The number of sentinel sites chosen to monitor the selected indicators depends on the capacity of local staff, costs, and availability of resources. However, at least one sentinel site per eco-epidemiological zone should be established and long-term surveillance should be conducted. Sites should be located in areas of greatest malaria incidence and pesticide use (for both agricultural and public health purposes). The relevance of sentinel sites may vary over time. Thus information must be analyzed continuously to take into account any changes in vector behavior, alterations in patterns of disease transmission, environmental changes, and human population movements.

Entomological indicators

The objective of entomological surveillance is highly qualitative, i.e. to determine if anopheline vectors are present and to identify their composition, seasonality, and susceptibility to insecticides. It also aims to detect changes in patterns of human-vector contact and if vector behavior is modified as a result of control measures. Routine monitoring of these indicators is essential to ensure continued effectiveness as vector populations change in response to intervention pressures. As transmission intensity decreases, the measurement of some entomological indicators becomes increasingly difficult and less sensitive, particularly those related to mosquito infection rates. Therefore, this guidance

1. Strategy for rational decision-making in control of malaria vectors for the countries of the region of the Americas. Available in Spanish at www.paho.org/spanish/ad/dpc/cd/ravreda-guia-control-vectores.doc

document lists two sets of entomological indicators. The first set is listed in Table 1 and represents basic entomological indicators. The second set of entomological indicators is listed in Table 2 and is applicable to special settings and circumstances when in-depth surveillance is required and financial resources are available.

In summary, monitoring vector species populations is a systematic activity that should be conducted at regular intervals depending on the transmission level. Indicators should be monitored at regular intervals during the transmission season according to transmission levels and at the same sentinel sites over long periods of time.

Table 1. **Basic entomological indicators to consider as part of malaria vector control programs in the Americas.**

Indicator	Definition
Presence of malaria vectors and species composition	Detection of the vector species present in a given area.
Spatial and seasonal distribution of vectors	Number of vector species present per unit of surveillance and time.
Relative abundance	Number of vectors of a given species per unit of collection and time.
Feeding behavior	Number of mosquitoes attempting to bite inside/outside the house per unit of collection and time.
Insecticide susceptibility	Ability of a given dose of insecticide to kill the vector population.

Table 2. **Intermediate entomological indicators to consider in special circumstances as part of malaria vector control programs in the Americas.**

Indicator	Definition
Human blood index	Proportion of vectors with human blood meals per unit of time
Malaria infection rate	Proportion of mosquitoes with malaria sporozoites
Parous rate	Proportion of female anophelines that have oviposited at least once.

Surveillance methods

Entomological surveillance involves collecting mosquitoes for different types of analyses. The selection of the trapping method should be based both on the behavior of the species and on the indicator that is being investigated.

The entomological indicators described here rely on the collection of *Anopheles* mosquitoes. Human landing catches (HLC) remain one of the most effective and informative collection methods for the species most common in the Americas. HLC allows for the collection of data on key mosquito behaviors, such as host seeking and feeding. Alternatives to HLC that have been field-tested in the Americas include the U.S. Centers for Disease Control and Prevention (CDC) light traps, CO_2

baited traps, human baited traps, pyrethrum spray catches, aspirator collections of indoor-resting mosquitoes, and outdoor resting collections. However, previous studies have consistently shown that the majority of anophelines in the Americas are not readily caught in traps, limiting their use in the region. Pyrethrum spray catches (PSC) are not recommended due to low levels of exophily in the local anophelines. Entry/exit window traps have not been widely used in the region, but the data generated to date show that considerable numbers of *Anopheles albimanus, An. darlingi,* and *An. vestitipennis* can be caught either entering or exiting houses. Their potential as a surveillance tool in the Americas needs to be further evaluated with different vectors and in different settings.

6.2 Monitoring vector control operations

Goals and objectives

IRS campaigns and the distribution of ITN s must be carried out with skill and achieve high coverage to be effective. A reliable monitoring strategy can ensure the accurate collection of this operational information. Table 3 lists operational indicators that should be monitored regularly when using ITNs and IRS.

The monitoring of operational indicators can be achieved through a variety of methods. ITN distribution campaigns and routine distributions should be closely monitored. Statistically robust coverage surveys should be conducted at regular intervals to evaluate ITN ownership and use (details on the suggested regularity of these can be found in the specific malaria transmission level section of this document). In addition, surveys should be conducted to assess how different cultural practices and ITN care habits can influence ITN physical durability and insecticide retention.

IRS operations should be monitored closely by the implementation agent. The quality of IRS applications should be evaluated to assess the efficacy of the spraying through the use of standard methods such as the WHO cone bioassay. Monitoring may include an evaluation of IRS coverage by an agent independent of the implementer. Standardized methods, strategies and guidelines to monitor the appropriate ratio of insecticide per surface area are still under development by technical partners including the CDC and the Innovative Vector Control Consortium (IVCC). As with ITNs, operational research activities and evaluations should be conducted to evaluate the long-term effect of the spraying.

Many countries routinely conduct major demographic and health surveys that include the collection of data on indicators that are relevant to malaria control. National Malaria Control Programs (NMCPs)

should consider reviewing those surveys and coordinating efforts to ensure that malaria indicators are included in such surveys. Doing so could help decrease the costs associated with the monitoring and evaluation of activities specifically for malaria.

Table 3. **Operational indicators to consider for use in the Americas to monitor vector control programs using ITNs and IRS.**

Vector control strategy	Indicator	Definition
ITN	Household coverage of ITNs	Proportion of households possessing ≥1 ITNs out of those targeted.
	Sufficient household coverage of ITNs	Proportion of households where the number of ITNs is ≥ number of beds/sleeping spaces, among those targeted.
	ITN usage	Proportion of people reported sleeping under an ITN the previous night out of those targeted.
	ITN survivorship	Proportion of nets distributed in a campaign that are still present in target households.
	ITN insecticidal activity	Proportion of ITNs with adequate levels of insecticidal activity among those surveyed.
	Physical integrity	Proportion of ITNs that are still in acceptable physical condition among those surveyed.
IRS	IRS coverage	Proportion of houses/structures sprayed among those targeted.
	Insecticidal effect on sprayed surfaces	Mosquito mortality per cone bioassay on sprayed surfaces at regular time intervals after IRS application.
	Dosage of insecticide*	Ratio of the quantity of insecticide present to the wall surface area sprayed.

* Methods to uniformly collect data for this indicator are still under development.

6.3 Entomological indicators

The following are the definitions of the complete set of entomological indicators suggested for the surveillance, monitoring, and evaluation of malaria vectors in the Americas:

- **Presence of malaria vectors and species composition:** The primary malaria vectors for a given area may be known, however, it is important to know all the vector species present in intervention areas. Species should be initially identified based on morphological criteria utilizing published taxonomic keys. Due to the unclear taxonomic status of some species, molecular identification should be used in addition to morphological classification when necessary and feasible.

- **Spatial and seasonal distribution of vectors:** Understanding spatial distribution and seasonality helps to define the length of the transmission season and the peaks of biting behavior for each vector species. This information allows for greater understanding of malaria transmission dynamics over time and guides the planning and implementation of control measures.
- **Relative abundance:** The relative abundance of anophelines can be an indicator of the efficacy of vector control interventions. After the implementation of an intervention, a reduction in human-vector contact is expected. Mosquito density, as measured through human landing rates, is a good proxy measure of relative abundance. Regular monitoring of the relative abundance of species is needed so that control programs can respond appropriately to any significant increases in the main vector populations.
- **Feeding behavior:** Behavioral changes in mosquito populations after the introduction of insecticide-based control measures have been reported. For example, vectors can adopt more exophagic or more zoophilic feeding patterns to avoid indoor insecticide contact. Therefore, it is important to routinely monitor indoor and outdoor feeding behavior and, if possible, the human blood index (HBI) to detect changes in host preference.
- **Parous rate:** Mosquito survival and parous rates are important determinants of vectorial capacity and malaria transmission, and can be affected by insecticide-based interventions. This indicator assumes that the mosquito population is at equilibrium regarding gain and loss due to migration, breeding, and mortality. The bias resulting from a temporary reduction in parous rates due to a sudden increase in newly emerged mosquitoes may be minimized by pooling samples collected regularly over an extended period.
- **Insecticide susceptibility:** Determining the levels of susceptibility of the vector population to insecticides currently in use, or planned for use in the future, is of crucial importance to vector control programs. Ideally, baseline insecticide susceptibility data should be collected before an intervention is initiated and further data should be collected annually at a minimum, preferably at end of the transmission season. If resources are available, testing frequency can be increased or expanded in geographic range and the modes of action of insecticide resistance can be determined. The frequency of testing should be increased if there is an unexpected increase in the number of malaria cases or if insecticide resistance is suspected. Resistance surveillance should be performed at sentinel sites on all present malaria vectors.

6.4 Operational indicators

Insecticide-treated nets

ITN coverage surveys should be conducted in specific domains of interest, such as an area targeted for distribution campaigns, and not as part of a sentinel site-based methodology. This population-based approach will give more representative data on ITN ownership and use. This information will also inform decisions on the timing of net replacement. These surveys can include analyses of the content of insecticide and physical status of the nets in a subset of nets collected from the households visited. Protocols for such surveys are available from AMI partners and can be used as guidance for the development of future surveys.

- **Household coverage and use:** Household surveys are the preferred means of assessing household coverage and use of ITNs among populations at risk of malaria, and can signal if distribution plans have included adequate numbers of nets. In general, surveys should be conducted at regular intervals, e.g., every 6-12 months, to allow for up-to-date and reliable estimates on coverage and use.
- **Sufficient household coverage of ITNs:** As many countries are now favoring universal coverage over the coverage of vulnerable groups (children < 5 years old and pregnant women), there is a need to include indicators to assess if there are sufficient nets in targeted households.
- **ITN usage:** In addition to assessing the presence of ITNs in target households, it is important to determine if the ITNs are being used correctly. As a part of household coverage surveys, a simple questionnaire can be administered to household residents to document the proportion of individuals who slept under an ITN on the night preceding the survey.
- **ITN survivorship:** As countries often rely on ITN distribution via large-scale campaigns, malaria control programs should develop strategies to monitor the retention of ITNs after such campaign events. This information will assist in the planning of the timing of follow up campaigns and also assist in the development and implementation of strategies to maintain coverage levels for longer periods of time. Protocols and guidelines for this kind of monitoring appropriate to the region are currently under development and should be available in the near future.
- **Expected life span of ITNs:** Insecticidal activity and physical integrity. As countries scale-up to universal coverage of ITNs, it is critical to monitor the durability and insecticide content of nets. This provides valuable information about the duration of protection for the target population. Failure to replace ITNs in a timely manner can lead to increases in malaria cases.

In addition, if more than one brand of ITN is being used in a given region, it may be advisable to compare these ITNs and determine if one has a better profile in terms of durability. This information can be collected through surveys designed to evaluate nets at regular time intervals. They should be conducted in areas representative of particular cultural contexts and practices that may impact ITN life span, such as hanging and washing habits. These surveys do not need to be repeated as often as the coverage surveys unless changes in habits have occurred or are suspected. These surveys should include the measurement of insecticidal activity and/or insecticide levels as measured by the WHO cone bioassay and biochemical assays (simple colorimetric methods or high performance liquid chromatography) and physical integrity using standard inspection methods. Examples of previous evaluations of this kind are available from AMI partners upon request.

Indoor residual spraying

The use of a product for IRS with a lower concentration of active ingredient than that which is recommended can result in the application of a sub-lethal dose of insecticide. This can compromise vector control and could promote the development of insecticide resistance. Thus, it is recommended that vector control programs rely on WHOPES approved insecticides and purchase insecticides only from internationally recognized sources. IRS efficacy is also highly dependent upon the quality of the spraying procedure. To assess this, a subset of walls in houses should be evaluated with standard tests, such as the WHO cone bioassay, after each spray round. Care should be taken to evaluate the insecticidal effect of the insecticide used on the different possible types of surfaces because wall material and construction style can affect the efficacy of IRS.

- **IRS coverage:** Houses should be sprayed immediately before the onset of the transmission season and the number of houses sprayed in relation to the number of houses targeted should be recorded by spraying programs to estimate the initial coverage. In addition to the routine monitoring of the IRS operation, IRS coverage can be evaluated by independent surveys, such as Malaria Indicator Surveys, which can help to estimate the coverage of the spraying program.
- **Insecticidal effect on sprayed surfaces:** The expected efficacy of residually applied insecticide is dependent on its concentration and rate of decay on wall surfaces after application and can be measured using the WHO cone bioassay with a susceptible mosquito strain or wild-caught mosquitoes with no evidence of insecticide resistance. Monitoring should be conducted at regular 1- to 2-month intervals post-IRS in a selected subset of houses. This can provide information on how long the insecticidal effect lasts in a particular setting. For the first year, wall bioassays should be done monthly to determine the length of residual activity for a particular insecticide on the predominant wall surface types in the locale (e.g., mud, cement, or wood).

Once the residual lifespan of an approved insecticide is determined in a particular locale, it may be possible to decrease the frequency of the wall bioassays after subsequent spray rounds, or conduct only an initial assay immediately following the spray operation to confirm the quality of the spraying. The cone bioassay may be followed by chemical analysis if the IRS quality is still in doubt.

- **Dosage of insecticide:** It is important to ensure that the recommended dosage of insecticide is used. Personnel should compute the wall surface area to be sprayed and dosages should be calculated accordingly. Instructions on the sachet of insecticide should be used to determine the dilution application rate. Public health officials should base their dosages on international WHOPES recommendations. Guidelines for the evaluation of dosage are currently under development.

7

Monitoring plans per epidemiological strata

7.1 Moderate to low-transmission settings

Entomological indicators

Collection of information and frequency

The collection of entomological indicators should be done using a sentinel site-based approach. Data for the different indicators should be collected using standardized methodologies at regular intervals (a previously mentioned document[1] includes the description of a detailed protocol for the collection of entomological indicators in Latin America). Due to the behavior of the primary malaria vectors in the Americas, HLC are a preferred method for gathering entomological data for indicators related to to mosquito host-seeking behavior such as human landing rates and feeding behavior.

Figure 1 shows the proposed timing for data collection in areas of moderate to low malaria transmission. As a starting point, entomological surveillance should be conducted 3-4 times during the transmission season to collect data for those indicators related to mosquito presence and behavior. This accounts for the fact that vector abundances can change at different periods of the rainy/transmission season. By sampling at several points throughout the season, a comprehensive understanding of vector dynamics throughout the season can be obtained. Collection timing can be adjusted according to the seasonality and species composition of vectors in a given area, i.e., if a known vector is more abundant at the beginning of the transmission season, data on that particular vector should be collected then. At the end of the transmission season, the information gathered through entomological surveillance should be analyzed and taken into consideration when planning subsequent vector control activities, such as changes in insecticides used for IRS.

Data should be collected for the following entomological indicators:

- Presence of malaria vectors and species composition
- Spatial and seasonal distribution of vectors
- Relative abundance
- Feeding behavior
- Parous rate
- Insecticide susceptibility

Operational indicators

In areas with ongoing vector control, such as ITNs and IRS, the operational indicators listed in Figure 1 should be monitored as described previously.

Vector control

- **Objective:** To reduce malaria cases by either preventing vector-human contact or by reducing the population of infected mosquitoes.

- **Strategies available**
  -IRS (mass spraying or targeted spraying)
  -ITNs

- **Description of strategies:** Current vector control strategies employed in moderate to low-transmission settings include ITNs and IRS. Choosing between ITNs and IRS is quite often a matter of operational feasibility, availability of resources, and socio-cultural determinants. In addition, it is important to take into consideration vector behavior and insecticide susceptibility. In situations where malaria transmission is concentrated around limited foci, indiscriminate and widespread spraying may become less practical and cost-effective than then targeted or focalized use of IRS.

  The use of SR and combined ITN-IRS interventions are not formally recommended at this time due to the lack of evidence for any additional benefits resulting from their use in the Americas. The only situation in which IRS and ITNs should be considered for simultaneous implementation would be if pyrethroid resistance emerges. In such cases, it is recommended to continue with the use of ITNs and add IRS using an insecticide from a different class.

Figure 1. **Yearly timing of data collection for entomological and operational indicators in moderate to low transmission settings.**

	Indicators		Transmission season[1]					
			Month 1	Month 2	Month 3	Month 4	Month 5	Month 6
Moderate to low transmission	Entomological	Presence of vectors and species composition		•		•		•
		Vector distribution and seasonality		•		•		•
		Feeding behavior		•		•		•
		Relative abundance		•		•		•
		Parous rate		•		•		•
		Insecticide susceptibility						•
	Operational	Household ownership of ITNs*	•					
		Sufficient household ownership of ITNs*	•					
		ITN use*	•					
		ITN survivorship*	•					
		ITN insecticide levels*	•					
		ITN physical durability*	•					
		IRS coverage*	•					
		Insecticidal effect on sprayed surfaces*	•		•		•	
		Dosage and quality of insecticide*	•					

1 Transmission season length will vary based on the local context; for the sake of clarity, a 6-month transmission season has been represented in this table

* According to the control strategy in use

7.2 Low to very low-transmission settings

Entomological indicators

- **Collection of information and frequency:** As malaria transmission decreases, some of the indicators recommended for areas of moderate to low malaria transmission, such as those related to mosquito behavior, become less sensitive and more subject to bias, especially if data are collected at sentinel sites, which limits the catchment area of information. Therefore, in areas of low to very low malaria transmission, the recommended entomological indicators are reduced (Figure 2). The recommended indicators in these areas are those related to the presence and composition of vector species. In the event of a significant increase in malaria cases (i.e., outbreaks) and depending on the availability of personnel and resources, the determination of malaria infection rates and parity can also be included.
- As with other transmission levels, the collection of entomological data should be performed using a sentinel site-based approach with appropriate standardized methodologies, such as HLC. Sentinel sites should represent the eco-epidemiological settings present in the region. If possible,

the number of collection sites should be increased if a substantial rise in transmission occurs. Entomological indicators should be evaluated twice a year in areas of low to very low transmission as depicted in Figure 2.

Data for the following entomological indicators should be collected in areas of low to very low transmission:

- Presence of malaria vectors and species composition.
- Relative abundance.
- Insecticide susceptibility.

Operational indicators

In areas with ongoing vector control, such as ITNs and IRS, the operational indicators listed in Figure 2 should be monitored as described previously. The timing of these surveys is slightly different in low to very low-transmission areas.

Vector control

- **Objective:** Reduce malaria cases by either preventing vector-human contact or reducing the population of infected mosquitoes.

- **Strategies available**
  -IRS (mass spraying or targeted spraying)
  -ITNs

- **Description of strategies:** In areas with low to very low transmission and ongoing vector control with either ITNs or IRS, it is recommended that the strategy of choice be continued. If no vector control is in place, malaria control efforts should be focused on providing prompt diagnosis and treatment. Resources permitting, the implementation of a vector control strategy should be considered.

  In the Americas, malaria case detection, treatment, and reporting is fairly good. However, a reported increase in malaria cases in the routine reporting system in a given region should trigger an intensified vector surveillance and control response. While mass IRS may not be considered a feasible alternative, targeted or focal IRS should be considered.

Figure 2. **Yearly timing of collection of entomological and operational indicators in low to very low-transmission settings.**

	Indicators		Transmission season[1]					
			Month 1	Month 2	Month 3	Month 4	Month 5	Month 6
Low to very low transmission	Entomological	Presence of vectors and species composition		•				•
		Relative abundance of vectors		•				•
		Insecticide susceptibility						•
	Operational	Household ownership of ITN*	•					
		Sufficient household ownership of ITNs*	•					
		ITN use*	•					
		ITN survivorship*	•					
		ITN insecticide levels*	•					
		ITN physical durability*	•					
		IRS coverage*	•					
		Insecticidal effect on sprayed surfaces*	•		•		•	
		Dosage and quality of insecticide*	•					

1 Transmission season length will vary based on the local context; for the sake of clarity, a 6-month transmission season has been represented in this table

* According to the control strategy in use

7.3 Settings with no active transmission but risk of transmission

Areas with no malaria transmission, but at risk of transmission, are areas where no locally transmitted malaria cases have been reported in the last three years, but with competent vectors and the potential migration of individuals from regions with active malaria transmission. These also include areas where the possible emergence of new foci of malaria may occur after deforestation and subsequent land transformations.

The main malaria control activities in these regions are based on the early detection of human malaria cases. Early detection requires that there is a human surveillance system in place that will identify malaria cases rapidly once they appear.

Entomological indicators

Collection of information and frequency

Surveillance of entomological indicators and operational indicators should be conducted at sentinel sites representative of different eco-epidemiological situations. Indicators should be monitored every year during the period of the year of greatest mosquito abundance, i.e., the rainy season, and when there is a temporal succession of species capable of transmission (Figure 3).

Data for the following entomological indicators should be collected:

- Presence of malaria vectors and species composition.
- Insecticide susceptibility.

Operational indicators

Since no routine vector control strategy is in place, there is no need to monitor operational indicators as part of the routine monitoring and surveillance activities.

Vector control

- **Objective:** The role of vector control in areas with no malaria transmission is to prevent human to mosquito transmission and thus avoid outbreaks. In the event of locally transmitted malaria cases, vector control strategies will focus on containing and controlling transmission before it spreads.

- **Strategies available:** The regular use of large-scale vector control strategies such as ITNs and IRS is not recommended in areas with no malaria transmission. Options for preventing malaria transmission are personal protection (using ITNs, repellents, coils, or other methods to avoid mosquito bites), targeted or focal IRS, and SR of larval habitats susceptible to elimination.

  These strategies can be implemented via campaigns to promote the use of personal protection and ITN use. When malaria cases are clustered, focal IRS in affected areas should be conducted with an insecticide to which the mosquito population is susceptible, and ITNs (preferably LLINs) should be provided to all the population. In those regions with previously high coverage with conventional nets, bednet treatment campaigns could be considered as an alternative to LLIN distribution. Finally, if mosquito breeding sites are identified and are amenable to elimination, these can be targeted for SR.

Figure 3. **Yearly timing of collection of entomological indicators in settings with no active transmission but where the risk of transmission still exists.**

	Indicators	Rainy season (Months)					
		Month 1	Month 2	Month 3	Month 4	Month 5	Month 6
No transmis	Presence of vectors and species composition				•		
	Insecticide susceptibility				•		

8

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9

Annexes

Annex 1: **Malaria vectors in the Americas**

Anopheline species are deemed as primary and secondary vectors of malaria based on the presence of malaria parasites in salivary glands or by sporozoites detected by enzyme-linked immunosorbent assay (ELISA). The Americas have been divided into three main regions: Mesoamerica (Caribbean, Central America, and Mexico); Non-Amazon areas of Bolivia, Colombia, Ecuador, Peru, and Venezuela; and Amazon Basin areas of Bolivia, Brazil, Colombia, Ecuador, French Guiana, Guyana, Peru, Suriname, and Venezuela.

Sub-Region	Primary Vectors (species /species complexes)	Secondary Vectors (species/species complexes)
Mesoamerica	*Anopheles albimanus*	*An. vestitipennis*
	An. pseudopunctipennis	*An. darlingi*
		An. puntimacula
		An. apicimacula
		An. pseudopunctipennis
Non-Amazon	*An. albimanus*	*An. pseudopunctipennis*
	An. darlingi	*An. punctimacula*
	An. nuneztovari	
	An. aquasalis	
Amazon	*An. darlingi*	*An. benarrochi*
		An. oswaldoi
		An. rangeli
		An. triannulatus
		An. marajoara
		An. aquasalis
		An. deaneorum
		An. janconnae
		An. nuñeztovari
		An. braziliensis
		An. triannulatus
		An. peryassui

Annex 2: **WHO recommended insecticides for indoor residual spraying**

(source: http://www.who.int/whopes/Insecticides_IRS_Malaria_09.pdf)

Insecticide compounds and formulations (1)	Class group (2)	Dosage (g a.i/m2)	Mode of action	Duration of effective action (months)
DDT WP	OC	1-2	Contact	>6
Malathion WP	OP	2	Contact	2-3
Fenitrothion WP	OP	2	contact & airborne	3-6
Pirimiphos-methyl WP & EC	OP	1-2	contact & airborne	2-3
Bendiocarb WP	C	0.1-0.4	contact & airborne	2-6
Propoxur WP	C	1-2	contact & airborne	3-6
Alpha-cypermethrin WP & SC	PY	0.02-0.03	Contact	4-6
Bifenthrin WP	PY	0.025-0.05	Contact	3-6
Cyfluthrin WP	PY	0.02-0.05	Contact	3-6
Deltamethrin WP, WG	PY	0.02-0.025	Contact	3-6
Etofenprox WP	PY	0.1-0.3	Contact	3-6
Lambda-cyhalothrin WP, CS	PY	0.02-0.03	Contact	3-6

CS: Capsule suspension; EC: Emulsifiable concentrate; SC: Suspension concentrate; WG: Water dispersible granule; WP: Wettable powder.
OC: Organochlorines; OP: Organophosphates; C: Carbamates; PY: Pyrethroids.

Annex 3: **WHO recommended long-lasting insecticide-treated nets**

(source: http://www.who.int/whopes/Long_lasting_insecticidal_nets_Aug09.pdf)

Product name	Product type	Status of WHO recommendation	Status of publication of WHO specification
DawaPlus® 2.0	Deltamethrin coated on polyester	Interim	Published
Duranet®	Alpha-cypermethrin incorporated into polyethylene	Interim	Published
Interceptor®	Alpha-cypermethrin coated on polyester	Interim	Published
Netprotect®	Deltamethrin incorporated into polyethylene	Interim	Published
Olyset®	Permethrin incorporated into polyethylene	Full	Published
PermaNet® 2.0	Deltamethrin coated on polyester	Full	Published
PermaNet® 2.5	Deltamethrin coated on polyester with strengthened border	Interim	Published
PermaNet® 3.0	Combination of deltamethrin coated on polyester with s trengthened border (side panels) and deltamethrin and PBO incorporated into polyethylene (roof)	Interim	Under development

Notes:

1 Reports of the WHOPES Working Group Meetings should be consulted for detailed guidance on use and recommendations. These reports are available on the WHO homepage at http://www.who.int/whopes/recommendations/wgm/en/

2 WHO recommendations on the use of pesticides in public health are valid ONLY if linked to WHO specifications for their quality control. WHO specifications for public health pesticides are available on the WHO homepage at http://www.who.int/whopes/quality/newspecif/en

Iniciativa Amazônica Contra a Malária/ Rede Amazônica de Vigilância da Resistência às Drogas Antimaláricas

Documento de orientação estratégica para vigilância e controle de vetores da malária na América Latina e no Caribe

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Iniciativa Amazônica Contra a Malária/ Rede Amazônica de Vigilância da Resistência às Drogas Antimaláricas

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1
Glossário

Antropofágico: quando os vetores se alimentam preferencialmente de seres humanos
Índice de inoculação entomológica (IIE): número de picadas de um mosquito infeccioso em um indivíduo por unidade de tempo
Endofágico: quando os vetores se alimentam preferencialmente em ambiente intradomiciliar
Endofílico: quando os vetores permanecem preferencialmente em ambiente intradomiciliar
Exofágico: quando os vetores se alimentam preferencialmente em ambiente peridomiciliar
Exofílico: quando os vetores permanecem preferencialmente em ambiente peridomiciliar
Ciclo gonotrófico: ciclo de produção de ovos em mosquitos fêmeas que inclui digestão da ingestão de sangue, maturação de ovos e oviposição
Monitoramento: controle sistemático das ações de um programa ao longo do tempo
Vetor primário: artrópode que transmite um agente patogênico ou parasita de um hospedeiro vertebrado a outro e assim o organismo se mantém em seu ciclo natural
Vetor secundário: artrópode que transmite um agente patogênico ou parasita de um hospedeiro vertebrado a outro, mas não consegue manter o organismo em um ciclo natural sem transmissão por um vetor primário
Complexo de espécies: grupo de espécies que são isoladas do ponto de vista reprodutivo mas com morfologia muito semelhante
Vigilância: coleta, análise e interpretação de dados sistemáticas e contínuas e difusão de dados aos responsáveis por tomar medidas de ação
Sinergistas: inibidores de enzimas de desintoxicação, como esterases, oxidases e glutationa S-transferases, que são importantes no metabolismo dos inseticidas
Simpátricas: populações com distribuição sobreposta ou que coexistem

2 ABREVIAÇÕES E SIGLAS

AMI	Iniciativa Amazônica contra a Malária, pela sigla em inglês
BRI	borrifação residual intradomiciliar com inseticidas
CDC	Centros para Controle e Prevenção de Doenças dos Estados Unidos
CIH	captura de mosquitos pelo método de isca humana
CSP	captura de mosquitos com spray de piretroide
DDT	diclorodifeniltricloroetano
IPA	índice parasitário anual
ISH	índice de sangue humano
IVCC	Consórcio Inovador de Controle de Vetores
MILD	mosquiteiros tratados com inseticida de longa duração
MIV	manejo integrado de vetores
MTI	mosquiteiros tratados com inseticida
OMS	Organização Mundial da Saúde
OPAS	Organização Pan-Americana da Saúde
PNCM	programas nacionais de controle da malária
RBM	Parceria para Fazer Recuar a Malária, pela sigla em inglês
RF	redução de focos
USAID	Agência dos Estados Unidos para o Desenvolvimento Internacional
WHOPES	Programa de avaliação de pesticidas da OMS

3

Objetivo

O propósito deste documento é servir de guia estratégico para vigilância e controle de vetores da malária nas Américas, onde a transmissão da malária é caracterizada como sendo moderada a baixa. Este documento resume os debates e as recomendações do grupo técnico assessor da Iniciativa Amazônica contra a Malária (AMI) e visa promover estratégias com fundamentação científica. Foi concebido para receber atualizações periódicas para incorporar novos avanços, achados, observações e sugestões de parceiros assim como aqueles procedentes da própria implementação.

4

Introdução

Desde a interrupção documentada da transmissão da malária em vários países na década de 1960, 23 países nas Américas ainda registram transmissão de malária endêmica: Argentina, Bahamas, Belize, Bolívia, Brasil, Colômbia, Costa Rica, Equador, El Salvador, Guatemala, Guiana, Guiana Francesa, Haiti, Honduras, Jamaica, México, Nicarágua, Panamá, Paraguai, Peru, República Dominicana, Suriname e Venezuela (OPAS 2010).

A região registrou 524.123 casos de malária confirmados em laboratório em 2009 (representando uma redução de 56% da morbidade por malária na região em comparação com 2000) e 109 mortes em 2009 (diminuição de 70% em relação aos valores de referência de 2000). Setenta e quatro por cento das infecções foram causadas por *Plasmodium vivax*, 26% por *Plasmodium falciparum* e menos de 0,1% por *Plasmodium malariae* (localmente registrado no Brasil, Guiana Francesa, Guiana, Suriname e Venezuela) (OPAS, 2010). As tendências recentes indicam que, em alguns países como Argentina, El Salvador, México e Paraguai, é provável que continue o avanço em direção à eliminação da doença nos próximos anos.

A dinâmica de transmissão da malária nas Américas envolve um cenário epidemiológico complexo: os parasitas *P. falciparum* e *P. vivax* são simpátricos no hospedeiro humano e na população de vetores. Há ampla diversidade de espécies de anofelinos, vetores competentes que coexistem com uma sucessão temporal favorecendo a transmissão sustentada. Assim, os padrões e a intensidade da transmissão da malária podem ser notavelmente diversos, requerendo uma variedade de enfoques para vigilância entomológica e controle de vetores.

A vigilância entomológica é peça fundamental para o controle eficaz e sustentado da malária. Porém, as técnicas e os indicadores de vigilância de vetores da malária mais bem elaborados se aplicam principalmente a áreas com transmissão intensa de malária e, nas Américas, os níveis de transmissão muito raramente se enquadram nesta categoria. As áreas endêmicas de malária das Américas são em geral consideradas de transmissão moderada a baixa. É evidente a inadequação das estratégias tradicionais de vigilância entomológica nesses locais de transmissão, pois existem desafios consideráveis para os esforços para sua implementação.

Os programas de controle de vetores da malária dependem da borrifação residual intradomiciliar (BRI) com inseticidas e distribuição de mosquiteiros tratados com inseticida (MTI) como instrumentos primários para controle de vetores. Porém, há lacunas significativas no conhecimento com relação à sua eficácia nas Américas, onde há diferentes espécies de vetores com hábitos de busca de hospedeiros que variam substancialmente e que respondem de maneira diferente às intervenções. Estima-se que a expansão dessas intervenções poderia ter diferentes graus de sucesso, dependendo dos contextos entomológicos e epidemiológicos locais. Portanto, o uso de indicadores entomológicos de relevância regional para monitorar o impacto permitirá que os programas de controle de vetores monitorem a eficácia dessas estratégias e, se necessário, busquem alternativas.

5

Controle de vetores

As intervenções que visam os vetores da malária são uma das maneiras mais eficazes de prevenir e reduzir a transmissão da malária e são os principais elementos técnicos da Estratégia Mundial de Luta contra a Malária. Atualmente, o controle de vetores é uma ferramenta importante, com potencial de reduzir a transmissão a níveis em que se pode contemplar a eliminação.

O controle vetorial com a aplicação de inseticidas de efeito residual foi o elemento central do controle da malária nas Américas, produzindo uma redução considerável do número de casos de malária e eliminação da transmissão em algumas regiões. Entre os fatores que comprometeram a eficácia da BRI estavam a resistência aos inseticidas, exofilia, exofagia, hábitos de evitação, restrições econômicas e questões públicas de contaminação ambiental. A conclusão do programa mundial de erradicação da malária e a subsequente implementação de políticas e estratégias globais para o controle da malária com base no tratamento de casos contribuíram para minimizar a importância de estratégias com foco nos vetores (OMS, 1979, 1985, 1992). Durante este período, as atividades de controle de vetores nas Américas passaram a ser de reação, com esforços de controle mal coordenados em resposta ao aumento do número de casos de malária.

Quando implementados adequadamente, o uso de MTI e a BRI são as duas estratégias de controle de vetores da malária de maior eficácia comprovada atualmente disponíveis. Essas duas estratégias conseguem diminuir de modo considerável a carga da malária, pela redução da população de vetores, reduzindo o tempo de vida dos mosquitos fêmeas adultos e prevenindo o contato de vetores com seres humanos. A redução de focos larvários (RF) é uma estratégia complementar, pois repercute na doença ao reduzir a densidade de vetores. Devido a seu alto custo e baixa eficácia a longo prazo para o controle da malária, a pulverização ambiental é usada para reduzir a densidade dos vetores a curto prazo, em geral somente em situações de emergência.

Para o sucesso do controle e eliminação da malária nas Américas, faz-se necessário o controle eficaz das espécies de *Anopheles* que servem como vetores da malária. Vários fatores limitam a eficácia do controle de vetores nesta região, como: (1) falta de conhecimento sobre a composição do sistema de vetores em muitos locais e o modo como as alterações antropogênicas do ambiente influenciam a

dinâmica da transmissão; (2) número limitado de estratégias de controle de vetores e falta de informação sobre como os vetores presentes em determinada região se adaptam para se contrapor aos efeitos dessas estratégias e (3) falta de pesquisa científica de campo e avaliação rigorosa das estratégias para guiar a implementação eficaz do manejo integrado de vetores (MIV).

Os principais vetores da malária nas Américas têm distribuição ampla em ambientes diversos e apresentam alta variabilidade nos seus padrões de comportamento mesmo em populações da mesma espécie. Até o momento, 18 espécies de *Anopheles* foram relacionadas como importantes vetores da malária nas Américas, das quais cinco são considerados vetores primários. Além dos vetores primários, baixos níveis de transmissão são com frequência mantidos por vários vetores secundários com ecologia e hábitos diversos. No Anexo 1 há uma relação dos vetores primários e secundários atualmente reconhecidos nas Américas.

Ao se selecionar as ferramentas adequadas para controle de vetores, deve-se levar em consideração a heterogeneidade do comportamento e das populações de vetores e do ambiente. Como uma variedade de anofelinos pode ser infectada por *Plasmodium spp*., é necessária uma avaliação do potencial epidemiológico em diferentes meios e/ou focos de transmissão a fim de se determinar as intervenções que podem ter maior repercussão.

O controle de vetores deve ser direcionado às áreas de alto risco de malária, e a BRI e o uso de MTI devem ser considerados como medidas de aplicabilidade geral. O processo para decidir qual dessas duas estratégias de controle de vetores deve ser implementada em uma determinada situação deve ser guiado por uma análise do nível de endemicidade da malária, aspectos bionômicos dos vetores, características ecoepidemiológicas, viabilidade operacional, aceitação da comunidade e sustentabilidade do programa. Dependendo da dinâmica específica de transmissão da malária e endemicidade da malária em uma área, é possível que algumas intervenções não sejam eficientes do ponto de vista econômico e, portanto, os programas de controle de vetores devem primeiro considerar esses fatores antes de decidir quais intervenções serão empregadas.

Alcançar alta cobertura é de importância fundamental para atingir o máximo impacto na transmissão da malária com uma determinada estratégia de controle de vetores. A Parceria para Fazer Recuar a Malária, recomenda cobertura de pelo menos 80% de uma intervenção de controle para que se possa atingir um impacto considerável na transmissão da malária. Seguindo esta orientação, os programas de controle de malária devem procurar alcançar altos níveis de cobertura para realmente terem impacto na transmissão.

5.1 Borrifação residual intradomiciliar com inseticidas

A redução de vetores com a aplicação intradomiciliar de inseticida de efeito residual foi parte central do controle da malária nas Américas. Quando a BRI foi usada amplamente na América Latina durante a campanha de erradicação da malária em meados do século XX, não foi mensurado o seu impacto nos casos de malária e parâmetros entomológicos (Pluess *et al.*, 2010; Tanser *et al.,* 2010). Porém, demonstrou-se de modo claro através de documentação histórica e de programas do impacto da BRI no controle da malária, que reconhecidamente permitiu eliminar a malária de várias partes do mundo, inclusive nos Estados Unidos. A BRI reduz a taxa de picada de seres humanos tanto ao matar como ao repelir os mosquitos através de um efeito irritante. Como a BRI é dirigida aos vetores endofágicos e endofílicos, sua eficácia é abaixo da ideal em áreas com vetores com diferentes hábitos alimentares e de repouso.

De acordo com o último relatório da OMS (OMS, 2010), dos 23 países e territórios com transmissão endêmica da malária nas Américas, 14 recomendam incluir a BRI no controle da malária. Em 2009, oito países usaram BRI para prevenção e controle de epidemias e 10 países usaram esta medida em combinação com o uso de MTI. A BRI focalizada e direcionada é usada em pelo menos três países para o controle da malária. Em 2009, estimou-se que 7.888.251 pessoas em risco de malária foram protegidas com o uso de BRI (OMS, 2010).

Das 20 classes de produtos químicos registrados para uso no controle de pragas agrícolas ou domésticas, somente quatro foram registradas para uso de saúde pública contra artrópodes vetores de doenças. Atualmente, 12 inseticidas que pertencem a estas quatro classes são recomendados pela OMS para uso na BRI. Informações sobre os inseticidas aprovados para uso em saúde pública podem ser encontradas nos sites da OMS: http://www.who.int/whopes e http:/www.who.int/malaria/areas/vector-control/en/. No Anexo 2 há uma relação dos inseticidas atualmente recomendados pela OMS para BRI.

5.2 Mosquiteiros tratados com inseticida

O uso de MTI, inclusive mosquiteiros tratados com inseticida de longa duração (MILD), se demonstrou ter um impacto substancial na transmissão da malária, doença clínica e mortalidade infantil na África. Os MTI protegem ao matar os mosquitos que tentam se alimentar das pessoas ou ao desviar os mosquitos que buscam outros hospedeiros para alimentar-se de sangue. Os MTI também podem ter um efeito ao nível comunitário, reduzindo a densidade de mosquitos, sua sobrevivência, os índices de sangue humano e a frequência de alimentação em grandes áreas com uso de MTI (Gimnig *et al.,* 2003).

Na última década, com a ajuda de doadores internacionais, houve um aumento sustentável da distribuição de MILD e esta estratégia é hoje a principal atividade para o controle de vetores da malária nas Américas. Mais de três milhões de MILD foram distribuídos em todo o continente sul-americano até o momento e se prevê uma rápida expansão da distribuição de MTI em um futuro próximo. De acordo com o Relatório da Malária da OMS de 2010, 15 dos 23 países onde a malária é endêmica nas Américas informaram, em 2009, ter uma política para fornecimento de MTI. Mosquiteiros foram distribuídos a pessoas de todas as faixas etárias em 13 países, e dois países realizaram campanhas de massa direcionadas a domicílios com crianças menores de 5 anos de idade. Cinco países informaram a distribuição de MTI em clínicas de assistência pré-natal. A distribuição de MTI se deu principalmente de forma gratuita em 12 países ou eles foram vendidos a um preço subsidiado.

Os MTI foram extensivamente testados no ciclo de transmissão da malária por *P. falciparum* na África, no entanto há informações limitadas com relação à eficácia dos MTI em outros contextos epidemiológicos. Pouco se conhece da escala de repercussão que esta intervenção poderia ter na transmissão da malária em outras partes do mundo. Os MTI são particularmente apropriados para os mosquitos com hábitos de picada noturna e com picada e repouso em ambiente intradomiciliar. É em geral reconhecido que os MTI são menos eficazes contra mosquitos exofílicos e exofágicos como o *Anopheles darlingi*, o principal vetor da malária na região amazônica. Devido à falta de dados sobre a dinâmica de vetores locais e sua resposta aos MTI, é difícil prever os resultados com a ampliação da distribuição de MTI. Portanto, é importante monitorar as mudanças nas populações e hábitos dos mosquitos como parte dos programas de distribuição de MTI.

De acordo com as diretrizes e práticas atuais, os MILD são definidos como sendo capazes de manter atividade inseticida adequada após 20 lavagens comuns ou um mínimo de três anos com o uso corrente em campo. O Programa de Avaliação de Pesticidas da OMS (WHOPES) fornece recomendação provisória sobre seis mosquiteiros que preenchem a primeira parte dos critérios, mas não foram observados por tempo adequado no teste em campo. Dois novos produtos preenchem ambos os critérios e são totalmente endossados pelo WHOPES. Os inseticidas usados em todos os MILD recomendados e na maioria dos mosquiteiros tratados de forma convencional pertencem à família dos piretroides, que são considerados particularmente seguros para uso humano devido à sua baixa toxicidade em mamíferos. Os países, que estão considerando o uso de MTI como estratégia de controle da malária, devem assegurar que os mosquiteiros tratados de forma convencional recebam regularmente novo tratamento com inseticidas ou que seja feita a distribuição adequada de MILD, incluindo também estratégias de manutenção e reposição dos mosquiteiros. O Anexo 3 apresenta os MILD recomendados pela OMS até o momento. Mais informações podem ser encontradas em http://www.who.int/whopes.

5.3 Redução de focos

A redução de focos larvários (RF) é a eliminação temporária ou permanente dos hábitats das larvas de anofelinos, em geral com o uso de larvicidas químicos ou biológicos. Em termos de repercussão na população de vetores e redução da transmissão da malária, a RF apenas causa diminuição da abundância de vetores. A redução da abundância de vetores tem um impacto relativamente menor na transmissão da malária que as estratégias para redução do contato entre vetores e seres humanos.

Os enfoques de RF pode ser viável em áreas onde há hábitats larvários em pequena quantidade, claramente definidos e acessíveis. Para que este enfoque seja eficaz, faz-se necessário tratar grande proporção dos focos de reprodução na área de alcance de voo dos vetores. Portanto, a RF é geralmente só recomendado em situações muito específicas, como em casos de surtos ou determinadas áreas urbanas.

Alguns programas que têm empregado a RF como estratégia de controle de vetores da malária fazem uso de gestão ambiental, assim como da aplicação de larvicidas. O resultado desses esforços tem sido principalmente a redução da densidade de mosquitos sem impacto documentado na redução do número de casos de malária (OPAS 2006, 2010; Walker e Lynch, 2007).

A RF tem aplicabilidade limitada nas Américas por falta de acessibilidade e existência de grande número de focos de reprodução dos principais vetores da malária na região. Portanto, a RF com o uso de larvicidas não é atualmente recomendada como ferramenta para o controle da malária por si só. Continua sendo uma estratégia em potencial, e estudos recentes realizados na África indicam que a RF direcionada a focos de reprodução criados pelo homem pode reduzir significativamente a malária nos ambientes apropriados. Além disso, a RF pode ser um componente de um programa de controle de vetores integrado (MIV), uma vez que se demonstrou que a RF pode amplificar o impacto dos MTI e BRI (Walker e Lynch, 2007).

5.4 Controle integrado de vetores

Define-se MIV como sendo um "processo decisório racional para ótima utilização dos recursos para o controle de vetores" (2007 de OMS). Ele compreende cinco elementos principais: 1) um processo decisório com fundamentação científica; 2) uso de abordagens integradas; 3) colaboração dentro do setor da saúde e com outros setores; 4) apoio através da defesa da causa, mobilização social e legislação e 5) capacitação.

Acredita-se que o uso de dois ou mais métodos de controle de vetores no contexto do MIV seja uma estratégia eficaz quando cada um dos métodos é direcionado a um aspecto distinto do ciclo de transmissão. Há consenso na região das Américas de que é mais provável de se alcançar o controle da malária, e sua posterior eliminação, se as melhores ferramentas disponíveis fossem usadas em combinação.

O MIV tem sido introduzido lentamente para o controle da malária nas Américas (Feachem *et al.*, 2009; OPAS, 2006). Alguns programas incorporaram elementos do MIV, mas em geral tem sido mal aplicado e avaliado na região. Porém, quando as estratégias do MIV foram implantadas de maneira completa nos países africanos, verificou-se um controle bem-sucedido da transmissão da malária (Beier *et al.*, 2008).

Embora a BRI e o uso de MTI sejam eficazes em separado e resultam em diminuição notável da prevalência da malária, poucos estudos exploraram o efeito sinérgico do uso combinado de BRI e MTI. O enfoque combinado se fundamenta no fato de que, se forem usadas diferentes classes de inseticidas na BRI e nos MTI, espera-se uma queda mais rápida da transmissão devido à maior cobertura de inseticida e ao retardo do surgimento de resistência aos inseticidas. Há evidências mostrando que este enfoque combinado tem efeito variável, sendo que alguns estudos mostraram um maior impacto como resultado da combinação e outros demonstraram que não há nenhum benefício comparado com BRI ou MTI por si só (Yakob *et al*., 2010).

Não há no momento comprovações suficientes para quantificar adequadamente o efeito aditivo da RF ou o impacto de combinar MTI, BRI e RF na redução da transmissão da malária. Também não há evidências suficientes para predizer qual seria a combinação de melhor custo-efetividade das estratégias de controle de vetores. É necessário reunir comprovações de estudos realizados através de esforços coordenados de grupos de pesquisa e programas de controle de vetores para preencher esta importante lacuna no conhecimento operacional.

6

Vigilância de vetores

A vigilância e o monitoramento são partes integrantes do controle de vetores e são prerrequisitos essenciais ao planejamento racional, implementação e avaliação dos programas de controle de vetores. A vigilância fornece informação contínua sobre o impacto das intervenções na população de vetores. O monitoramento das atividades de controle dá feedback sobre a implementação e permite identificar problemas ou limitações. Tanto a vigilância como o monitoramento são necessários para avaliar a eficácia e efetividade das intervenções de controle de vetores. A avaliação pode fornecer informações fundamentais sobre os ganhos e dificuldades das estratégias de intervenção e assim direcionar o planejamento das atividades de controle subsequentes.

A vigilância de vetores, o monitoramento e a avaliação devem ser contextualizados dentro dos programas regionais e nacionais de controle de malária, aproveitando as possíveis colaborações com outros programas públicos de saúde ou instituições de pesquisa que trabalham nesta área. Se existem laboratórios centrais ou regionais de referência de entomologia, eles com frequência podem fornecer assistência técnica a essas atividades.

Neste documento de orientação, é proposto um sistema de vigilância de vetores melhorado e adaptado a áreas com transmissão moderada a baixa, que pode ser utilizado de forma fácil e habitual no contexto da vigilância de saúde pública. O plano de monitoramento está centrado em um número limitado de indicadores, que podem ser coletados a um custo razoável e têm relevância operacional.

Entre os indicadores selecionados neste documento estão indicadores do impacto entomológico ou risco de exposição e indicadores relacionados com a implementação operacional das estratégias de controle (MTI e BRI). Quando há coleta sistemática de dados, esses indicadores podem fornecer informação sobre onde e por que uma intervenção está, ou não está, produzindo o impacto epidemiológico esperado. O controle de vetores eficaz também requer pessoal capacitado, supervisão das operações de controle e avaliação periódica do impacto das medidas de controle nos vetores selecionados e na incidência ou prevalência da doença.

6.1 Vigilância entomológica

Meta e objetivos

A vigilância entomológica é parte integrante do controle de vetores e deve ser adaptada aos tipos de estratégias de controle usadas e à capacidade do programa. A meta da vigilância entomológica é monitorar algumas das características críticas dos vetores que guiarão o planejamento, a implementação e a avaliação dos programas de controle de vetores da malária.

A vigilância entomológica tem como objetivo:

- Identificar a população de vetores à qual serão direcionadas as medidas de controle.
- Orientar o cronograma ideal para implementação das estratégias de controle de vetores.
- Detectar padrões de comportamento dos vetores que poderiam limitar a eficácia das intervenções de controle de vetores.
- Monitorar o impacto entomológico das intervenções de controle de vetores.
- Detectar o surgimento da resistência aos inseticidas e modos de resistência.

Descrição geral do sistema de vigilância de vetores

Não existe um sistema de vigilância de vetores de malária de aplicação universal, assim a vigilância entomológica local deve ser adaptada segundo o nível de risco de malária e os recursos disponíveis. Dada a complexidade da transmissão da malária nas Américas, os programas de vigilância devem ser planejados e formulados com base no nível mais elevado de conhecimento disponível com relação à ecologia das espécies locais de vetores e dinâmica de transmissão da malária.

A estratégia proposta de vigilância serve de ferramenta para documentar a eficácia sustentada das medidas de controle de vetores e fornece uma base para a avaliação da sua eficácia. À medida que os programas conseguem reduzir com sucesso a transmissão da malária, a medida dos indicadores entomológicos fica cada vez mais difícil e perde sensibilidade, em particular para a determinação das taxas de infecção pelos vetores. Para compensar as mudanças na transmissão, a estratégia de vigilância deve ser avaliada continuamente e atualizada.

Vários modelos foram desenvolvidos na tentativa de explicar e predizer as relações entre os índices de vetores e a transmissão da malária. A abundância de vetores, a taxa de infecção e a expectativa de vida dos mosquitos infectantes têm sido descritos como os principais elementos associados à transmissão da malária. Devem ser realizadas pesquisas entomológicas a intervalos regulares e em áreas de maior

transmissão da malária e precisam ser monitorados os indicadores entomológicos com maior frequência porque podem ocorrer mudanças na morbidade e mortalidade em um menor período. Como enfoque geral, em áreas de transmissão moderada a alta, as pesquisas entomológicas investigando a presença e os hábitos de vetores devem ser realizadas todos os meses durante a estação de transmissão; em áreas de transmissão moderada a baixa, as pesquisas devem ser realizadas três a quatro vezes ao ano durante a estação de transmissão; em áreas de transmissão baixa a muito baixa, as pesquisas devem ser realizadas duas vezes ao ano durante a estação de transmissão; e por fim, em áreas de transmissão nula mas com risco da transmissão, o monitoramento deve ser realizado uma vez ao ano. Uma vez que seja estabelecida uma compreensão geral da dinâmica de transmissão, os programas de vigilância entomológica podem adaptar a periodicidade e a intensidade do monitoramento às situações e áreas específicas.

Com base na incidência registrada da malária nas Américas, as áreas endêmicas podem ser classificadas em três categorias principais: transmissão moderada a baixa, transmissão baixa a muito baixa e transmissão nula mas com risco de transmissão.

Dependendo da capacidade do programa, recomenda-se que sejam coletados os dados de referência em uma área antes de implementar uma intervenção. Esta informação pode ser usada para monitorar o impacto das medidas de controle e também ajudar a determinar a frequência do monitoramento futuro. Se houver mudança na transmissão, a frequência de coleta de dados pode ser aumentada para assegurar o monitoramento adequado do impacto das medidas corretivas. Os dados entomológicos devem estar vinculados com a vigilância epidemiológica em curso para avaliar a transmissão da doença e o número de casos de malária.

Locais de pesquisa entomológica

Vigilância com cobertura de toda a área em risco é o melhor enfoque para conhecer o impacto das estratégias de controle de vetores na população de vetores. Tal enfoque representa um grande desafio pois pode ser extremamente difícil coletar amostras de mosquitos em áreas grandes. Uma opção é fazer a vigilância em sítios sentinela, que correspondem a áreas prioritárias de vigilância entomológica e atividades de controle de vetores. Assume-se que as populações de mosquitos presentes nestes locais sejam representativas de áreas geográficas maiores. Este enfoque permite a coleta de dados longitudinais que, quando vinculados à incidência da malária, podem medir o impacto sustentado das intervenções de controle de vetores. Também permitem a ótima utilização de recursos limitados, sendo que a vigilância baseada em sítios sentinela é um enfoque interessante particularmente recomendado para a coleta de dados entomológicos nas Américas.

Os sítios sentinela devem ser representativos de área maior que está sob vigilância. Os locais devem representar zonas ecoepidemiológicas relevantes e áreas de controle contínuo de vetores ou áreas onde há

possibilidade do uso de intervenções de controle de vetores. Para identificar as zonas ecoepidemiológicas, as regiões devem ser delimitadas com base nos determinantes da intensidade de transmissão da malária como elementos ambientais (geologia, vegetação, clima, rios etc.), determinantes geográficos (altitude, temperatura, umidade, precipitação), presença humana e distribuição de populações rurais e urbanas (rodovias, cidades, uso da terra etc.) e principais distribuições de vetores. Em geral, os programas de malária têm uma ideia sobre estas grandes ecorregiões e várias publicações existentes sobre ecorregiões servem como ponto de partida para que cada país em particular possa melhor definir essas regiões (Rubio-Palis e Zimmerman, 1997; OMS, 2006).

Os principais estratos epidemiológicos de transmissão da malária foram inicialmente definidos no contexto da Estratégia Global da OMS para Controle da Malária (OMS, 1993) e posteriormente adaptados por Castillo-Salgado (1992) para uso específico nas Américas. A Organização Pan-Americana da Saúde (OPAS) propôs o uso de um processo de estratificação com base nos índices parasitários anuais (IPA). As áreas de transmissão alta a moderada são as que apresentam IPA ≥1 por 1.000 habitantes e as áreas de transmissão baixa são as que apresentam IPA <1 por 1.000 habitantes. Estas correspondem a áreas que poderiam ser consideradas em pré-eliminação. Este sistema também inclui áreas sem transmissão corrente de malária mas onde há potencial de ocorrer a transmissão. Outros documentos apoiados pela AMI, em particular a *Estrategia para la toma de decisiones en control racional de vectores de malaria para los países de la región de las Américas,*[1] descrevem outros enfoques.

O número de sítios sentinela escolhidos para monitorar os indicadores selecionados depende da capacidade do pessoal local, custos e disponibilidade de recursos. Porém, pelo menos um sítio sentinela por zona ecoepidemiológica deve ser instituído, sendo realizada vigilância a longo prazo. Estes centros devem estar localizados em áreas de maior incidência da malária e uso de pesticidas (para propósitos agrícolas e de saúde pública). A relevância dos sítios sentinela pode variar com o tempo. Portanto, os dados devem ser continuamente analisados para levar em consideração qualquer mudança nos hábitos dos vetores, alterações nos padrões de transmissão da doença, alterações ambientais e deslocamentos da população humana.

Indicadores entomológicos

A vigilância entomológica tem um objetivo altamente qualitativo, isto é, determinar se os vetores anofelinos estão presentes e identificar sua composição, sazonalidade e sensibilidade aos inseticidas. Ela também visa detectar mudanças nos padrões de contato entre vetores e seres humanos e se o

1. Estratégia para racionalizar as decisões de controle de vetores da malária nos países da Região das Américas. Disponível em espanhol: www.paho.org/spanish/ad/dpc/cd/ravreda-guia-control-vectores.doc

hábito de vetores é modificado como resultado das medidas de controle. O monitoramento de rotina desses indicadores é essencial para assegurar a eficácia contínua, pois as populações de vetores sofrem modificações em resposta às pressões de intervenção. Com a redução da intensidade de transmissão, alguns indicadores entomológicos ficam cada vez mais difíceis de serem medidos e perdem a sensibilidade, em particular os relacionados com taxas de infecção por mosquitos. Portanto, este documento de orientação relaciona duas séries de indicadores entomológicos. A primeira série é apresentada na Tabela 1 e representa os indicadores entomológicos básicos. A segunda série de indicadores entomológicos é apresentada na Tabela 2 e se aplica a meios e circunstâncias especiais quando é necessária a vigilância minuciosa e existem recursos financeiros disponíveis.

Em resumo, o monitoramento das populações de espécies de vetores é uma atividade sistemática que deve ser realizada a intervalos regulares dependendo do nível de transmissão. Os indicadores devem ser monitorados a intervalos regulares durante a estação de transmissão segundo os níveis de transmissão e nos mesmos sítios sentinela de modo prolongado.

Tabela 1: **Indicadores entomológicos básicos a serem considerados como parte dos programas de controle de vetores da malária nas Américas.**

Indicador	Definição
Presença de vetores da malária e composição das espécies	Detecção das espécies de vetores presentes em uma determinada área.
Distribuição espacial e sazonal dos vetores	Número de espécies de vetores presentes por unidade de vigilância e de tempo.
Abundância relativa	Número de vetores de uma determinada espécie por unidade de coleta e de tempo.
Hábitos alimentares	Número de mosquitos com tentativas de picada em ambiente intradomiciliar/ peridomiciliar por unidade de coleta e de tempo.
Sensibilidade aos inseticidas	Capacidade de uma determinada dose de inseticida de matar a população de vetores.

Tabela 2: **Indicadores entomológicos intermediários a serem considerados em circunstâncias especiais como parte dos programas de controle de vetores da malária nas Américas.**

Indicador	Definição
Índice de sangue humano	Proporção de vetores alimentados com sangue humano por unidade de tempo
Taxa de infecção da malária	Proporção de mosquitos com esporozoítos da malária
Taxa de paridade	Proporção de anofelinos fêmeas com pelo menos uma oviposição.

Métodos de vigilância

A vigilância entomológica inclui a coleta de mosquitos para diferentes tipos de análises. A seleção do método de captura deve ser baseada tanto no comportamento das espécies como no indicador que está sendo investigado.

Os indicadores entomológicos aqui descritos dependem da coleta dos mosquitos *Anopheles*. A captura de mosquitos pelo método de isca humana (CIH) continua sendo um dos métodos de coleta mais informativos e eficazes para as espécies mais comuns nas Américas. A CIH possibilita a coleta de dados sobre os principais hábitos dos mosquitos, como busca de hospedeiros e alimentação. Alternativas à CIH têm sido testadas em campo nas Américas como as armadilhas luminosas dos Centros para Controle e Prevenção de Doenças dos Estados Unidos (CDC), armadilhas de CO_2, armadilhas que imitam o perfil humano, captura de mosquitos com spray de piretroide (CSP), coletas com aspirador que captura mosquitos em repouso no intradomicílio e peridomicílio. Porém, estudos anteriores revelaram sistematicamente que a maioria de anofelinos nas Américas não é facilmente capturada em armadilhas, limitando o seu uso na região. A CSP não é recomendada devido aos níveis baixos de exofilia nos anofelinos locais. Armadilhas em pontos de entrada/saída não têm sido muito usadas na região, mas os dados produzidos até o momento mostram que um número considerável de *Anopheles albimanus, A. darlingi,* e *A. vestitipennis* pode ser capturado ao entrar ou sair das casas. O seu potencial como ferramenta de vigilância nas Américas precisa ser ainda melhor avaliado com diferentes vetores e em diferentes meios.

6.2 Monitoramento de operações de controle de vetores

Metas e objetivos

Campanhas para BRI e distribuição de MTI precisam ser realizadas com habilidade e atingir alta cobertura para serem eficazes. Uma estratégia confiável de monitoramento pode assegurar a coleta exata destas informações operacionais. A Tabela 3 apresenta os indicadores operacionais que devem ser monitorados regularmente ao se usar MTI e BRI.

O monitoramento dos indicadores operacionais pode ser feito por meio de vários métodos. Campanhas de distribuição e a distribuição de rotina de MTI devem ser estreitamente monitoradas. Levantamentos de cobertura estatisticamente robustos devem ser realizados a intervalos regulares para avaliar a posse e o uso de MTI (informações detalhadas da frequência recomendada podem ser encontradas neste documento na seção específica de níveis de transmissão de malária). Além disso, devem ser realizadas pesquisas para avaliar como as diferentes práticas culturais e hábitos de cuidado podem influenciar na durabilidade física dos MTI e retenção do inseticida.

As aplicações de BRI devem ser monitoradas estreitamente pelo agente de implementação. Deve ser avaliada a qualidade das aplicações de BRI para avaliar a eficácia da pulverização com o uso de métodos padronizados como a prova biológica de parede da OMS. O monitoramento pode incluir uma ava-

liação da cobertura de BRI por um agente independente daquele que faz a implementação. Métodos padronizados, estratégias e diretrizes para monitorar a proporção adequada de inseticida por área de superfície ainda estão sendo desenvolvidos por parceiros técnicos como os CDC e o Consórcio Inovador de Controle de Vetores (IVCC). Assim como para os MTI, devem ser realizadas atividades de pesquisa operacional e avaliações para avaliar o efeito a longo prazo da pulverização.

Muitos países realizam de modo rotineiro grandes levantamentos demográficos e de saúde que incluem a coleta de dados sobre os indicadores que são relevantes ao controle da malária. Os programas nacionais de controle de malária devem considerar fazer a análise destes levantamentos e coordenar esforços para assegurar que os indicadores da malária estejam incluídos em tais pesquisas. Isso poderia ajudar a reduzir os custos associados ao monitoramento e avaliação das atividades específicas para a malária.

Tabela 3: **Indicadores operacionais a serem considerados para uso nas Américas para monitorar os programas de controle de vetores com uso de MTI e BRI.**

Estratégia de controle de vetores	Indicador	Definição
MTI	Cobertura domiciliar de MTI	Proporção de domicílios que possui ≥1 MTI entre os que se pretende atingir
	Cobertura domiciliar suficiente de MTI	Proporção de domicílios onde o número de MTI é ≥ ao número de camas/locais para dormir, entre os que se pretende atingir
	Uso de MTI	Proporção de pessoas que declararam dormir embaixo de MTI na noite anterior entre os que se pretende atingir
	Sobrevivência dos MTI	Proporção de mosquiteiros distribuídos em uma campanha que estão presentes nos domicílios-alvo
	Atividade inseticida dos MTI	Proporção de MTI com níveis adequados de atividade inseticida entre os pesquisados
	Integridade física	Proporção de MTI que ainda estão em estado físico aceitável entre os inspecionados
BRI	Cobertura de BRI	Proporção de casas/estruturas borrifadas entre os que se pretende atingir
	Efeito inseticida nas superfícies borrifadas	Mortalidade de mosquitos por prova biológica de parede com utilização de cones plásticos em superfícies borrifadas a intervalos regulares após a aplicação de BRI
	Dose de inseticida*	Proporção da quantidade de inseticida presente na superfície da área borrifada

* Os métodos para coletar uniformemente os dados para este indicador ainda estão em desenvolvimento.

6.3 Indicadores entomológicos e operacionais

a. Indicadores entomológicos

A seguir são apresentadas definições de todos os complementos de indicadores entomológicos sugeridos para vigilância, monitoramento e avaliação dos vetores da malária nas Américas:

- **Presença de vetores da malária e composição das espécies:** é possível que os vetores primários da malária para uma determinada área sejam conhecidos, porém é importante conhecer todas as espécies de vetores que estão presentes nas áreas de intervenção. As espécies devem ser inicialmente identificadas com base nos critérios morfológicos do sistema de classificação taxonômica publicada. Como a classificação taxonômica de algumas espécies é pouco clara, além da classificação morfológica, deve ser usada identificação molecular quando necessário e factível.
- **Distribuição espacial e sazonal dos vetores:** a compreensão da distribuição espacial e sazonalidade possibilita determinar a duração da estação de transmissão e os períodos de maior intensidade de picadas para cada espécie de vetores. Esta informação permite maior compreensão da dinâmica da transmissão da malária ao longo do tempo e pode direcionar o planejamento e a implementação das medidas de controle.
- **Abundância relativa:** a abundância relativa de anofelinos pode ser um indicador da eficácia das intervenções de controle de vetores. Após a implementação de uma intervenção, se espera redução do contato entre vetores e seres humanos. A densidade dos mosquitos, medida pelas taxas de captura de mosquitos pelo método de isca humana, é uma boa medida substituta da abundância relativa. O monitoramento regular da abundância relativa das espécies é necessário para que os programas de controle possam responder de maneira apropriada a qualquer aumento significativo das principais populações de vetores.
- **Hábitos de alimentação:** foram observadas mudanças nos hábitos nas populações de mosquitos após a introdução de medidas de controle à base de inseticidas. Por exemplo, os vetores podem adotar padrões de alimentação mais exofágicos ou zoofílicos de alimentação para evitar o contato intradomiciliar com inseticidas. Portanto, é importante fazer o monitoramento rotineiro dos hábitos de alimentação intradomiciliares e peridomiciliares e, se possível, do índice de sangue humano para detectar mudanças na preferência de hospedeiros.
- **Taxa de paridade:** as taxas de sobrevivência e paridade dos mosquitos são importantes determinantes da capacidade vetorial e transmissão da malária, e podem ser modificadas por intervenções à base de inseticidas. Para a medida deste indicador, se assume que a população de mosquitos esteja em equilíbrio em relação a ganhos e perdas por migração, reprodução e mortalidade. A

tendência geral resultante da redução temporária das taxas de paridade por aumento súbito de novos mosquitos pode ser minimizada ao se combinar amostras coletadas regularmente por um período prolongado.

- **Sensibilidade aos inseticidas:** a determinação dos níveis da sensibilidade da população de vetores aos inseticidas em uso, ou planejados para serem usados no futuro, é de importância fundamental aos programas de controle de vetores. Em condições ideais, dados de referência da sensibilidade aos inseticidas devem ser coletados antes do início de uma intervenção e mais dados devem ser coletados pelo menos uma vez ao ano, de preferência ao fim da estação de transmissão. Se houver recursos disponíveis, a frequência de teste pode ser aumentada ou geograficamente ampliada e também determinados os modos de ação da resistência aos inseticidas. A frequência de teste deve ser aumentada se houver um aumento inesperado do número de casos de malária ou se houver suspeita de resistência aos inseticidas. A vigilância da resistência deve ser realizada nos sítios sentinela para todos os vetores da malária presentes.

b. Indicadores operacionais

Mosquiteiros tratados com inseticida

Devem ser realizados levantamentos da cobertura de MTI em domínios específicos de interesse, como uma área-alvo de campanhas de distribuição, e não como parte de uma metodologia baseada em sítios sentinela. Este enfoque populacional fornece dados mais representativos sobre a posse e o uso de MTI. Esta informação também poderá ser usada para a tomada de decisão sobre o cronograma para reposição dos mosquiteiros. Esses levantamentos podem incluir análises do conteúdo de inseticidas e estado físico dos mosquiteiros em uma subamostra de mosquiteiros coletados dos domicílios visitados. Os protocolos para tais levantamentos são disponibilizados pelos parceiros da AMI e podem ser usados como orientação para o desenvolvimento de levantamentos futuros.

- **Cobertura domiciliar e uso:** levantamentos domiciliares são o método de escolha para avaliar a cobertura domiciliar e uso de MTI entre as populações em risco de malária, e eles podem indicar se os planos de distribuição abrangem um número suficiente de mosquiteiros. Em geral, os levantamentos devem ser realizados a intervalos regulares, por exemplo, a cada 6-12 meses, para permitir estimativas atualizadas e confiáveis na cobertura e uso.
- **Cobertura domiciliar suficiente de MTI:** como muitos países hoje preferem a cobertura universal dos grupos vulneráveis (crianças acima de 5 anos e mulheres grávidas), há necessidade de incluir indicadores para avaliar se há mosquiteiros suficientes nos domicílios-alvo.

- **Uso de MTI:** além de avaliar a presença de MTI nos domicílios-alvo, é importante determinar se os mosquiteiros estão sendo usados corretamente. Como parte dos levantamentos de cobertura domiciliar, pode ser administrado um questionário simples aos moradores para documentar a proporção de indivíduos que dormiram embaixo de um MTI na noite anterior à pesquisa.
- **Sobrevivência dos MTI:** como os países costumam fazer a distribuição de MTI por meio de campanhas em larga escala, os programas de controle de malária devem elaborar estratégias para monitorar a retenção de MTI após as campanhas. Esta informação possibilita melhor planejar o cronograma de campanhas subseqüentes e também contribui para a elaboração e implementação de estratégias para manter os níveis de cobertura por períodos prolongados. Estão sendo atualmente desenvolvidos protocolos e diretrizes para este tipo de monitoramento adequado à região e eles devem estar disponíveis em um futuro próximo.
- **Durabilidade esperada dos MTI – atividade inseticida e integridade física:** à medida que os países ampliam a cobertura universal de MTI, é fundamental monitorar a durabilidade e o conteúdo de inseticida dos mosquiteiros. Isto fornece informação valiosa sobre a duração da proteção para a população-alvo. A falta de reposição dos MTI no momento adequado pode levar a um aumento do número de casos de malária.

Além disso, se mais de uma marca de MTI estiver sendo usada em uma determinada região, pode ser recomendável comparar os MTI e determinar se um é melhor que os outros em termos de durabilidade. Estes dados podem ser coletados em levantamentos com o propósito de avaliar periodicamente os mosquiteiros, que devem ser realizados em áreas representativas de contextos e práticas culturais específicos que podem ter influência na vida útil dos MTI, como a forma de pendurar e lavar os mosquiteiros. Estes levantamentos não precisam ser repetidos com a mesma frequência que os levantamentos sobre cobertura, a menos que se suspeite ou tenham ocorrido mudanças nos hábitos. Esses levantamentos devem compreender a medida da atividade do inseticida e/ou níveis de inseticida, medido pela prova biológica de parede com utilização de cones plásticos da OMS e análises bioquímicas (métodos colorimétricos simples ou cromatografia líquida de alta resolução), e da integridade física, medida por métodos padrão de inspeção. Exemplos de avaliações semelhantes anteriores podem ser obtidos dos parceiros da AMI sob solicitação.

Borrifação residual intradomiciliar com inseticida

O uso de um produto para BRI com uma concentração do princípio ativo menor que o recomendado pode resultar na aplicação de uma dose subletal de inseticida, prejudicando o controle de vetores e possivelmente promovendo a resistência aos inseticidas. Portanto, recomenda-se que os programas de controle de vetores usem inseticidas aprovados pelo WHOPES e adquiram os produtos somente de

fabricantes com certificação internacional. A eficácia da BRI depende muito também da qualidade da pulverização. Para avaliar este procedimento, uma subamostra de paredes nos domicílios deve ser avaliada com testes padrão, como a prova biológica de parede com utilização de cones plásticos da OMS, após cada rodada de pulverização. Deve-se também incluir a avaliação do efeito inseticida do produto usado nos diferentes tipos de superfícies porque o material das paredes e estilo de construção pode interferir com a eficácia da BRI.

- **Cobertura da BRI:** os domicílios devem ser borrifados pouco antes do início da estação de transmissão e o número de domicílios borrifados em relação ao número de domicílios-alvo deve ser registrado pelos programas de aplicação de inseticida para que seja estimada a cobertura inicial. Além do monitoramento de rotina da BRI, a cobertura desta medida pode ser avaliada por levantamentos independentes, como levantamentos de indicadores da malária, que podem ajudar a estimar a cobertura do programa de aplicação de inseticida.
- **Efeito inseticida nas superfícies borrifadas:** a eficácia esperada do inseticida com efeito residual depende da sua concentração e taxa de deterioração nas superfícies da parede após a aplicação e pode ser medida com a prova biológica de parede com utilização de cones plásticos da OMS com uma linhagem de mosquitos sensível ou com mosquitos selvagens coletados sem evidência de resistência a inseticidas. O monitoramento deve ser realizado a intervalos regulares de 1 a 2 meses pós-BRI em uma subamostra selecionada de casas. Assim, pode-se obter informação sobre a duração do efeito inseticida em um meio em particular. No primeiro ano, as provas biológicas de parede devem ser feitas mensalmente para determinar a extensão da atividade residual de um inseticida em particular nos tipos de superfície de parede predominantes na localidade (ex., barro, cimento ou madeira). Após ser determinada a ação residual de um inseticida aprovado em uma determinada localidade, talvez seja possível diminuir a frequência das provas biológicas de parede após rodadas subsequentes de pulverização, ou realizar somente uma prova inicial logo após a pulverização para confirmar a sua qualidade. A prova biológica de parede pode ser seguida de análise química se ainda houver dúvida sobre a qualidade da BRI.
- **Dose de inseticida:** é importante assegurar que seja usada a dose recomendada de inseticida. O pessoal responsável deve medir a superfície da parede a ser borrifada e fazer o cálculo correto da dose e consultar as instruções do produto para determinar a diluição do inseticida em pó. Os responsáveis da saúde pública devem basear o cálculo das doses nas recomendações internacionais do WHOPES. Estão sendo desenvolvidas diretrizes para avaliação da dose.

7

Planos de monitoramento por estratos epidemiológicos

7.1 Locais de transmissão moderada a baixa

Indicadores entomológicos

Coleta de informações e frequência: A coleta dos indicadores entomológicos deve ser feita com um enfoque baseado em sítios sentinela. Os dados para os diversos indicadores devem ser coletados com o uso de metodologias padronizadas a intervalos regulares (um documento citado anteriormente[1] apresenta um protocolo detalhado para a coleta de indicadores entomológicos na América Latina). Considerando-se os hábitos dos vetores primários da malária nas Américas, a captura de mosquitos pelo método de isca humana (CIH) é o método preferencial para coletar dados entomológicos para os indicadores relacionados aos hábitos de mosquitos em busca de hospedeiros como CIH e hábitos de alimentação.

A Figura 1 exibe o cronograma proposto para a coleta de dados em áreas de transmissão da malária moderada a baixa. No início, a vigilância entomológica deve ser realizada 3 a 4 vezes durante a estação de transmissão para coletar dados para estes indicadores relacionados com a presença dos mosquitos e seus hábitos. Isto considera o fato de que as taxas de abundância dos vetores podem mudar nos diferentes períodos da estação chuvosa/de transmissão. Com a amostragem em vários pontos durante a estação, pode-se ter uma compreensão completa da dinâmica dos vetores ao longo da estação. O cronograma de coleta pode ser ajustado segundo a sazonalidade e a composição das espécies dos vetores em uma determinada área, ou seja, se um vetor conhecido é mais abundante no começo da estação de transmissão, devem ser coletados dados sobre este vetor em particular. Ao final da estação de transmissão, a informação coletada através da vigilância entomológica deve ser analisada e levada em consideração ao se planejarem as atividades subseqüentes de controle de vetores, como mudanças nos inseticidas usados para BRI.

Dados devem ser coletados para os seguintes indicadores entomológicos:

- Presença de vetores da malária e composição das espécies
- Distribuição espacial e sazonal de vetores
- Abundância relativa
- Hábitos de alimentação
- Taxa de paridade
- Sensibilidade aos inseticidas

Indicadores operacionais

Em áreas com controle contínuo de vetores, como MTI e BRI, os indicadores operacionais relacionados na Figura 1 devem ser monitorados conforme descrito anteriormente.

Controle de vetores

- **Objetivo:** reduzir os casos de malária com a prevenção do contato entre vetores e seres humanos ou com a redução da população de mosquitos infectados.
- **Estratégias disponíveis**
  - BRI (pulverização em massa ou direcionada)
  - MTI
- **Descrição das estratégias:** entre as estratégias atuais de controle de vetores empregadas em locais de transmissão moderada a baixa estão MTI e BRI. A escolha entre MTI e BRI com frequência se baseia na viabilidade operacional, disponibilidade de recursos e determinantes socioculturais. Além disso, é importante levar em consideração os hábitos dos vetores e a sensibilidade aos inseticidas. Em situações onde a transmissão da malária está concentrada em torno de focos limitados, a pulverização geral e indiscriminada pode ser menos conveniente e econômica que a BRI direcionada ou focalizada.

  O uso da estratégia de RF e de intervenções combinadas de MTI e BRI não é recomendado formalmente no momento devido à falta de evidências de benefícios adicionais com esta prática nas Américas. A única situação na qual BRI e MTI devem ser considerados para implementação simultânea seria no caso de surgir resistência aos piretroides. Nestes casos, é recomendado continuar o uso de MTI e complementar com BRI usando-se um inseticida de uma classe diferente.

Figura 1: **Cronograma anual de coleta de dados para indicadores entomológicos e operacionais em locais de transmissão moderada a baixa.**

		Indicadores	Estação de transmissão[1]						
Transmissão moderada a baixa	Entomológico	Presença de vetores e composição das espécies		•		•			•
		Distribuição dos vetores e sazonalidade		•		•			•
		Hábitos de alimentação		•		•			•
		Abundância relativa		•		•			•
		Taxa de paridade		•		•			•
		Sensibilidade aos inseticidas							•
	Operacional	Posse domiciliar de MTI *	•						
		Posse domiciliar suficiente de MTI *	•						
		Uso de MTI *	•						
		Durabilidade geral dos MTI *	•						
		Níveis de inseticida nos MTI *	•						
		Durabilidade física dos MTI *	•						
		Cobertura da BRI*	•						
		Efeito do inseticida nas superfícies borrifadas *	•		•		•		
		Dose e qualidade do inseticida *	•						

1. A duração da estação de transmissão varia segundo o contexto local; para facilitar, foi representada na tabela uma estação de transmissão de 6 meses.
* Segundo a estratégia de controle em uso.

7.2 Locais de transmissão baixa a muito baixa

Indicadores entomológicos

- **Coleta de informações e frequência:** como há redução da transmissão da malária, alguns dos indicadores recomendados para áreas de transmissão de malária moderada a baixa, como os relacionados aos hábitos dos mosquitos, tornam-se menos sensível e mais sujeitos a vieses, principalmente se os dados são coletados em sítios sentinela, o que limita a área de captação de informação. Portanto, em áreas de transmissão de malária baixa a muito baixa, recomenda-se um número menor de indicadores entomológicos (Figura 2). Os indicadores recomendados nessas áreas são os relacionados com a presença e composição das espécies de vetores. Em situações em que há aumento significativo do número de casos de malária (ou seja, surtos), e dependendo da disponibilidade de pessoal e recursos, pode também ser realizada a determinação das taxas de infecção da malária e paridade.

Assim como para outros níveis de transmissão, a coleta de dados entomológicos deve ser realizada com um enfoque baseado em sítios sentinela com metodologias padronizadas adequadas, como CIH. Os sítios sentinela devem representar os locais ecoepidemiológicos presentes na região. Se possível, o número de locais de coleta deve aumentar se houver um aumento substancial da transmissão. Os indicadores entomológicos devem ser avaliados duas vezes ao ano em áreas de transmissão baixa a muito baixa como ilustrado na Figura 2.

Dados para os seguintes indicadores entomológicos devem ser coletados em áreas de transmissão baixa a muito baixa:

- Presença de vetores da malária e composição das espécies
- Abundância relativa
- Sensibilidade aos inseticidas

Indicadores operacionais

Em áreas com o controle contínuo de vetores, com MTI e BRI, os indicadores operacionais relacionados na Figura 2 devem ser monitorados como descrito anteriormente. O cronograma dos levantamentos é um pouco diferente em áreas de transmissão baixa a muito baixa.

Controle de vetores

- **Objetivo:** reduzir o número de casos de malária com a prevenção do contato entre vetores e seres humanos ou com a redução da população de mosquitos infectados.
- **Estratégias disponíveis**
  - BRI (pulverização em massa ou direcionada)
  - MTI
- **Descrição das estratégias:** em áreas com transmissão baixa a muito baixa e controle contínuo de vetores com MTI ou BRI, recomenda-se que a estratégia de escolha seja continuada. Se não é feito o controle de vetores, os esforços de controle da malária devem ser dirigidos ao diagnóstico e tratamento imediatos. Se houver recursos, deve ser considerada a implementação de uma estratégia de controle de vetores.

Nas Américas, a detecção, o tratamento e a notificação dos casos de malária são bons. Porém, um aumento registrado do número de casos de malária no sistema de notificação de rotina em uma determinada região deve desencadear uma resposta intensificada de vigilância e controle de vetores. Se a BRI em massa não for uma opção viável, deve ser considerada a BRI direcionada ou focalizada.

Figura 2: **Cronograma anual da coleta de dados para indicadores entomológicos e operacionais em locais de transmissão baixa a muito baixa.**

		Indicadores	Estação de transmissão[1]						
Transmissão moderada a baixa	Entomológico	Presença de vetores e composição das espécies		•					•
		Abundância relativa de vetores		•					•
		Sensibilidade aos inseticidas							•
	Operacional	Posse domiciliar de MTI *	•						
		Posse domiciliar suficiente de MTI *	•						
		Uso de MTI *	•						
		Durabilidade geral dos MTI *	•						
		Níveis de inseticida nos MTI *	•						
		Durabilidade física dos MTI *	•						
		Cobertura da BRI*	•						
		Efeito do inseticida nas superfícies borrifadas *	•		•		•		
		Dose e qualidade do inseticida *	•						

1. A duração da estação de transmissão varia segundo o contexto local; para facilitar, foi representada na tabela uma estação de transmissão de 6 meses.
* Segundo a estratégia de controle em uso.

7.3 Locais sem transmissão ativa mas com risco de transmissão

As áreas sem transmissão de malária mas com risco de transmissão são aquelas em que não foram registrados casos locais de malária nos últimos três anos, mas existem vetores competentes e possível migração de mosquitos de regiões com transmissão ativa de malária. Também incluem áreas onde é possível o surgimento de novos focos de malária após o desflorestamento e subseqüentes transformações da terra.

As principais atividades de controle da malária nessas regiões são baseadas na detecção precoce dos casos humanos de malária. A detecção precoce requer que exista um sistema de vigilância em seres humanos implantado que poderá identificar com rapidez casos de malária assim que eles surgirem.

Indicadores entomológicos

- **Coleta de informações e frequência:** A vigilância dos indicadores entomológicos e operacionais deve ser realizada nos sítios sentinela representativos de diferentes situações ecoepidemiológicas. Os indicadores devem ser monitorados todos os anos durante o período do ano de maior abundância de mosquitos, ou seja, durante a estação chuvosa, e quando há uma sucessão temporal de espécies com potencial de transmissão (Figura 3).

Dados para os seguintes indicadores entomológicos devem ser coletados:

- Presença de vetores da malária e composição das espécies
- Sensibilidade aos inseticidas

Indicadores operacionais

Como não há implantada nenhuma estratégia de controle de vetores, não há necessidade de monitorar os indicadores operacionais como parte das atividades rotineiras de vigilância e monitoramento.

Controle de vetores

- **Objetivo:** a função do controle de vetores em áreas sem transmissão de malária é prevenir a transmissão de mosquitos aos seres humanos e assim evitar surtos. Na situação de ocorrer casos de malária de transmissão local, as estratégias de controle de vetores se concentrarão na contenção e controle da transmissão antes que ela se alastre.

- **Estratégias disponíveis:** o uso regular de estratégias de controle de vetores em larga escala como MTI e BRI não é recomendado em áreas sem transmissão de malária. As opções para prevenir a transmissão da malária são a proteção pessoal (com uso de MTI, repelentes, repelentes em espirais ou outros métodos para evitar picadas de mosquitos), BRI direcionada ou focalizada e RF dos hábitats larvários sensíveis à eliminação.
  Essas estratégias podem ser implantadas por meio de campanhas para promover o uso de proteção pessoal e MTI. Quando há um cluster de casos de malária, a BRI focal nas áreas afetadas deve ser feita com inseticida ao qual a população de mosquitos é suscetível, e devem ser distribuídos MTI (preferencialmente MILD) a toda a população. Nas regiões com ampla cobertura anterior de mosquiteiros convencionais, campanhas para o tratamento de mosquiteiros podem ser consideradas como alternativa à distribuição de MILD. Por fim, se focos de reprodução de mosquitos forem identificados e puderem ser eliminados, pode ser aplicada uma estratégia direcionada de RF.

Figura 3: **Cronograma anual de coleta de indicadores entomológicos em locais sem transmissão ativa mas onde existe ainda risco de transmissão**

Ausência de transmissão mas com risco de transmissão	Indicadores	Estação chuvosa (meses)					
	Presença de vetores e composição das espécies				•		
	Sensibilidade aos inseticidas				•		

1 A duração da estação de transmissão varia segundo o contexto local; para facilitar, foi representada na tabela uma estação de transmissão de 6 meses.
* Segundo a estratégia de controle em uso.

8

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Anexos

Anexo 1: **Vetores da malária nas Américas**

Espécies de anofelinos são apontadas como vetores primários e secundários da malária segundo a presença de parasitas nas glândulas salivares ou por esporozoítos detectados pelo ensaio imunoenzimático (ELISA). As Américas estão divididas em três regiões principais: Mesoamérica (Caribe, América Central e México); áreas fora da bacia amazônica (na Bolívia, Colômbia, Equador, Peru e Venezuela) e áreas da bacia amazônica (na Bolívia, Brasil, Colômbia, Equador, Guiana Francesa, Guiana, Peru, Suriname e Venezuela).

Anexo 1: **Cronograma anual de coleta de dados para indicadores entomológicos e operacionais em locais de transmissão moderada a baixa.**

Sub-região	Vetores primários (espécies/complexos de espécies)	Vetores secundários (espécies/complexos de espécies)
Mesoamérica	*Anopheles albimanuss*	*A. vestitipennis*
	A. pseudopunctipennis	*A. darlingi*
		A. puntimacula
		A. apicimacula
		A. pseudopunctipennis
Fora da bacia amazônica	*A. albimanus*	*A. pseudopunctipennis*
	A. darlingi	*A. punctimacula*
	A. nuneztovari	
	A. aquasalis	
Bacia amazônica	*A. darlingi*	*A. benarrochi*
		A. oswaldoi
		A. rangeli
		A. triannulatus
		A. marajoara
		A. aquasalis
		A. deaneorum
		A. janconnae
		A. nuñeztovari
		A. braziliensis
		A. triannulatus
		A. peryassui

Anexo 2: **Recomendação da OMS de produtos para aplicação intradomiciliar de inseticida de efeito residual**

(Fonte: http:/www.who.int/whopes/Insecticides_IRS_Malaria_09.pdf)

Compostos e formulações de inseticidas (1)	Grupo da classe (2)	Dose (g i.a./m^2)	Modo de ação	Duração de ação eficaz (meses)
DDT (PM)	***OC***	1–2	Contato	>6
Malation (PM)	***OF***	2	Contato	2–3
Fenitrotion (PM)	***OF***	2	Contato e veiculado pelo ar	3–6
Pirimifós-metil (PM e CE)	***OF***	1–2	Contato e veiculado pelo ar	2–3
Bendiocarb (PM)	***C***	0,1–0,4	Contato e veiculado pelo ar	2–6
Propoxur (PM)	***C***	1–2	Contato	3-6
Alfacipermetrina (PM, CS)	***PI***	0,02–0,03	Contato	4-6
Bifentrina (PM)	***PI***	0,025–0,05	Contato	3-6
Ciflutrina (PM)	***PI***	0,02–0,05	Contato	3-6
Deltametrina (PM, GA)	***PI***	0,02–0,025	Contato	3-6
Etofemprox (PM)	***PI***	0,1–0,3	Contato	3-6
Lambda-cialotrina (PM, SC)	***PI***	0,02–0,03	Contato	3-6

(1) SC: suspensão em cápsula; CE: concentrado emulsionável; CS: concentrado em suspensão; GA: grânulo dispersível em água; PM: pó molhável.
(2) OC: organoclorados; OF: organofosforados; C: carbamatos; PI: piretroides.

Anexo 3: **Recomendação da OMS de mosquiteiros tratados com inseticida de longa duração**

(Fonte: http:/www.who.int/whopes/Long_lasting_insecticidal_nets_Aug09.pdf)

Nome do produto	Tipo de produto	Situação de recomendação da OMS	Situação de publicação de especificação da OMS
DawaPlus® 2.0	Poliéster com deltametrina	Provisória	Publicado
Duranet®	Alfacipermetrina impregnada em polietileno	Provisória	Publicado
Interceptor®	Poliéster com alfacipermetrina	Provisória	Publicado
Netprotec ®	Deltametrina impregnada em polietileno	Provisória	Publicado
Olyset®	Permetrina impregnada em polietileno	Provisória	Publicado
PermaNet® 2.0	Poliéster com deltametrina	Provisória	Publicado
PermaNet® 2.5	Poliéster com deltametrina com borda reforçada	Provisória	Publicado
PermaNet® 3.0	Combinação de poliéster com deltametrina com borda reforçada (painéis laterais) e deltametrina e PBO impregnados em polietileno (teto)	Provisória	Sendo elaborado

Observações:

1. Os relatórios das reuniões do Grupo de Trabalho do WHOPES devem ser consultados para orientação detalhada sobre uso e recomendações. Esses relatórios estão disponíveis na página inicial da OMS em http://www.who.int/whopes/recommendations/wgm/en/
2. As recomendações da OMS sobre o uso dos pesticidas em saúde pública são válidas SOMENTE se vinculadas às especificações da OMS para controle de qualidade. As especificações da OMS para pesticidas de saúde pública estão disponíveis na página inicial da OMS em http://www.who.int/whopes/quality/newspecif/en

Amazon Malaria Initiative/ Amazon Network for the Surveillance of Antimalarial Drug Resistance

Strategic Orientation Document on Monitoring the Efficacy of and Resistance to Antimalarials in the Current Epidemiological Context

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CDC
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Amazon Malaria Initiative/ Amazon Network for the Surveillance of Antimalarial Drug Resistance

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ACRONYMS AND ABBREVIATIONS

AMI	Amazon Malaria Initiative
API	Annual Parasite Index
AQ	Amodiaquine
AS	Artesunate
ATM	Artemether
CDC	U.S. Centers for Disease Control and Prevention
CQ	Chloroquine
DOX	Doxycycline
LUM	Lumefantrine
MQ	Mefloquine
MSH	Management Sciences for Health
PAHO	Pan American Health Organization
Q	Quinine
RAVREDA	Amazon Network for the Surveillance of Antimalarial Drug Resistance
SP	Sulfadoxine-pyrimethamine
SPS	Strengthening Pharmaceutical Systems
USAID	U.S. Agency for International Development
WHO	World Health Organization
µL	microliters

1

Objective

To have a strategic document in place for monitoring the efficacy of and resistance to antimalarials in the current epidemiological context, facilitating the countries' familiarization with all the available tools and their use in different epidemiological contexts.

2

Introduction

Malaria epidemiology in the region of the Americas has evolved over the last decade, and the current situation is marked by a reduction in the incidence of malaria, particularly that caused by *Plasmodium falciparum*. The result has been areas with very low or no risk of transmission coexisting with areas where the incidence of the disease is high (Table 1). The reduced incidence is a positive public health development, but brings new challenges for national malaria surveillance and control programs.

In 2009, 564,541 cases of malaria were reported—52% fewer than reported to the Pan American Health Organization (PAHO) in 2000 by all its member countries (Table 1). Thus, the region has seen a very significant decline in transmission of this disabling disease, which affects the quality of life of a significant segment of the continent's population.

Malaria transmission was certified to have been interrupted in some countries during the 1960s. Today, 21 of the region's countries have endemic transmission: Argentina, Belize, Bolivia, Brazil, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Guyana, French Guiana, Haiti, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, the Dominican Republic, Suriname and Venezuela. However, the trend in recent years suggests that some countries, such as Argentina, El Salvador, Mexico, and Paraguay, are making steady progress in reducing the disease, possibly leading to its elimination in the coming years.

The malaria situation in the region can be analyzed by grouping the countries in four subregions, each of which shares eco-epidemiological characteristics and social determinants.

It is in the Amazon subregion—those countries that include parts of the Amazon jungle—that the greatest number of malaria cases is concentrated. These countries also represented 90% of the continent's total disease burden in 2009. Among them, it was Brazil that reported the most cases in that year: 308,498 cases, or 55% of the total for the Americas.

For several years, Colombia has had the second greatest number of cases of malaria on the continent. This is due to the presence of extensive areas with social and environmental conditions favorable to the transmission of malaria. Colombia is also an important connecting point between the Amazon subregion and Mesoamerica.

In the subregion comprising of Mexico and Central America, transmission is lower, and *Plasmodium vivax* malaria is the predominant form of disease (96%). In these countries, strains of *P. falciparum* are sensitive to chloroquine (CQ).

Haiti and the Dominican Republic, which form the island of Hispaniola, constitute the third subregion. Their epidemiological situation is unique in the Caribbean, since Hispaniola is the only Caribbean island with endemic transmission of malaria. Furthermore, almost 100% of the cases reported there are due to *P. falciparum*, posing a serious public health problem, a potential threat to tourism, and a risk that the disease will spread to other parts of the Caribbean that have been free of transmission.

Argentina and Paraguay form the fourth subregion. Here, *P. vivax* malaria transmission is very low and localized.

The majority of the countries in the Americas have adopted the World Health Organization's (WHO) Global Strategy for Malaria Control. The strategy has four components, the most important of which is timely diagnosis and effective treatment as the best means for the reduction of malaria morbidity and mortality. The success of the strategy is based on the ability of ministries of health to provide truly effective antimalarial drugs. Given the spread and intensification of resistance to many of the currently available antimalarial drugs, evidence-based decision-making on what drug to recommend as the first and second lines of treatment becomes more complex every year.

There are a variety of methods for evaluating the efficacy of and resistance to antimalarial drugs, including *in vivo* studies, *in vitro* tests, and molecular analysis. The majority of national malaria control programs (NMCPs) use data from *in vivo* studies to evaluate the efficacy of first- and second-line drugs, and to decide whether malaria treatment policies need to be changed. Thus, this methodology is the standard way of determining the efficacy or inefficacy of antimalarial drugs. The method most commonly used for these studies follows the WHO guidelines, which were recently revised and include modifications recommended by PAHO for studies in the Americas. The objective of the studies is to evaluate antimalarial drugs currently being used as the first and second lines of treatment for uncomplicated malaria caused by *P. falciparum*, as well as for *P. vivax* treatment, and to compare their efficacy with that of possible alternative treatments. Such data are fundamental in guiding the development of policy on the use of antimalarial drugs in endemic areas (Table 2).

The principal goal of malaria therapy in the Americas is to eliminate parasitemia, not simply to eliminate the symptoms of the infection. Thus, in evaluating the efficacy of antimalarial drugs in the Americas, the emphasis is on the elimination of parasitemia, although patients' clinical response is also assessed.

During the 1960s, CQ was the drug of choice in the Americas for the treatment of uncomplicated malaria caused by *P. falciparum*, since it was fast-acting, safe, and inexpensive compared with other antimalarials. As resistance to CQ grew in the Amazon Basin during the 1970s, some countries began to change their first-line treatment from CQ to sulfadoxine-pyrimethamine (SP or Fansidar®). In the mid-1980s, evidence of growing resistance to SP in the Amazon region forced Brazil's NMCP to begin to use quinine (Q) plus tetracycline or mefloquine (MQ) as first-line drugs. On the Pacific coast of South America, CQ or amodiaquine (AQ) is still used in several countries, although growing resistance to CQ in recent years has led Colombia and Peru to change to SP in combination with AQ or artesunate (AS) as the first line of treatment (Tables 2 and 3).

Table 1. **Reported cases of malaria in the region of the Americas, 2000-2009**

Country	Year									
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Argentina	440	215	125	122	115	259	209	387	130	–
Belize	1,486	1,097	928	928	1,066	1,549	844	845	540	256
Bolivia	31,469	15,765	14,276	20,343	14,910	20,142	18,995	14,610	9,748	9,743
Brazil	613,241	388,303	348,259	408,886	465,004	606,067	549,469	458,652	315,642	308,498
Colombia	144,432	231,272	207,225	180,961	142,243	121,647	120,096	125,262	79,230	79,252
Costa Rica	1,879	1,363	1,021	718	1,289	3,541	2,903	1,223	966	262
Ecuador	104,528	108,903	86,757	52,065	28,730	17,050	9,863	8,464	4,891	4,120
El Salvador	745	360	117	83	111	65	48	40	33	20
Guatemala	53,311	35,824	35,540	31,127	28,955	39,571	31,093	15,382	7,198	7,080
Guyana	24,018	27,122	21,895	27,627	28,866	38,984	21,064	11,656	11,815	13,673
French Guiana	3,708	3,823	3,661	3,839	3,038	3,414	4,074	2,797	3,264	2,800
Haiti	16,897	9,837	9,837	9,837	10,802	21,778	32,739	29,825	36,774	49,535
Honduras	35,125	24,149	17,223	14,123	17,293	16,007	11,561	10,270	8,225	9,216
Mexico	7,390	4,996	4,624	3,819	3,406	2,967	2,514	2,361	2,357	2,703
Nicaragua	23,878	10,482	7,695	6,717	6,897	6,642	3,114	1,356	762	610
Panama	1,036	928	2,244	4,500	5,095	3,667	1,663	1,281	744	778
Paraguay	6,853	2,710	2,778	1,392	694	376	823	1,341	341	91
Peru	68,321	78,544	99,237	88,408	93,581	86,272	64,871	56,538	42,214	36,886
Dominican Republic	1,233	1,038	1,296	1,529	2,355	3,837	3,525	2,711	1,840	1,643
Suriname	13,132	16,003	12,837	10,982	8,378	9,131	3,289	1,178	1,530	1,371
Venezuela	29,736	20,006	29,491	31,719	46,655	45,049	37,062	41,749	32,037	35,828
Total	1,182,858	982,740	907,066	899,725	909,483	1,048,015	919,819	787,928	560,281	564,451

– No data

Table 2. **Changes in treatment policy for uncomplicated cases of *P. falciparum* in Amazon countries, 1998-2009**[1]

Country	Year	
	1998	2009
Bolivia	CQ7d	AS+MQ
Brazil	CQ3d+D5d	LUM+ATM
Colombia	CQ + SP	AQ+SP AS+MQ LUM+ATM
Ecuador	CQ	SP+AS
Guyana	Q5d+SP	LUM+ATM

Table 3. **Periodic review of *P. falciparum* treatment schemes in the region**[2]

Country	2010	Proposal	Presentations of drugs**
Bolivia	AS+MQ (single-drug)	AS+MQ+PQ	Fixed dose or co-blister packs
Brazil	ATM-LUM AS-MQ	ATM-LUM AS-MQ+PQ	Fixed dose for both combinations
Colombia	ATM-LUM	ATM-LUM+PQ	Fixed-dose combination
Ecuador	AS+SP (Co-blister)	ATM-LUM+PQ	Fixed dose
Guyana	ATM-LUM	ATM-LUM+PQ	Fixed-dose combination
Peru (Amazon/Coast)	AS+SP AS+MQ (single-drug)	AS+MQ+PQ	Fixed dose or co-blisters
Suriname	ATM+LUM	ATM-LUM+PQ	Fixed-dose combination

* The underlined therapeutic combination is among the suggested changes to current schemes.
** The fixed-dose combinations do not include primaquine (PQ).

1 Information provided to PAHO by countries. Changes based on efficacy studies by AMI/RAVREDA with funding from USAID. Available at: http://new.paho.org/ hq/&index.php?option=com_docman& &task=doc_download&gid=11789 &&Itemid=

2 Information presented at the AMI/RAVREDA meeting in Cartagena de Indias, Colombia on 13-15 2010. Last underlined modifications by the Strengthening Pharmaceutical Systems (SPS) program at Management Sciences for Health. 2010. *Informe técnico: Análisis de los criterios de selección, programación de necesidades y adquisición de medicamentos antimaláricos en los países que comparten la Cuenca del Amazonas.* Submitted to the U.S. Agency for International Development by the Strengthening Pharmaceutical Systems (SPS) program of Management Sciences for Health (MSH). Arlington, VA: Management Sciences for Health.

3

Proposal for the implementation of tools available for monitoring the efficacy and resistance of antimalarials according to the epidemiological context

3.1 Epidemiological context

In order to standardize procedures, the epidemiological context is described according to the Annual Parasite Index (API). This is obtained by dividing the total number of reported malaria cases by the total population, and then multiplying by 1000. The API should be calculated for each district or smallest geographical unit, following the PAHO/WHO guidelines. In accordance with the above, the following classification is used:

Epidemiological situation	API
High transmission	> 10 cases / 1000 people
Moderate transmission	1-10 cases / 1000 people
Low transmission	<1 case / 1000 people
No transmission	No evidence of autochthonous transmission

3.2 Available tools

In vivo studies

- *Revised practical guidelines for studies of efficacy of malaria drugs in the Americas.* HSD/DC/M/0o5-10. Revised and modified in 2010. Available at: http://new.paho.org/hq/index. &php?option=com_docman&task=d &oc_download&gid=11531&Item &id=

- Generic protocols for *in vivo* studies of the efficacy of antimalarial drugs in the Americas. The list of protocols mentioned here is used as a reference, and each country is advised to adapt them according to the treatment scheme in use.

- Efficacy of chloroquine and sulfadoxine-pyrimethamine therapy for the treatment of uncomplicated malaria caused by *Plasmodium falciparum*. Available at: http:/www.paho.org/english/ad/dpc/cd/mal-genericPf_CQ-SP_eng.doc

- Efficacy and safety of mefloquine therapy and mefloquine-artesunate combination therapy for the treatment of uncomplicated malaria caused by *Plasmodium falciparum*. Available at: http://www.paho. org/english/ad/dpc/CD/mal-GenericPf_MQ-AS_eng.doc

- Efficacy of chloroquine for the treatment of malaria due to *Plasmodium vivax*. Available at: http://www.paho.org/english/ad/dpc/cd/mal-genericPv_CQ_Eng.doc

Other documents

Flow Chart: Efficacy and safety of mefloquine therapy and mefloquine–artesunate combination therapy for the treatment of uncomplicated malaria caused by *Plasmodium falciparum*. Available at: http://www.paho.org/english/ad/dpc/cd/404.asp

3.3 Molecular markers

The use of known and validated molecular markers such as the MQ, SP and CQ markers will help the countries determine the state of antimalarial drug resistance in specific situations. It will also serve as additional information to that provided by *in vivo* studies.

3.4 *In vitro* tests

The methodologies most commonly used in *in vitro* tests for antimalarials are the Mark III *in vitro* micro-test, the isotopic test, the drug sensitivity test based on measuring HRP2 and/or pLDH ELISA, and the SYBR Green test. See Basco, L. 2007. Field application of *in vitro* assays for the sensitivity of human malaria parasites to antimalarial drugs. Geneva: World Health Organization. Available at: http://www.who.int/malaria/publications/atoz/9789241595155/en/index.html

In vitro susceptibility testing in monitoring antimalarial drug resistance in AMI/RAVREDA: Proposed guidelines from a technical meeting on standardizing the use of *in vitro* tests in AMI/RAVREDA. Available at: http://www.paho.org/english/ ad/dpc/cd/ravreda3-/tests-in-vitro.doc

The following table shows what studies are suggested given different current epidemiological scenarios.

Table 4. **How to use the available tools in different epidemiological scenarios**

Surveillance with:	High or Moderate transmission	Low or No transmission (pre-elimination or elimination)
In vivo	• Up to 8 sentinel sites • Every 3 years • One arm	• One site at least every 3 years • Multicenter studies* • One arm
Molecular markers	Concomitant with ***in vivo*** studies	Collect samples every 18 months
In vitro (ELISA)	Concomitant with ***in vivo*** studies	Collect samples every 18 months

* In places within a country or between countries that have similar epidemiological features.

In vivo studies are the preferred method of obtaining the data needed to orient changes in malaria treatment policy, since they correlate best with patients' clinical response to the drugs. WHO has published recommendations for these studies in high-transmission areas. In light of changing epidemiological situations, it has also published modified recommendations for areas of low or moderate transmission, including the *Practical Guide for* in vivo *Antimalarial Drug-Efficacy Studies in the Americas.*

Though *in vivo* studies do not require sophisticated technology, they are not simple to conduct. Well-trained clinical and laboratory personnel who strictly follow the protocol are essential. Moreover, a laboratory must be found that is capable of conducting molecular biology tests, ascertaining the presence of the drug and its metabolites in serum, and/or doing *in vitro* tests where indicated. Due to the low rate of transmission of malaria in the countries of the Americas, it is often difficult to obtain enough *P. falciparum* malaria patients for the necessary sample size. In dispersed and mobile populations, the relevance and strategy of studies should be analyzed to ensure the feasibility of ongoing monitoring and to limit drop out as much as possible.

In vivo studies in the Americas over the last decade (see Annex 1) have used standard protocols—in particular, protocols based on the PAHO/WHO recommendations in the *Practical Guides for* in vivo *Antimalarial Drug-Efficacy Studies in the Americas,* published in 2003 and revised in 2010. This guide complements the standard protocols and are based on experience with efficacy studies of anti-malarial drugs conducted in the region of the Americas.

When it proves difficult to recruit an adequately representative number of patients at the places where the study is to be conducted, the following recommendations should be considered (Methods for surveillance of antimalarial drug efficacy, WHO 2009), depending on the epidemiological situation:

3.5 **High- to moderate-transmission areas** (see Annex 2)

- Reduce the parasitemia threshold to 1000 parasites/microliters (µL) of blood.
- Consider the fact that high-transmission areas can feature frequent asymptomatic carriers of very low parasitemias, which can disappear spontaneously, leading to an underestimation of treatment failure.
- The reading of slides should be very precise in order to avoid errors in classifying early treatment failure, which should be based on comparing the parasitemia on day 0 with day 2 or 3.
- Other modifications in the protocol include changing the minimum recruitment age from 6 months to 15 years. Also, history of fever in last 24 hours is used in place of confirmed fever at the time of admission.

3.6 **Moderate to low transmission areas** (see Annex 2)

- Reduce the parasitemia threshold to 250 parasites/µL of blood.
- This reduction implies the same considerations as apply to areas of high transmission, where the reading of slides must be very precise in order to avoid errors in classifying early treatment failure.
- The principal benefit of reducing the threshold is that it makes approximately 30% more patients candidates for inclusion.
- If it is not possible in a given country to include at least four or five patients a week at a sentinel site for a period of 6 months, other alternatives such as *multicenter studies* or studies with mobile teams should be considered.
- It is recommended that surveillance is done every two to three years.

3.7 **Low- to very-low transmission areas** (see Annex 3)

- In areas where transmission is very low, it is suggested that *in vivo* efficacy studies be conducted every three years in the form of multicenter studies within the country or in a number of neighboring countries. There should be studies with known molecular markers that are validated annually (such as MQ, SP, or CQ), as well as studies with the samples collected in the efficacy studies.
- If it is not feasible for the country to conduct tests of therapeutic effectiveness every three years, surveillance should be based on other elements of the early warning systems, such as studies with molecular markers or *in vitro* studies.

3.8 **Areas of very low to no transmission, but with risk** (see Annex 4)

- Active case-finding should be conducted, and all patients, regardless of age and level of parasitemia, should be hospitalized if possible until the parasitemia and symptoms disappear.
- Countries in the pre-elimination or elimination stage are advised to follow up on patients for at least 28 days. The same information that is collected from patients enrolled in the efficacy and sample studies should be collected in all cases for possible eventual utilization in *in vitro* and molecular-marker tests.

4

All transmission levels

In situations where there is a high level of treatment failure, whether or not in the context of an epidemic, when an *in vivo* study is not possible, the collection of *in vitro* test samples should be considered. The findings may orient or be a basis for changes in the treatment scheme for the specific situation.

Other factors to consider

1. These studies should guarantee the surveillance of the efficacy of first and second-line antimalarials for the treatment of uncomplicated malaria caused by *P. vivax* and *P. falciparum*.
2. The only tool for verifying treatment failure are *in vivo* efficacy studies.
3. Studies with *in vitro* tests and molecular markers are complementary to *in vivo* studies.
4. Given the low incidence of cases, one arm studies are recommended.
5. Efficacy studies should not last more than 6 months.
6. The protocol *must* include collecting blood on filter paper on day zero and on the day of treatment failure, in order to distinguish relapses from cases of reinfection by genotyping.
7. In studies monitoring the effectiveness of CQ for *P. vivax* malaria, the following considerations should be taken into account:
   - Parasitemia threshold 250 parasites/μL of blood,
   - Axillary temperature ≥ 37.5°C at the time of entry to the medical system, or history of fever in the last 48 hours,
   - Follow-up time 28 days,
   - Administration of primaquine on the last day of monitoring (day 28),
   - Classification of therapeutic response the same as for *P. falciparum*.
8. Overall serum levels of the antimalarials should be measured (with priority on day 7 and the day of treatment failure—or on day 28 if there is no failure) in all studies of CQ for *P. vivax* (in the entire region) and *P. falciparum* (for Central America and the island of Hispaniola, where *P. falciparum* is sensitive to CQ), as well as in studies with the ATM-LUM combination for LUM levels, by collecting 100 μL of blood on filter paper (Whatman 31ETCHR).
9. Given the low level of parasitemias expected, the day-3 parasitemia test requires expert microscopy.

10. The second reading of the thick blood smear obtained during the identification and entry of the patient to medical care should take place within 24—48 hours of obtaining the sample.
11. 100% supervision of therapy is mandatory.
12. In special situations where *in vivo* research is not feasible (with mobile populations, for instance), it is suggested that the parasitemia assessment be done on days 2 and 3 of the monitoring. The absence of a reduction in the parasitemia, or an increase, can help detect a problem with the efficacy of the drug being used.

The early detection of variations in the parasites' susceptibility to artemisinin derivatives is possible through *in vitro* tests with the ELISA techniques (HRP2 or pLDH). In considering whether to use the test, consideration should be given to its sensitivity and specificity, experience with it in the region, and cost.

Although concordance with treatment failure (measured by *in vivo* studies) is not good for the antimalarials being used, this technique makes it possible to evaluate temporary variations in the IC50 values of artemisinin derivatives and other important drugs such as first and second-line components used in severe malaria cases, MQ and Q being examples. Several drugs can be evaluated with the same sample of patients and slides.

This makes it easier to obtain the sample size in a single contact with the patient, which is advantageous in low-transmission situations. The problem is that the standardization and monitoring of the protocol must be highly rigorous and disciplined. The idea is to identify laboratories in the region that have experience, and whose technical teams can work with the countries.

The findings from assessments of susceptibility to antimalarial drugs should be used as a complement to the therapeutic efficacy information obtained through *in vivo* studies. The following factors make these assessments adequate ways of filling the methodological and logistical gaps that *in vivo* studies leave in the surveillance system, providing very useful information for policy decisions about antimalarials:

- They ascertain resistance independent of the effect of immunity and pharmacodynamic factors.
- They independently assess the components of the schemes in use, or drugs that have already been withdrawn.
- They have fewer constraints on the inclusion of patients than do *in vivo* studies, in particular because they do not depend on monitoring patients, and because they are exempt from other ethical requirements associated with clinical trials.

Based on such complementary advantages of *in vitro* assessments, two basic objectives can be pointed to in using them as a complement to evaluations of efficacy in the framework of a resistance surveillance system. One is to guide decisions on changes in therapeutic schemes, the other is to monitor resistance to antimalarials that are being used.

In vitro tests can complement *in vivo* studies and provide orientation for changes of therapeutic schemes. If temporary variations and/or spatial differences of susceptibility *in vitro* are found, this may be an indication for *in vivo* studies, and may even in some cases directly contribute to decision-making on whether to change policy on antimalarials. As an additional tool in the surveillance system, the test makes it possible to monitor the susceptibility of the components of the combinations, and provide an alternative way to assess the problem of resistance in places or circumstances where *in vivo* evaluations are not feasible.

Confirming resistance to antimalarial drugs requires other tools, such as *in vitro* sensitivity tests, genetic mutation or amplification studies associated with the parasite's resistance, and/or measurement of the concentration of the drug in question.

The secondary purpose of policy on antimalarials has to do with minimizing selection pressure for drug resistance. Currently, drug policies pursue this secondary purpose by:

- restricting the use of chemoprophylaxis,
- restricting the prescription and distribution of specific antimalarials,
- recommending that only fully curative dosages be employed,
- employing combination therapies, and
- improving the use of antimalarials.

The effect of implementing policy for that secondary purpose should be evaluated. Since they show temporal and spatial variations in susceptibility, *in vitro* tests are a very important tool for assessing the effect of policies, and for containing or preventing the spread or emergence of resistance in the medium and long term.

5

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6

Annex

Annex 1: **Summary of *in vivo* studies conducted in the region of the Americas**

Country	Species of Plasmodium	Antimalarial drug tested	Year study concluded	Locality/ Municipality	Number of patients who completed the study	Treatment failure (%)	Source
Bolivia	Pv	CQ	2003	Yaquiba	60	0	RAVREDA-AMI
	Pv	CQ	2003	Riberalta	59	15	
	Pv	CQ	2007	Yaquiba	57	0	
	Pv	CQ	2007	Guayaramerin	75	12.1	
	Pv	CQ	2007	Riberalta	81	6.1	
Brazil	Pf	MQ	2004	Macapa	33	6	
	Pf	AS+MQ	2007	Macapa	58	0	
	Pv	CQ	2004	Careiro	40	25	
	Pv	CQ	2004	Coari	98	2	
	Pf	AS+MQ	2006	Colniza	49	0	
	Pf	AT+LM	2006	Porto Velho	54	0	
	Pf	MQ	2004	São Luis	11	9	
	Pf	MQ	2004	Manaus	73	1	
	Pv	CQ	2004	Manaus	108	19	
	Pv	CQ	2004	Macapa	136	18	
	Pv	CQ	2004	São Luis	46	13	
	Pv	CQ	2004	Belém	165	10	
	Pf	Q+DOX	2004	Macapa	63	18	
	Pv	CQ	2004	Porto Velho	87	8	
	Pf	MQ	2004	Porto Velho	54	7	
	Pv	CQ	2004	Cuiaba	75	13	
	Pf	Q+DOX	2007	Coari	86	33.6	
	Pf	AT+LM	2007	Coari	117	0	
	Pf	AS+MQ	2006	Porto Velho	86	0	
	Pf	Q+DOX	2004	Belém	79	11	

Annex 1: **Summary of *in vivo* studies conducted in the region of the Americas** (continued from page 25)

Country	Species of Plasmodium	Antimalarial drug tested	Year study concluded	Locality/ Municipality	Number of patients who completed the study	Treatment failure (%)	Source
Colombia	Pf	AQ+SP	2004	Buenaventura	5	50	RAVREDA-AMI
	Pf	AQ+SP	2003	Turbo	44	2.3	
	Pf	AS+SP	2004	Turbo	47	2.1	
	Pf	AS+SP	2004	El Bagre	51	1.9	
	Pf	MQ+SP	2004	El Bagre	33	0	
	Pf	AQ	2004	El Bagre	12	42	
	Pf	MQ+SP	2004	Turbo	20	0	
	Pf	AQ	2004	Turbo	21	23	
	Pv	CQ	2004	Buenaventura	42	0	
	Pf	AQ	2004	Buenaventura	14	57	
	Pf	AQ	2003	Tumaco	29	38	
	Pv	CQ	2003	Turbo	45	2.2	
	Pf	MQ	2003	Turbo	45	2.2	
	Pf	MQ	2003	Tumaco	50	0	
	Pf	AQ+SP	2003	El Bagre	46	2.2	
	Pv	CQ	2003	El Bagre	47	0	
	Pv	CQ	2003	Guapi	34	0	
	Pf	SP	2003	Guapi	44	0	
	Pf	AQ	2003	Guapi	40	15	
	Pf	AQ+SP	2003	Tumaco	49	0	
	Pv	CQ	2003	Tumaco	49	2	
	Pf	MQ	2003	El Bagre	47	6.4	

3 Information provided to PAHO by countries. Available at: http:/new.paho.org/hq/index.php?option=com_docman&task=doc_download&gid=11789& Itemid=

Annex 1: **Summary of *in vivo* studies conducted in the region of the Americas** (continued from page 26)

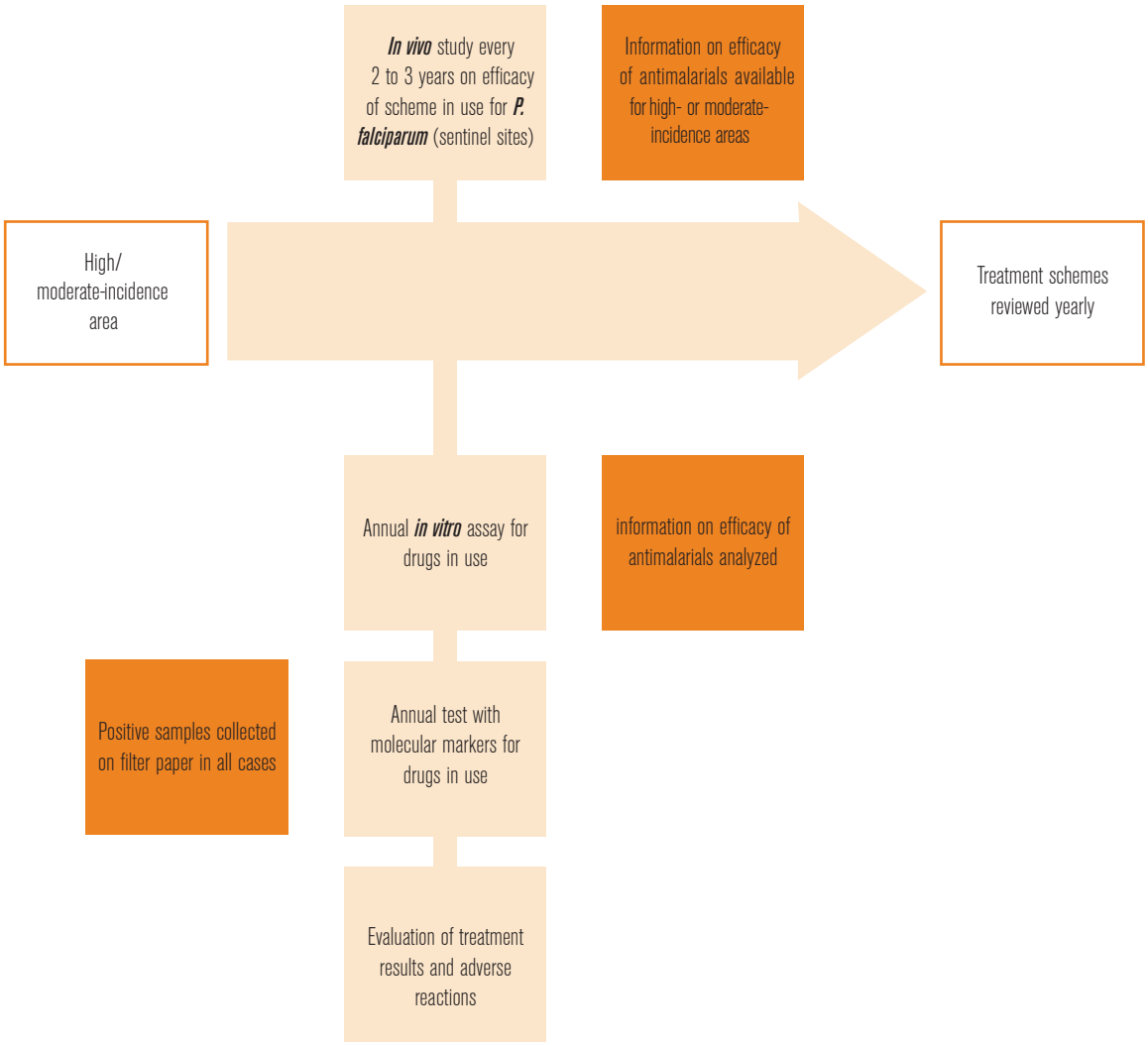
Country	Species of Plasmodium	Antimalarial drug tested	Year study concluded	Locality/ Municipality	Number of patients who completed the study	Treatment failure (%)	Source
Ecuador	Pf	AQ+SP	2004	Esmeraldas	34	0	RAVREDA-AMI
	Pf	CQ	2003	Portoviejo	22	81	
	Pv	AQ	2003	Esmeraldas	22	0	
	Pf	AQ	2004	Santo Domingo	60	47	
	Pf	SP	2003	Portoviejo	29	0	
	Pf	SP	2003	Milagro	49	0	
	Pf	CQ	2003	Milagro	15	80	
	Pf	CQ+SP	2004	Esmeraldas	50	0	
	Pf	AS+SP	2004	Machala	48	0	
	Pf	AT+LM	2005	Esmeraldas-/ Milagro-Santo Domingo	62	0	
	Pf	AS+SP	2003	Esmeraldas	61	0	
Guyana	Pf	MQ	2003	Port Kaituma	37	28	
	Pf	AT+LM	2008	Georgetown	63	1.7	
	Pf	AS+MQ	2005	Madhia	82	1.2	
	Pf	MQ	2005	Madhia	82	3.6	
	Pf	AS+MQ	2003	Port Kaituma	27	7.5	
	Pf	AT+LM	2004	Georgetown	72	0	
	Pv	CQ	2006	Georgetown	68	32.3	
	Pv	CQ+PQ	2006	Georgetown	8	25	
Honduras	Pf	CQ	2009	Puerto Lempira	67	0	
	Pf	SP	2006	Bonanzas and Rosita	28	0	
	Pf	CQ	2006	Bonanzas and Rosita	30	0	
Peru	Pf	AS+MQ	2005	Iquitos	95	1.01	
	Pv	CQ	2002	Iquitos	132	4	
	Pf	CQ	2002	Ullpayacu	20	90	
	Pf	SP	2002	Ullpayacu	34	12	

Annex 1: **Summary of *in vivo* studies conducted in the region of the Americas** (continued from page 27)

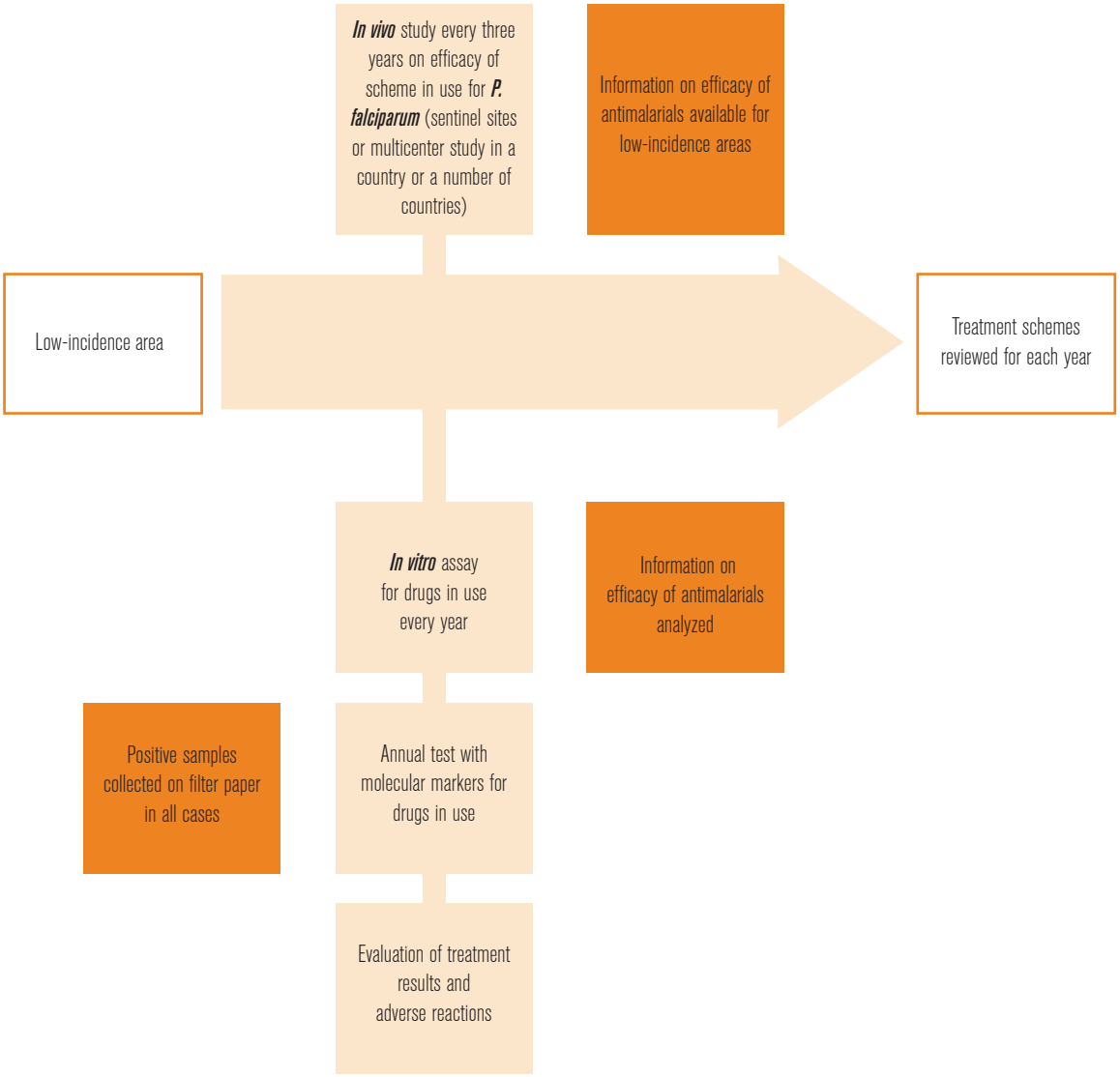
Country	Species of Plasmodium	Antimalarial drug tested	Year study concluded	Locality/ Municipality	Number of patients who completed the study	Treatment failure (%)	Source
Suriname	Pf	AT+LM	2003	Paramaribo	53	1.9	RAVREDA-AMI
	Pf	MQ	2002	Paramaribo	55	7	
	Pf	AT+LM	2006	Paramaribo	44	4.5	
	Pf	AS+MQ	2002	Paramaribo	52	6	
	Pf	AT+LM	2003	Marowijne	49	2	
	Pf	AT+LM	2005	Paramaribo	36	2.8	
	Pf	Articom	2005	Paramaribo	31	6.5	
	Pf	AS+DOX	2003	Paramaribo	49	18	
	Pf	Artecon	2006	Paramaribo	43	4.6	
	Pf	AS+MQ	2003	Paramaribo	41	2	
Venezuela	Pf	AS+MQ	2005	La Leona	17	0	
	Pv	CQ+PQ	2002	Yaguaraparo	102	0	
	Pv	CQ	2004	La Leona	18	0	
	Pv	CQ	2004	Tumeremo	19	31.6	
	Pf	AS+MQ	2006	Atures	51	0	
	Pf	AS+MQ	2005	Atures	60	0	
	Pv	CQ	2005	Atures	65	1.5	
	Pv	CQ	2005	Yaguaraparo	8	0	
	Pf	AS+MQ	2005	KM 88	5	0	
	Pf	AT+LM	2005	Atures	60	0	
	Pf	CQ	2002	Atures	17	100	
	Pv	CQ+PQ	2002	Atures	102	0	
	Pf	Q+PQ	2003	Atures	52	9.6	
	Pf	CQ	2002	Manapiare	5	80	
	Pf	Q+PQ	2002	Manapiare	19	0	
	Pf	CQ	2002	Tumeremo	21	76	
	Pf	AT+LM	2004	Tumeremo	27	11.1	
	Pf	Q+PQ	2003	Tumeremo	45	22.2	
	Pf	AS+MQ	2004	Tumeremo	20	0	
	Pv	CQ	2003	KM 88	44	0	
	Pv	CQ	2003	El Dorado	25	0	
	Pv	CQ+PQ	2003	Tumeremo	94	0	

Pf: *Plasmodium falciparum*, Pv: *Plasmodium vivax*
CQ: Chloroquine, AS: Artesunate, MQ: Mefloquine, Q: Quinine, PQ: Primaquine, AT: Artemether, LM: Lumefantrine, DOX: Doxycycline, SP: Sulfadoxine-pyrimethamine, AQ: Amodiaquine

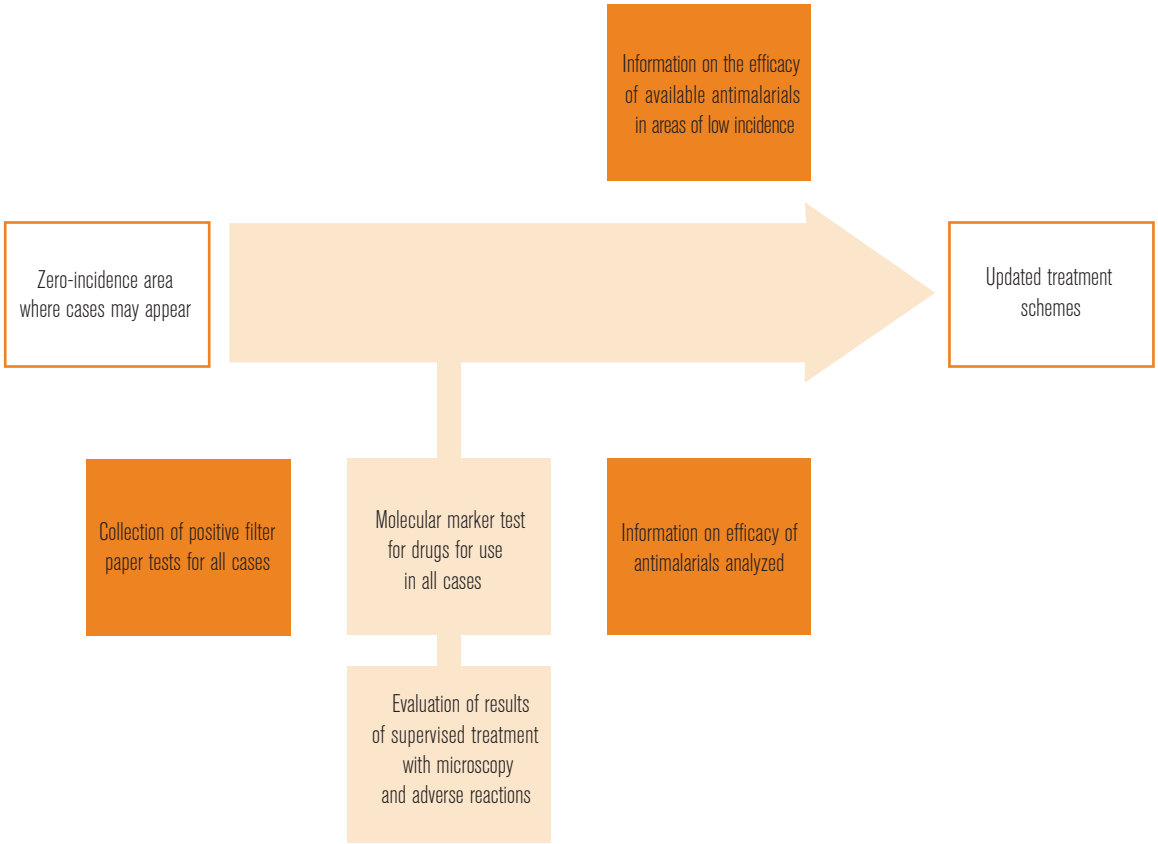
Annex 2: **Flow chart for high/moderate- to low-transmission areas**



Annex 3: **Flow chart for very-low transmission areas**



Annex 4: **Flow chart for very-low to no transmission, but with risk**



Iniciativa Amazônica Contra a Malária/ Rede Amazônica de Vigilância da Resistência às Drogas Antimaláricas

Documento estratégico para o monitoramento da eficácia e resistência dos antimaláricos no atual contexto epidemiológico

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Iniciativa Amazônica Contra a Malária/ Rede Amazônica de Vigilância da Resistência às Drogas Antimaláricas

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ABREVIAÇÕES E SIGLAS

AMI	Iniciativa Amazônica Contra a Malária, pela sigla em inglês
AQ	Amodiaquina
AS	Artesunato
ATM	Arteméter
CQ	Cloroquina
DOX	Doxiciclina
IPA	Índice parasitário anual
LUM	Lumefantrina
MQ	Mefloquina
MSH	Management Sciences for Health
OMS	Organização Mundial da Saúde
OPAS	Organização Pan-Americana da Saúde
Q	Quinina
RAVREDA	Rede Amazônica de Vigilância da Resistência às Drogas Antimaláricas
SP	Sulfadoxina-pirimetamina
SPS	Strengthening Pharmaceutical Systems
USAID	Agência dos Estados Unidos para o Desenvolvimento Internacional
µl	Microlitro

1

Objetivo

Dispor de um documento estratégico para o monitoramento da eficácia e resistência dos antimaláricos no atual contexto epidemiológico que facilite aos países tomar conhecimento de todas as ferramentas disponíveis e sua aplicação segundo o contexto epidemiológico.

2

Introdução

A epidemiologia da malária na América Latina evoluiu ao longo da década passada a uma situação marcada pela redução da incidência da malária, especialmente da malária transmitida pelo *Plasmodium falciparum*. Isso resultou na coexistência de áreas com risco de transmissão muito baixo ou inexistente com outras áreas de alta incidência da malária (Tabela 1). A modificação da ocorrência dos casos de malária, que por um lado é positiva para a saúde pública, traz novos desafios para os programas nacionais de vigilância e controle da malária.

Em 2009, foram registrados 564,541 casos de malária nas Américas, 52% a menos do notificado à Organização Pan-Americana da Saúde (OPAS) em 2000 por todos os países membros da OPAS (Tabela 1), sendo registrada na Região uma redução importante da transmissão desta doença que incapacita e compromete a qualidade de vida de uma grande parcela da população do continente.

Depois de haver sido certificada a interrupção da transmissão em alguns países durante a década de 1960, atualmente 21 países da Região têm transmissão endêmica de malária: Argentina, Belize, Bolívia, Brasil, Colômbia, Costa Rica, Equador, El Salvador, Guatemala, Guiana, Guiana Francesa, Haiti, Honduras, México, Nicarágua, Panamá, Paraguai, Peru, República Dominicana, Suriname e Venezuela. No entanto, diante da tendência da doença nos últimos anos, é possível pensar que em alguns países como Argentina, El Salvador, México e Paraguai poderia haver um avanço constante para redução que poderia levar à eliminação da doença nos próximos anos.

A situação da malária na Região pode ser analisada com o agrupamento dos países em quatro sub-regiões que têm características ecoepidemiológicas e determinantes sociais em comum.

No primeiro grupo de países estão os que dividem a floresta amazônica e formam a sub-região de mesmo nome. É onde se concentrou o maior número de casos de malária e 90% do total da carga de doença do continente em 2009. Entre os países amazônicos, o Brasil registrou o maior número de casos em 2009, 308,498, correspondendo a 55% do total das Américas.

A Colômbia é, há vários anos, o segundo país do continente com maior número de casos de malária. Isto ocorre porque uma grande extensão do país apresenta condições sociais e ambientais propícias para a transmissão da malária. Além disso, constitui um ponto importante de conexão entre a sub-região amazônica e a Mesoamérica.

O México e a América Central formam uma sub-região onde o grau de transmissão é menor e onde predomina a malária por *Plasmodium vivax* (96%). Nestes países, as cepas de *P. falciparum* são sensíveis à cloroquina.

O Haiti e a República Dominicana, que ocupam a Ilha Hispaniola, formam o terceiro grupo e apresentam um panorama epidemiológico único no Caribe, visto que só nessa ilha há atualmente transmissão endêmica de malária. Além disso, quase 100% dos casos notificados são de malária por *P. falciparum,* o que representa um sério problema de saúde pública, uma ameaça em potencial ao turismo e um risco de disseminação de casos a outros territórios do Caribe que têm permanecido livres de transmissão.

Por fim, Argentina e Paraguai formam o quarto grupo, caracterizado por uma transmissão de malária por *P. vivax* muito baixa e focalizada.

A maioria dos países nas Américas adotou a Estratégia Global para o Controle da Malária da Organização Mundial da Saúde (OMS), com quatro componentes, sendo o principal dispor de diagnóstico e tratamento antimalárico oportuno e efetivo como o melhor meio de reduzir a morbidade e mortalidade por malária. O êxito desta estratégia está na habilidade dos ministérios da saúde de proporcionar antimaláricos que de fato sejam eficazes. Devido à extensão e intensificação da resistência a muitos dos antimaláricos atualmente disponíveis, torna-se a cada ano mais complexa tomar decisão baseada em evidências sobre quais os medicamentos a serem recomendados como primeira e segunda linha de tratamento.

Existem diversos métodos para avaliar a eficácia e a resistência aos antimaláricos como estudos *in vivo*, testes *in vitro* e análises moleculares. A maioria dos programas nacionais para controle da malária usam dados de estudos *in vivo* para avaliar a eficácia dos medicamentos de primeira e segunda linha e decidir se são necessárias mudanças na política de tratamento da malária, o que torna esta metodologia o teste padrão para determinar a eficácia dos antimaláricos. O método mais usado para estes estudos segue as diretrizes da OMS, as quais foram recentemente revisadas, com modificações recomendadas pela OPAS para estudos nas Américas. O objetivo de tais estudos é avaliar os antimaláricos que são atualmente usados como tratamento de primeira e segunda linha para malária não complicada por *P. falciparum,* como também o tratamento para a malária por *P. vivax,* e comparar sua eficácia com a de possíveis tratamentos alternativos. Estes dados são básicos para nortear o desenvolvimento de políticas de tratamento fundamentadas para antimaláricos em áreas endêmicas (Tabela 2).

Nas Américas, a meta principal do tratamento antimalárico é eliminar a parasitemia e não apenas eliminar os sintomas da infecção. Por essa razão, a ênfase da avaliação da eficácia dos antimaláricos nas Américas está na eliminação da parasitemia, embora também seja avaliada a resposta clínica dos pacientes.

Na década de 1960, a cloroquina (CQ) era o medicamento de escolha para o tratamento da malária não complicada por *P. falciparum* nas Américas, devido à sua rápida ação, segurança e baixo custo relativo a

outros antimaláricos. Com o crescente aumento da resistência à CQ na Bacia Amazônica, nos anos 70, alguns países passaram a mudar o tratamento de primeira linha, de CQ a sulfadoxina-pirimetamina (SP ou Fansidar®). Em meados dos anos 80, evidências da crescente resistência à SP na região amazônica obrigaram o Programa Nacional de Controle da Malária no Brasil a introduzir a quinina mais tetraciclina ou mefloquina (MQ) como medicamentos de primeira linha nesta região. Na costa do Pacífico da América do Sul, CQ ou amodiaquina ainda é usada em vários países, embora nos últimos anos o aumento da resistência à CQ fez com que na Colômbia e no Peru se passasse à SP em combinação com amodiaquina ou artesunato (AS) como medicamentos de primeira linha (Tabelas 2 e 3).

Tabela 1. **Casos de malária registrados na Região das Américas de 2000 a 2009**

País	Ano									
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Argentina	440	215	125	122	115	259	209	387	130	–
Belize	1.486	1.097	928	928	1.066	1.549	844	845	540	256
Bolívia	31.469	15.765	14.276	20.343	14.910	20.142	18.995	14.610	9.748	9.743
Brasil	613.241	388.303	348.259	408.886	465.004	606.067	549.469	458.652	315.642	308.498
Colômbia	144.432	231.272	207.225	180.961	142.243	121.647	120.096	125.262	79.230	79.252
Costa Rica	1.879	1.363	1.021	718	1.289	3.541	2.903	1.223	966	262
Equador	104.528	108.903	86.757	52.065	28.730	17.050	9.863	8.464	4.891	4.120
El Salvador	745	360	117	83	111	65	48	40	33	20
Guatemala	53.311	35.824	35.540	31.127	28.955	39.571	31.093	15.382	7.198	7.080
Guiana	24.018	27.122	21.895	27.627	28.866	38.984	21.064	11.656	11.815	13.673
Guiana Francesa	3.708	3.823	3.661	3.839	3.038	3.414	4.074	2.797	3.264	2.800
Haiti	16.897	9.837	9.837	9.837	10.802	21.778	32.739	29.825	36.774	49.535
Honduras	35.125	24.149	17.223	14.123	17.293	16.007	11.561	10.270	8.225	9.216
México	7.390	4.996	4.624	3.819	3.406	2.967	2.514	2.361	2.357	2.703
Nicarágua	23.878	10.482	7.695	6.717	6.897	6.642	3.114	1.356	762	610
Panamá	1.036	928	2.244	4.500	5.095	3.667	1.663	1.281	744	778
Paraguai	6.853	2.710	2.778	1.392	694	376	823	1.341	341	91
Peru	68.321	78.544	99.237	88.408	93.581	86.272	64.871	56.538	42.214	36.886
República Dominicana	1.233	1.038	1.296	1.529	2.355	3.837	3.525	2.711	1.840	1.643
Suriname	13.132	16.003	12.837	10.982	8.378	9.131	3.289	1.178	1.530	1.371
Venezuela	29.736	20.006	29.491	31.719	46.655	45.049	37.062	41.749	32.037	35.828
Total	1.182.858	982.740	907.066	899.725	909.483	1.048.015	919.819	787.928	560.281	564.451

– Sem informação

Tabela 2. **Mudanças na política de tratamento de casos não complicados de malária por *P. falciparum* nos países amazônicos 1998–2009**[1]

Esquema	Ano	
	1998	2009
Bolívia	CQ7d	AS + MQ
Brasil	CQ3d + DSd	LUM + ATM
Colômbia	CQ + SP	AQ+ SP AS + MQ LUM + ATM
Equador	CQ	SP + AS
Guiana	QSd + SP	LUM + ATM

Tabela 3. **Revisão periódica dos esquemas terapêuticos de *P. falciparum* na região**[2]

Esquema	Ano		
	2010	Proposta*	Apresentações dos medicamentos**
Bolívia	AS + MQ (monofármaco)	AS + MQ + PQ	Dose fixa ou co-blíster
Brasil	ATM-LUM AS-MQ	ATM-LUM + PQ AS-MQ + PQ	Ambas as combinações de dose fixa
Colômbia	ATM-LUM	ATM-LUM + PQ	Combinação de dose fixa
Equador	AS + SP (co-blíster)	ATM-LUM + PQ	Dose fixa
Guiana	ATM-LUM	ATM-LUM + PQ	Combinação de dose fixa
Peru (costa amazônica)	AS + SP AS + MQ (monofármaco)	AS + MQ + PQ	Dose fixa ou co-blíster
Suriname	ATM + LUM	ATM + LUM + PQ	Combinação de dose fixa

* A combinação terapêutica sublinhada está entre as mudanças sugeridas aos esquemas atuais.
** As combinações de doses fixas não incluem primaquina (PQ).

1 Informação dos países à OPAS. Mudanças baseadas em estudos de eficácia pela AMI/RAVREDA financiados pela USAID. Disponível em http://new.paho.org/ hq/&index.php?option=com_docman& &task=doc_download&gid= 11789 &&Itemid=.

2 Informação apresentada na reunião da AMI/RAVREDA realizada em Cartagena das Índias, Colômbia, de 13 a 15 de 2010, últimas modificações sublinhadas por: Strengthening Pharmaceutical Systems (SPS) de Management Sciences for Health. 2010. *Informe técnico: Análise dos critérios de seleção, programação de necessidades e aquisição de antimaláricos nos países que compartilham a Bacia Amazônica.* Apresentado à Agência dos Estados Unidos para o Desenvolvimento Internacional pelo Programa Strengthening Pharmaceutical Systems (SPS) de Management Sciences for Health (MSH). Arlington, VA: Management Sciences for Health.

3

Proposta da aplicação das ferramentas disponíveis para o monitoramento da eficácia e resistência dos antimaláricos segundo o contexto epidemiológico

3.1 Contexto epidemiológico

Para a padronização dos procedimentos, o contexto epidemiológico é baseado no Índice parasitário anual (IPA). Este é calculado a partir do número total de casos de malária registrados, dividido pelo total da população e multiplicado por 1000. O IPA deve ser calculado para cada distrito ou menor unidade geográfica, segundo as diretrizes da OPAS/OMS. De acordo com o descrito anteriormente, a seguinte classificação é usada:

Situação epidemiológica	IPA
Transmissão alta	> 10 casos /1000 pessoas
Transmissão moderada	1-10 casos /1000 pessoas
Transmissão baixa	<1 caso / 1000 pessoas
Ausência de transmissão	Não há evidência de transmissão autóctone

3.2 Ferramentas disponíveis

Estudos *in vivo*

- *Guia prático revisado para estudos de eficácia dos antimaláricos nas Américas.* HSD/DC/M/0o5-10. Revisado e modificado em 2010. Disponível em http://new.paho.org/hq/index. &php?option=com_docman&task=d &oc_download&gid=11531&Item &id=

- Protocolos genéricos para estudos *in vivo* de eficácia dos antimaláricos nas Américas. A lista de protocolos mencionados aqui é usada como referência e se aconselha que cada país adapte os protocolos segundo o esquema terapêutico em uso.

  - Eficácia da terapia com cloroquina e sulfadoxina-pirimetamina para o tratamento da malária não complicada por *Plasmodium falciparum*. Disponível em http://www.paho.org/spanish/ad/dpc/cd/mal-genericPf_CQ-SP_esp.doc
  - Eficácia e segurança do tratamento com mefloquina e combinação de mefloquina-artesunato para o tratamento da malária não complicada por *Plasmodium falciparum*. Disponível em http://www.paho. org/spanish/ad/dpc/cd/mal-GenericPf_MQ-AS_esp.doc
  - Eficácia da cloroquina para o tratamento da malária por *Plasmodium vivax*. Disponível em http://www.paho.org/spanish/ad/dpc/cd/mal-genericPv_CQ_Esp.doc

- Outros documentos

  - Fluxograma: Eficácia e segurança do tratamento com mefloquina e da combinação de mefloquina-artesunato para o tratamento da malária não complicada por *Plasmodium falciparum*. Disponível em http://www.paho.org/spanish/ad/dpc/cd/mal-fluxograma-PF-MQ-AS.pdf

3.3 Marcadores moleculares

Através do uso de marcadores moleculares conhecidos e validados como são os de MQ, SP e CQ, os países terão respaldo para conhecer a situação da resistência aos antimaláricos em situações pontuais. Além disso, eles servirão como informação complementar aos estudos *in vivo.*

3.4 Testes *in vitro*

As metodologias mais comumente usadas para os testes *in vitro* para os antimaláricos são: microteste *in vitro* Mark III, teste isotópico, teste de sensibilidade de medicamentos baseado na medida de HRP2 e/ou pLDH com ELISA e o teste SYBR Green. Ver: Basco, L. 2007. Field application of *in vitro* assays for the sensitivity of human malaria parasites to antimalarial drugs. Genebra: Organização Mundial da Saúde. Disponível em http:/www.who.int/malaria/publications/atoz/9789241595155/en/index.html.

Uso de testes de suscetibilidade *in vitro* na vigilância da resistência aos antimaláricos na AMI/RAVREDA: Diretrizes propostas em uma reunião técnica sobre a padronização do uso de testes *in vitro* na AMI/RAVREDA. Disponível em http://www.paho.org/spanish/ad/dpc/cd/ravreda3-/pruebas-in-vitro.doc

Na tabela a seguir pode-se observar que os estudos são sugeridos segundo o atual cenário epidemiológico.

Tabela 4. **Como utilizar as ferramentas disponíveis nos diversos cenários epidemiológicos**

Vigilância	Transmissão moderada	Transmissão baixa ou em declínio (pré-eliminação ou eliminação)
In vivo	- Até 8 áreas-sentinela - A cada 3 anos - Um grupo	- Uma área pelo menos a cada 3 anos - Estudos multicêntricos* - Um grupo
Marcadores moleculares	Concomitante com os estudos ***in vivo***	Coletar amostras a cada 18 meses
In vitro (ELISA)	Concomitante com os estudos ***in vivo***	Coletar amostras a cada 18 meses

* Em locais com epidemiologia semelhante em um mesmo país ou entre países.

Os **estudos** *in vivo* são considerados como o método de escolha para se obter os dados necessários para nortear as mudanças na política de tratamento da malária pois se correlacionam melhor com a resposta clínica dos pacientes aos medicamentos. A OMS publicou recomendações para estes estudos com foco nas áreas de alta transmissão. Além disso, devido às mudanças epidemiológicas, foram recentemente publicadas recomendações com modificações apropriadas para áreas de transmissão baixa ou moderada, como é o caso das Américas, no *Guia prático para estudos* in vivo *da eficácia dos antimaláricos nas Américas*.

Os estudos *in vivo* não requerem tecnologia sofisticada, no entanto, não são simples de serem realizados. É imprescindível dispor de equipe clínica e de laboratório bem capacitada que siga estritamente o protocolo. Além disso, é necessário identificar um laboratório que possa realizar os testes de biologia molecular, dosagem sérica do medicamento e seus metabólitos e/ou testes *in vitro*, se estiverem indicados. Devido à transmissão baixa da malária nos países das Américas, muitas vezes há dificuldade para completar o tamanho da amostra necessária de pacientes com malária por *P. falciparum*. Em populações dispersas e móveis, deve-se avaliar a pertinência e a estratégia a ser usada para o desenvolvimento de estudos que garantam o acompanhamento e limitem ao máximo o abandono do acompanhamento do estudo.

Os estudos *in vivo* realizados na última década nas Américas (ver Anexo 1) usaram protocolos padrão baseados nas recomendações da OMS/OPAS, especificamente os contidos no documento *Guia prático para estudos* in vivo *de eficácia dos antimaláricos nas Américas,* elaborado em 2003 e revisado em 2010. Este guia serve como um complemento aos protocolos padrão e baseia-se nas experiências com estudos de eficácia dos antimaláricos realizados na Região das Américas.

Quando há dificuldade de recrutar um número representativo de pacientes nos locais onde o estudo será realizado, deve-se levar em conta as seguintes recomendações *(Métodos para Vigilância da Eficácia dos Antimaláricos, OMS, 2009)* segundo a situação epidemiológica:

3.5 **Zonas de transmissão alta a moderada** (ver Anexo 2)

- Reduz-se o limite inferior de parasitemia para 1000 parasitas/microlitro (µl) de sangue.
- Considerar que, em áreas de transmissão alta, podem ser frequentes os portadores assintomáticos com parasitemias muito baixas, que podem se resolver espontaneamente levando a subestimar a falha terapêutica.
- A leitura das lâminas deve ser muito precisa para evitar erros de classificação da falha terapêutica precoce, que se baseia na comparação da parasitemia entre os dias 0 e os dias 2 ou 3.
- Outras modificações no protocolo são a mudança da idade de recrutamento de 6 meses a 15 anos. Além disso, usa-se como critério de inclusão história de febre nas últimas 24 horas em vez de febre confirmada no momento da admissão.

3.6 **Zonas de transmissão baixa a moderada** (ver Anexo 2)

- Reduz-se o limite inferior de parasitemia nestas áreas para 250 parasitas/µl de sangue.
- Esta redução implica as mesmas considerações feitas para áreas de transmissão alta em que a leitura das lâminas deve ser muito precisa para evitar erros na classificação da falha terapêutica precoce.
- O principal benefício de reduzir o limite inferior é que permite um aumento de cerca de 30% no número de pacientes que podem ser incluídos no estudo.
- Se, em um determinado país, no mínimo quatro ou cinco pacientes por semana não puderem ser incluídos no estudo em uma área-sentinela em um período de 6 meses, deve-se considerar outras alternativas como a realização de estudos multicêntricos ou com equipes móveis.
- Sugere-se que a vigilância seja realizada a cada dois a três anos.

3.7 **Zonas de transmissão baixa a muita baixa** (ver Anexo 3)

- Em áreas onde a transmissão é muito baixa, recomenda-se realizar o estudo de eficácia *in vivo* a cada três anos, com estudos multicêntricos em um mesmo país ou em vários países vizinhos. Devem-se realizar estudos com marcadores moleculares que utilizem marcadores conhecidos e validados anualmente (ex., MQ, SP e CQ) bem como amostras coletadas nos estudos de eficácia.
- Se não for viável para o país realizar testes de eficácia terapêutica a cada três anos, a vigilância deve ser baseada em outros componentes dos sistemas de alerta precoce, como estudos com marcadores moleculares ou estudos *in vitro*.

3.8 **Zonas de transmissão muita baixa a inexistente, mas com risco** (ver Anexo 4)

- Deve-se fazer busca ativa de casos e todos os pacientes, de todas as idades e com todos os níveis de parasitemia, se possível, devem ser hospitalizados até que sua parasitemia e sintomas se resolvam.
- Aos países em fase de pré-eliminação ou eliminação, recomenda-se que façam o acompanhamento dos pacientes por, pelo menos, 28 dias. Para todos os casos, deve-se reunir os mesmos dados que são coletados dos pacientes participantes dos estudos de eficácia e amostras, para eventual uso em testes *in vitro* e marcadores moleculares.

4

Todos os níveis de transmissão

Em situações de altos níveis de falha terapêutica, em caso de epidemia ou não, quando não é possível desenvolver um estudo *in vivo*, deve-se considerar a obtenção de amostras para testes *in vitro.* Os resultados obtidos poderão justificar/orientar a modificação do esquema terapêutico para essa situação específica.

Outras considerações a serem feitas

1. Estes estudos devem garantir a vigilância da eficácia dos antimaláricos usados como primeira e segunda linha para o tratamento da malária por *P. vivax* e *P. falciparum* não complicada.
2. A única ferramenta para comprovar a falha terapêutica são os estudos de eficácia *in vivo.*
3. Os estudos que usam testes *in vitro* e marcadores moleculares são complementares aos estudos *in vivo*.
4. Devido à baixa incidência de casos, recomenda-se realizar estudos com um só grupo.
5. A duração dos estudos de eficácia não deve ser superior a 6 meses.
6. Deve-se incorporar como elemento obrigatório do protocolo a coleta de sangue em papel de filtro no dia 0 e dia da falha terapêutica para diferenciar os casos de recrudescência e reinfecção com genotipagem.
7. Em estudos de monitoramento da eficácia da CQ para malária por *P. vivax,* devem-se ser feitas as seguintes considerações:
   - Parasitemia deve ser >250 parasitas/µl de sangue
   - Temperatura axilar ≥37,5oC no momento da captação ou história de febre nas últimas 48 horas
   - Período de acompanhamento de 28 dias
   - Administração de primaquina será no último dia de acompanhamento (dia 28)
   - Classificação da resposta terapêutica será a mesma que a para o *P. falciparum*.
8. Deve-se considerar a dosagem completa no sangue dos antimaláricos (com prioridade para os dias 7 e dia da falha terapêutica, e no dia 28 se não existir falha terapêutica) em todos os estudos de CQ em *P. vivax* (para toda a região) e *P. falciparum* (América Central e Ilha Hispaniola, onde o *P. falciparum* é ainda sensível à CQ) e em estudos com a combinação ATM-LUM para LUM, com a coleta de 100 µl de sangue em papel de filtro (*Whatman* 31ETCHR).
9. Como se espera baixa parasitemia, a avaliação da parasitemia no dia 3 requer boa experiência em microscopia.

10. A segunda leitura da lâmina para exame de gota espessa, obtida durante a identificação e captação do paciente, deve ser feita nas primeiras 24-48 horas após a coleta da amostra.
11. É obrigatório realizar a supervisão da administração de 100% do tratamento.
12. Em situações especiais em que não é possível realizar um estudo *in vivo* (ex., populações móveis), recomenda-se realizar a avaliação da parasitemia nos dias 2 e 3 do acompanhamento. A ausência de redução ou o aumento da parasitemia ajuda a identificar possíveis problemas de eficácia do medicamento usado.

É possível fazer a detecção precoce de variações na suscetibilidade dos parasitas aos derivados da artemisinina com o uso de testes *in vitro* com técnicas de ELISA (HRP2 ou pLDH). Para a escolha do teste, deve-se considerar sua sensibilidade, especificidade, experiência de uso na região e custo. Embora a concordância com a falha terapêutica (avaliada por estudos *in vivo*) não seja boa para os antimaláricos em uso, esta técnica permite avaliar variações temporárias nos valores de IC50 dos derivados de artemisininas e de outros medicamentos importantes como os componentes de primeira e segunda linha usados em casos graves de malária (ex., MQ e quinina [Q]). Vários medicamentos podem ser avaliados com a mesma amostra de pacientes e as mesmas placas. Isto facilita obter os tamanhos de amostras necessários com um só contato com o paciente, o que é interessante em situações de transmissão baixa. O problema reside em que deve haver muito rigor e disciplina na padronização e seguimento do protocolo. Propõe-se identificar os laboratórios da região que tenham experiência e cujas equipes técnicas possam colaborar com os países.

Os achados das avaliações de suscetibilidade aos antimaláricos devem complementar os dados sobre a eficácia terapêutica obtidos com os estudos *in vivo.* Os seguintes fatores fazem com que estes testes sejam adequados para preencher as falhas metodológicas e logísticas acarretadas no sistema de vigilância pelas avaliações *in vivo,* que proporcionam dados de grande utilidade para tomar decisões em termos da política de antimaláricos:

- Avalia a resistência independentemente do efeito da imunidade e dos fatores farmacodinâmicos.
- Avalia independentemente os componentes dos esquemas em uso ou medicamentos já retirados.
- Têm menos limitações de inclusão de pacientes que os estudos *in vivo*, especialmente porque não têm de garantir o seguimento de pacientes, nem têm de satisfazer outras exigências éticas dos estudos clínicos.

Com base nestas vantagens complementares dos testes *in vitro,* identificam-se basicamente dois objetivos fundamentais para o seu uso como complemento às avaliações de eficácia dentro de um sistema de vigilância da resistência. Os objetivos são: orientar decisões sobre mudanças nos esquemas terapêuticos e o monitoramento da resistência aos antimaláricos em uso.

Os testes *in vitro* podem complementar os estudos *in vivo* para orientar mudanças nos esquemas terapêuticos. O registro das variações temporárias e/ou de diferenças espaciais na suscetibilidade *in vitro* pode indicar a realização de estudos *in vivo* e, inclusive em alguns casos, contribuir diretamente para o processo decisório sobre mudar ou não políticas de antimaláricos. Os testes contribuem sendo mais uma ferramenta no sistema de vigilância que permitem monitorar a suscetibilidade dos componentes das combinações e ser uma alternativa para registrar o problema da resistência em locais ou circunstâncias onde não é possível realizar avaliações *in vivo.*

Para confirmar a resistência aos antimaláricos são necessárias outras ferramentas, como estudos de sensibilidade *in vitro*, estudos das mutações ou amplificações genéticas associadas à resistência do parasita e/ou dosagem da concentração do antimalárico.

A política de antimaláricos tem como finalidade secundária reduzir ao mínimo a pressão de seleção para resistência aos medicamentos. Hoje as políticas de medicamentos buscam atingir esta finalidade secundária com:

- restrição do uso da quimioprofilaxia,
- restrição de indicações e distribuição de antimaláricos específicos,
- recomendação de usar somente doses completamente curativas,
- uso da terapia combinada e,
- melhorar o uso dos antimaláricos.

O efeito da implementação da política para cumprir com tal finalidade secundária deve ser avaliada. Os testes *in vitro*, com o registro das variações temporárias e espaciais na suscetibilidade, constituem uma ferramenta de grande importância para avaliar o efeito das políticas e conter ou evitar a disseminação ou emergência da resistência a médio e longo prazo.

5

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6

Anexos

Anexo 1: **Resumo dos estudos *in vivo* realizados na Região das Américas**

#	País	Espécie de Plasmodium	Antimalárico testado	Ano de finalização do estudo	Localidade/ municipalidade	Número de pacientes que completaram o estudo	Falha terapêutica (%)	Fonte
1	Bolívia	Pv	CQ	2003	Yaquiba	60	0	RAVREDA/AMI
2		Pv	CQ	2003	Riberalta	59	15	
3		Pv	CQ	2007	Yaquiba	57	0	
4		Pv	CQ	2007	Guayaramerin	75	12.1	
5		Pv	CQ	2007	Riberalta	81	6.1	
6	Brasil	Pf	MQ	2004	Macapá	33	6	
7		Pf	AS + MQ	2007	Macapá	58	0	
8		Pv	CQ	2004	Careiro	40	25	
9		Pv	CQ	2004	Coari	98	2	
10		Pf	AS + MQ	2006	Colniza	49	0	
11		Pf	AT + LM	2006	Porto Velho	54	0	
12		Pf	MQ	2004	São Luís	11	9	
13		Pf	MQ	2004	Manaus	73	1	
14		Pv	CQ	2004	Manaus	108	19	
15		Pv	CQ	2004	Macapá	136	18	
16		Pv	CQ	2004	São Luís	46	13	
17		Pv	CQ	2004	Belém	165	10	
18		Pf	Q + DOX	2004	Macapá	63	18	
19		Pv	CQ	2004	Porto Velho	87	8	
20		Pf	MQ	2004	Porto Velho	54	7	
21		Pv	CQ	2004	Cuiabá	75	13	
22		Pf	Q + DOX	2007	Coari	86	33.6	
23		Pf	AT + LM	2007	Coari	117	0	
24		Pf	AS + MQ	2006	Porto Velho	86	0	
25		Pf	Q + DOX	2004	Belém	79	11	

(Cont.)

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#	País	Espécie de Plasmodium	Antimalárico testado	Ano de finalização do estudo	Localidade/ municipalidade	Número de pacientes que completaram o estudo	Falha terapêutica (%)	Fonte
26	Colômbia	Pf	AQ + SP	2004	Buenaventura	5	50	RAVREDA/AMI
27		Pf	AQ + SP	2003	Turbo	44	2.3	
28		Pf	AS + SP	2004	Turbo	47	2.1	
29		Pf	AS + SP	2004	El Bagre	51	1.9	
30		Pf	MQ + SP	2004	El Bagre	33	0	
31		Pf	AQ	2004	El Bagre	12	42	
32		Pf	MQ + SP	2004	Turbo	20	0	
33		Pf	AQ	2004	Turbo	21	23	
34		Pv	CQ	2004	Buenaventura	42	0	
35		Pf	AQ	2004	Buenaventura	14	57	
36		Pf	AQ	2003	Tumaco	29	38	
37		Pv	CQ	2003	Turbo	45	2.2	
38		Pf	MQ	2003	Turbo	45	2.2	
39		Pf	MQ	2003	Tumaco	50	0	
40		Pf	AQ + SP	2003	El Bagre	46	2.2	
41		Pv	CQ	2003	El Bagre	47	0	
42		Pv	CQ	2003	Guapi	34	0	
43		Pf	SP	2003	Guapi	44	0	
44		Pf	AQ	2003	Guapi	40	15	
45		Pf	AQ + SP	2003	Tumaco	49	0	
46		Pv	CQ	2003	Tumaco	49	2	
47		Pf	MQ	2003	El Bagre	47	6.4	
48	Equador	Pf	AQ + SP	2004	Esmeraldas	34	0	
49		Pf	CQ	2003	Portoviejo	22	81	
50		Pv	AQ	2003	Esmeraldas	22	0	
51		Pf	AQ	2004	Santo Domingo	60	47	
52		Pf	SP	2003	Portoviejo	29	0	
53		Pf	SP	2003	Milagre	49	0	
54		Pf	CQ	2003	Milagre	15	80	
55		Pf	CQ + SP	2004	Esmeraldas	50	0	
56		Pf	AS + SP	2004	Machala	48	0	
57		Pf	AT + LM	2005	Esmeraldas/ Milagre-Santo Domingo	62	0	
58		Pf	AS + SP	2003	Esmeraldas	61	0	

(Cont.)

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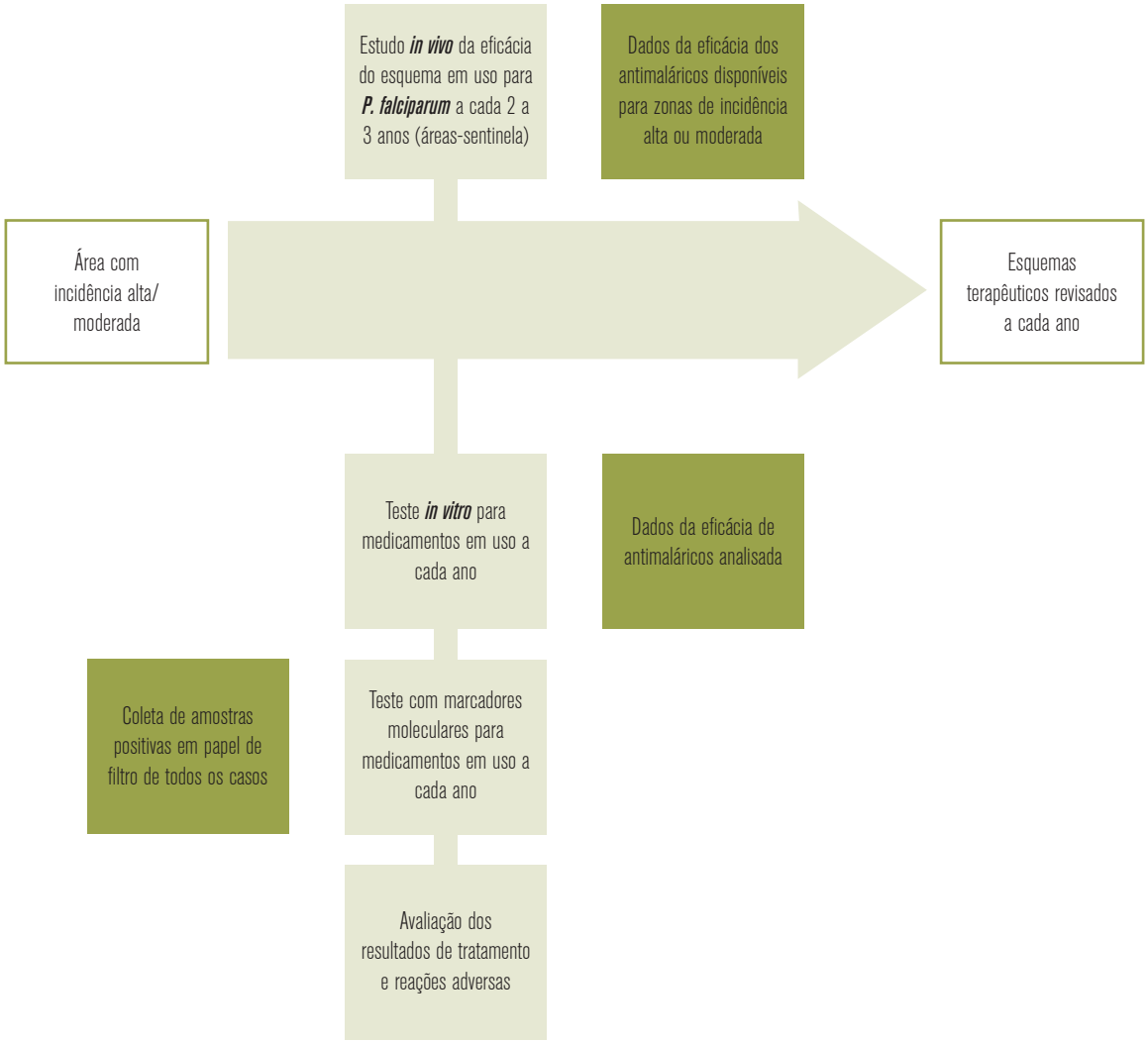
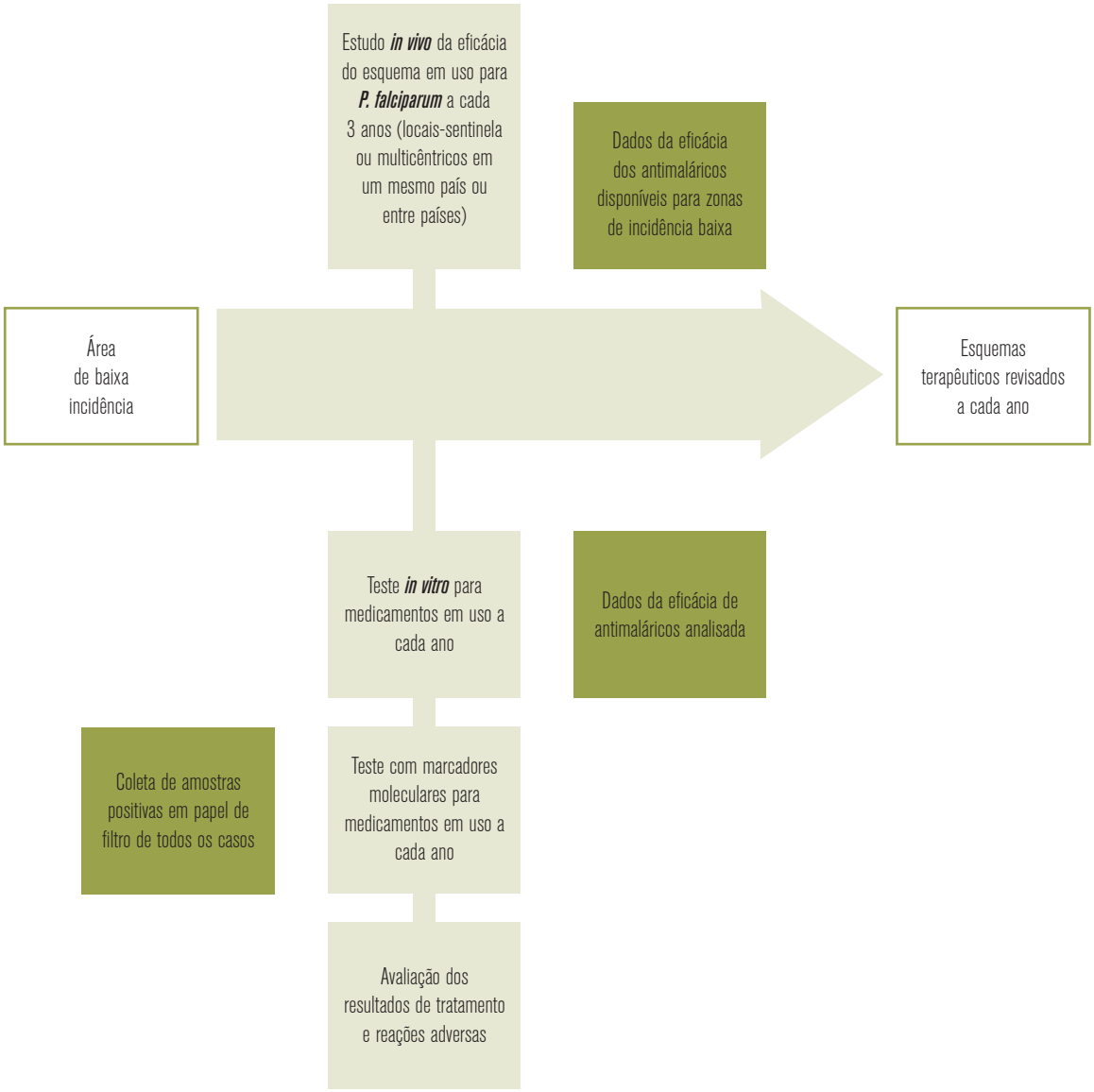
#	País	Espécie de Plasmodium	Antimalárico testado	Ano de finalização do estudo	Localidade/ municipalidade	Número de pacientes que completaram o estudo	Falha terapêutica (%)	Fonte
59	Guiana	Pf	MQ	2003	Port Kaituma	37	28	RAVREDA/AMI
60		Pf	AT + LM	2008	Georgetown	63	1.7	
61		Pf	AS + MQ	2005	Madhia	82	1.2	
62		Pf	MQ	2005	Madhia	82	3.6	
63		Pf	AS + MQ	2003	Port Kaituma	27	7.5	
64		Pf	AT + LM	2004	Georgetown	72	0	
65		Pv	CQ	2006	Georgetown	68	32.3	
66		Pv	CQ + PQ	2006	Georgetown	8	25	
67	Honduras	Pf	CQ	2009	Puerto Lempira	67	0	
68		Pf	SP	2006	Bonanzas y Rosita	28	0	
69		Pf	CQ	2006	Bonanzas y Rosita	30	0	
70	Peru	Pf	AS + MQ	2005	Iquitos	95	1.01	
71		Pv	CQ	2002	Iquitos	132	4	
72		Pf	CQ	2002	Ullpayacu	20	90	
73		Pf	SP	2002	Ullpayacu	34	12	
74	Suriname	Pf	AT + LM	2003	Paramaribo	53	1.9	
75		Pf	MQ	2002	Paramaribo	55	7	
76		Pf	AT + LM	2006	Paramaribo	44	4.5	
77		Pf	AS + MQ	2002	Paramaribo	52	6	
78		Pf	AT + LM	2003	Marowijne	49	2	
79		Pf	AT + LM	2005	Paramaribo	36	2.8	
80		Pf	Articom	2005	Paramaribo	31	6.5	
81		Pf	AS + DOX	2003	Paramaribo	49	18	
82		Pf	Artecon	2006	Paramaribo	43	4.6	
83		Pf	AS + MQ	2003	Paramaribo	41	2	
84	Venezuela	Pf	AS + MQ	2005	La Leona	17	0	
85		Pv	CQ + PQ	2002	Yaguaraparo	102	0	
86		Pv	CQ	2004	La Leona	18	0	
87		Pv	CQ	2004	Tumeremo	19	31.6	
88		Pf	AS + MQ	2006	Atures	51	0	
89		Pf	AS + MQ	2005	Atures	60	0	
90		Pv	CQ	2005	Atures	65	1.5	
91		Pv	CQ	2005	Yaguaraparo	8	0	
92		Pf	AS + MQ	2005	KM 88	5	0	
93		Pf	AT + LM	2005	Atures	60	0	
94		Pf	CQ	2002	Atures	17	100	
95		Pv	CQ + PQ	2002	Atures	102	0	

Pf: *Plasmodium falciparum*, Pv: *Plasmodium vivax*
CQ: cloroquina, AS: artesunato, MQ: mefloquina, Q: quinina, PQ: primaquina, AT: arteméter , LM: lumefantrina, DOX: doxiciclina, SP: sulfadoxina-pirimetamina, AQ: amodiaquina

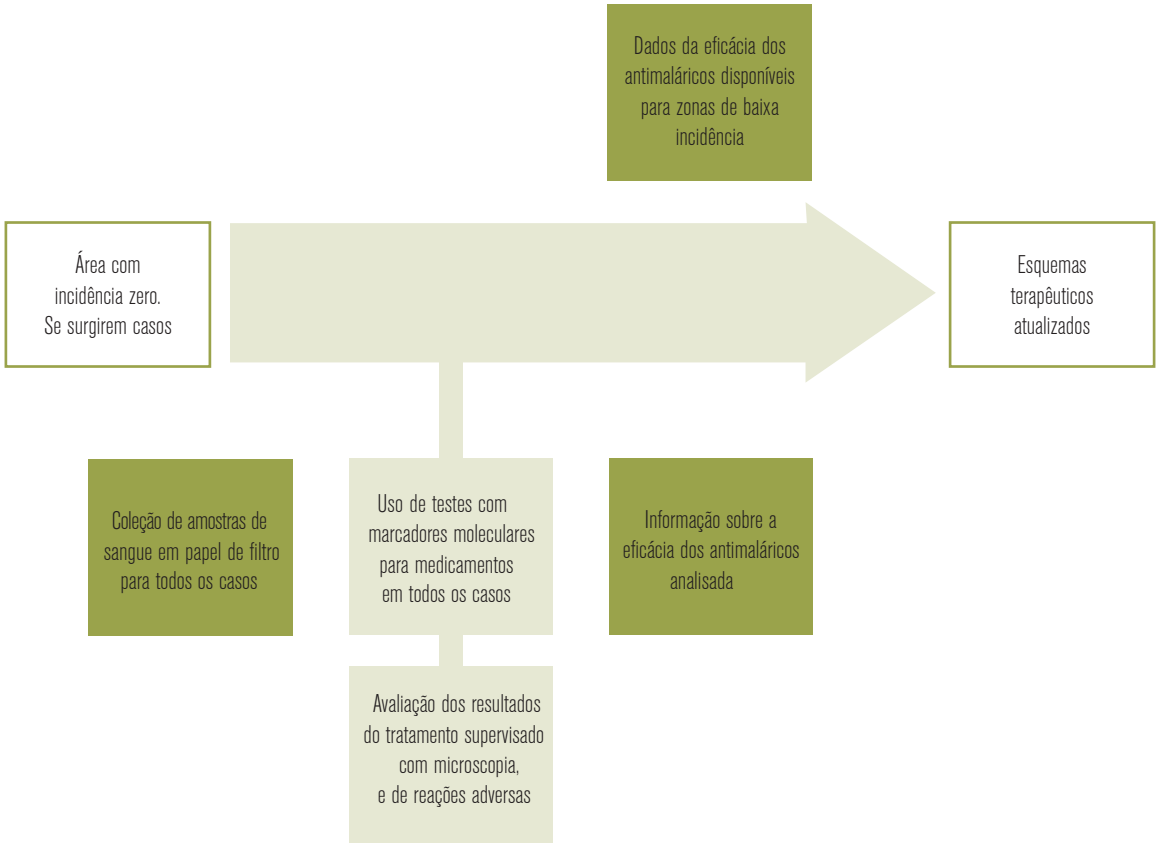
Anexo 2: **Fluxograma de zonas de transmissão alta/moderada a baixa**



Anexo 3: **Fluxograma de zonas de transmissão baixa a muita baixa**



Anexo 4: **Fluxograma de zonas de transmissão muita baixa a inexistente, mas com risco**



USAID
FROM THE AMERICAN PEOPLE

FACT SHEET 2015-03

AMAZON MALARIA INITIATIVE

MALARIA ELIMINATION
Frequently Asked Questions (FAQs)

November 2015

What is malaria elimination?

The World Health Organization (WHO) defines malaria elimination as the interruption of local mosquito-borne malaria transmission in a defined geographical area, usually a country, as a result of deliberate efforts. Malaria elimination is a continuous process that requires national and community commitment to sustain efforts beyond the achievement of zero cases, in order to prevent reintroduction of the disease.

How is malaria elimination different from malaria eradication?

Elimination refers to the interruption of local malaria transmission in a defined geographical area.[1] Malaria eradication is when malaria has been permanently eliminated on a global level, in other words, once all countries have eliminated the disease.

How is malaria elimination different from malaria control?

Malaria control is on the continuum towards malaria-free status. In the short term, the goal of malaria control is to reduce the disease burden to manageable levels of morbidity and mortality. A country-level malaria control program may have national elimination as its ultimate goal. Elimination seeks to reduce local transmission of the disease to zero cases. Committing to elimination requires a specific set of programmatic interventions, which should be based on the WHO guidelines as well as scientific evidence about what works in the local context.

When does a country receive malaria elimination certification?

A country may request WHO (in the region of the Americas, the Pan American Health Organization) to begin the process to certify malaria elimination after local malaria transmission has been interrupted for at least three consecutive years. At this point, the WHO may grant certification if the country can prove beyond reasonable doubt to an independent certification team designated by WHO that it has met the evaluation prerequisites.

What are some of the WHO prerequisites[2] that my country must achieve for malaria elimination?

- A good surveillance mechanism with full coverage of all geographical areas;
- Quality-assured laboratory services to diagnose malaria;
- Notification and full, immediate reporting by public and private health services, with epidemiological investigation of every malaria infection (case) and focus;
- Vigilant health services for detection, treatment, and follow-up of all possible malaria cases, supported by continued education on malaria for health workers;
- Services to raise awareness and provide practical advice on malaria prevention for nationals traveling abroad;
- Entomological surveillance in receptive areas;
- Systems for early detection of and rapid response to outbreaks;
- Inter-country information-sharing and coordination mechanisms for malaria control and elimination wherever relevant, due to migration patterns or adjacent malarious areas;
- A comprehensive national plan of action with continued political and financial support to carry out activities needed to prevent reestablishment of transmission.

Pan American Health Organization
World Health Organization Regional Office for the Americas
CDC Safer · Healthier · People
SIAPS Systems for Improved Access to Pharmaceuticals and Services
USAID From the American People | USP Promoting the Quality of Medicines

What are some of the challenges to malaria elimination?

Countries in Latin America and the Caribbean have had a long history of attempting to eliminate malaria. Ensuring political commitment to provide sustainable resources is an ongoing challenge. Other challenges include parasites that may become less sensitive or resistant to certain antimalarial medicines and vectors (mosquitoes) that may become less sensitive or resistant to control measures. For this reason, efforts to combat malaria must continue to monitor resistance and provide adaptive measures to reduce malaria morbidity and mortality.

Will malaria elimination benefit other health issues?

By meeting the WHO prerequisites (see above), a country may be able to strengthen its capacity to address other health issues, particularly vector-borne diseases such as dengue and chikungunya.

Is it possible that a country may have cases of malaria after elimination has been certified?

Yes, there is a possibility for imported malaria cases when travelers carrying the parasite arrive from other countries where they acquired the infection. This may lead to reintroduction of the disease. For this reason, it is important that countries have strong surveillance systems to test, treat, and track all new cases in order to prevent the disease from being reestablished within a malaria-free area.

Is malaria elimination only a health issue? What other sectors should be involved?

Though malaria elimination is led by the health sector, malaria elimination may have positive consequences for other sectors including agriculture, commerce, tourism, and education. Therefore, these sectors should be actively involved in working to eliminate the disease, help identify resources, and commit to supporting efforts beyond zero cases.

With all the other issues in my community, why should I make malaria elimination a priority and commit resources to this effort?

Malaria has a high social cost, as it is linked to reduced educational achievement, prolonged disability, economic difficulties due to lost productivity, and unnecessary loss of life. However, these costs are avoidable. Investing in malaria control and elimination now can help communities to overcome multiple development issues. In the long run, the cost of inaction may be equal to or higher than the additional resources needed to intensify efforts and eliminate the disease.

Have other diseases been eliminated in Latin America and the Caribbean? If so, which ones?

Yes, rubella, polio, and smallpox have been eliminated in Latin America and the Caribbean. Smallpox remains the only disease to date to have been eradicated, meaning it has been eliminated worldwide. Ongoing efforts exist in the region to eliminate other preventable diseases such as river blindness, tuberculosis, and mother-to-child transmission of HIV and syphilis, which has so far been achieved only in Cuba.

Where can I find more information?

You can learn more about malaria elimination from the Ministry of Health in your country, the Pan American Health Organization (PAHO/WHO),[3] the Malaria Eradication Scientific Alliance (MESA),[4] and from regional initiatives including the USAID-funded Amazon Malaria Initiative (AMI),[5] the Elimination of Malaria in Mesoamerica and the Island of Hispaniola (EMMIE) Initiative, and the Malaria Zero Initiative.

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1 See WHO definition: http://www.who.int/malaria/areas/elimination/overview/en/

2 See WHO prerequisites: http://www.who.int/wer/2014/wer8929.pdf

3 PAHO/WHO website: http://www.paho.org

4 MESA website: http://www.malariaeradication.org

5 AMI website: http://www.usaidami.org

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USAID
DO POVO DOS ESTADOS UNIDOS

INFORMATIVO AMI 2015-03

INICIATIVA AMAZÔNICA CONTRA A MALÁRIA

ELIMINAÇÃO DA MALÁRIA
Perguntas Frequentes

Novembro de 2015

O que é a eliminação da malária?

A Organização Mundial da Saúde (OMS) define a eliminação da malária como a interrupção da transmissão local de malária por mosquitos em uma área geográfica definida, geralmente um país, como resultado de esforços deliberados. A eliminação da malária é um processo contínuo que requer um compromisso nacional e local para manter os esforços de controle da doença, mesmo após alcançar zero casos, a fim de evitar a reintrodução da mesma.

Como a eliminação da malária difere da erradicação da malária?

A eliminação se refere à interrupção da transmissão local da malária em uma área geográfica definida.[1] A erradicação da malária é quando se consegue eliminar a doença permanentemente a nível global, ou seja, quando todos os países eliminam a doença.

Qual é a diferença entre a eliminação da malária e o controle da malária?

O controle da malária se dá de forma contínua, em direção a uma situação livre da mesma. A curto prazo, o objetivo do controle da malária é reduzir a carga associada a esta doença a níveis de morbidade e mortalidade baixos. Um programa de controle de malária pode ter por objetivo final a eliminação a nível nacional. A eliminação busca reduzir a transmissão local da doença a zero. Para se comprometer à eliminação, é preciso implementar uma série de intervenções programáticas específicas que devem levar em conta as orientações da OMS como base, bem como os dados científicos sobre o que funciona no contexto local.

Quando é que um país recebe a certificação da eliminação da malária?

Um país pode solicitar à OMS (na região das Américas, através da Organização Pan-Americana da Saúde) o início do processo de certificação de eliminação da malária, após a interrupção da transmissão local da doença por três anos consecutivos. Ao chegar a esse ponto, a OMS pode conceder a certificação, desde que o país consiga comprovar, com boa margem de segurança e além de qualquer dúvida razoável, a uma equipe de certificação independente designada pela OMS que cumpriu com os pré-requisitos da avaliação.

Quais são alguns dos pré-requisitos[2] que o meu país deve alcançar para a eliminação da malária?

- Um bom mecanismo de vigilância com cobertura completa de toda a área geográfica;
- Serviços de laboratório com qualidade assegurada para diagnosticar a malária;
- Notificação completa e imediata por parte dos serviços de saúde públicos e privados, com investigação epidemiológica de cada caso de malária e foco de transmissão;
- Serviços de saúde atentos para detecção, tratamento e acompanhamento de todos os suspeitos casos de malária, apoiados pela educação contínua para os profissionais da área da saúde sobre a malária;
- Serviços para sensibilizar e prestar aconselhamento prático sobre como prevenir a malária em pessoas que viajam ao exterior;
- Vigilância entomológica em áreas receptivas;
- Sistemas para a detecção precoce e resposta rápida a surtos;
- Compartilhamento de informação entre países e mecanismos de coordenação para o controle e a eliminação da malária sempre que seja pertinente devido aos padrões de migração ou proximidade a áreas com malária;
- Um plano de ação nacional completo que conte com o apoio político e financeiro contínuo para realizar as atividades que são necessárias para evitar o reestabelecimento da transmissão.

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Quais são alguns dos desafios para a eliminação da malária?

Os países da América Latina e o Caribe têm uma longa história de tentativas de eliminar a malária. Entre os desafios está a falta de compromisso político para fornecer recursos sustentáveis para apoiar os esforços contra a malária. Outro desafio constante é a presença de parasitas que se tornam menos sensíveis ou mesmo resistentes a determinados medicamentos antimaláricos e vetores (mosquitos) que se tornam menos sensíveis ou mesmo resistentes a certas medidas de controle vetorial. Por este motivo, os esforços contra a malária devem incluir o acompanhamento da resistência e a introdução de medidas de resposta para reduzir a morbidade e mortalidade por malária.

A eliminação da malária irá beneficiar outras questões de saúde?

Ao satisfazer os pré-requisitos da OMS (ver acima), um país acaba por fortalecer a sua capacidade de lidar com outras questões de saúde, especialmente outras doenças transmitidas por vetores como dengue e chikungunya.

Após receber a certificação da eliminação da malária, ainda existe a possibilidade do país ter casos de malária?

Sim, existe a possibilidade de haver casos de malária importados quando viajantes infetados trazem a malária de outros países, levando à reintrodução da doença. Por esta razão, é importante que os países mantenham sistemas de vigilância fortes para testar, tratar e monitorar todos os novos casos, a fim de evitar que a doença se reestabeleça dentro de uma área livre da malária.

A eliminação da malária é exclusivamente uma questão de saúde? Quais outros setores deveriam ser envolvidos?

Apesar da eliminação da malária ser dirigida pelo setor da saúde, a eliminação da malária pode ter consequências positivas para outros setores incluindo a agricultura, o comércio, o turismo e a educação. Por esse motivo, estes setores deveriam ser ativos no trabalho de eliminar a doença, identificar recursos e se comprometer a apoiar os esforços além do ponto de atingir zero incidência de malária.

Considerando os outros problemas na minha comunidade, por que devo priorizar a eliminação da malária e destinar recursos a este esforço?

A malária tem um custo social elevado, estando associada ao desempenho escolar reduzido, incapacidade prolongada, dificuldades econômicas devido à perda de produtividade e à redução da sobrevida. No entanto, estes custos são evitáveis. Investir no controle e eliminação da malária agora pode ajudar a comunidade a superar diversas questões de desenvolvimento. A longo prazo, o custo da falta de ação pode ser contabilizado como igual ou superior aos recursos extras que seriam necessários para acelerar os esforços e eliminar a doença de uma vez.

Existe alguma doença que se já conseguiu eliminar na América Latina e o Caribe? Em caso afirmativo, qual?

Sim, rubéola, poliomelite e varíola foram eliminadas na América Latina e o Caribe. Até hoje, a varíola continua sendo a única doença que se erradicou, ou seja, que foi eliminada mundialmente. Existem esforços contínuos na região das Américas para eliminar outras doenças evitáveis como oncocercose ("cegueira dos rios'"), tuberculose e transmissão vertical entre mãe e filho do HIV e da sífilis, que até agora foi alcançado apenas em Cuba.

Onde posso encontrar mais informações?

Saiba mais sobre a eliminação da malária através do Ministério da Saúde no seu país, a Organização Pan-Americana da Saúde (OPAS/OMS),[3] a Aliança Científica para a Erradicação da Malária (MESA)[4] e também pelas iniciativas regionais tais como a Iniciativa Amazônica contra a Malária (AMI)[5] financiada pela USAID, a Iniciativa de Eliminação da Malária na América Central e na Ilha de Hispaniola (EMMIE) e a Iniciativa Malária Zero.

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1 Ver a definição da OMS: http://www.who.int/malaria/areas/elimination/overview/en/

2 Ver os pre-requisitos da OMS: http://www.who.int/wer/2014/wer8929.pdf

3 Página da OPAS/OMS: http://www.paho.org

4 Página de MESA: http://www.malariaeradication.org

5 Página da AMI: http://www.usaidami.org

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HOJA INFORMATIVA 2015-03

INICIATIVA AMAZÓNICA CONTRA LA MALARIA

ELIMINACIÓN DE LA MALARIA
Preguntas Frecuentes

Noviembre de 2015

¿Qué es la eliminación de la malaria?

La Organización Mundial de la Salud (OMS) define la eliminación de la malaria como la interrupción de la transmisión local por los mosquitos en una zona geográfica determinada, que por lo general es un país, como resultado de esfuerzos deliberados. La eliminación de la malaria es un proceso continuo que requiere el compromiso a nivel nacional y comunitario para sostener los esfuerzos, más allá de poder lograr cero casos, para evitar el restablecimiento de la enfermedad.

¿Cuál es la diferencia entre la eliminación y la erradicación de la malaria?

La eliminación se refiere a la interrupción local de la transmisión de la malaria en una zona geográfica definida.[1] La erradicación de la malaria se refiere a la interrupción permanente de la transmisión a nivel mundial, es decir, una vez que todos los países eliminaron la enfermedad.

¿Cuál es la diferencia entre la eliminación y el control de la malaria?

El control de la malaria se ubica en el continuum hacia un estado libre de la malaria. A corto plazo, el objetivo del control de la malaria es reducir la carga de enfermedad a niveles manejables de morbilidad y mortalidad. Un programa nacional de control de la malaria puede tener como su objetivo final la eliminación a nivel nacional de la enfermedad. La eliminación busca reducir la transmisión local de la enfermedad a cero casos. Comprometerse a la eliminación requiere una serie de intervenciones programáticas específicas, que se deben asentar en las directrices de la OMS, así como en las evidencias científicas de lo que funciona en el contexto local.

¿Cuándo un país recibe certificación por haber eliminado la malaria?

El país puede solicitar a la OMS (en la región de las Américas, a través de la Organización Panamericana de la Salud) a iniciar el proceso de certificar la eliminación de la malaria una vez que la transmisión local de la malaria esté interrumpida durante por lo menos tres años consecutivos. Es en ese momento que la OMS puede conceder la certificación si el país puede demostrar más allá de cualquier duda razonable que ha cumplido con los prerrequisitos correspondientes ante un equipo independiente de certificación designado por la OMS.

¿Cuáles son algunos de los prerrequisitos[2] de la OMS que el país debe alcanzar para la eliminación de la malaria?

- Un buen mecanismo de vigilancia con cobertura plena de todas las zonas geográficas;
- Servicios de laboratorio de calidad garantizada para diagnosticar la malaria;
- Notificación e informe completo e inmediato, con una investigación epidemiológica de toda infección (caso) y foco malárico por parte de los servicios de salud públicos y privados;
- Servicios de salud que se mantienen siempre atentos para la detección, tratamiento y seguimiento de todos los posibles casos de malaria, apoyados por la educación continua sobre la malaria para los profesionales de salud;
- Servicios para generar conciencia y proporcionar consejos prácticos sobre la prevención de la malaria para nacionales que viajan al extranjero;
- Vigilancia entomológica en zonas receptivas;
- Sistemas de detección temprana y respuesta rápida a brotes;
- Intercambio de información entre países y mecanismos de coordinación para el control y la eliminación de la malaria, donde sea pertinente debido a patrones de migración o zonas adyacentes con malaria;
- Un plan integral de acción nacional con apoyo financiero y político constante para realizar las actividades necesarias para prevenir el restablecimiento de la transmisión.

Organización Panamericana de la Salud
Organización Mundial de la Salud
OFICINA REGIONAL PARA LAS Américas
CDC SAFER · HEALTHIER · PEOPLE
SIAPS Systems for Improved Access to Pharmaceuticals and Services
USAID FROM THE AMERICAN PEOPLE USP PROMOTING THE QUALITY OF MEDICINES

¿Cuáles son algunos de los retos para la eliminación de la malaria?

Los países de América Latina y el Caribe tienen una larga historia de lucha contra la malaria. Asegurar el compromiso político en la provisión de recursos sostenibles es siempre un reto. Otros incluyen parásitos que pueden volverse resistentes o menos sensibles a ciertos medicamentos antimaláricos y vectores (mosquitos) que pueden volverse menos sensibles o resistentes a determinadas medidas de control. Por esta razón, se debe continuar a monitorear la resistencia y proporcionar medidas adaptivas para reducir la morbilidad y mortalidad por malaria.

¿Podría la eliminación de la malaria beneficiar a otros problemas de salud?

Por cumplir con los prerrequisitos de la OMS (ver más arriba), es posible que el esfuerzo para eliminar la malaria también ayude en los esfuerzos para combatir otras enfermedades, especialmente las enfermedades transmitidas por vectores como el dengue y la chikungunya.

¿Es posible que un país tenga casos de malaria después de recibir la certificación de eliminación?

Sí, existe la posibilidad de tener casos de malaria importados cuando llegan viajeros que traen la enfermedad que han adquirido en otro país y esto puede ocasionar la reintroducción de la enfermedad. Por esta razón, es importante que los países tengan sistemas de vigilancia fortalecidos para poder diagnosticar, tratar y monitorear todos los nuevos casos y así impedir el restablecimiento de la enfermedad en zonas libres de malaria.

¿La eliminación de la malaria es un problema solo para la salud? ¿Qué otros sectores deben participar?

Aunque la eliminación de la malaria es mayormente dirigida por el sector de salud, la eliminación de la malaria tendrá implicaciones positivas para otros sectores, como para la agricultura, el turismo y la educación. Por ende, estos sectores deben participar activamente en los esfuerzos de eliminación, para ayudar a identificar recursos y comprometerse a apoyar los esfuerzos para avanzar más allá de cero casos.

¿Con tantos problemas en la comunidad, por qué la eliminación de la malaria y la consigna de recursos es prioritaria?

El costo social y económico de la malaria es elevado, al estar ligado a la reducción de rendimiento escolar, la incapacidad prolongada, la baja productividad, y la pérdida innecesaria de vidas. Estos costos son evitables y la inversión inmediata en el control y la eliminación de la malaria puede contribuir a superar varios problemas de desarrollo. A largo plazo, el costo de la inacción puede ser mayor o igual que los recursos adicionales necesarios para intensificar los esfuerzos y eliminar la enfermedad.

¿Se han eliminado otras enfermedades en América Latina y el Caribe? ¿Cuáles?

La rubéola, poliomielitis y viruela han sido eliminadas en América Latina y el Caribe. La viruela es la única enfermedad que ha sido erradicada, es decir, que se ha eliminado en todo el mundo. En la región, existen esfuerzos continuos para eliminar otras enfermedades prevenibles como la oncocercosis, tuberculosis y la transmisión materno-infantil del VIH y de la sífilis, que hasta ahora solo se ha logrado en Cuba.

Para más información:

Más información acerca de la eliminación de la malaria se puede obtener a través del Ministerio de Salud en su país, la Organización Panamericana de la Salud (OPS/OMS),[3] la Alianza Científica para la Erradicación de la Malaria (MESA)[4] e iniciativas regionales, entre ellas la Iniciativa Amazónica Contra la Malaria (AMI)[5] financiada por la USAID, la Iniciativa de Eliminación de la Malaria en Mesoamérica y la Isla Española (EMMIE), y la Iniciativa Cero Malaria.

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1 Vea la definición de la OMS: http://www.who.int/malaria/areas/elimination/overview/es/

2 Vea los prerrequisitos de la OMS: http://www.who.int/wer/2014/wer8929.pdf

3 Página de la OPS/OMS: http://www.paho.org/esp/

4 Página de la MESA: http://www.malariaeradication.org

5 Página de la AMI: http://www.usaidami.org

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AMAZON MALARIA INITIATIVE

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INFORMATIVO AMI 2016-01

INICIATIVA AMAZÔNICA CONTRA A MALÁRIA

REFERÊNCIAS SELECIONADAS SOBRE A ELIMINAÇÃO DA MALÁRIA

Março de 2016

As seguintes referências contêm ferramentas e informações que os programas nacionais de malária podem consultar para tomar decisões bem-informadas no momento de abordar tendências epidemiológicas atuais, enquanto avançam em direção à eliminação da malária a longo prazo.

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HOJA INFORMATIVA 2015-02

INICIATIVA AMAZÓNICA CONTRA LA MALARIA

REFERENCIAS SELECCIONADAS SOBRE LA ELIMINACIÓN DE LA MALARIA

Noviembre de 2015

Las siguientes referencias consisten de herramientas e información que los programas nacionales de malaria pueden utilizar para tomar decisiones informadas al abordar las actuales tendencias epidemiológicas, progresando simultáneamente hacia la eliminación de la malaria a largo plazo.

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FACT SHEET 2016-02

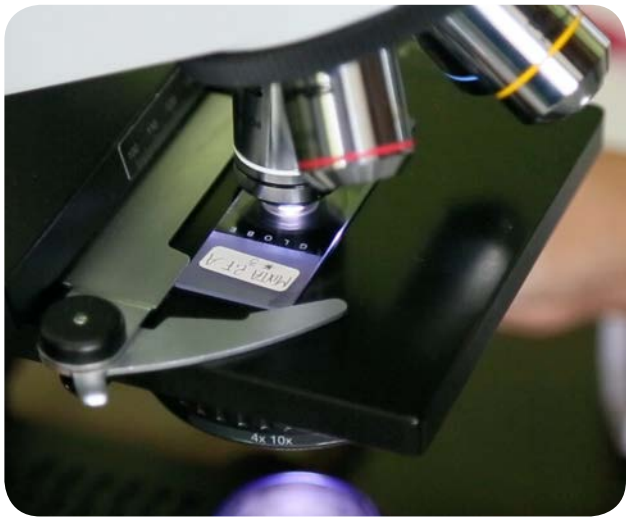
AMAZON MALARIA INITIATIVE

Malaria in Low-Incidence Settings

MAINTAINING LABORATORY CAPACITY FOR MALARIA DIAGNOSIS

April 2016

Microscopy remains the gold standard method for malaria diagnosis. However, as cases become less frequent, laboratory staff may have fewer opportunities to practice microscopy skills acquired for reading thick and thin blood smears. Supervision, as well as continued education and training opportunities for microscopists are essential to ensure that personnel develop expertise in this area and maintain their skills and capacities to properly diagnose malaria. AMI supported regional trainings and has helped to develop a quality assurance system to improve malaria diagnosis capacities across countries.



Photos: PAHO/WHO

Low incidence of malaria can result in:

- Community health workers and health professionals mistaking signs and symptoms of malaria for other febrile illnesses.
- Health professionals failing to confirm clinical diagnosis of malaria with proper laboratory diagnosis.
- Personnel losing the skills required to make a diagnosis and provide treatment.
- Malaria incidence and prevalence are under-reported to national surveillance systems.
- Increased probability of cases of severe malaria, as well as re-introduction and outbreaks.

WHO recommendations on malaria diagnostics in low-transmission settings[1]

1. Quality-assured rapid diagnostic tests (RDTs) and microscopy are the primary diagnostic tools for confirmation and management of cases of suspected clinical malaria in all epidemiological situations,

Pan American Health Organization | World Health Organization Regional Office for the Americas | CDC Safer·Healthier·People | SIAPS Systems for Improved Access to Pharmaceuticals and Services | USAID from the American People | USP Promoting the Quality of Medicines

including areas of low transmission, because of their good performance in detecting clinical malaria, their widespread availability and their relatively low cost. Similarly, RDTs and microscopy are appropriate for routine malaria surveillance (of clinical cases) in most malaria-endemic settings.

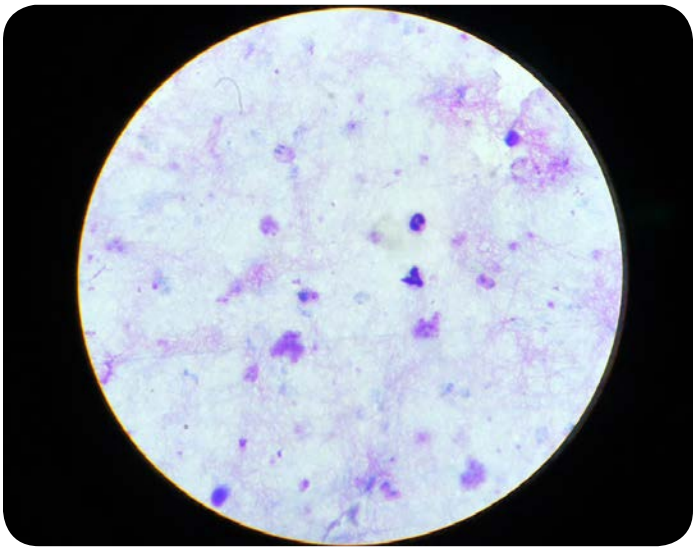
2. Several nucleic acid amplification techniques (NAA) such as PCR are available, which are more sensitive in detecting malaria than RDTs and microscopy. Generally, use of highly sensitive diagnostic tools should be considered only in low-transmission settings where there is already widespread malaria diagnostic testing and treatment and low parasite prevalence rates (e.g. < 10%). Use of NAA-based methods should not divert resources from malaria prevention and control or from strengthening of health care services and surveillance systems.

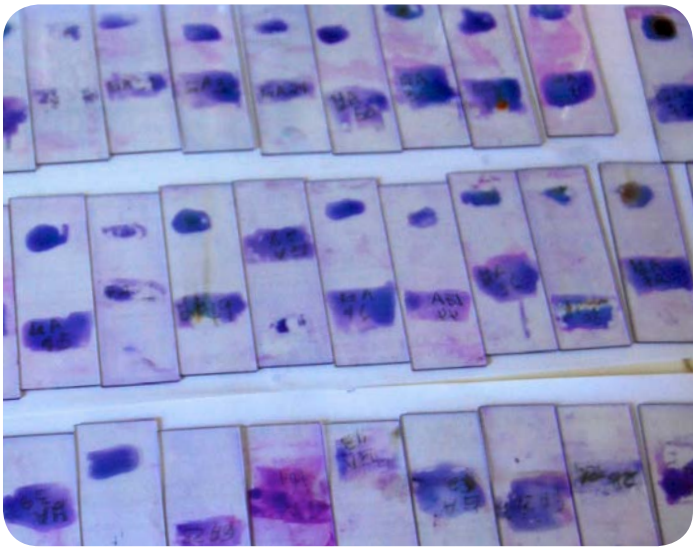
3. Sub-microscopic *P. falciparum* and *P. vivax* infections are common in both low- and high-transmission settings. Use of NAA methods in malaria programmes should be considered for epidemiological research and surveys to map sub-microscopic infections in low-transmission areas. NAA methods might also be used for identifying foci for special interventions in elimination settings.

4. In most infections with asexual parasites, gametocytes are detectable by molecular amplification at densities that are not detectable by microscopy or RDTs. Most malaria infections (microscopic and sub-microscopic) should be considered potentially infectious and therefore potential contributors to ongoing transmission. Sensitive NAA methods are not required for routine detection of gametocytes in malaria surveys or clinical settings.

5. Common standards should be set for nucleic acid-based assays. The WHO international standard should be followed for *P. falciparum* DNA amplification assays, and standards should be set for other *Plasmodium* species, particularly *P. vivax*. A standard operating procedure should be prepared for sample collection and extraction and for the equivalent quantity of blood to be added to the assay. Development of an international external quality assurance system is strongly recommended to ensure that data obtained from NAA assays are reliable and comparable.

6. In order to define the role of serological assays in epidemiological assessments, the reagents (antigens and controls), assay methods and analytical approaches should be standardized and validated.





Photos: PAHO/WHO

1 WHO. Policy brief on malaria diagnostics in low-transmission settings. September 2014. http://www.paho.org/hq/index.php?option=com_docman&task=doc_view&Itemid=270&gid=30398&lang=en

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HOJA INFORMATIVA 2016-02

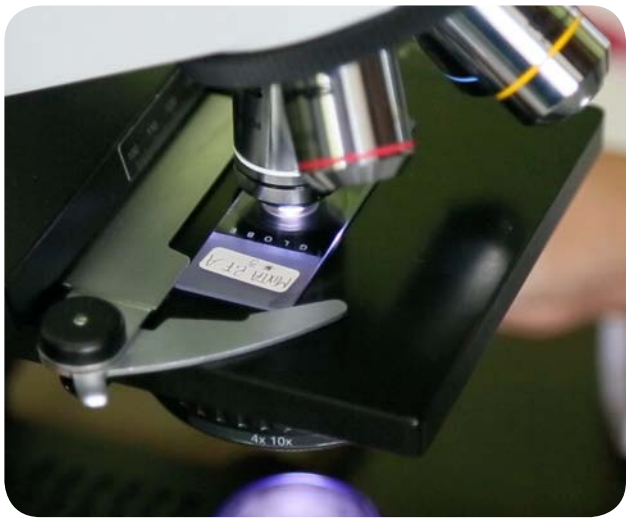
INICIATIVA AMAZÓNICA CONTRA LA MALARIA

La Malaria en Contextos de Transmisión Baja

MANTENER LA CAPACIDAD DE DIAGNÓSTICO DE LOS LABORATORIOS

Abril de 2016

Actualmente, el análisis microscópico se mantiene como el método estándar para el diagnóstico de la malaria. Sin embargo, conforme los casos se vuelven menos frecuentes, el personal técnico de laboratorio puede tener menos oportunidades para practicar leer láminas de gota gruesa y frotis de sangre periférica bajo el microscopio. La supervisión, así como las oportunidades para la capacitación y educación continua, son esenciales para asegurar que los microscopistas desarrollen pericia en esta área y mantengan sus habilidades y capacidades para diagnosticar malaria apropiadamente. A la fecha, AMI ha apoyado en capacitaciones regionales y ha ayudado a desarrollar sistemas de calidad que permiten mejorar el diagnóstico de la malaria a través de los países de la región.



Fotos: OPS/OMS

En contextos con baja incidencia de malaria, puede ocurrir que:

- Colaboradores voluntarios y profesionales de la salud confunden la malaria con otras enfermedades febriles, con lo que se retrasa su diagnóstico.
- Colaboradores voluntarios y profesionales de la salud no confirman el diagnóstico clínico de malaria con pruebas de laboratorio apropiadas.
- Trabajadores de la salud pierden las habilidades requeridas para diagnosticar la malaria y proporcionar el tratamiento.
- Se deja de notificar la totalidad de los casos de malaria que ocurren a los sistemas de vigilancia nacionales.
- Hay un aumento de la probabilidad de casos graves de malaria, así como de su re-introducción y de brotes.

Recomendaciones de la OMS para el diagnóstico de la malaria en áreas con niveles de transmisión bajos[1]

1. La microscopía y las pruebas de diagnóstico rápido (PDR) de calidad asegurada son las principales herramientas de diagnóstico para la

Organización Panamericana de la Salud · Organización Mundial de la Salud Américas · CDC · SIAPS Systems for Improved Access to Pharmaceuticals and Services · USAID USP PROMOTING THE QUALITY OF MEDICINES

confirmación y el manejo de casos clínicos sospechosos de malaria en todas las situaciones epidemiológicas, incluyendo en áreas de baja transmisión, debido a su alto desempeño en la detección de casos de malaria clínica, su amplia disponibilidad y su costo relativamente bajo. Así también, las PDR y la microscopía son herramientas apropiadas para la vigilancia rutinaria de casos clínicos de la malaria en la mayoría de situaciones de malaria endémica.

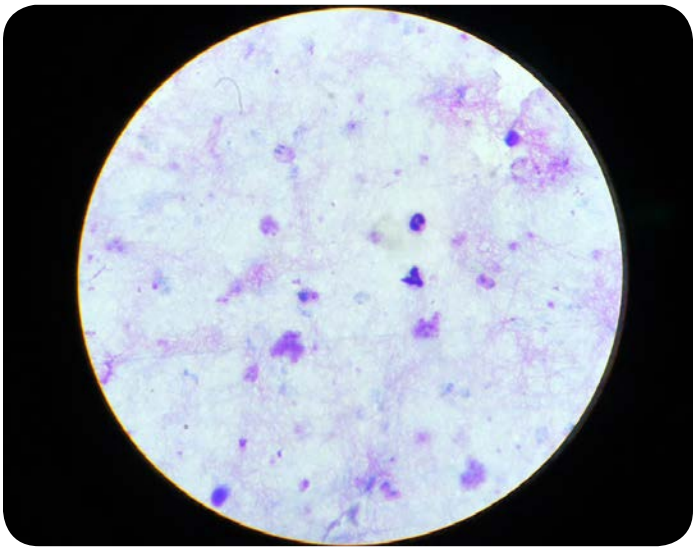
2. Se encuentran disponibles un número de técnicas de amplificación del ácido nucleico (NAA, por su sigla en inglés) como PCR, siendo estas herramientas diagnósticas más sensibles en la detección de la malaria, comparadas a las PDR y la microscopía. Por lo general, el uso de herramientas de diagnóstico altamente sensibles deberá ser considerado únicamente en contextos con niveles de transmisión bajos donde ya existe y está ampliamente disponible el diagnóstico y tratamiento para malaria, y la tasa de prevalencia es baja (ej. <10%). El uso de métodos basados en NAA no debe desviar recursos de las acciones de prevención y control de la malaria y el fortalecimiento de los servicios de salud, incluyendo el sistema de vigilancia.

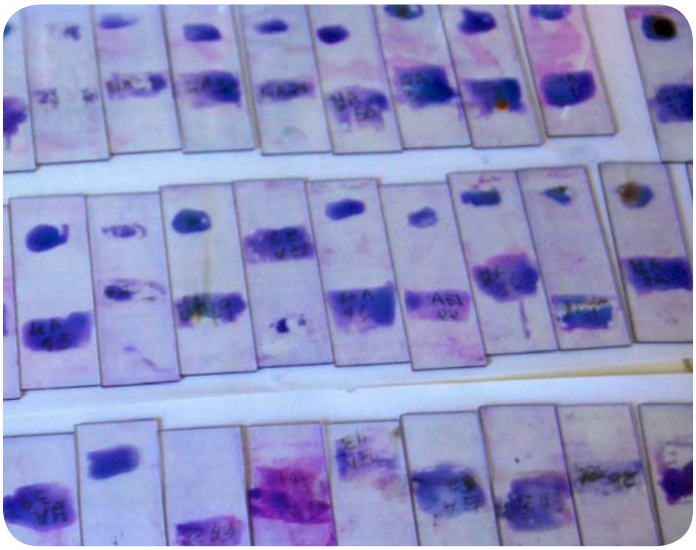
3. Las infecciones sub-microscópicas / asintomáticas por *P. falciparum* y *P. vivax* son comunes tanto en contextos de baja como de alta transmisión. El uso de métodos diagnósticos basados en NAA por los programas de malaria debe ser considerado para investigaciones epidemiológicas y encuestas con el objetivo de mapear las infecciones sub-microscópicas en áreas de baja transmisión. Pueden también utilizarse estos métodos (NAA) para la identificación de focos para medidas de intervención especiales en situaciones de eliminación.

4. La mayoría de las infecciones con parásitos asexuales tienen gametocitos detectables por métodos de amplificación molecular, en densidades bajas las cuales no serían detectables por microscopía ni por PDR. La mayoría de las infecciones por malaria (microscópicas y sub-microscópicas) deben ser consideradas como potenciales contribuyentes a continuación de la transmisión. No existe la necesidad de la detección rutinaria de gametocitos utilizando métodos NAA en encuestas de malaria o en el entorno clínico.

5. Deben establecerse estándares comunes para las pruebas basadas en la detección de ácido nucleico. El estándar internacional de la OMS debe seguirse para ensayos de amplificación de ADN para *P. falciparum* y se debe establecer estándares para otras especies de *Plasmodium,* particularmente para *P. vivax.* Un procedimiento normalizado de operación debe ser preparado para la recolección y extracción de muestras, así como para la cantidad equivalente de sangre a ser añadida al ensayo. Se recomienda enérgicamente el desarrollo de un sistema internacional de aseguramiento de la calidad que asegure que los resultados obtenidos mediante pruebas de NAA sean confiables y comparables.

6. Para definir el rol de la pruebas serológicas en las evaluaciones epidemiológicas, se debe estandarizar y validar los reactivos (antígenos y controles), los métodos de ensayo y las aproximaciones analíticas.





Fotos: OPS/OMS

1 OMS. Resumen de la política para el diagnóstico de la malaria en contextos de transmisión baja. Septiembre del 2014 http://www.paho.org/hq/index.php?option=com_docman&task=doc_view&Itemid=270&gid=30398&lang=en

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FACT SHEET 2016-03

AMAZON MALARIA INITIATIVE

Malaria in Low-Incidence Settings

VECTOR SURVEILLANCE AND CONTROL

April 2016

Vector surveillance and control are key components of malaria prevention strategies. However, determining appropriate vector surveillance and control activities in areas of low malaria transmission (see Table 1) can be a challenge. National Malaria Control Programs (NMCPs) and vector control authorities need to adapt their strategies according to the transmission intensity and local vector characteristics.

Table 1. Malaria Transmission Classifications

Epidemiological Situation	Annual Parasite Incidence (API)
High transmission	>10 cases /10,000 persons
Moderate transmission	1 – 10 cases /10,000 persons
Low transmission	<1 case /10,000 persons
No transmission	No evidence of local transmission

Photo: PAHO/WHO

Areas with decreasing malaria transmission are at risk of resurgence due to financial and operational constraints that tend to weaken surveillance, prevention, and control activities. In order to reduce a community's risk, WHO currently recommends maintaining vector surveillance and considering the continuation of standard malaria vector control tools including insecticide treated nets (ITNs) and indoor residual spraying (IRS) of insecticides in areas with ongoing malaria transmission. The implementation of these vector control interventions should be monitored routinely (some key operational indicators are listed in Table 2).

With regard to vector surveillance in low to very low malaria transmission settings, entomological monitoring should ideally be conducted twice a year during the transmission season. The minimum entomological indicators that should be monitored in low to very low malaria transmission settings include measures of vector species composition and abundance, as well as insecticide resistance (see Table 2).

The collection of entomological data should use an approach based on sentinel sites with appropriate, standardized methodologies. Sentinel sites should be representative of the eco-epidemiological settings present in the region. If there is a significant increase in an area's malaria transmission rate, collection frequency and number of sites should be increased accordingly.

Where no vector control measures are implemented and resources are limited, efforts should focus on providing prompt diagnosis and treatment to the human population.

Table 2. Recommended indicators for areas with low to very low malaria transmission

Entomological	Presence of vectors and species composition
	Relative abundance of vectors
	Insecticide susceptibility
Operational*	Household ownership of ITNs
	Sufficient household ownership of ITNs
	ITN use
	ITN survivorship
	ITN insecticide levels
	ITN physical durability
	IRS coverage
	Insecticidal effect on sprayed surfaces
	Dosage and quality of insecticide

*Depending on the vector control intervention(s) in use

If an area achieves zero transmission, it is recommended that the same entomological indicators be monitored at least once a year, since a risk of malaria reintroduction exists as long as competent vectors are present. If vector control interventions are ongoing, operational indicators should be monitored.

In general, vector surveillance and control should remain a part of national malaria control strategies for the long-term, with activities continually adapted to the changing epidemiology of malaria.

Photos: PAHO/WHO

Content adapted from the *Amazon Malaria Initiative Strategic Orientation Document for Malaria Vector Surveillance and Control in Latin America and the Caribbean* (2011).

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HOJA INFORMATIVA 2016-03

INICIATIVA AMAZÓNICA CONTRA LA MALARIA

La Malaria en Contextos de Transmisión Baja

VIGILANCIA Y CONTROL DE VECTORES

Abril de 2016

La vigilancia y el control de vectores son componentes clave en las estrategias de prevención de la malaria. Sin embargo, determinar las actividades apropiadas de vigilancia y control del vector en áreas con niveles de transmisión bajos (véase Cuadro 1) representa un desafío. Los Programas Nacionales de Control de la Malaria (PNCM) y las autoridades encargadas del control del vector necesitan adaptar sus estrategias de acuerdo a la intensidad de la transmisión y a las características de los vectores locales.

Cuadro 1. Clasificación de la Transmisión de la Malaria

Situación Epidemiológica	Índice Parasitario Anual (IPA)
Transmisión Alta	>10 casos /10.000 personas
Transmisión Moderada	1 – 10 casos /10.000 personas
Transmisión Baja	<1 caso /10.000 personas
Sin transmisión	No hay evidencia de transmisión local

Foto: PAHO/WHO

Las áreas que presentan una disminución en la transmisión de la malaria se encuentran en riesgo de resurgencia debido a limitaciones financieras y operativas que tienden a debilitar la vigilancia, prevención y actividades de control. Actualmente, con el fin de reducir el riesgo de las comunidades, la OMS recomienda continuar con la vigilancia de los vectores y seguir con el uso de herramientas estandarizadas de control de los vectores de la malaria en áreas que presentan una transmisión de malaria continua, tales como mosquiteros tratados con insecticidas (MTI) y rociado de interiores con insecticidas de acción residual (IRS por sus siglas en ingles). La implementación de estas intervenciones de control de vectores debe ser monitoreada rutinariamente (véase algunos indicadores clave en Cuadro 2).

Con respecto a la vigilancia del vector en áreas con niveles de transmisión baja o muy baja, el monitoreo entomológico debe llevarse a cabo idealmente dos veces al año, durante la temporada de transmisión. Como mínimo, los indicadores entomológicos que deben ser monitoreados en áreas con niveles de transmisión de malaria baja o muy baja incluyen la cuantificación de la composición y abundancia de especies de vectores, así como de resistencia a insecticidas (véase Cuadro 2).

La recolección de datos entomológicos debe seguir un enfoque basado en sitios centinela, siguiendo metodologías apropiadas y estandarizadas. Los sitios centinela deben ser representativos del contexto eco-epidemiológico presente en la región. Si hubiera un aumento significativo de la tasa de transmisión de malaria en un área, la frecuencia de recolección, así como el número de sitios centinela, deben aumentar de acuerdo a ello.

Donde no hay medidas de control implementadas y los recursos son limitados, los esfuerzos deben enfocarse en proporcionar diagnóstico y tratamiento oportuno a la población.

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Cuadro 2. Indicadores recomendados para áreas con niveles de Transmisión Baja o Muy Baja

Entomológico	Presencia de vectores de la malaria y composición de especies
	Abundancia relativa
	Sensibilidad a los insecticidas
Operativo*	Cobertura domestica de MTI
	Cobertura domestica suficiente de MTI
	Uso de MTI
	Supervivencia de MTI
	Actividad Insecticida de MTI
	Integridad física de MTI
	Cobertura de IRS
	Efecto insecticida sobre las superficies rociadas
	Dosificación de los insecticidas

*Depende del tipo de intervención(es) de control de vectores utilizado(s).

Si un área alcanza un nivel de transmisión cero, es recomendable que los mismos indicadores entomológicos sean monitoreados por lo menos una vez al año, dado que el riesgo de reintroducción de la malaria existe siempre y cuando estén presentes los vectores competentes. Si las intervenciones de control continúan, los indicadores operativos deben ser monitoreados.

En general, la vigilancia y control del vector deben mantenerse como parte de las estrategias de control de la malaria a largo plazo, con actividades que se adapten continuamente a la cambiante epidemiologia de la malaria.

Fotos: PAHO/WHO

Adaptado del *Documento Estratégico de AMI/RAVREDA para la Vigilancia y el Control de los Vectores de la Malaria en América Latina y el Caribe* (2011).

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FACT SHEET 2016-05

AMAZON MALARIA INITIATIVE

Malaria in Low-Incidence Settings

TREATMENT: ENSURING ACCESS TO QUALITY MEDICINES

May 2016

Ensuring rigorous quality control and supply chain management of antimalarial medicines is more difficult in low-incidence settings, particularly when the affected population is highly mobile, remote, or dispersed.[1]

The main trends are that:

- Pharmaceutical vendors no longer have a business interest in selling the reduced volumes of antimalarial medicines that are required in these contexts.
- Areas with low or no malaria incidence fail to receive antimalarial medicines, even when the risk of reintroduction is high.
- Poor quality or counterfeit medicines exist on the market, some with little or no active ingredients.
- The long storage periods of medicines in poor conditions (e.g. high temperature, humidity, direct exposure to sunlight, deficient refrigeration) may lead to a decline in medicine efficacy.
- Medicines may expire before they are needed.
- Insufficient resources for ensuring medicine quality control limit the ability of health professionals to collect statistically representative samples of medicines for quality testing.[2]
- As countries move closer to elimination, providing access to quality medications, particularly to mobile, migrant, and indigenous populations becomes more important to the overall success of malaria programs in low-transmission settings.[3]

Expanded access to free, quality antimalarial medicines through the public sector helps to make unregulated medicines less appealing. The region's national health systems, in collaboration with AMI, continue to

Photos: USP/PQM

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improve pharmaceutical access and storage conditions of antimalarial medicines. Moreover, AMI works with health systems to improve key populations' access to prevention, diagnosis, and quality treatment.

For example, AMI has facilitated the joint procurement of antimalarial medicines through the Pan American Health Organization (PAHO/WHO) Strategic Fund and created reference standards for the procurement of medicines in low-incidence areas. AMI also provides trainings, manuals, and supplies to countries' medicine regulatory agencies and official medicine control laboratories.

Photo: Marieke Heemskerk

1 Management Sciences for Health. Malaria Pharmaceutical Management in Low-Incidence Settings: Lessons Learned from the Americas. PowerPoint presentation made on behalf of the USAID-funded Systems for Improved Access to Pharmaceuticals and Services (SIAPS) program. April 25, 2014. http://usaidami.org/extras/MalariaPharmMgmt.pdf

2 Barillas, E, Barojas, A, and Pribluda, V. 2011. *Strategic Orientation Document on Supply Management and Quality Assurance for Drugs and Supplies Used in Malaria Diagnosis and Treatment.* Produced by the Strengthening Pharmaceutical Systems Program (SPS) of Management Sciences for Health (MSH), the Promoting the Quality Program of Medicines (PQM) Program of the United States Pharmacopeia (USP) and Links Media, LLC. for the U.S. Agency for International Development (USAID) as part of the Amazon Malaria Initiative (AMI). Gaithersburg, MD: Links Media, LLC. http://usaidami.org/extras/SOD_Meds_Mgmt_En.pdf

3 World Health Organization. 2015. *Global Technical Strategy for Malaria 2016-2030*, p. 8

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HOJA INFORMATIVA 2016-05

INICIATIVA AMAZÓNICA CONTRA LA MALARIA

La Malaria en Contextos de Transmisión Baja

TRATAMIENTO: ASEGURANDO EL ACCESO A MEDICAMENTOS DE CALIDAD

Mayo de 2016

En contextos de transmisión baja se hace más difícil asegurar la gestión óptima de la cadena de suministro y el control de calidad de los medicamentos. Esto se torna particularmente complejo cuando la población afectada tiene altos índices de movilidad o dispersión, o se ubica en zonas remotas[1].

Las principales tendencias son:

- Los proveedores farmacéuticos no tienen interés en comercializar los volúmenes reducidos de medicamentos antimaláricos que son requeridos en dichos contextos.
- Las localidades que tienen muy poca o ninguna incidencia de malaria, pero mantienen un elevado riesgo de reintroducción, pueden encontrarse desabastecidas de medicamentos antimaláricos.
- El sector privado informal vende medicamentos antimaláricos de dudosa calidad o incluso falsificados.
- El almacenamiento prolongado de medicamentos antimaláricos en condiciones inadecuadas (ej. alta temperatura, humedad, exposición directa a la luz solar, refrigeración deficiente) puede provocar la disminución de su eficacia.
- Los medicamentos antimaláricos expiran antes de su uso.
- La escasez de recursos limita la recolección de muestras estadísticamente representativas para realizar pruebas que aseguren la calidad de los medicamentos antimaláricos[2].
- El éxito de los programas de malaria en contextos de transmisión baja depende de que se logre asegurar que las poblaciones con altos índices de movilidad como la población migrante o indígena tenga acceso a los medicamentos antimaláricos. Este factor es de gran importancia conforme el país se aproxime a la eliminación[3].

Fotos: USP/PQM

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La expansión de la cobertura y el acceso gratuito a medicamentos antimaláricos de calidad a través del sector público contribuye a disminuir la demanda de medicamentos comercializados informalmente. Los sistemas nacionales de salud de la región, en colaboración con AMI, se esfuerzan en mejorar el acceso, calidad y condiciones de almacenamiento de medicamentos antimaláricos y productos farmacéuticos. Además, trabajan para mejorar el acceso a la prevención, diagnóstico y tratamiento de poblaciones clave.

Por ejemplo, a través del Fondo Estratégico de la OPS/OMS, y con apoyo de AMI, se ha facilitado la adquisición conjunta de medicamentos antimaláricos de calidad. Además, se han desarrollado estándares de referencia para la programación de la compra de medicamentos antimaláricos en áreas con incidencia baja de malaria. Igualmente, se han conducido capacitaciones y producido herramientas técnicas e insumos para las agencias reguladoras de medicamentos y los laboratorios oficiales de control de la calidad de medicamentos.

Foto: Marieke Heemskerk

1 Management Sciences for Health. Malaria Pharmaceutical Management in Low-Incidence Settings: Lessons Learned from the Americas. Presentación preparada por el programa Sistemas para Mejorar el Acceso a Productos y Servicios Farmacéuticos (SIAPS), apoyado por USAID. 25 de Abril, 2014. http://usaidami.org/extras/MalariaPharmMgmt.pdf

2 Barillas, E, Barojas, A, y Pribluda, V. 2011. *Documento estratégico para la gestión del suministro y garantía de la calidad de los medicamentos e insumos para el diagnóstico y tratamiento de la malaria.* Preparado por el Programa Strengthening Pharmaceutical Systems (SPS) de Management Sciences for Health (MSH), el Programa Promoviendo la Calidad de los Medicamentos (PQM) de la Farmacopea de Estados Unidos de América (USP, por su sigla en inglés) y Links Media, LLC. para la Agencia de los Estados Unidos para el Desarrollo Internacional (USAID) bajo la Iniciativa Amazónica Contra la Malaria. Gaithersburg, MD: Links Media, LLC. http://usaidami.org/extras/DocumentoEstrategicoyGestioncalidadmedicamentos.pdf

3 Organización Mundial de la Salud. 2015. *Global Technical Strategy for Malaria 2016-2030,* p. 8

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FACT SHEET 2016-04

AMAZON MALARIA INITIATIVE

Malaria in Low-Incidence Settings

EPIDEMIOLOGICAL SURVEILLANCE: LOW PARASITE LOADS DIFFICULT TO DETECT

May 2016

Malaria endemic areas with a low incidence of clinical disease may have a significant occurrence of sub-clinical infections, meaning that infections are asymptomatic. In addition, most individuals with sub-clinical infections have a low parasite density in blood that is not detected through microscopy or with a rapid diagnostic test (RDT).[1] These diagnostic tests, however, are likely to underestimate the presence of malaria and leave a substantial proportion of the human parasite reservoir undetected. Only more sensitive methods like polymerase chain reaction (PCR) can detect low parasite density in the blood, yet these tests are more costly and complicated to apply in rudimentary conditions.

The following table provides recommendations for the application of diagnostic tests in low-transmission settings.

Photo: PAHO/WHO

Recommendations for diagnostic tests application in low-transmission settings[2]

Purpose	Diagnostic technique	Comments
Routine surveillance and case detection	High-performance microscopy and quality-assured RDTs	As long as microscopy is available, it is the preferred diagnostic method because it is reliable and relatively inexpensive.
Malaria epidemiological surveys	Classic PCR, quantitative PCR and Loop-mediated Isothermal Amplification (LAMP). Non-NAA-based (Nucleic Acid Amplification) tests with similar performance would be acceptable.	A substantial proportion of infections are missed by microscopy and RDTs because of low parasite-density infections. NAA-based tests with an analytical sensitivity of about 2 parasites/µL provide better detection than microscopy. It is recommended that at least 50 µL of blood be collected from each individual and that the eluate used in the assay be derived from a minimum of 5 µL of blood. It might be acceptable to use smaller quantities of blood in assays with RNA (Ribonucleic acid) targets if the targets are homogeneously mixed into the extracted material. Rapid turn-around times are not a high priority. Internal and external quality assurance procedures should be in place.

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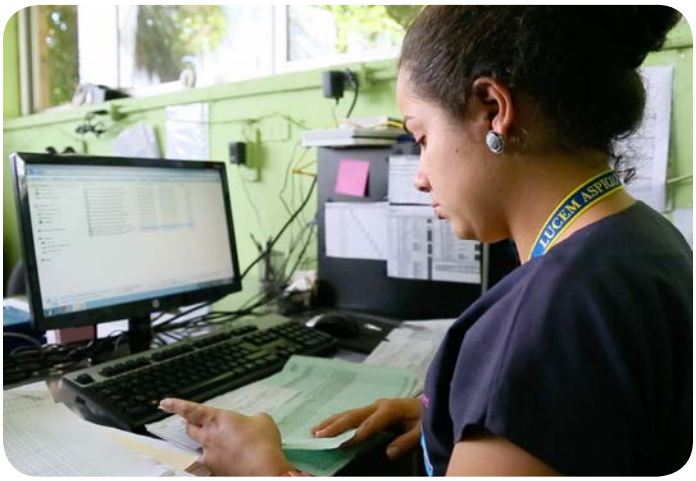
Focus investigations; reactive infection detection after identification of an index case	Field-adapted classical PCR, quantitative PCR and LAMP methods are appropriate.	The NAA-based test should have an analytical sensitivity of 2 parasites/µL or 10 parasites in 5 µL of blood analyzed. A mobile laboratory may be a useful option. Results should be available within 48 hours to allow prompt follow-up and treatment of positive cases. The choice of providing high-throughput, highly sensitive services at a location far from the field or lower-throughput, less sensitive NAA-based testing close to the point of care with rapid results depends on the context. Quality assurance, including external quality assurance, should be in place for the analytical technique chosen.
Mass screening and treatment	Field-adapted classic PCR, quantitative PCR and LAMP methods are appropriate.	RDTs and microscopy are not sufficiently sensitive for mass screening and treatment programs in low-endemic settings. A moderate throughput test with an analytical sensitivity of 2 parasites/µL should be used to ensure identification of asymptomatic and low-density infections. A mobile laboratory may be a useful option. Results should ideally be available on the same day as testing, to maximize follow-up of individuals and treatment of positive cases. Quality assurance, including external quality assurance, should be in place for the analytical technique chosen.
Screening of key populations (e.g. at border crossings)	If screening of key populations is deemed appropriate, RDT or microscopy should be used for symptomatic infections only, and NAA-based tests with an analytical sensitivity of 2 parasites/µL should be used to detect infection in asymptomatic individuals.	The local context will determine the most appropriate, cost-effective tools and whether screening at borders is feasible and useful. Results should be provided on the same day in order to minimize loss to follow-up.



Photos: PAHO/WHO

1 Vallejo A, et al. 2015. High prevalence of sub-microscopic infections in Colombia. *Malaria Journal* 14:201.

2 World Health Organization. September 2014. *Policy brief on malaria diagnostics in low-transmission settings.*

3 Key populations are those that suffer major malaria incidence, have lower access to health services, and/or are socially marginalized.

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HOJA INFORMATIVA 2016-04

INICIATIVA AMAZÓNICA CONTRA LA MALARIA

La Malaria en Contextos de Transmisión Baja

VIGILANCIA EPIDEMIOLÓGICA: CARGAS BAJAS PARASITARIAS SON DIFÍCILES DE DETECTAR

Mayo de 2016

Las áreas con baja incidencia de malaria clínica pueden tener una incidencia mayor de infecciones sub-clínicas, que generalmente se presentan con parasitemias bajas, no detectables mediante microscopía o pruebas rápidas[1]. Así, estas pruebas diagnósticas sub-estiman la presencia de malaria y dejan sin ubicar una parte importante del reservorio humano de parásitos. Solo los métodos más sensibles, como la reacción de cadena de polimerasa (PCR por sus siglas en inglés), pueden detectar esas parasitemias bajas, pero son aún costosas y difíciles de utilizar en condiciones rutinarias.

En la tabla que figura a continuación se dan recomendaciones sobre el uso de pruebas diagnósticas en áreas de baja transmisión de malaria.

Foto: OPS/OMS

Recomendaciones para el uso de pruebas de diagnóstico en áreas con baja incidencia de malaria[2]

Propósito	Prueba de diagnóstico	Comentarios
Vigilancia rutinaria y detección de casos	Microscopía de alto desempeño y pruebas de diagnóstico rápido (PDR) de calidad asegurada	Se prefiere el diagnóstico microscópico siempre que esté disponible, debido a su alta confiabilidad y bajo costo.
Encuestas epidemiológicas de malaria	Reacción de polimerasa en cadena (PCR) clásica, PCR cuantitativa y amplificación isotérmica mediada por bucle (LAMP por sus siglas en inglés). Pruebas no basadas en amplificación del ácido nucleico (NAA por sus siglas en inglés) con desempeño similar son aceptadas.	Una proporción sustancial de infecciones no son detectadas por microscopía o las PDR debido a la baja densidad parasitaria. Pruebas basadas en NAA de sensibilidad analítica aproximada a 2 parásitos/µL proveen mejor detección que el microscopio. Es recomendado que al menos 50 µL de sangre sean recolectados por cada individuo y que el eluido usado en el ensayo sea derivado de un mínimo de 5 µL de sangre. Puede ser aceptable utilizar menores cantidades de sangre en ensayos con secuencias de RNA si las secuencias dianas son mezcladas homogéneamente en el material extraído. El procesamiento rápido no es una prioridad alta. Debe contarse con procedimientos de aseguramiento de calidad internos y externos.

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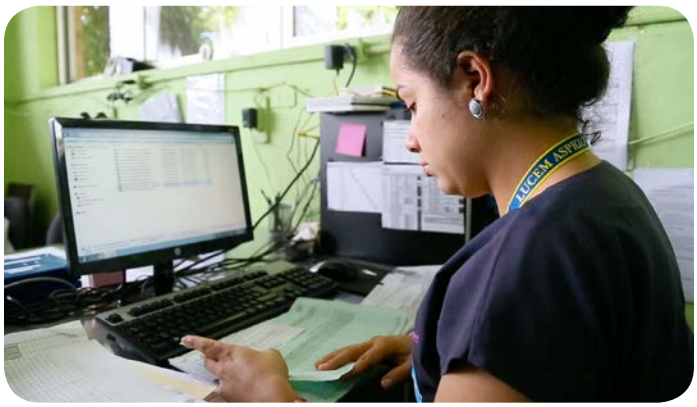
Continuación página 1

Investigaciones de focos; búsqueda reactiva de infecciones a partir de la identificación de un caso índice	Métodos como PCR clásica adaptados al campo, PCR cuantitativa y LAMP son apropiados.	Las pruebas basadas en NAA deben tener una sensibilidad analítica de 2 parásitos/µL o 10 parásitos en 5 µL de sangre analizada. Un laboratorio móvil puede ser una opción útil. Los resultados deben estar disponibles en menos de 48 h para permitir un pronto seguimiento y tratamiento de casos positivos. La elección entre proveer servicios de alto rendimiento y muy sensibles en una ubicación lejos del campo; o proveer servicios de bajo rendimiento y pruebas basadas en NAA menos sensibles cerca del lugar de atención, con resultados rápidos, depende del contexto. Debe contarse con procedimientos de aseguramiento de la calidad, incluyendo procedimientos externos, para la técnica analítica escogida.
Detección y tratamiento masivos	Métodos como PCR clásica adaptados al campo, PCR cuantitativa y LAMP son apropiados.	Las PDR y la microscopía no son suficientemente sensibles para programas de detección y tratamiento masivos en contextos endémicos bajos. Una prueba de rendimiento moderado con sensibilidad analítica de 2 parásitos/µL debe ser utilizada para confirmar la identificación de infecciones asintomáticas y de densidad baja. Un laboratorio móvil puede ser una opción útil. Los resultados deben estar disponibles, idealmente, el mismo día de la tomada de la prueba para maximizar el seguimiento y tratamiento de casos positivos. Debe contarse con procedimientos de aseguramiento de la calidad, incluyendo procedimientos externos, para la técnica analítica escogida.
Detección de la malaria en poblaciones clave[3] (ej. en las fronteras)	Si el tamizaje de poblaciones clave es considerado apropiada, la PDR o la microscopía deben utilizarse solo para infecciones sintomáticas; y pruebas basadas en NAA, con una sensibilidad analítica de 2 parásitos /µL deben utilizarse para detectar infecciones asintomáticas.	El contexto local determinará el uso de las herramientas más apropiadas y costo efectivas, así como si el tamizaje en las zonas de fronteras es factible y útil. Los resultados deben estar disponibles el mismo día de la prueba para minimizar las pérdidas durante el seguimiento.



Fotos: OPS/OMS

1 Vallejo A, et al. 2015. High prevalence of sub-microscopic infections in Colombia. *Malaria Journal* 14:201.

2 Véase: Organización Mundial de la Salud. Septiembre 2014. *Policy brief on malaria diagnostics in low-transmission settings.*

3 Las poblaciones clave son aquellas poblaciones que sufren una mayor incidencia de malaria, combinada con un menor acceso a los servicios de salud, y/o marginación social.

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FACT SHEET 2016-06

AMAZON MALARIA INITIATIVE

Malaria in Low-Incidence Settings

MONITORING THE EFFICACY OF AND RESISTANCE TO ANTIMALARIAL MEDICINES

June 2016

The emergence of antimalarial resistance is a concern in the Americas. In South America, *Plasmodium falciparum* parasites are resistant to chloroquine, therefore the WHO is concerned that parasites may develop resistance to the antimalarial medicine artemisinin as well as partner medicines in artemisinin-based combination therapies.

According to WHO, there are a variety of methods for evaluating the efficacy of and resistance to antimalarial drugs in low-incidence settings, including *in vivo* studies, *in vitro* tests, and molecular analysis. Data collected through these methods should guide the development of policy on the use of antimalarial drugs in endemic areas.

- *In vivo* therapeutic efficacy studies (TES) of antimalarial medicines continue to be essential to orient changes in malaria treatment policies since they correlate best with patients' clinical response to the drugs. Though *in vivo* studies do not require sophisticated technology, they are not simple to conduct. Moreover, a lower incidence setting poses challenges to their feasibility; for example, it hinders the enrollment and follow-up of patients and/or increases the cost and duration of studies, making it more difficult to ensure the quality of studies. Nevertheless, it is recommended that a TES be conducted at least every three years. Alternatively, a multi-center study may be implemented (involving various locations within the country or in a number of neighboring countries that have similar epidemiological characteristics).
- Other elements of the early warning systems like *in vitro* studies that measure the susceptibility of malaria parasites to antimalarial medicines, as well as testing for molecular markers resistance to antimalarials (for cloroquine, mefloquine, sulfadoxine-pyrimethamine, and artimisinin), may help to track the emergence of resistance and, complement the information provided by TES. However, reliable markers are not available for all parasite species.

Photo: John Marmion

Photo: CDC

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In vivo, in vitro and molecular analysis must follow standard protocols and stringent quality control and quality assurance procedures, as data from these studies helps to evaluate the efficacy or inefficacy of antimalarial drugs. Well trained clinical and laboratory personnel who strictly follow the protocol are essential. Likewise, a laboratory that is capable of conducting molecular biology tests, ascertaining the presence of the drug and its metabolites in serum, and/or doing *in vitro* tests where indicated is key to monitoring efficacy and resistance to antimalarials.

Photo: PAHO/WHO

Due to the low rate of transmission of malaria, it is often difficult to obtain enough *P. falciparum* malaria patients for the necessary sample size. In dispersed and mobile populations, the relevance and strategy of studies should be analyzed to ensure the feasibility of ongoing monitoring and to limit drop out as much as possible. Overall, more research and innovation is needed, but is rarely supported in low-incidence settings.

The Amazon Malaria Initiative has published a *Strategic Orientation Document on Monitoring the Efficacy of and Resistance to Antimalarials in the Current Epidemiological Context* as a reference for countries in Latin America and the Caribbean on how to best combine available tools for monitoring efficacy and resistance to antimalarials.

Table 1: How to use the available tool in different epidemiological scenarios

Surveillance with:	**High or Moderate transmission**	**Low or No transmission (pre-elimination or elimination)**
In-vivo	• Up to 8 sentinel sites • Every 3 years • One arm	• One site at least every 3 years • Multi-center studies • One arm
Molecular markers	Concomitant with *in vivo* studies	Collect samples every 18 months
In-vitro (ELISA)	Concomitant with *in vivo* studies	Collect samples every 18 months

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HOJA INFORMATIVA 2016-06

INICIATIVA AMAZÓNICA CONTRA LA MALARIA

La Malaria en Contextos de Transmisión Baja

EL MONITOREO DE LA EFICACIA Y LA RESISTENCIA A MEDICAMENTOS ANTIMALÁRICOS

Junio de 2016

En las Américas, la resistencia a medicamentos antimaláricos genera una alta preocupación. En Sudamérica, los parásitos *Plasmodium falciparum* son resistentes a la cloroquina, por lo que la OMS teme que puedan desarrollar resistencia a medicamentos antimaláricos como la artemisinina o demás componentes de los tratamientos combinados basados en artemisinina.

De acuerdo a la OMS, existe una variedad de métodos para evaluar la eficacia y resistencia a los medicamentos antimaláricos como lo son los estudios *in vivo,* las pruebas *in vitro,* y los análisis moleculares. Los datos recolectados a través de estos métodos deben guiar el desarrollo de las políticas de uso de medicamentos antimaláricos en áreas endémicas.

- Los estudios *in vivo* que permiten monitorear la eficacia terapéutica de los medicamentos antimaláricos (TES por sus siglas en inglés) continúan siendo esenciales para orientar cambios en las políticas de tratamiento de la malaria debido a que se correlacionan mejor con la respuesta clínica de los pacientes a los medicamentos. Los estudios *in vivo* no requieren una tecnología sofisticada; sin embargo, no son sencillos de realizar. Además, los contextos de transmisión baja complican la viabilidad de estos estudios; por ejemplo, dificultan la inscripción y seguimiento de pacientes y/o incrementan los costos y tiempo de estudio, complicando el aseguramiento de la calidad de los estudios. A pesar de ello, es recomendable realizar un estudio tipo TES por lo menos una vez cada tres años. Como alternativa, se puede implementar un estudio multi-sitio (involucrando a diversos sitios en un mismo país o entre países con características epidemiológicas similares).
- Otros elementos de los sistemas de alerta temprana como los estudios *in vitro* que miden la susceptibilidad de los parásitos de la malaria a los medicamentos antimaláricos, así como los análisis para detectar marcadores moleculares de resistencia a antimaláricos (como para cloroquina, mefloquina, sulfadoxina-pirimetamina y artemisinina), pueden ayudar a monitorear la aparición de resistencia y complementar la información provista por los estudios TES. Sin embargo, no existen marcadores moleculares confiables para todas las especies de parásitos.

Foto: John Marmion

Foto: CDC

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Los estudios *in vivo, in vitro* y análisis moleculares requieren seguir protocolos estandarizados y procedimientos con estrictos controles de calidad, ya que los datos proporcionados por estos estudios ayudan a evaluar la eficacia o ineficacia de los medicamentos antimaláricos. Para ello es esencial contar con un equipo clínico y de laboratorio bien capacitado que siga estrechamente el protocolo. Igualmente, un laboratorio que pueda realizar pruebas de biología molecular, determinar la presencia de medicamentos y sus metabolitos en suero y/o pruebas *in vitro* donde sea indicado, es clave para monitorear la eficacia y resistencia a medicamentos antimaláricos.

Foto: OPS/OMS

Debido a la baja transmisión de la malaria, muchas veces hay dificultades para completar el tamaño de la muestra requerido de pacientes con malaria por *P. falciparum.* Además, en poblaciones dispersas y móviles, debe evaluarse la pertinencia y estrategia a utilizar para el desarrollo de estudios que garanticen el seguimiento y limiten al máximo el abandono del seguimiento del estudio. En general, se necesita continuar investigando e innovando a pesar de que estas actividades son raramente apoyadas en contextos de transmisión baja.

La Iniciativa Amazónica contra la Malaria ha publicado un *Documento de Orientación Estratégica titulado Documento Estratégico para el Monitoreo de la Eficacia y Resistencia de los Antimaláricos en el Contexto Actual Epidemiológico* como una referencia para los países Latinoamérica y el Caribe acerca de cómo es que se deben combinar las herramientas disponibles para el monitoreo de la eficacia y la resistencia a medicamentos antimaláricos.

Cuadro 1: Como utilizar las herramientas disponibles en los diversos escenarios epidemiológicos

Vigilancia con:	Transmisión alta o moderada	Baja transmisión o sin transmisión (pre-eliminación o eliminación)
In-vivo	• Hasta 8 sitios centinelas • Cada 3 años • Un brazo	• Un sitio al menos cada 3 años • Estudios multi-sitio • Un brazo
Marcadores moleculares	Simultaneo con estudios *in vivo*	Recolectar muestras cada 18 meses
In-vitro (ELISA)	Simultaneo con estudios *in vivo*	Recolectar muestras cada 18 meses

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FACT SHEET 2016-07

AMAZON MALARIA INITIATIVE

Malaria in Low-Incidence Settings

COMMUNICATION AND STAKEHOLDER ENGAGEMENT

July 2016

As malaria incidence decreases and countries move towards elimination, the health system tends to shift its focus and resources to other health issues, threatening the progress achieved. In low-incidence settings, a lack of sufficient resources may significantly undermine the system's responsiveness to maintaining laboratory capacity, sustaining vector control or epidemiological surveillance, ensuring access to quality medicines and the monitoring of resistance to antimalarials. In order to maintain malaria as a key priority under the national health agenda and sustain malaria prevention and control efforts, communication and advocacy must continue to play a vital role in building political and community will within the general public, affected and underserved communities, stakeholders and decision makers.

Photo: PAHO/WHO

Communication and advocacy efforts are crucial to identify and mobilize resources in order to sustain these technical interventions and avoid an increase in malaria incidence. Integrating effective communication and dissemination strategies within national malaria program's (NMPs) annual work plans enhances NMPs capacity to communicate with their constituents and advocate for better malaria control with stakeholders. Communities affected by malaria, multi-sector partners, and stakeholders must be considered throughout the planning and design of communication, information dissemination, and advocacy activities.

In low-incidence settings, uniting with the private sector and civil society through a multi-sectoral approach can be an effective way to strengthen malaria programming and communication. Communication strategies may be designed for several different types of communication: social and behavior change communication (SBCC) and advocacy communication. While SBCC informs and helps protect the public in the areas of transmission, prevention, control, and treatment, emphasizing the public's ability to protect itself and its communities, advocacy efforts encourage and enable political commitment and stakeholder engagement in support of malaria programs and interventions.[2]

The design and planning of communication efforts, whether for SBCC or advocacy, should follow a systemic and evidence-based process to effectively target audiences and adapt messages based on evolving contexts. Theories are key to effective communication because they help public health campaigns understand the factors and pathways that may affect the behavior and actions of individuals, communities and stakeholders. The communication plan should contain clear objectives, identify key audiences and culturally relevant messages, communication channels and key outreach events, and establish a monitoring and evaluation plan in order to measure processes, make adjustments to activities, and check outcomes.

Regarding outreach events, the Amazon Malaria Initiative (AMI) recommends that countries in the region develop campaigns on awareness dates such as World Malaria Day, Malaria Day in the Americas, International Migrants Day, and International Day of the World's Indigenous Peoples in order to leverage mass media opportunities. AMI also recommends for countries to practice knowledge management by creating and maintaining a repository of malaria information, education, and communication products by the different health systems levels in order to avoid the duplication of efforts and share lessons learned and best practices.

1 Amazon Malaria Initiative. 2016. Fact Sheet *"Malaria in low-incidence settings,"* series 02-06.
2 Amazon Malaria Initiative. 2015. *Strategic Malaria Communiation Guide for Central America 2015 – 2020.*

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HOJA INFORMATIVA 2016-07

INICIATIVA AMAZÓNICA CONTRA LA MALARIA

La Malaria en Contextos de Transmisión Baja

COMUNICACIÓN Y COMPROMISO DE LAS PARTES INTERESADAS

Julio de 2016

Foto: OPS/OMS

Conforme la incidencia de malaria disminuye, los sistemas de salud tienden a reorientar sus recursos hacia otros problemas de salud amenazando los avances logrados. En los contextos de transmisión baja, la falta de recursos adecuados impacta la capacidad de diagnóstico de los laboratorios, el sostenimiento del control vectorial o la vigilancia epidemiológica, el aseguramiento del acceso a tratamiento con medicamentos de calidad o el monitoreo de la resistencia a medicamentos antimaláricos, perjudicando la capacidad de reacción de los sistemas de salud[1]. La comunicación y la abogacía son indispensables para mantener el tema de control de la malaria en la agenda nacional, y así generar voluntad política y comunitaria que permita movilizar recursos para sostener las intervenciones.

Los programas nacionales de malaria deben integrar estrategias de comunicación y divulgación dentro de sus planes de trabajo. Las actividades de comunicación, diseminación de información y abogacía requieren de un proceso de planificación y diseño participativo que involucre a los múltiples sectores y actores en el tema de control de la malaria. Para realizar estas intervenciones es necesario identificar y asegurar financiamiento para sostener las intervenciones técnicas y evitar un aumento en la incidencia de la malaria.

En los contextos de transmisión baja es necesario crear oportunidades de sinergia entre los diferentes sectores del gobierno, el sector privado y la sociedad civil a nivel local y nacional. El plan de comunicación debe implementarse a través de una estrategia sólida que siga objetivos claros, apunte a distintos segmentos de la audiencia y disemine mensajes a través de canales de comunicación y materiales culturalmente relevantes. Finalmente, la estrategia debe considerar la implementación de un plan de monitoreo y evaluación que permita medir los resultados y el impacto de las acciones de comunicación[2].

Asimismo, las estrategias de comunicación deben contemplar múltiples enfoques. Por un lado, la comunicación para el cambio social permite informar a la población sobre las formas de transmisión, prevención, control y tratamiento, haciendo énfasis en la capacidad que tienen las personas de protegerse a sí mismas y su comunidad. Por el otro lado, la abogacía permite hacer incidencia política en salud, comprometer a los múltiples actores involucrados en la problemática de la malaria. Del mismo modo, se deben seguir buenas prácticas basadas en evidencias; por ejemplo, las campañas de salud pública deben sostenerse en teorías sociales que ayuden a comprender los factores y las vías que pueden afectar el comportamiento y las acciones de las comunidades y las personas.

La Iniciativa Amazónica contra la Malaria (AMI) recomienda a los países de la región a realizar campañas de sensibilización en fechas de concientización como el Día Mundial de la Malaria, el Día de la Malaria en las Américas, el Día del Migrante y el Día Internacional de los Pueblos Indígenas. Así como establecer un repositorio de productos de información, educación y comunicación sobre la malaria creados por los diferentes niveles del sistema de salud para asegurar una buena gestión del conocimiento y evitar la duplicación de esfuerzos.

1 Cfr. Iniciativa Amazónica contra la Malaria. 2016. Hoja informativa *"La Malaria en Contextos de Transmisión Baja"*, serie 02-06.
2 Cfr. Iniciativa Amazónica contra la Malaria. 2015. *Guía de comunicación estratégica sobre la malaria para Centroamérica 2015 – 2020.*

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AMAZON MALARIA INITIATIVE

SUCCESS STORY

PERU STRENGTHENS ITS MEDICINE QUALITY CONTROL APPROACH

Poor quality medicines that fail to meet official standards pose a significant threat to patients in need of quality-assured medicines to combat diseases such as malaria, for which proper treatment is essential to eliminate parasites from the blood effectively. Lack of quality-assured medicines can delay progress towards malaria control and eventual elimination.

From January to June 2015, 60% of 124 counterfeit products that were analyzed under orders from Peru's General Directorate of Medicines, Supplies and Drugs (DIGEMID) did not contain an active ingredient. These medicines could have been identified rapidly in the field with screening tests, allowing more prompt regulatory action.

In order to strengthen the capacity of Regional Health Directorate (DIRESA) staff and university labs, in August 2015 DIGEMID and the National Center for Quality Control (CNCC) convened a training workshop in Cuzco with the participation of six universities and six DIRESAs. Of the six DIRESAs in attendance, five (La Libertad, Ayacucho, Loreto, Tacna and Cuzco) had reported the highest rates of substandard and counterfeit medicines in the country.

During the workshop, CNCC trained participants on the use of rapid field tests. The head of Peru's National Institute of Health (INS) pointed out that field screening tests drastically reduce the time needed to assess medicine quality, from several months down to a few hours or days, depending on the number of samples to be analyzed. Expanding the use of rapid field tests for the monitoring of medicines at the decentralized level would allow for more prompt regulatory action and a larger volume of medicines screened.

Photo Credit: CNCC

Workshop participants received training on Level 2 of the Three Level Approach for medicines quality control, at the National University of San Antonio Abad's Pharmaceutical Technology Laboratory.

The methodology that Peru chose to adopt and began to scale up with the critically important August 2015 workshop is known as the Three Level Approach to medicine quality control. The Three Level Approach is a globally-proven methodology to detect substandard and counterfeit

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medicines in a rapid and cost effective manner. It consists of preliminary visual and physical inspection (Level 1), rapid screening field tests (Level 2), and compendial or other validated laboratory tests (Level 3).[1] It was first introduced in the Americas through the Amazon Malaria Initiative (AMI), by implementing partner USP's Promoting the Quality of Medicines Program.

Starting with the workshop in Cuzco, the six participating universities began the process of being integrated into a network to support the CNCC with supplemental technical and human resources for the decentralized quality control of medicines at the DIRESAs. The inclusion of university laboratories to cooperate with medicine quality monitoring in the field is intended to enhance Peru's capacity to ensure the quality of medicines on the market.

Also in 2015, Peru developed an annual timeline for the DIRESAs in Loreto and Madre de Dios to analyze the quality of a list of medicines. Medicine samples that fail field tests will be sent to the CNCC immediately to expedite confirmatory testing.

The involvement of universities in the August 2015 workshop demonstrates DIGEMID and CNCC's commitment to nationwide implementation of the Three Level Approach and to further strengthening the country's capacity to survey medicine quality in the field. Peru now has concrete plans to invest in long-term, sustainable solutions to facilitate the identification and removal of poor quality medicines from its territory, made possible with technical support provided through AMI.

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The Three Level Approach

The Three Level Approach applies sequential and complementary levels of quality control of increasing complexity, which are:

Level 1 – Visual and physical inspection

Level 2 – Rapid analytical screening tests that can be performed in the field

Level 3 – Registration methodologies that require an established lab and trained personnel

Photo Credit: PAHO/WHO

The Three Level Approach, developed by PQM to support countries' post marketing surveillance programs, was introduced and implemented initially in AMI countries through PQM assistance. Countries' implementation of Level 2 analysis helped to assess more than 1600 malaria medicines from 2005-2010.[2]

1. Pribluda VS, Barojas A, Coignez V, Brady S, Dijiba Y, et al. (2014) The Three Level Approach: A Framework for Ensuring Medicines Quality in Limited-Resource Countries. *Pharmaceut Reg Affairs* 3:117
2. Pribluda VS. Barojas A, Añez A, López CG, et al. (2012) Implementation of basic quality control tests for malaria medicines in Amazon Basin countries: results for the 2005–2010 period. Malaria Journal 11:202.

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May 2016

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INICIATIVA AMAZÓNICA CONTRA LA MALARIA

HISTORIA DE ÉXITO

PERÚ FORTALECE SU ENFOQUE PARA EL CONTROL DE CALIDAD DE MEDICAMENTOS

Los medicamentos de baja calidad, que no cumplen con estándares oficiales, constituyen un riesgo para la salud de aquellos pacientes que los necesitan para combatir enfermedades como la malaria, que requiere un tratamiento adecuado para eliminar eficazmente los parásitos en la sangre. La falta de medicamentos de calidad puede ocasionar retrasos en el control y la eventual eliminación de la malaria.

La Dirección General de Medicamentos, Insumos y Drogas (DIGEMID) reportó que de los 124 productos falsificados analizados de enero a junio del 2015, el 60% no contenían principio activo. Estos medicamentos podrían haber sido identificados con facilidad en el campo con pruebas rápidas para tamizado, lo que hubiera permitido acelerar la implementación de las medidas regulatorias correspondientes.

En agosto del 2015, la DIGEMID y el Centro Nacional de Control de Calidad (CNCC) del Instituto Nacional de Salud (INS) convocaron a un taller en Cusco con el fin de fortalecer la capacidad del personal de Direcciones Regionales de Salud (DIRESAs) y laboratorios universitarios. El taller contó con la participación de seis DIRESAs y seis universidades. Cinco de las seis DIRESAs participantes (La Libertad, Ayacucho, Loreto, Tacna y Cusco) están entre las que han reportado las tasas más elevadas de medicamentos de sub-estándar y falsificados en el país.

Durante el taller, el CNCC capacitó a los participantes en el uso de pruebas rápidas de campo para el tamizado de medicamentos. El director del INS destacó que estas pruebas permiten disminuir el tiempo necesario para evaluar la calidad de los medicamentos de meses a pocos días u horas, dependiendo del número de muestras que deben procesarse. La expansión a nivel descentralizado del uso de pruebas rápidas de campo para tamizado permitirá monitorear un volumen mayor de medicamentos y asimismo ejecutar medidas regulatorias con mayor prontitud.

Foto: CNCC

Participantes del taller de capacitación en el Laboratorio de Tecnología Farmacéutica de la Universidad Nacional de San Antonio de Abad recibieron entrenamiento en el segundo nivel del Enfoque de Tres Niveles para el control de calidad de medicamentos.

El enfoque que Perú decidió adoptar y empezar a expandir con este taller de capacitación es conocido como el

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Enfoque de Tres Niveles para el control de calidad de medicamentos. Este enfoque usa una metodología, probada a nivel mundial, que permite detectar medicamentos sub-estándar y falsificados de manera rápida y costo-efectiva. El enfoque consiste en la inspección inicial, visual y física del medicamento (Nivel 1), seguida de pruebas rápidas de campo para el tamizado (Nivel 2), y por el uso de pruebas compendiales u otras pruebas de laboratorio validadas (Nivel 3)[1]. Este enfoque fue introducido por primera vez a las Américas a través de la Iniciativa Amazónica Contra la Malaria (AMI) por el socio implementador USP, a través de su programa de Promoción de la Calidad de Medicamentos (PQM).

A partir del taller llevado a cabo en Cusco, las seis universidades participantes empezaron a conformar una red para apoyar al CNCC con recursos técnicos y humanos para el control de calidad descentralizado en las DIRESAs. La incorporación de los laboratorios universitarios en el monitoreo de la calidad de medicamentos en el campo tiene como objetivo fortalecer la capacidad para asegurar la calidad de los medicamentos en el mercado peruano.

En el 2015, Perú desarrolló un cronograma anual para el análisis de calidad de una lista de medicamentos en las DIRESAs de Loreto y Madre de Dios. Las muestras de los medicamentos que no pasen las pruebas de campo se enviarán inmediatamente al CNCC para acelerar la ejecución de pruebas confirmatorias.

Al involucrar a las universidades en el taller de agosto del 2015, la DIGEMID y el CNCC evidencian el compromiso asumido para la implementación del Enfoque de Tres Niveles a nivel nacional, y para continuar fortaleciendo la capacidad del país para evaluar la calidad de medicamentos en el campo. Perú tiene ahora planes concretos para invertir en soluciones sostenibles y de largo alcance para facilitar la identificación y retiro de medicamentos de baja calidad de su territorio; logro que ha sido en parte posible por medio del apoyo técnico ofrecido a través de AMI.

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El Enfoque de Tres Niveles

El Enfoque de Tres Niveles aplica los siguientes niveles secuenciales y complementarios de control de calidad, en orden de complejidad:

1er Nivel – Inspección visual y física

2° Nivel – Examen analítico rápido de detección que se puede realizar en el campo

3er Nivel – Metodologías de registro que requieren un laboratorio establecido y personal entrenado

Foto: OPS/OMS

La implementación del Enfoque de Tres Niveles en los países de AMI se inició con el apoyo del PQM con el objetivo de apoyar a los países en sus estudios de supervisión posteriores a la comercialización. La realización por parte de los países, del segundo nivel de análisis de campo contribuyó al análisis de más de 1600 medicamentos de malaria del 2005–2010[2].

1 Pribluda VS, Barojas A, Coignez V, Brady S, Dijiba Y, et al. (2014) The Three-Level Approach: A Framework for Ensuring Medicines Quality in Limited-Resource Countries. *Pharmaceut Reg Affairs* 3: 117.

2 Pribluda VS, Barojas A, Añez A, López CG, et al. (2012) Implementation of basic quality control tests for malaria medicines in Amazon Basin countries: results for the 2005–2010 period. *Malaria Journal* 11:202.

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INICIATIVA AMAZÓNICA CONTRA LA MALARIA

Estrategia sostenible para el control de la malaria en el Perú: Riego con secas intermitentes para el cultivo de arroz

Junio de 2016

En muchos países, la transmisión de malaria se ha relacionado a la implementación de sistemas de irrigación para el cultivo de arroz[1, 2, 3]. Tradicionalmente, el arroz se cultiva en pozas bajo inundación permanente, las cuales crean espacios favorables para la proliferación de mosquitos (hasta 90% de la superficie de agua disponible)[4]. Una situación similar ocurre en Perú, donde el mosquito transmisor de la malaria *Anopheles albimanus* prolifera en las pozas de cultivo de arroz[5,6].

En los últimos años, la actividad arrocera en el país se ha expandido, alcanzando una tasa de crecimiento anual de 5.2% en la costa norte, que es la principal zona productora. Investigaciones recientes han comprobado que los mosquitos que se reproducen alrededor del cultivo de arroz se han vuelto resistentes a los insecticidas convencionales[7]. Frente a este contexto, los especialistas recomiendan implementar alternativas enfocadas en modificar el ambiente donde se reproducen los mosquitos, tales como el Riego con Secas Intermitentes (RSI) para el cultivo de arroz[8,9].

En Perú, el RSI ha sido desarrollado por el Ministerio de Salud, en alianza con múltiples sectores y agencias de cooperación como la Agencia de los Estados Unidos para el Desarrollo Internacional (USAID/Perú) y el Centro Internacional de Investigación para el Desarrollo de Canadá (IDRC) como un paquete de intervenciones que se enfocan en optimizar la gestión de los recursos productivos, generando prácticas que se puedan sostener en el tiempo[10]. Lograr que una estrategia de esta índole sea sostenible depende, principalmente, de su adopción por el sector agrícola a nivel regional y nacional. El RSI reemplaza el riego por inundación permanente por un esquema de periodos de secas intermitentes; asimismo, incentiva el uso mejorado de agroquímicos e impulsa el uso de semillas mejoradas. Los resultados de los estudios de validación demuestran beneficios importantes, tanto para el control vectorial, como para los agricultores que implementan la intervención (Ver Tabla 1). Por ejemplo, actualmente se está validando data respecto a la reducción en el uso de agroquímicos, dado que los periodos de secas también permiten controlar algunas de las plagas propias del arroz. Adicionalmente, el RSI reduce el consumo de recursos hídricos, previene la salinización de los suelos y disminuye la emisión de gases de efecto invernadero como el metano. Los beneficios de implementar esta estrategia impactan favorablemente a diversos sectores creando resultados donde todos ganan.

Tabla 1. Resultados promedio de la validación del RSI en cuatro regiones del Perú[11]

Región	Has. bajo RSI	Producción de arroz	Densidad larvaria de anofelinos	Uso de agua	Años de la campaña
Lambayeque	704	+25.6%	-70%	-38.4%	2006/2007
	300	+33%	-85%	-46%	2008/2010
Piura	51.6	+20%	-98.3%	-26.3%	2008/2009
San Martín	40.2	+13%	-62.3%	-27%	2008/2009
La Libertad	623.04	+7%	-75%	-20%	2014/2015

En el 2014 se promulgó el D.S. N⁰ 018-2014-SA[12], el cual declara la implementación del RSI como una medida de interés nacional no obstante, aún es necesario expandir el RSI en todas las zonas arroceras donde sea aplicable. Actualmente, los esfuerzos conjuntos de los ministerios de Salud, Agricultura y Ambiente están encaminando la difusión del RSI en varias regiones del país bajo el liderazgo del Instituto Nacional de Innovación Agraria[13]. La implementación del RSI como política pública nacional permitiría no solo contribuir a los esfuerzos de prevención de la malaria, sino a mantener ecosistemas saludables, menos vulnerables a los efectos del cambio climático y con menores riesgos para la salud de los agricultores y sus comunidades.

Figura 1: Beneficios del RSI para la regiones arroceras[14]

1 Dolo, G et al. 2004. Malaria transmission in relation to rice cultivation in the irrigated Sahel of Mali. *Acta Tropica* 89: 147-159.

2 Mutero, CM et al. 2003. A transdisciplinary perspective of the links between malaria and agroecosystems in Kenya. International Centre of Insect Physiology and Ecology, Nairobi, Kenia.

3 Koudou, BG et al. 2009. Effects of Agricultural Activities on prevalence rates, and clinical and presumptive malaria episodes in Central Cote d'Ivoire. *Acta Tropica* 111: 268-274.

4 Ministerio de Salud de Perú. 2002. Salud y agricultura sostenibles. Riego Intermitente en el cultivo del arroz para el control vectorial de la malaria en la costa norte peruana. Estudio de factibilidad.

5 Cfr. 4.

6 Guthmann, JPA et al. 2002. Environmental factors as determinants of malaria risk. A descriptive study on the northern coast of Peru. *Tropical Medicine International Health* 7 (6):518-525.

7 Instituto Nacional de Salud. 2002. Susceptibilidad de los vectores de la malaria a los insecticidas en el Perú.

8 Qunhua, L et al. 2004. New irrigation methods sustain malaria control in Sechuan province, China. *Acta Tropica* 89: 241-247.

9 Tabbal, DF et al. 2002. On-farm strategies for reducing water input in irrigated rice; case studies in the Philippines. *Agricultural Water Management* 56:93-112.

10 Ministerio de Salud de Perú. 2011. Plan de Implementación de la Estrategia de Riego con Secas Intermitentes en el Cultivo de Arroz para el Control Vectorial de la Malaria en Regiones Priorizadas del Perú. URL: http://www.digesa.sld.pe/publicaciones/descargas/Plan%20de%20Riego%20Secas.pdf (visitado el 28 de Marzo del 2016).

11 Cfr. 10.

12 Cfr. URL: http://sinia.minam.gob.pe/modsinia/index.php?accion=verElemento&idElementoInformacion=1558&idformula (visitado el 29 de Marzo del 2016).

13 Cfr. URL: http://www.inia.gob.pe/tecnologias/cultivos/132-cat-tecnologias/cultivos/391-tecnologia-en-arroz

14 Cfr. 10.

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Case Study

AMAZON MALARIA INITIATIVE

PRIVATE SECTOR ENGAGEMENT HELPS TO INTERRUPT MALARIA TRANSMISSION IN BRAZIL

May 2016

Malaria, a potentially fatal illness transmitted by mosquitoes, is endemic to nine states in the Brazilian Amazon. Scientific evidence shows that deforestation, environmental degradation, and population migration associated with large infrastructure projects may increase the incidence of malaria.[1] With over 45,000 cases, Porto Velho had the second highest number of malaria cases reported by any municipality in the Amazon region in 2005.

In 2008, the building of the Santo Antônio and Jirau hydroelectric dams in and around Porto Velho began. In a matter of months, thousands of people flooded into a district of Porto Velho and another area 120 km (75 miles) away to meet the demand for labor during dam construction. As the local population doubled in size, malaria cases were bound to increase.

Despite the presence of competent vectors, environmental degradation propitious for malaria transmission, and considerable population growth, malaria incidence in Porto Velho decreased — contrary to what would have been expected. The number of cases fell from 34,865 in 2006 to just 3,600 cases in 2015.

From 2006–2015, Brazil has implemented a regulatory framework to bring together government, the private sector, and communities in the fight against malaria by requiring all large infrastructure projects in the Amazon to assess and mitigate their impact on malaria transmission. Effects of the regulations have been seen with the construction of two hydroelectric dams on the Madeira River in the vicinity of Porto Velho, Rondônia state.

Photo: PAHO/WHO

Map: Google Earth

Regulations require large infrastructure projects like the Santo Antônio and Jirau hydroelectric dams in the Brazilian Amazon to help mitigate the risk of increased malaria transmission in the surrounding areas. Map on right shows, in yellow, locations of the dams in relation to the city of Porto Velho.

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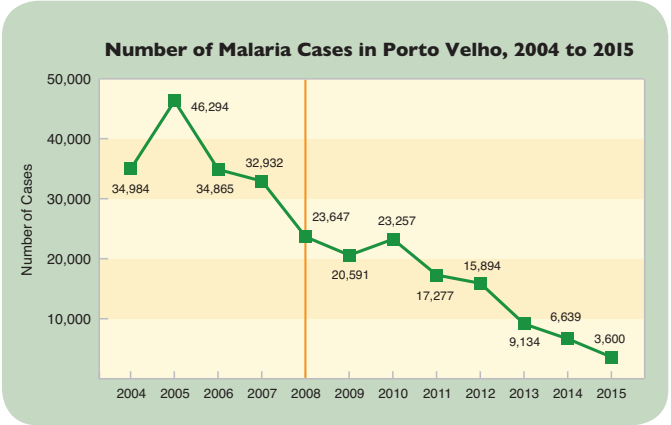
According to a Brazilian Ministry of Health Regulation published in December 2006,[2] the two energy companies and the dam builder involved had to provide the municipality of Porto Velho with material support for malaria control as a requirement for environmental licensing; the companies were mandated to set aside funds to help mitigate malaria transmission in local communities near the Santo Antônio and Jirau dams. The companies provided over 38 million Reais[3] (equivalent to USD 21 million at the time) in equipment, educational materials, supplies such as rapid diagnostic tests and long-lasting insecticidal nets, as well as services. With the in-kind goods and services such as health education and door-to-door installation of mosquito nets from the private sector, the state and municipal health secretariats were able to enhance existing programs to reduce malaria transmission.

Figure 1: Decline in Malaria Cases in Porto Velho, Rondônia state, Brazil



Line shows start of dam construction in 2008. Sources: Rondônia State Health Secretariat (SESAU), November 2015 and Brazilian National Malaria Control Program, March 2016.

Health workers were trained in education and communication for malaria, and then made home visits to all residences to educate the population about malaria risk. They focused on communicating the importance of early diagnosis and treatment at public primary care facilities, as well as proper use of bed nets for prevention. The population was involved in developing educational materials for malaria, with activities implemented in collaboration with the Public Defender's Office. In order to monitor all privately-supported health programs that had been approved as part of the environmental licensing process, an inter-institutional committee was also established. As such, besides implementing interventions for malaria diagnosis, treatment, and vector control, the health programs also created a space for engaging with local communities and making them a part of the solution.

Photo: PAHO/WHO

The private sector supported the door-to-door installation of mosquito nets.

The implementation of Brazilian regulations that require large infrastructure projects in the Amazon to contribute to malaria control efforts is considered an important asset in helping the Ministry of Health strive towards malaria elimination. In this case, the successful implementation of a regulatory framework that promotes the active leadership, involvement, and ownership of both public and private sectors has made a difference in limiting the spread of disease, bringing significant benefits to malaria-affected communities.

Regulations were intended to mitigate an increase in malaria cases. However, after the deployment of prevention, diagnosis, and treatment measures using effective communication and social mobilization, malaria cases actually decreased by 90% in the end compared to annual cases before dam construction. As a result, Porto Velho has moved from the high to low risk category for malaria transmission.

Brazil expanded the regulatory framework for malaria control with Ministry of Health Regulation Nº 001 in 2014 and Inter-Ministerial Regulation Nº 60 in 2015, so that the regulations now involve the ministries of health, the environment, mines and energy, the National Foundation of the Indian (FUNAI) and the Palmares Institute. The case of the Santo Antônio and Jirau dams reinforces the notion that human health impact needs to be considered early on in large infrastructure projects, and exemplifies how effectively-implemented regulatory frameworks can engage the private sector in successfully interrupting the transmission of malaria.

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1 Katsuragawa, TH, Gil, LHS, Tada, MS, and Silva, LHP. Dec. 2008. Endemias e epidemias na Amazônia. Malária e doenças emergentes em áreas ribeirinhas do Rio Madeira. Um caso de escola. *Estud Av* [online]. 22(64). http://www.scielo.br/scielo.php?pid=s0103-40142008000300008&script=sci_arttext. Accessed on November 18, 2015.

2 The Ministry of Health's Health Surveillance Secretariat (SVS) issued Regulation Nº 47 on December 29, 2006, which set forth the need to verify the occurrence of malaria, its determinants, and mitigating factors, in areas directly and indirectly impacted by infrastructure projects in order for companies to obtain environmental licensing in the malaria-endemic region of Brazil.

3 Rodovalho, S. 2014. O controle da malária nos grandes empreendimentos na Amazônia. Presentation made at the 14th ExpoEpi held from October 28-31, 2014 in Brasília, Brazil on behalf of the National Malaria Control Program (CGPNCM/DEVIT).

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Estudio de caso

INICIATIVA AMAZÓNICA CONTRA LA MALARIA

LA PARTICIPACIÓN DEL SECTOR PRIVADO CONTRIBUYE A INTERRUMPIR LA TRANSMISIÓN DE MALARIA EN BRASIL

Mayo de 2016

La malaria, una enfermedad potencialmente letal transmitida por mosquitos, es endémica en nueve estados de la amazonia brasileña. La evidencia científica sugiere que factores como la deforestación, la degradación medio ambiental y la migración, asociados a los grandes proyectos de infraestructura, pueden contribuir al aumento de la incidencia de malaria[1]. En el 2005, con más de 45,000 casos, Porto Velho obtuvo el segundo lugar en número de casos reportados de malaria por cualquiera de las municipalidades de la región amazónica.

En el 2008 comenzó la construcción de las represas hidroeléctricas Santo Antônio y Jirau en los alrededores de Porto Velho. A los pocos meses, miles de personas migraron a la zona para trabajar en la construcción de las represas, ubicándose en uno de los distritos de Porto Velho y otra área situada a 120 km de la ciudad. Conforme la población se expandía era predecible que los casos de malaria aumentarían.

No obstante, contrario a lo que se esperaba que sucediera debido a la manifestación de factores que propiciaban la transmisión de malaria tales como la presencia de mosquitos, la degradación del medio ambiente y el considerable crecimiento poblacional, los casos de malaria disminuyeron en Porto Velho. El número de casos bajo de 34,865 en el 2006 a 3,600 en el 2015.

Desde el 2006 al 2015, Brasil ha implementado un marco regulatorio que requiere que todos los proyectos de infraestructura en la región amazónica evalúen y mitiguen su impacto en la transmisión de malaria, reuniendo al gobierno, el sector privado y las comunidades locales para luchar contra la malaria. Los efectos de estas medidas son visibles en la construcción de dos represas hidroeléctricas en el rio Madeira, en las cercanías de Porto Velho, estado de Rondônia.

Foto: OPS/OMS

Mapa: Google Earth

Las regulaciones requieren que los grandes proyectos de infraestructura que se llevan a cabo en la amazonia brasileña, tales como las represas hidroeléctricas Santo Antônio y Jirau, colaboren para mitigar el riesgo de aumento de la transmisión de malaria en los alrededores. El mapa a la derecha muestra la ubicación, en amarillo, de las represas en relación a la ciudad de Porto Velho.

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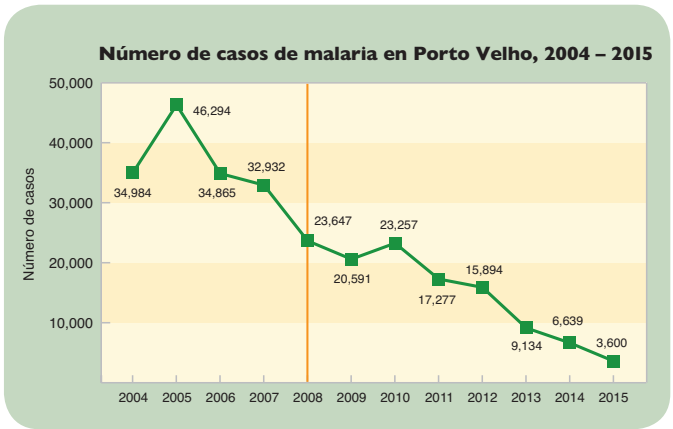
De acuerdo con la regulación del Ministerio de Salud de Brasil publicada en Diciembre del 2006[2], las compañías de energía y construcción involucradas en el proyecto debían proveer a la municipalidad de Porto Velho de fondos para contribuir a la mitigación de la malaria en las comunidades locales cercanas a las represas Santo Antônio y Jirau. Este apoyo forma parte de los requerimientos para obtener la licencia medio ambiental, la cual indica que las compañías deben destinar fondos para el control de la malaria. Es así que las compañías terminaron proporcionando más de 38 millones de Reales[3] (equivalentes, en ese momento, a 21 millones de dólares americanos) en equipos, materiales educacionales, suministros, tales como pruebas de diagnóstico rápido, mosquiteros tratados con insecticidas de larga duración y servicios de salud. Con los bienes y servicios del sector privado, las secretarias de salud del estado y la municipalidad fueron capaces de mejorar los programas existentes de reducción de la malaria en aspectos como educación para la salud e instalación de mosquiteros casa por casa.

Los agentes de la salud fueron capacitados en educación y comunicación para la malaria, visitando todos los hogares para educar a la población acerca de los riesgos de esta enfermedad. Ellos se enfocaron en comunicar la importancia del diagnóstico temprano y tratamiento en centros públicos de atención primaria, así como el uso correcto de medidas de prevención tales como mosquiteros. Además de implementar intervenciones para el diagnóstico, tratamiento y control vectorial, los programas de salud también crearon espacios para involucrar a las comunidades locales y hacerlas parte de la solución. Por ejemplo, la población se involucró mediante actividades implementadas en colaboración con la Defensoría del Pueblo en el desarrollo de los materiales educacionales sobre la malaria. Finalmente, un comité inter-institucional fue establecido con el fin de monitorear todos los programas de salud apoyados por el sector privado que fueron aprobados como parte del proceso de obtención de la licencia ambiental.

Figura 1: Reducción en casos de malaria en Porto Velho, estado de Rondônia, Brasil



La línea indica el comienzo de la construcción de las represas en el 2008. Fuentes: La Secretaria de Salud del Estado de Rondônia (SESAU), Noviembre 2015 y el Programa Nacional de Control de la Malaria de Brasil, Marzo 2016.

Foto: OPS/OMS

El sector privado colaboró con la instalación de mosquiteros casa por casa.

La implementación de las regulaciones que requieren que los grandes proyectos de infraestructura en la Amazonía contribuyan a los esfuerzos de control de la malaria es considerada un apoyo importante a los esfuerzos de eliminación de la malaria del Ministerio de Salud. En este caso, la exitosa implementación de un marco regulatorio que promueve el liderazgo, involucramiento y contribución tanto de los sectores público como privado ha tenido impacto al limitar la expansión de la enfermedad, trayendo beneficios significativos a las comunidades afectadas por la malaria.

En un primer momento, las regulaciones fueron pensadas para mitigar el posible aumento de los casos de malaria. Sin embargo, luego del despliegue de una efectiva comunicación y movilización social en medidas de prevención, diagnóstico y tratamiento, los casos de malaria se redujeron en 90% en comparación a la tasa anual previa a la construcción de las represas. Como resultado, Porto Velho ha pasado a ser considerada una zona de bajo riesgo de transmisión de malaria.

Brasil expandió el marco regulatorio para el control de la malaria con la Regulación del Ministerio de Salud N⁰ 001 en 2014 y la Regulación Inter-Ministerial N⁰ 60 en 2015. Ahora las regulaciones involucran a los ministerios de salud, medio ambiente, energía y minas, la Fundación Nacional del Indio (FUNAI) y el instituto Palmares. El caso de las represas Santo Antônio y Jirau no solo refuerza la idea de que los impactos en la salud deben ser considerados en las etapas tempranas de los grandes proyectos de infraestructura, sino que ejemplifica como es que los marcos regulatorios exitosamente implementados pueden involucrar al sector privado en los esfuerzos que buscan interrumpir la transmisión de malaria.

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1 Katsuragawa, TH, Gil, LHS, Tada, MS, and Silva, LHP. Dec. 2008. Endemias e epidemias na Amazônia. Malária e doenças emergentes em áreas ribeirinhas do Rio Madeira. Um caso de escola. *Estud Av* [online]. 22(64). http://www.scielo.br/scielo.php?pid=s0103-40142008000300008&script=sci_arttext. Visitado el 18 de Noviembre, 2015.

2 La Secretaria de Vigilancia del Ministerio de Salud (SVS) emitió la Regulación N° 47 el 29 de Diciembre del 2006. Esta resolución establece que todo proyecto de infraestructura que se lleva a cabo en regiones con malaria endémica y desee obtener la licencia medio ambiental debe verificar la ocurrencia de malaria, identificar sus causas y plantear factores de mitigación para las zonas donde espera tener un impacto directo o indirecto.

3 Rodovalho, S. 2014. O controle da malária nos grandes empreendimentos na Amazônia. Presentación de la 14 ExpoEpi llevada a cabo entre Octubre 28-31, 2014 en Brasília, Brasil a nombre del Programa Nacional de Control de Malaria (CGPNCM/DEVIT).

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Estudo de Caso

INICIATIVA AMAZÔNICA CONTRA A MALÁRIA

PARTICIPAÇÃO DO SETOR PRIVADO AJUDA A INTERROMPER A TRANSMISSÃO DA MALÁRIA NO BRASIL

Maio de 2016

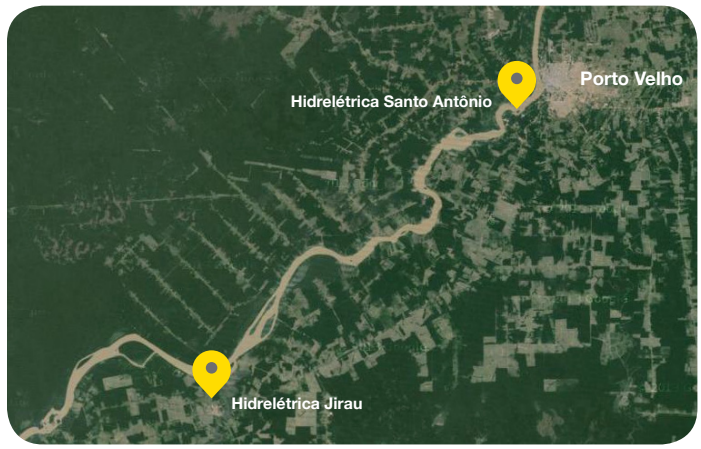
A malária é uma doença potencialmente fatal que é transmitida pela picada de mosquitos. No Brasil, a malária é endêmica nos nove estados da Amazônia Legal. Evidências científicas demonstram que o desmatamento, a degradação ambiental e a migração associada a grandes projetos de infra-estrutura podem aumentar a incidência de malária.[1] Em 2005, o município de Porto Velho registrou mais de 45 mil casos de malária, sendo este o segundo maior número de casos relatados por qualquer município da região Amazônica naquele ano.

Em 2008 foi iniciada a construção das usinas hidrelétricas Santo Antônio e Jirau na região de Porto Velho. Em uma questão de meses, milhares de pessoas migraram ao distrito de Porto Velho e Jirau, a 120 km de distância da cidade, para atender a demanda por mão de obra durante a construção das usinas. Uma vez que a população local duplicou de tamanho, era inevitável o que a incidência de malária fosse aumentar.

Surpreendentemente, a incidência de malária em Porto Velho diminuiu nesse período, ao contrário do que era esperado tendo em vista à existência de vetores competentes, a degradação ambiental propícia para a transmissão da malária e um aumento significativo da população. O número de casos de malária caiu de 34.865 em 2006 para apenas 3.600 casos em 2015.

De 2006 a 2015, o Brasil tem implementado um marco regulatório que reune o governo, o setor privado e a comunidade na luta contra a malária, exigindo de todos os grandes empreendimentos na Amazônia a avaliação e mitigação do seu impacto na transmissão da malária. Essas regulações têm surtido efeito observado após a construção de duas hidrelétricas no Rio Madeira nas proximidades de Porto Velho, Rondônia.

Foto: OPAS/OMS



Mapa: Google Earth

Regulações requerem grandes empreendimentos como as hidrelétricas de Santo Antônio e Jirau na Amazônia a ajudar a mitigar o risco de aumento na transmissão da malária nas áreas de influência. O mapa à direita mostra, em amarelo, a localização das hidrelétricas em relação à cidade de Porto Velho.

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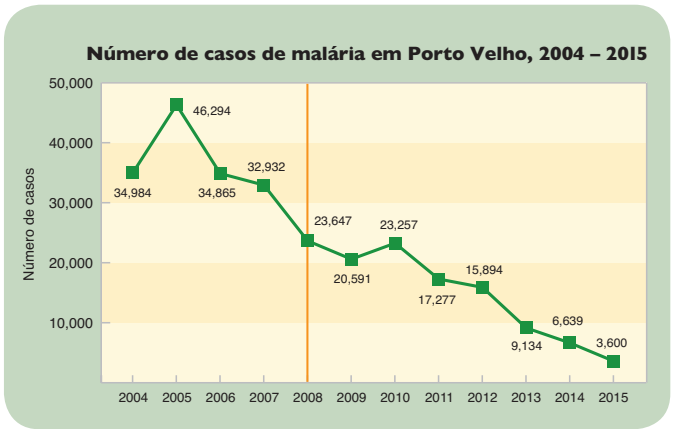
A razão por trás dessa redução se deve a uma portaria do Ministério da Saúde, publicada em dezembro de 2006,[2] em que as duas empresas responsáveis pela construção e a gestão das usinas hidrelétricas tiveram que fornecer ao município, como uma exigência para o licenciamento ambiental, um plano para o controle da malária em Porto Velho. As empresas foram obrigadas a reservar fundos para ajudar a mitigar a transmissão da malária nas comunidades próximas às usinas de Santo Antônio e Jirau. Essas duas empresas forneceram mais de R$ 38 milhões[3] na forma de equipamentos, material didático, serviços e insumos, tais como testes de diagnóstico rápido e mosquiteiros tratados com inseticida de longa duração. Com os materiais e serviços do setor privado, tais como atividades educativas e a instalação dos mosquiteiros de casa em casa, a secretaria estadual e municipal de saúde puderam melhorar os programas de malária já existentes para reduzir a transmissão da doença.

Figura 1: Redução de casos de malária em Porto Velho, Rondônia, Brasil



A linha mostra o início da construção das hidrelétricas em 2008. Fontes: Secretaria de Estado da Saúde de Rondônia (SESAU), novembro de 2015 e Programa Nacional de Controle da Malária do Brasil, março de 2016.

Agentes de saúde foram capacitados em educação e comunicação para a malária e realizaram visitas em domicílio a todas as residências com o objetivo de educar a população sobre o risco da malária. Os agentes de saúde ressaltaram a importância do diagnóstico e tratamento precoce nas unidades públicas de saúde, bem como o uso adequado de mosquiteiros para a prevenção da malária. O projeto contou com a participação da população local na elaboração do material didático sobre a prevenção e tratamento da malária, como também em atividades implementadas em colaboração com o Ministério Pública. Além disso, foi criado um comitê interinstitucional para acompanhar todos os programas de saúde da iniciativa privada que tinham sido aprovados no processo de licenciamento ambiental. Assim, além de implementar intervenções para o diagnóstico, tratamento e controle de vetores da malária, os programas de saúde também abriram um espaço para colaborar com a comunidade e torná-la parte da solução.

Foto: OPAS/OMS

O setor privado apoiou a instalação de mosquiteiros de casa em casa.

A implementação de normas brasileiras que exigem que grandes empreendimentos na Amazônia contribuam para os esforços de controle da malária é considerada um recurso importante uma vez que apoiam o Ministério da Saúde na eliminação da malária. Neste caso, a implementação bem-sucedida de um marco regulatório que promove a participação ativa, envolvimento e liderança dos setores público e privado tem feito a diferença na limitação da propagação da malária, trazendo benefícios significativos para as comunidades afetadas pela doença.

Estabeleceram-se as normas com o objetivo de mitigar o aumento dos casos de malária. Porém, após a implantação eficaz de medidas de prevenção, diagnóstico e tratamento que usaram comunicação e mobilização social, houve uma redução de 90% dos casos de malária quando comparados aos números registrados antes da construção das usinas hidrelétricas. Com isso, o município de Porto Velho reduziu sua qualificação quando ao risco de transmissão de malária de alto para baixo risco.

O Brasil ampliou seu marco regulatório para o controle da malária com a Portaria nº 001 do Ministério da Saúde publicada em 2014 e o Regulamento Interministerial nº 60, publicado em 2015. Agora a regulamentação envolve os ministérios da Saúde, Meio Ambiente, Minas e Energia, a Fundação Nacional do Índio (FUNAI) e o Instituto Palmares. O caso das usinas de Santo Antônio e Jirau reforça o princípio de que o impacto na saúde humana deve ser considerado no início de grandes empreendimentos e ilustra como marcos regulatórios implementados de maneira eficaz podem envolver o setor privado na interrupção bem-sucedida da transmissão da malária.

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2 Em 29 de dezembro de 2006, a Secretaria de Vigilância em Saúde (SVS) do Ministério da Saúde emitiu a Portaria N° 47 como requerimento para obter o licenciamento ambiental na Amazônia Legal. A portaria estabelece a necessidade de verificar a incidência da malária, os seus fatores determinantes e fatores de mitigação nas áreas afetadas direta e indiretamente pelos grandes empreendimentos.

3 Rodovalho, S. 2014. O controle da malária nos grandes empreendimentos na Amazônia. Apresentação feita por parte da Coordenação Geral do Programa Nacional de Controle da Malária (CGPNCM/DEVIT) à 14ª ExpoEpi, conferência realizada de 28 a 31 de outubro de 2014 em Brasília, Brasil.

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AMAZON MALARIA INITIATIVE

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Photo: PAHO/WHO

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Global Malaria News

From October 5–9, 2015, the Pan American Health Organization (PAHO/WHO) organized a series of regional consultation meetings on the Strategy and Plan of Action for Malaria in the Americas 2016–2020 in Punta Cana, Dominican Republic. The meetings were opened by the Dominican Minister of Health, Altagracia Guzmán Marcelino, the PAHO/WHO Country Representative in the Dominican Republic, Alma Morales, the Director of the World Health Organization's Global Malaria Program, Pedro Alonso, and Marcos Espinal, the Director of Communicable Diseases and Health Analysis for PAHO/WHO. Commentary on the draft strategy was provided by participants from 20 malaria-endemic countries, five non-endemic countries, as well as 18 partners and research institutions. All AMI technical partners were represented at the consultation meeting. The stakeholders' input helped to inform the strategic direction of malaria control and elimination in the region for the next five years, in alignment with the WHO's Global Technical Strategy for malaria and the Sustainable Development Goals (SDGs). The consultations concluded with the inaugural meeting of PAHO's Technical Advisory Group (TAG) for malaria as the principal advisory group to PAHO on matters related to malaria in the Americas.

International Partner Highlights

Photo: Jaime Chang

From September 21–October 2, 2015, AMI partners from Belize, Brazil, Honduras, Nicaragua, Panama, Peru, USAID, PAHO/WHO and Links Media participated in the regional edition of the Science of Eradication: Malaria course in São Paulo, Brazil. The course was administered to approximately 100 program managers and members of the research community in malaria-endemic countries. It was hosted at the University of São Paulo's School of Public Health and co-sponsored by the Harvard T.H. Chan School of Public Health, Swiss Tropical and Public Health Institute (Swiss TPH), and ISGlobal — Barcelona Institute for Global Health, with additional support from PAHO/WHO, FAPESP — the São Paulo Research Foundation, the Bill & Melinda Gates Foundation, and the CAPES Foundation. The participation of AMI country representatives was coordinated by PAHO in close collaboration with the São Paulo School of Public Health.

Pan American Health Organization (PAHO/WHO)

Coordinated by PAHO's Regional Malaria Program, an External Quality Assurance Program (EQAP) was established in 2011 with the national laboratories of Honduras and Peru as supranational reference laboratories that prepare standardized panels of slides for distribution to participating laboratories. The aim of this program is to improve the quality of malaria diagnosis across countries. Four rounds of evaluation have been undertaken from 2011 to 2015, with 21 national reference laboratories participating in the fourth round. Microscopy performance in 2015 compared with the previous rounds showed that there has been satisfactory improvement and achievement of concordance percentage in diagnosis and parasite morphology, but much less so in parasite density estimation and species identification. Evaluation serves to standardize processes and protocols across countries in the microscopic diagnosis of malaria. With decreasing malaria cases, countries need to prioritize the quality of diagnosis in order to detect each and every case. Given different treatment regimens for *P. falciparum* and *P. vivax* throughout the Americas, countries should focus on species identification and parasite density in order to move towards malaria elimination. In October 2015, PAHO/WHO presented a poster on EQAP for Malaria

Microscopy Diagnosis in the Countries of the Americas at the 64th Annual Meeting of the American Society of Tropical Medicine and Hygiene (ASTMH) in Philadelphia, USA.

PAHO/WHO continues to provide technical assistance for the monitoring of therapeutic efficacy of antimalarial medicines. Currently, all AMI countries using artemisinin-based combination therapies (ACT) for *P. falciparum* implement Day 3 surveillance on all *P. falciparum* positive patients as an early warning system to detect any possible loss in sensitivity to first-line treatments. Following this approach, the Central American countries supported by AMI follow a routine surveillance system for all positive *P. falciparum* cases, using molecular markers for the detection of possible resistance to chloroquine as the first-line treatment.

Photo: PAHO/WHO

The joint procurement of antimalarial medicines for the region is moving forward. A long-term agreement to procure antimalarials is now available as a result of a tender process completed in collaboration with UNICEF/WHO. The 24/7 strategic stock warehouse in Panama acquired new antimalarials, such as ACTs for imported cases coming from areas where resistance to chloroquine is known, as well as antimalarials for severe cases that can be mobilized rapidly to save lives.

PAHO warehouse activities from July-September 2015 included:

1. ACTs (arthemeter+lumefantrine 6x4) were distributed to 11 countries.
2. Intravenous artesunate and quinine were distributed to 6 countries for severe malaria cases, including to one country in Africa. One positive outcome has been the successful treatment of three severe cases.

As part of surveillance efforts, countries submitted their 2014 malaria morbidity and mortality data to PAHO/WHO to be analyzed and subsequently compiled for the WHO's World *Malaria Report 2015.*

Centers for Disease Control and Prevention (CDC)

From August to September, the CDC hosted an entomologist from Peru's National Institute of Health (INS, by its acronym in Spanish) to be trained on molecular detection of insecticide resistance mechanisms in malaria vectors. The CDC also provided technical assistance to Peru's INS regarding the interpretation of insecticide resistance data to make insecticide recommendations for vector control.

Photo: Links Media

In December, the CDC will be hosting two entomologists from Honduras to be trained on biochemical assays to detect mechanisms of insecticide resistance and to provide technical assistance in interpreting insecticide resistance data for vector control decision making. In the same month, the CDC will host a researcher from Instituto Evandro Chagas in Belém, Brazil who is working on characterizing molecular mechanisms of pyrethroid resistance recently detected in *Anopheles darlingi* in the Brazilian Amazon.

The CDC disseminated the results from an AMI-supported *in vivo* study on the "Efficacy of Chloroquine and Primaquine in the Treatment of Uncomplicated *Plasmodium vivax* Malaria, Cruzeiro do Sul, Acre, Brazil, 2014" at an oral presentation during the 64th Annual ASTMH meeting. Two posters about molecular analyses of the kelch-13 (K13) antimalarial resistance marker in South America were also presented at the meeting:

- Molecular surveillance for K13 gene and other *Plasmodium falciparum* molecular markers associated with antimalarial resistance in Suriname
- Characterization of the K13 propeller domain in Guyana for suspected artemisinin resistance

U.S. Pharmacopeial Convention/Promoting the Quality of Medicines Program (PQM)

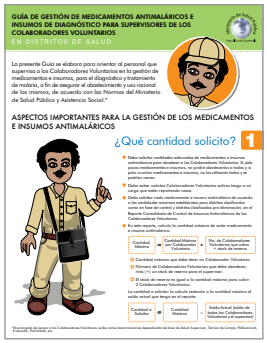
Guatemala's Medicines Unit of the National Health Laboratory (OMCL), received ISO 17025 accreditation from ANAB in September 2015, transitioning from a product-based to a method-based accreditation. The expanded scope of this accreditation includes high-performance liquid chromatography (HPLC) testing, as well as spectrophotometry and dissolution tests, strengthening the capacity to ensure the quality of medicines, including antimalarials in-country. PQM's laboratory support towards the accreditation was initially provided in the context of AMI, and during the last couple of years was financed by the in-country USAID mission.

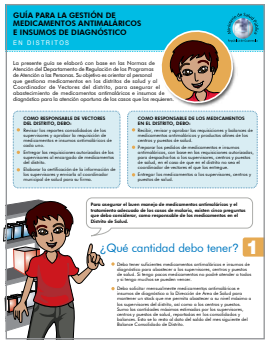
Management Sciences for Health/Systems for Improved Access to Pharmaceuticals and Services Program (MSH/SIAPS)

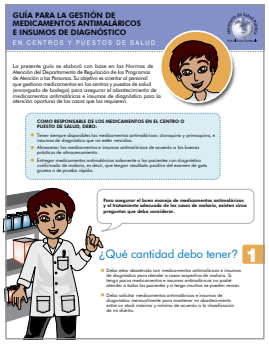
The USAID-funded SIAPS program continued to support Colombia's National Malaria Control Program (NMCP) in the completion and validation of a data collection protocol and instruments. During the next quarter, SIAPS will collect the information in three departments in Colombia. In Brazil, the state malaria programs have scheduled a follow-up monitoring exercise using the adequacy approach for February 2016.

Data collection and analysis for the *Quarterly Bulletin on Availability and Consumption of Antimalarials* showed an increase in the availability of antimalarials in central warehouses, from 71% in Quarter 3 to 86% in Quarter 4.

In working with local counterparts and AMI partners in Peru, SIAPS supported coordination meetings to finalize a plan for the introduction of artesunate+mefloquine fixed-dose combination therapy. It is anticipated that this fixed-dose combination will be introduced in selected counties in the region of Loreto next quarter, to pilot-test operational procedures for scaling up to the rest of the district.







Credit: SIAPS/Links Media

In Guatemala, SIAPS provided technical assistance (TA) for the introduction of guidelines to support malaria pharmaceutical management in primary health facilities, and to monitor the availability of antimalarials used by primary health volunteers. Trainings for health volunteers will be carried out during the next quarter.

SIAPS will provide TA to Ecuador on a visit to collect primary data on the country's malaria supply management, and will discuss alternative interventions with national counterparts.

Links Media

From October 6–8, 2015, Links Media participated in the 1st Workshop on Education and Social Participation for Malaria Surveillance and Control organized by the NMCP in Brasília, Brazil. The purpose of the workshop was to discuss and present health education and social mobilization actions and strategies for malaria. Participants included state-level malaria program coordinators, professionals from the areas of health education and social mobilization, and representatives from the Ministry of Health, Ministry of Education, Ministry of the Environment, and the Ministry of Cities. Links Media also presented a poster at the 64th Annual ASTMH meeting in Philadelphia, USA, on the role of communication in raising the awareness of key decision-makers and mobilizing resources as more countries in the Americas transition towards elimination.

Country Spotlight

Researchers from **Brazil**'s malaria-endemic and non-endemic areas and international counterparts shared their work at the XIV National Malaria Research Meeting held in São Paulo from October 1–3, 2015. The prospects for eliminating *P. falciparum* malaria in Brazil were discussed, along with innovations in the fields of parasitology, molecular biology, immunology, and vaccine development. The Brazilian Ministry of Health co-sponsored the event. Separately, Brazil has launched a regional epidemiological bulletin with data collected on malaria cases imported from neighboring countries.

Photo: PAHO/WHO

Honduras' supranational laboratory is currently creating a regional slide bank including over 1,000 slides to date with PAHO's support. All samples were tested with PCR prior to their inclusion in the slide bank, following standard operating procedures adapted from WHO's South East Asia Regional Office (WHO/SEARO). Other malaria-endemic and non-endemic countries in the region will be able to borrow panels from the slide bank to sustain their national diagnostic capacity for malaria through trainings and periodic evaluations following quality assurance procedures.

Photo: Jorge Escobedo

In September 2015, **Peru**'s Ministry of Health and the regional government of Loreto contributed additional resources to deploy health brigades to remote areas of the Amazon more frequently in order to address malaria. Thirty health brigades left Iquitos by boat to provide microscopy diagnosis and treatment to riverine populations in light of the ongoing health emergency due to malaria in Loreto. Emphasis was placed on providing timely and efficacious services to communities who live along the Pastaza, Marañón, Tigre and Corrientes rivers.

Calendar of Events

November 2015

143rd American Public Health Association (APHA) Annual Meeting and Exposition,
Chicago, USA,
October 31–November 4, 2015.

Forum of Malaria Networks and Advocates & Regional Launch of Action and Investment to Defeat Malaria (AIM),
Pan American Health Organization Headquarters, Washington, USA,
November 5, 2015.

Malaria Day in the Americas,
Region-wide, November 6, 2015.

November–December 2015

World Malaria Report 2015
Release, TBD.

March 2016

AMI/RAVREDA Annual Evaluation Meeting and Semi-Annual Steering Committee Meeting,
Colombia, March 14–18, 2016.

Photo: PAHO/WHO

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AMAZON MALARIA INITIATIVE

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Volume 3, Issue 1

Photo: PAHO/WHO

Pan American Health Organization
World Health Organization Regional Office for the Americas
CDC Safer • Healthier • People
SIAPS Systems for Improved Access to Pharmaceuticals and Services
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PROMOTING THE QUALITY OF MEDICINES

International Partner Highlights

The **Pan American Health Organization/World Health Organization (PAHO/WHO)** in collaboration with the UN Foundation, the Milken Institute School of Public Health at George Washington University, and the Center for Communication Programs at the Johns Hopkins Bloomberg School of Public Health hosted the annual Malaria Day in the Americas event at its headquarters in Washington, DC on November 5. The 2015 "Forum of Malaria Networks and Advocates" included the regional launch of the Roll Back Malaria (RBM) Partnership's *Action and Investment to Defeat Malaria (AIM) 2016–2030* document. The event also recognized Malaria Champions of the Americas; finalists were Brazil's National Malaria Control Program (NMCP), Paraguay's National Malaria Eradication Service (SENEPA), and the Health Surveillance Unit within Honduras' Health Secretariat. The Brazilian NMCP won the overall prize as the 2015 Malaria Champion of the Americas.

Photo: PAHO/WHO

PAHO compiled and analyzed data from national counterparts for the *Quarterly Bulletin on the Availability and Consumption of Antimalarials* with support from the Systems for Improved Access to Pharmaceuticals and Services (SIAPS) Program. Eight countries reported data, showing that antimalarial stock levels at central warehouses remained the same as in the previous quarter (85% availability).

Countries of the Americas with order volumes too low to convene the interest of suppliers continue to face difficulties in the local procurement of antimalarials. As a temporary measure, PAHO has procured first-line treatments of chloroquine and primaquine to meet the needs of countries that are at risk of stock outs during 2016. It is expected that the regional joint procurement of antimalarials facilitated by PAHO/WHO will circumvent the problems of local procurement and ensure stocks for 2017. PAHO/WHO continues to stock Artemisinin-based Combination Therapies (ACTs) at its Panama regional warehouse, for provision to countries requiring treatment of imported cases resistant to chloroquine, as well as cases of severe malaria.

In November 2015, PAHO provided basic entomological training to Vector Control Services staff in Guyana. Topics included basic epidemiology of malaria, taxonomy, morphology of the vector lifecycle (adult, larva, and pupa), and integrated vector management. PAHO is currently developing additional vector control training modules for Guyana to build on these efforts and create the capacity for the country to undertake basic entomological surveillance in the field.

In collaboration with the two supranational laboratories in Honduras and Peru, PAHO finalized the Fourth Slide Panel 2014–2015 Technical Report for the External Quality Assurance Program for Malaria Microscopy Diagnosis. The report can be accessed via the following link: http://bit.ly/PAHO_Fourth_Slide_Panel_2014_2015.

The **US Centers for Disease Control and Prevention (CDC)** is collaborating with the Brazilian ministry of health, the Evandro Chagas Institute, and health researchers in implementing an *in vivo* efficacy study of artemether-lumefantrine in the treatment of uncomplicated *P. falciparum* malaria in Acre state. Patient enrollment began in early December 2015 and will continue to enroll a total of 81 patients. Also in December 2015, an article was published in the *Journal of Infectious Diseases* highlighting AMI-funded research, titled "Independent Emergence of the *Plasmodium falciparum* Kelch Propeller Domain Mutant Allele C580Y in Guyana" that was co-authored by CDC, PAHO/WHO, the Guyana ministry of health, Atlanta Research and Education Foundation, Institut Pasteur de la Guyane, and the President's Malaria Initiative. The authors emphasized the importance of continuously monitoring the therapeutic efficacy of drugs and parasite populations, including the use of molecular surveillance tools.

Photo: PAHO/WHO

The CDC continues to provide regional technical assistance on vector surveillance and control in collaboration with PAHO/WHO. CDC staff traveled to Guatemala to support an evaluation of long-lasting insecticidal nets (LLINs), mosquito behavior, and deployment of assays to the field. A field visit was conducted in Nicaragua with assistance from PAHO's Nicaragua office to support an LLIN durability evaluation and molecular monitoring of antimalarial resistance being carried out by the Medical Entomology Department of the ministry of health's National Center for Diagnostics and Reference as part of the activities included under Nicaragua's AMI/RAVREDA work plan. In order to foster greater

collaboration for vector control in the region, the CDC also trained Honduran and Brazilian entomologists on the detection of insecticide resistance mechanisms in malaria vectors, including molecular and other determinations, and potential resistance management strategies. Both CDC and PAHO/WHO provided technical assistance to NMCPs on the development of national insecticide resistance management plans.

Final sample collection was undertaken for the RealAmp field evaluation in Brazil, conducted together with the Brazilian Ministry of Health and the Evandro Chagas Institute. Laboratory processing in Brazil was planned for January 2016, to be followed by quality control testing and data analysis at CDC headquarters.

The USAID-funded **Systems for Improved Access to Pharmaceuticals and Services (SIAPS)** Program finalized a technical report on the situation of malaria pharmaceutical management in seven AMI countries, along with the impact of AMI-supported interventions. This report is available on the AMI website at: http://bit.ly/Regional_Gestion_Suministro.

Photo: Jaime Chang

With assistance from PAHO's Peru office, SIAPS conducted a site visit to the region of Loreto to assess the progress in introducing a fixed-dose combination of mefloquine and artesunate, and on implementing good storage practices. The new fixed-dose combination formulation can help address a reported shortage of mefloquine, resulting in the use of artemisinin monotherapy.

SIAPS supported the Guatemalan NMCP to estimate antimalarial requirements for 2016 and 2017, based on morbidity and logistics data from the last four years. The resulting forecast and supply plan will serve as a basis for procurement for 2016. The NMCP will be able to use this process for future procurement cycles, which may help to prevent stock outs. Additional TA for the procurement of antimalarials in Guatemala included tailoring a quantification and procurement manual based on ministry of health norms for essential medicines to malaria, and finalizing a guide for monitoring the flow of information across all levels of the supply chain.

From September–October 2015, SIAPS visited Ecuador to assess the malaria pharmaceutical management system, and to discuss alternative interventions with national counterparts for the transition of the malaria supply management from the NMCP to the national pharmaceutical system. SIAPS provided recommendations including a situational analysis and proposed interventions to national counterparts and AMI partners following this site visit.

The **Promoting the Quality of Medicines (PQM) Program** implemented by the US Pharmacopeial Convention (USP) coordinated with country stakeholders to plan for 2016 activities building on previous PQM work plans. During this quarter, PQM in collaboration with PAHO/WHO and SIAPS developed a survey that was sent to 11 NMCPs to collect information on quality control measures for antimalarials since 2014.

Photo: Jaime Chang

Working with Links Media, PQM has drafted a success story on its assistance with Peru's expansion of the Three-Level Approach (3LA) to medicine quality control. As a result of AMI-supported interventions related to medicine quality control, Peru's ministry of health has invested in long-term, sustainable solutions to facilitate the identification and removal of poor-quality medicines from its territory by expanding the rapid testing of medicines from two regional health directorates to a total of 8 in 2015. The AMI success story is expected to be released in Quarter 2 of FY 2016.

As part of knowledge dissemination activities, **Links Media** released new products for Malaria Day in the Americas 2015, including a Malaria Elimination Frequently Asked Questions (FAQs) fact sheet (available in English, Spanish, and Portuguese), Selected References on Malaria Elimination (available in Spanish, with English and Portuguese versions forthcoming), and the previous AMI quarterly bulletin in coordination with other partners.

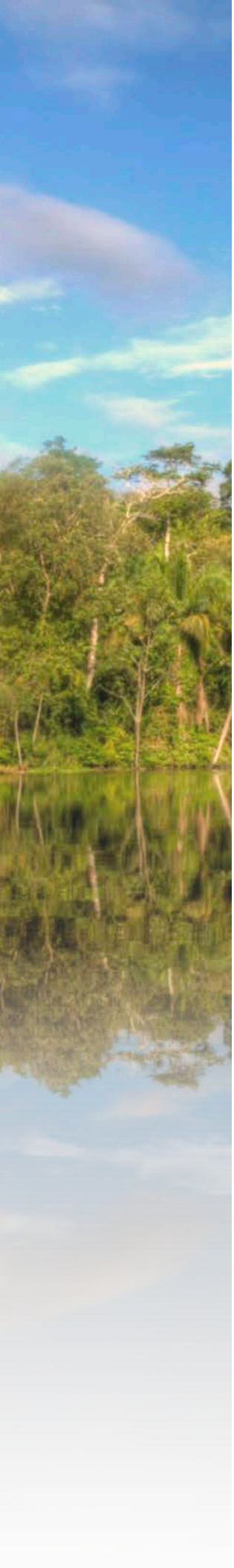
From September–December 2015, Links Media advanced the conceptualization of a behavior change communication guide for clinicians and community health workers to use with malaria patients in Guyana. Additionally, Links Media provided technical assistance to Guyana's Vector Control Services for the development of messages and materials about malaria for the general public in two of the country's endemic regions, 7 and 9.

Links Media and SIAPS delivered technical input on the final revision of malaria job aids for administrative and clinical staff in Guatemala that had originally been developed and validated as a pilot exercise. Links Media revised these information, education, and communication products, which included guides and job aids for malaria supervisors at the district level, the district pharmacy, health centers and posts, a poster on case management, and a laminated sheet on medicines management for malaria volunteer collaborators. Materials were printed for national dissemination through upcoming workshops. SIAPS will complement the guides with an orientation curriculum for staff.

Links Media also began preparations for a webinar on "Good Practices for Collaborating with Indigenous Peoples on Malaria Prevention and Control," to be held in early 2016.

As part of knowledge dissemination activities, Links Media disseminated information from new publications via various channels including the AMI website and AMI Facebook Group Page, to keep stakeholders abreast of the evolving evidence base related to malaria in the Americas. The following is a selection of articles shared during this quarter:

- Carter, K., et al. 2015. Malaria in the Americas: Trends from 1959–2011. *American Journal of Tropical Medicine and Hygiene.* 92(2), pp. 302-316. http://usaidami.org/extras/Carter_2015.pdf
- Griffing, SM., et al. 2015. A historial perspective on malaria control in Brazil. *Memórias do Instituto Oswaldo Cruz.* 110(5). http://usaidami.org/extras/Griffing_et_al_2015.pdf



- Lapouble, OMM., et al. 2015. Epidemiological situation of malaria in the Brazilian Amazon region, 2003 to 2012. *Pan American Journal of Public Health.* 38(4). http://www.usaidami.org/extras/Lapouble_2015.pdf
- Padilla, JC. et. al. 2015. Is there malaria transmission in urban settings in Colombia? *Malaria Journal.* 14(453). http://www.usaidami.org/extras/Padilla(2014)_MalariaJournal.pdf
- Reis, ICd., et al. 2015. Contribution of fish farming ponds to the production of immature *Anopheles spp.* in a malaria-endemic Amazonian town. *Malaria Journal.* 14(452). http://www.usaidami.org/extras/Reis(2015)_MalariaJournal.pdf
- Reis, ICd., et al. 2015. Epidemic and endemic malaria transmission related to fish farming ponds in the Amazon frontier. *PLoS ONE.* 10(9). http://www.usaidami.org/extras/Reis(2015)_PLoSOne.pdf
- Whittaker, M. and Smith, C. 2015. Reimagining malaria: five reasons to strengthen community engagement in the lead up to malaria elimination. *Malaria Journal.* 14(410). http://www.usaidami.org/extras/Whittaker(2014)_MalariaJournal.pdf

Global Malaria News

Countries in the Americas including AMI-supported countries and technical partners USAID, CDC, MSH/SIAPS, USP/PQM, and Links Media participated in an October 2015 consultation in Punta Cana, Dominican Republic, after which convener PAHO/WHO began incorporating feedback into the draft *Regional Strategy and Action Plan for Malaria 2016–2020* aligned with the WHO *Global Technical Strategy (GTS) for Malaria 2016–2030*. PAHO's Technical Advisory Group (TAG) for malaria had its first meeting at the same venue and will work to update the draft, which will be shared at the XV AMI/RAVREDA Annual Evaluation Meeting in Colombia in May 2016.

Photo: PAHO/WHO

Country Spotlight

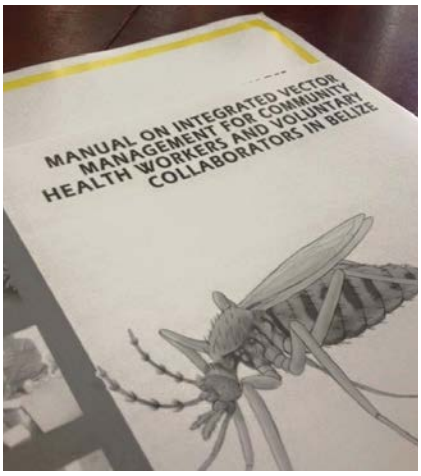


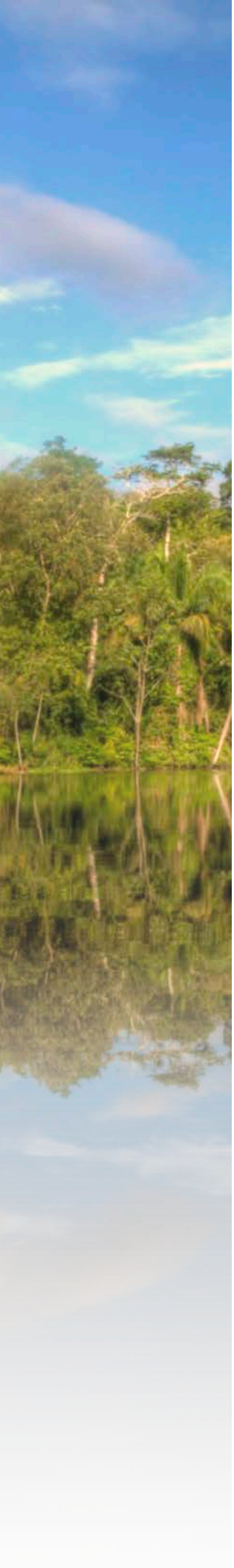
Photo: PAHO/WHO

Belize completed a new manual on integrated vector management (IVM) for community health workers and voluntary collaborators.

In the presence of Roll Back Malaria's Executive Director, Dr. Fatoumata Nafo-Traoré and PAHO/WHO Senior Advisor, Dr. Keith Carter, in November 2015 **Brazil**'s NMCP launched a national malaria elimination plan together with Roll Back Malaria's *Action and Investment to Defeat Malaria (AIM 2015–2030)* document. The elimination plan provides important technical guidance for Brazilian municipalities, and defines differentiated strategies for diagnosis, treatment, vector control, health education, and social mobilization. Brazil aims to reduce malaria cases by 90% by 2030, in support of the new UN Sustainable Development Goals. In 2014, Brazil had its lowest number of malaria cases in 35 years.

Peru continues to address an ongoing malaria emergency in the region of Loreto. The national program has organized trainings to strengthen the capacity of health workers at local health facilities in remote areas of the Amazon such as Yurimaguas, in order to improve the national malaria surveillance system. In addition, the NMCP has coordinated efforts with the regional laboratory in Iquitos, Loreto to confirm suspected cases. After a prolonged absence, Rapid Diagnostic Tests (RDTs) will be deployed to the Loreto region after having been procured centrally by the ministry of public health (MINSA, by its acronym in Spanish).

Photo: Jaime Chang



Calendar of Events

February

American Mosquito Control Association 82nd Annual Meeting
Savannah, USA, February 7–11, 2016.

Deadline to submit nominations for the Roll Back Malaria Partnership Board
February 12, 2016.

April

World Malaria Day
Worldwide, April 25, 2016.

May

AMI/RAVREDA Annual Evaluation Meeting and Semi-Annual Steering Committee Meeting
Colombia, May 2–6, 2016.

AMI/RAVREDA Workshop to Evaluate Antimalarial Drug Supply Management, organized by SIAPS and PAHO
Lima, Peru, May 10–12, 2016.

June

IV International Research Meeting on Infectious Diseases and Tropical Medicine
Quito, Ecuador, June 13–15, 2016.

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Photo: Chloe Hans-Barrientos

August

International Day of the World's Indigenous Peoples
August 9, 2016.

September

AMI/RAVREDA Semi-Annual Steering Committee Meeting
Washington, DC, USA, TBD.

International Congress for Tropical Medicine and Malaria
Brisbane, Australia, September 18–22, 2016.

November

Malaria Day in the Americas
November 6, 2016.

65th Annual Meeting of the American Society of Tropical Medicine and Hygiene (ASTMH)
Atlanta, USA, November 13–17, 2016.

December

World Malaria Report 2016 release.

International Migrants Day
Worldwide, December 18, 2016.

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Photo: PAHO/WHO

Pan American Health Organization
World Health Organization Americas
CDC
SIAPS Systems for Improved Access to Pharmaceuticals and Services
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International Partner Highlights

The **Pan American Health Organization/World Health Organization (PAHO/WHO)** in coordination with the Colombian Ministry of Health and Social Protection (MHSP), hosted the Regional Malaria Partners Meeting in Bogotá on May 2, 2016 and the XV AMI/RAVREDA Annual Evaluation Meeting on May 3–5, 2016. The XV AMI/RAVREDA Annual Meeting included a policy update on mass drug administration by the WHO and the announcement of two new publications by the WHO's Evidence Review Group (ERG).

PAHO in collaboration with member countries developed a *Plan of Action for Malaria Elimination 2016–2020* aligned to the *Global Technical Strategy 2016–2030.* PAHO's Technical Advisory Group (TAG) for malaria reviewed the advanced draft. The document will be presented for approval at the next PAHO Directing Council meeting in September 2016.

With the general shift towards malaria elimination, new publications now include the use of molecular techniques to identify asymptomatic malaria infections, as well as provide details on the surveillance systems around disease foci, case identification, and case specification.

Countries of the Americas continue to face difficulties in the procurement and distribution of antimalarial medicines due to the irregular timing of antimalarial requisitions and the minimum number required for the majority of them. To inform ministries of health about joint procurement protocols and coordinate the timing of antimalarial requisitions, PAHO developed a brochure for engaging with high-level decision makers on the joint procurement of medicines.

Photo: PAHO/WHO

Also to support emergencies and stock-outs, PAHO manages a strategic stock warehouse in Panama. PAHO continues to stock Artemisinin-based Combination Therapies (ACTs) for imported *Plasmodium falciparum* cases coming from areas where resistance to chloroquine is known, as well as antimalarials for severe cases. The warehouse recently acquired first line treatment with chloroquine and primaquine to support countries without access to those antimalarial drugs. Operating 24 hours a day, 7 days a week, it is able to dispatch medicines to address critical shortages, outbreaks, imported cases, and severe cases throughout the Americas. This activity has saved at least 10 lives by providing treatment for severe malaria cases, in addition to ensuring availability of drugs in participating countries. Antimalarials for severe cases (artesunate IV and quinine IV) have been distributed to six countries, including two shipments sent out of the region to Somalia and Swaziland. During this quarter, the warehouse also began stocking treatment for Guillain–Barré disorder to ensure that countries in the region will be able to respond to cases that may emerge in association with the spread of the Zika virus.

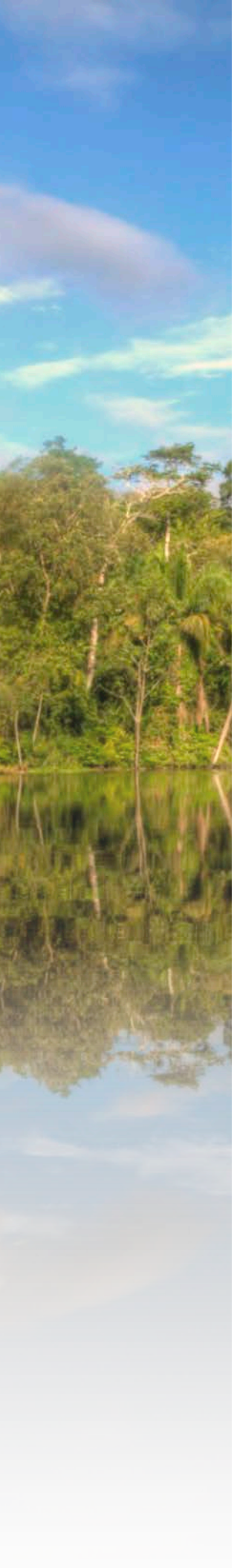


Photo: PAHO/WHO

Coordinated by PAHO's Regional Malaria Program, an External Quality Assurance Program (EQAP) was implemented. Four rounds of evaluation have been undertaken between 2011 and 2015, with twelve national reference laboratories participating in the first round, increasing to 18 and then 21 by the fourth round. Results show that there have been important improvements in laboratory performance compared to the previous round, with satisfactory improvement and achievement of cutoff value in diagnosis (95% cutoff) and parasite morphology (80% cutoff), but much less so in density estimation (80% cutoff) and species identification (95% cutoff). The evaluation will serve to standardize processes and protocols across countries in the microscopic diagnosis of malaria. With decreasing malaria cases, countries need to prioritize the quality of diagnosis in order to detect each and every case. Given different treatment regimens for *P. falciparum* and *Plasmodium vivax* throughout the region, countries should focus on species identification and parasite density in order to move towards malaria elimination. The EQAP continues to showcase the South–South collaboration that is possible in the region, and has helped strengthen the leadership of the national laboratories in Honduras and Peru in the process.

Missions coordinated by PAHO/WHO are visiting countries participating in the Elimination of Malaria in Mesoamerica and the Island of Hispaniola (EMMIE) Initiative to verify malaria data with the purpose of strengthening malaria surveillance as the countries move towards elimination. In collaboration with the US Centers for Disease Control and Prevention (CDC), PAHO/WHO has established a regional Technical Advisory Group on Public Health Entomology (TAG-PHE). The TAG-PHE brings together experts from across the Americas in a direct advising role to PAHO/WHO Director Carissa Etienne, and held its first meeting from March 8–10, 2016. The group of experts aims to strengthen public health entomology, implement integrated vector management (IVM), and both monitor and manage insecticide resistance to address Zika as a public health emergency of international concern. The TAG-PHE is also focused on analyzing the evidence in the field of public health entomology to better direct efforts on other vector-borne diseases. Exploration of new vector surveillance and control measures, including the adoption of new technologies, will also be included in the work of the TAG-PHE.

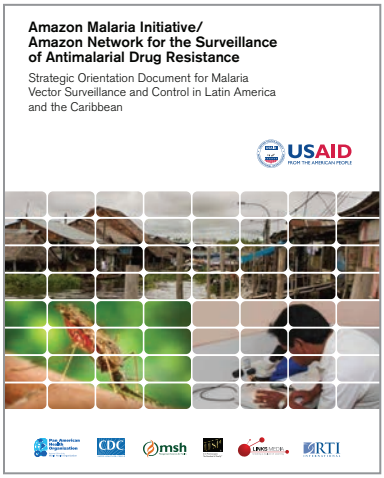
Photo: PAHO/WHO

Experts from the **US Centers for Disease Control and Prevention (CDC)** malaria branch have been contributing to the Zika outbreak response in the region, reinforcing vector surveillance and control activities in affected countries.

As part of continued support in strengthening medicines' quality assurance systems in the region, the **Promoting the Quality of Medicines (PQM) Program** implemented by the US Pharmacopeial Convention (USP) will hold a meeting in the second half of 2016. The meeting will convene partners from selected countries to further advance in establishing a sustainable framework for South–South collaborations.

The USAID-funded **Systems for Improved Access to Pharmaceuticals and Services (SIAPS)** Program evaluated progress of the Integrated Malaria Control Strategy implemented by the Colombian National Program for the Promotion, Prevention and Control of Vector Borne Diseases in the departments of Cauca, Meta and Nariño. In the area of pharmaceutical supply chain management, Brazil was a major focus of SIAPS interventions this quarter, with an electronic application developed to analyze information from the supervision system, and piloted in the states of Amazonas and Acre. Also in Brazil, SIAPS completed a rapid evaluation to characterize the mobile population in Roraima state and design targeted interventions, particularly for artisanal gold miners. In addition, SIAPS delivered its systematization of practices and proposal to monitor malaria control activities in mining areas of Pará state to the National Malaria Control Program (NMCP) in March 2016, with follow-up scheduled for July 2016. In both cases, the need to establish alternative mechanisms for the continuous provision of diagnosis and treatment to mobile populations was highlighted. A workshop to follow-up on the progress of closing performance gaps in the implementation of malaria control interventions was scheduled for May 17–18, 2016 with the participation of nine state-level malaria programs in Brazil.

Photo: PAHO/WHO



Credit: PAHO/WHO, Links Media

As part of continued support to AMI, **Links Media** provided graphic design assistance and editorial support to PAHO/WHO for three AMI Strategic Orientation Documents that were originally published in 2011: (1) Vector Surveillance and Control in Latin America and the Caribbean, (2) Supply Management and Quality Assurance for Drugs and Supplies Used in Malaria Diagnosis and Treatment, and (3) Monitoring the Efficacy of and Resistance to Antimalarials in the Current Epidemiological Context. The documents were finalized and disseminated in English, Spanish, and Portuguese.

On April 5th, Links Media held a regional webinar on "Good Practices for Collaborating with Indigenous Peoples on Malaria Prevention and Control," with the goal of improving health managers' knowledge of indigenous health and intercultural communication pertaining to malaria. The webinar was attended by a total of 70 participants from Bolivia, Brazil, Colombia, Costa Rica, Ecuador, Guatemala, Guyana, Honduras, Nicaragua, Panama, and Peru including health professionals, civil society organizations, PAHO and USAID.

In close coordination with the regional health directorate (DIRESA) in Peru's Loreto region, Links Media finalized terms of reference for an Education, Communication, and Social Mobilization Specialist for Malaria to work within Loreto's DIRESA.

Links Media provided research support and advocacy recommendations to the Suriname NMCP director for a letter to be sent on World Malaria Day 2016, to national decision-makers about malaria elimination.

Links Media provided technical assistance to Guyana's Vector Control Services for the development of a pocket guide on rapid diagnostic test (RDT) use and storage, to be distributed at regional trainings in the country's endemic regions. The illustrated guide includes instructions in English, Spanish, and Brazilian Portuguese for mobile loggers and miners.

Global Malaria News

According to WHO, at least 10 new countries are expected to eliminate malaria by 2020, at least 10 from 2020–2025, and at least 15 from 2025–2030. Importantly, the WHO has said that all countries can accelerate towards malaria elimination, and that innovative tools and implementation approaches will be needed to reach elimination targets.

New research at the University of Melbourne by Goodman et al., *Parasites resistant to the antimalarial atovaquone fail to transmit by mosquitoes*, on *Plasmodium berghei* malaria in mice, published in March 2016, suggests that resistance to the commonly-used antimalarial medication, atovaquone, is apparently unable to be transmitted. Although the human-specific *P. falciparum* malaria has only been investigated experimentally in mosquitoes so far, similar effects were reported.

The WHO has recently published *Eliminating Malaria* and *Information note on recommended selection criteria for procurement of malaria rapid diagnostic tests (RDTs)*. The WHO has also published *The Emergency Response to Artemisinin Resistance in the Greater Mekong Sub-Region.* Another publication on the *Control and Elimination of* P. vivax *Malaria* is expected to be an important resource for the Americas, given the predominance of *P. vivax* malaria in most countries in the region.

Country Spotlight

Colombia's MHSP hosted the XV AMI/RAVREDA Annual Evaluation Meeting from May 3–5, 2016 in the city of Bogotá. In recognition of World Malaria Day 2016, on April 26th Colombia's epidemiological surveillance committee within the Ministry of Health developed the following themes: perspectives on malaria elimination, urban malaria and epidemiological surveillance by laboratory and entomology. On April 29th, the National Institute of Health (NIH) held a scientific discussion on malaria specific themes. Lastly, a meeting was held to develop malaria contingency plans for the country departments that are experiencing outbreaks.

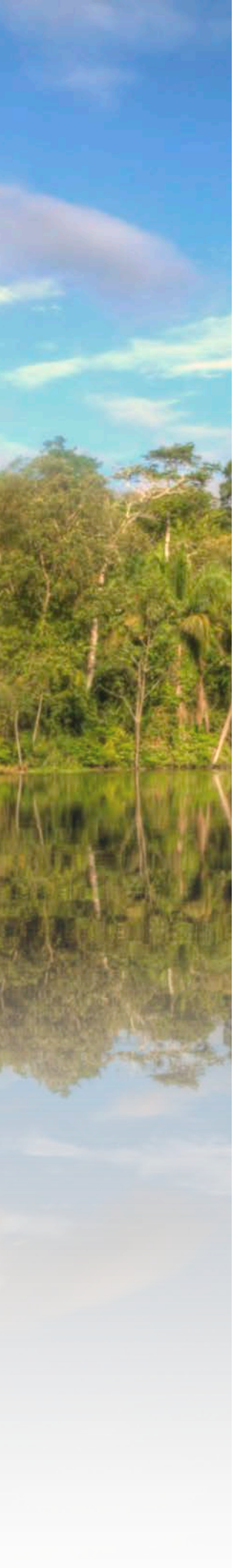
To mark World Malaria Day 2016, **Guatemala**'s Ministry of Public Health and Social Assistance launched the "National Alliance to Eliminate Malaria" with the goal of eliminating *P. falciparum* malaria by 2017 and *P. vivax* by 2020. Through this partnership, Guatemala's civil society, private sector, and international cooperation agencies will provide technical and financial support to malaria elimination efforts.

Peru continues to address an ongoing malaria emergency in the region of Loreto. The national program, in coordination with PAHO and Peru's National Institute of Health, organized a training workshop from February 22–26, 2016 (23 microscopists participated) to strengthen the capacity for quality-assured microscopy in order to continue improving the national malaria surveillance system in Iquitos. During the month of April, NMCP representatives from Peru and Brazil met in Loreto to discuss joint efforts to address malaria cases in border towns and share work experiences with indigenous populations.

Ecuador is currently addressing the aftermath of an April 2016 earthquake, in which some equipment for malaria control, such as microscopes, were damaged. After the NMCP's functions were assumed by the National Direction of Prevention and Control Strategies and the National Institute of Public Health Research (NIPHR), the country now has a 2016–2020 Malaria Elimination Plan.

On April 24, 2016, to mark World Malaria Day, **Guyana**'s Vector Control Services (VCS) launched the pilot roll-out of RDTs in one of the country's malaria endemic regions, Region 8 and held a two-day training session for miners on the use of RDTs, from April 25-26. The recently developed pocket guide, including illustrated user instructions for the proper use and storage of RDTs, will be used for future training sessions in other endemic regions.

Photo: PAHO/WHO



Calendar of Events

June

Meeting of the WHO's malaria evidence review group to discuss changes to *Malaria Elimination: An Operational Manual*
Shanghai, China, June 2–3, 2016.

IV International Research Meeting on Infectious Diseases and Tropical Medicine
Quito, Ecuador, June 13–15, 2016.

Science of Eradication: Malaria Course
Barcelona, Spain, June 12–18, 2016.

Meeting of the Council of Ministers of Health of Central America and the Dominican Republic (COMISCA),
TBD.

August

International Day of the World's Indigenous Peoples
Worldwide, August 9, 2016.

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Amazon Malaria Initiative Group

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AMI's Flickr Page

Instagram.com/AmazonMalaria

Photo: Patricia Sanchez Bao

September

AMI/RAVREDA Semi-Annual Steering Committee Meeting
Washington, DC, USA, TBD.

International Congress for Tropical Medicine and Malaria
Brisbane, Australia, September 18–22, 2016.

October/November

Launch of new WHO/GMP malaria elimination materials
Cairo, Egypt.

November

Malaria Day in the Americas
November 6, 2016.

65th Annual Meeting of the American Society of Tropical Medicine and Hygiene (ASTMH)
Atlanta, USA, November 13–17, 2016.

December

World Malaria Report 2016 release.

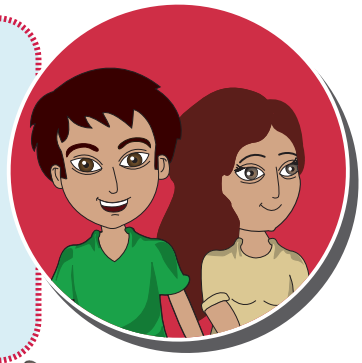
International Migrants Day
Worldwide, December 18, 2016.

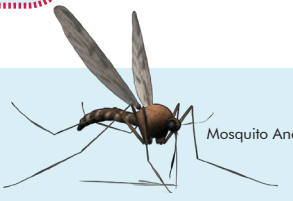
DISCLAIMER: Bulletin contents do not necessarily reflect views or endorsements of the United States Agency for International Development or the United States Government.

GUÍA PARA COLABORADORES VOLUNTARIOS/AS:

¿Cómo debo atender a las personas con sospecha de malaria?

- **Es muy importante confirmar el diagnóstico a toda persona que se sospeche que tiene malaria mediante:**
  Un examen de gota gruesa.
  Si se dispone de la Prueba de Diagnóstico Rápido (PDR), también se debe realizar.
- **Los medicamentos para curar la malaria se dan solamente si el resultado es positivo.**
- **La malaria se cura tomando el tratamiento completo de cloroquina y primaquina, según el esquema radical de tratamiento.**
- **El tratamiento es gratis.**





1 ¿CUÁNDO SOSPECHO QUE UNA PERSONA PUEDE TENER MALARIA?

Cuando la persona:

-Tiene calentura un día sí y otro no.

-Tiene escalofríos un día sí y otro no.

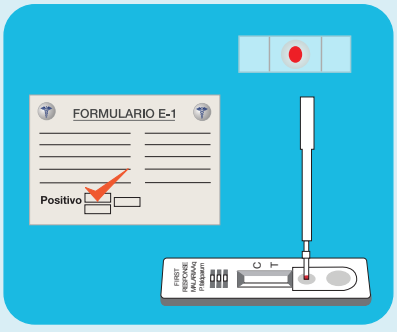
-Tiene dolor y malestar generalizados.

-Vive en zona malárica y cree que tiene malaria.

SEÑALES DE GRAVEDAD

- **Mareo**
- **Desorientación**
- **Convulsiones**

2 ¿CÓMO CONFIRMO QUE ES MALARIA?



-Tomo la muestra para gota gruesa, envuelvo la laminilla en el Formulario E-1 y la entrego al supervisor antes de 72 horas.

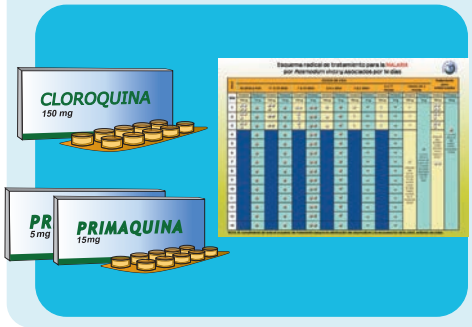
-En caso de que el supervisor no llegue todavía, envío la muestra con el personal del puesto de salud, del Centro de Atención Permanente o con un maestro de la comunidad.

-Si tengo PDR, también la realizo y espero el resultado en 20 minutos.

-Solamente si el resultado de la prueba es positivo le doy tratamiento.

Referir al centro de salud

3 ¿CÓMO DEBO TRATAR LOS CASOS CONFIRMADOS?

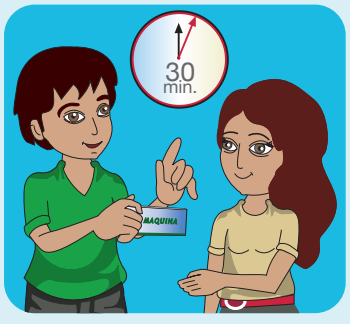


-Todas las embarazadas y todos los niños menores de un año, con diagnóstico positivo deben referirse al hospital o centro de salud.

-Cuando el resultado del examen de gota gruesa o PDR es positivo, doy medicamentos antimaláricos.

-Entrego cloroquina y primaquina, según la ficha de esquema radical de tratamiento.

4 ¿CÓMO DEBO ENTREGAR LOS MEDICAMENTOS ANTIMALÁRICOS?



-Doy la primera dosis de cloroquina y primaquina y observo al paciente.

-Si vomita en los primeros 30 minutos, le doy otra vez la misma dosis de las medicinas; si con la segunda dosis sigue vomitando, entonces referirlo a un centro de salud u hospital.

-Oriento al paciente o familiar sobre cómo se deben tomar los medicamentos antimaláricos.

-Le entrego tratamiento en tres partes. Por ejemplo, los primeros tres días, y el resto dividido en dos entregas.

-Cada vez que regresa el paciente por su tratamiento, lo observo y le pregunto si se siente mejor y si está cumpliendo con el tratamiento.

-Lleno un **Formulario E-1** para cada paciente y anoto en él, la cantidad de medicamentos antimaláricos entregada.

-Reporto los tratamientos finalizados de igual manera en el E-1.

-Debo hacer las pruebas de control al terminar el tratamiento.

5 ¿CÓMO DEBO ORIENTAR SOBRE EL TRATAMIENTO?

Explico que:

-La malaria se cura únicamente tomando cloroquina y primaquina, según el esquema radical.

-Se deben tomar las pastillas cada día, a la misma hora.

-Se debe tomar el medicamento antimalárico después de comer, para evitar molestias del estómago.

-Se debe cumplir con todo el tratamiento, aunque ya no tenga molestias.

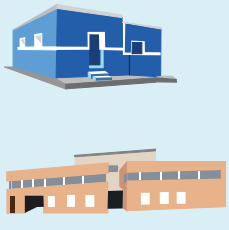
-No se debe dar el medicamento antimalárico a otra persona.

-Se debe guardar fuera del alcance de los niños.

-Si los signos de malaria no desaparecen se debe consultar otra vez.

-No se debe automedicar.

6 ¿CUÁNDO DEBO REFERIR AL PACIENTE AL CENTRO DE SALUD O AL HOSPITAL?



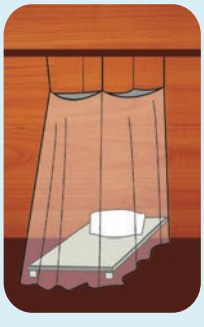
-Cuando la persona ya tomó los medicamentos antimaláricos y sigue con síntomas.

-Cuando el resultado sea negativo y la persona sigue con síntomas.

-Cuando haya señales de gravedad.

-Cuando el paciente sea un niño menor de un año o una embarazada.

7 ¿CÓMO PREVENIR LA MALARIA?



-Evitar las picaduras usando pabellón cuando están descansando o durmiendo.

-Identificar criaderos que tienen apariencia de lana verde, limpiarlos cada 8 días o drenarlos y rellenarlos.

-Chapear los alrededores y la orilla de los riachuelos para evitar que el agua se estanque.

-Además, trabajar con las autoridades y la comunidad para eliminar criaderos de zancudos.

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GUÍA PARA LA GESTIÓN DE MEDICAMENTOS ANTIMALÁRICOS E INSUMOS DE DIAGNÓSTICO

EN CENTROS Y PUESTOS DE SALUD

Ministerio de Salud Pública
República de Guatemala

La presente guía se elaboró con base en las Normas de Atención del Departamento de Regulación de los Programas de Atención a las Personas. Su objetivo es orientar al personal que gestiona medicamentos en los centros y puestos de salud (encargado de bodega) para asegurar el abastecimiento de medicamentos antimaláricos e insumos de diagnóstico para la atención oportuna de los casos que los requieren.

COMO RESPONSABLE DE LOS MEDICAMENTOS EN EL CENTRO O PUESTO DE SALUD, DEBO:

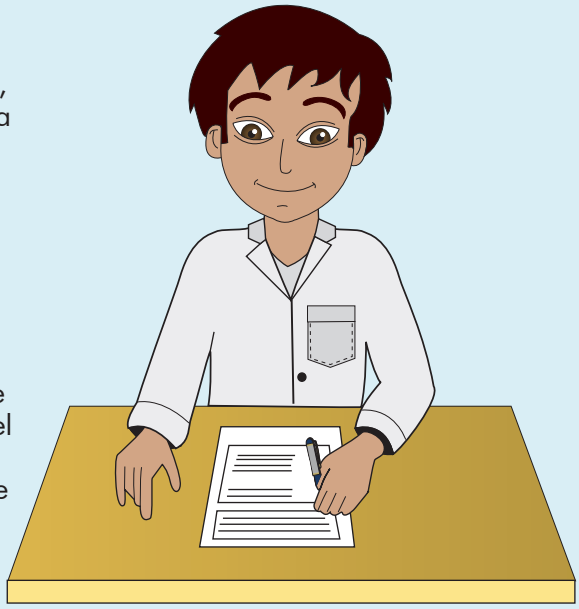
- Tener siempre disponibles los medicamentos antimaláricos: cloroquina y primaquina, e insumos de diagnóstico que no estén vencidos.
- Almacenar los medicamentos e insumos antimaláricos de acuerdo a las buenas prácticas de almacenamiento.
- Entregar medicamentos antimaláricos solamente a los pacientes con diagnóstico confirmado de malaria, es decir, que tengan resultado positivo del examen de gota gruesa o de prueba rápida.

Para asegurar el buen manejo de medicamentos antimaláricos y el tratamiento adecuado de los casos de malaria, existen cinco preguntas que debo considerar.

¿Qué cantidad debo tener? 1

- Debo estar abastecido con medicamentos antimaláricos e insumos de diagnóstico para atender a casos sospechos de malaria. Si tengo pocos medicamentos e insumos antimaláricos no podré atender a todos los pacientes, y si tengo muchos se pueden vencer.
- Debo solicitar medicamentos antimaláricos e insumos de diagnóstico mensualmente para mantener mi abastecimiento entre un stock máximo y mínimo de acuerdo a la classificación de mi distrito.

2 ¿Cómo solicito los medicamentos e insumos antimaláricos?



- Al solicitar los medicamentos, tengo que incluir cloroquina y primaquina, porque el tratamiento de malaria necesita los dos medicamentos. Para facilitar tratamientos de niños y adultos tengo que incluir las dos presentaciones de primaquina (tabletas de 5 mg y de 15 mg).
- También, es importante incluir en el balance de medicamentos y productos afines, todos los insumos necesarios para las pruebas de malaria: laminillas, lancetas, pruebas rápidas de diagnóstico, algodón, alcohol y otros insumos de laboratorio.
- Cada mes, debo solicitar en el formulario de requisición, la cantidad de medicamentos e insumos antimaláricos que me faltan para completar el stock máximo. La requisición debidamente firmada la envío al responsable de la bodega del distrito junto con el reporte de balance de medicamentos y productos afines.
- Esta documentación la debo enviar según el calendario mensual establecido por la Dirección de Área de Salud.

3 ¿Qué debo hacer cuando recibo los medicamentos antimaláricos?

Debo revisar los medicamentos e insumos antimaláricos que me entregan, verificando que sean los que solicité.

REVISO

1. Nombre del medicamento e insumo de diagnóstico, concentración y presentación.
2. Cantidad recibida, comparada con la cantidad solicitada.
3. Número de lote.
4. Fecha de vencimiento.
5. Forma y apariencia física de los medicamentos (que el blíster no tenga aire, que las tabletas no tengan rajaduras, cambio de color, no se vean mojadas.
6. Que la caja del empaque no esté dañada.

- Si hay errores o faltantes, comparado con lo solicitado, lo anoto en la Requisición e informo al director del distrito para que tome las medidas administrativas correspondientes.
- Si el medicamento antimalárico solicitado presenta alteraciones físicas visibles como las descritas anteriormente, elaboro un conocimiento con la información siguiente: nombre del medicamento, concentración, número de lote, fecha de vencimiento y marca comercial, si la tuviera. Envío copia del conocimiento y los medicamentos que presentan problemas al encargado del medicamentos del distrito quien informa al encargado de logística de medicamentos de la Dirección del Área de Salud.
- Anoto el ingreso de los medicamentos en la tarjeta de control de suministros (kardex), llenando cada columna descrita en el formulario
- Archivo copia del balance de medicamentos y productos afines.
- Archivo copia de la requisición.

¿Cómo debo almacenar los medicamentos antimaláricos?

4

Es muy importante que almacene los medicamentos e insumos antimaláricos en un ambiente adecuado, en buenas condiciones. No los debo almacenar junto con productos tóxicos, como insecticidas.

La bodega de medicamentos debe ser:

- Un lugar seguro.
- Protegido de la luz solar.
- Un lugar fresco, no húmedo, evitando temperatura superior a los 30 °C. Debo controlar la temperatura ambiental dos veces al día, anotando la temperatura máxima y mínima alcanzada.
- La bodega debe tener estanterías para colocar los medicamentos antimaláricos ordenados por fecha de vencimiento. Los que tienen fecha de vencimiento más cercana deben de estar más accesibles y consumirse primero. Debo aplicar el sistema: Primero en Expirar, Primero en Entregar (PEPE).

  → Verifico una vez al mes la fecha de vencimiento y las características físicas de los medicamentos, ya que pueden dañarse o vencerse.
- Si mi bodega no cumple con estas condiciones, debo informar a mis superiores.
- Cada vez que despache un medicamento antimalárico de la bodega, lo debo anotar en el kardex. Este documento sirve para llevar el control físico de cada medicamento y contiene información detallada y actualizada sobre ingreso, consumo y saldos.

Al seguir estas indicaciones no tendré pérdida de medicamentos antimaláricos por vencimiento, daño o defectos de calidad. Pero si se diera el caso, debo:

- Separar los medicamentos antimaláricos que estén vencidos, dañados o con aparentes defectos de calidad.
- Notificar al nivel superior para iniciar el proceso administrativo de descargo y destrucción; el nivel superior deberá indicarme cuando tenga la autorización de descargarlos del kardex (ver Acuerdo Ministerial No. 534-2011).

  En el reporte de balance de medicamentos y productos afines, los reporto con reajustes negativos, pues ya no son existencias disponibles.
- Solicitar medicamentos antimaláricos nuevamente a la bodega de distrito.

5 ¿Cómo entrego los medicamentos?

- Entrego medicamentos antimaláricos a los pacientes, anotándolos en el formulario SIGSA 4 C/S o en el formulario SIGSA 3 P/S.
- Entrego medicamentos antimaláricos solamente si hay diagnóstico confirmado por gota gruesa o prueba rápida.
- Entrego el tratamiento de cloroquina y primaquina, según el esquema de tratamiento.
- Al entregar medicamentos antimaláricos debo llenar **Formulario E-1, Formulario SIGSA correspondiente, registro diario de demanda real** y kardex.
- Debo proporcionar al paciente o al familiar consejos claros de cómo tomar los medicamentos antimaláricos y la importancia de completar el tratamiento. **Los consejos que debo dar son:**

  - Tomar los medicamentos antimaláricos una vez al día a la misma hora, según el esquema de tratamiento.
  - Tomar los medicamentos antimaláricos después de comer para evitar molestias gástricas.
  - Finalizar el tratamiento antimalárico aun cuando hayan desaparecido los síntomas.
  - No guardar medicamentos antimaláricos para que los tome otra persona.
  - No automedicarse.
  - Si los signos de malaria no desparecen, se debe consultar otra vez.
  - Guardar los medicamentos fuera del alcance de niños.
  - Consejos sobre prevención de malaria como: uso constante del pabellón, uso de repelentes y casa limpia.

- Verifico que el paciente comprenda los consejos, pidiéndole que los repita.

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GUÍA PARA LA GESTIÓN DE MEDICAMENTOS ANTIMALÁRICOS E INSUMOS DE DIAGNÓSTICO

EN DISTRITOS

Ministerio de Salud Pública
República de Guatemala

La presente guía se elaboró con base en las Normas de Atención del Departamento de Regulación de los Programas de Atención a las Personas. Su objetivo es orientar al personal que gestiona medicamentos en los distritos de salud y al coordinador de vectores del distrito, para asegurar el abastecimiento de medicamentos antimaláricos e insumos de diagnóstico para la atención oportuna de los casos que los requieren.

COMO RESPONSABLE DE VECTORES DEL DISTRITO, DEBO:

- Revisar los reportes consolidados de los supervisores y aprobar la requisición de medicamentos e insumos antimaláricos de cada uno.
- Entregar las requisiciones autorizadas de los supervisores al encargado de medicamentos del distrito.
- Elaborar la certificación de la información de los supervisores y enviarla al coordinador municipal de salud para su firma.

COMO RESPONSABLE DE LOS MEDICAMENTOS EN EL DISTRITO, DEBO:

- Recibir, revisar y aprobar las requisiciones y balances de medicamentos antimaláricos y productos afines de los centros y puestos de salud.
- Preparar los pedidos de medicamentos e insumos antimaláricos, con base en las requisiciones autorizadas, para despacharlos a los supervisores, centros y puestos de salud, en el caso de que en el distrito no sea el coordinador de vectores el que los entregue.
- Entregar los medicamentos a los supervisores, centros y puestos de salud.

Para asegurar el buen manejo de medicamentos antimaláricos y el tratamiento adecuado de los casos de malaria, existen cinco preguntas que debo considerar, como responsable de los medicamentos en el Distrito de Salud.

¿Qué cantidad debo tener? 1

- Debo tener suficientes medicamentos antimaláricos e insumos de diagnóstico para abastecer a los supervisores, centros y puestos de salud. Si tengo pocos medicamentos no podré atender a todos, y si tengo muchos se pueden vencer.
- Debo solicitar mensualmente medicamentos antimaláricos e insumos de diagnóstico a la Dirección de Área de Salud para mantener un stock que me permita abastecer a su nivel máximo a los supervisores del distrito, así como a los centros y puestos de salud. Sumo las cantidades máximas estimadas por los supervisores, centros y puestos de salud reportadas en los consolidados y balances. Esto se lo resto al dato del saldo del mes siguiente del balance consolidado de distrito.

2 ¿Cómo solicito los medicamentos e insumos antimaláricos?

- En el balance de medicamentos y productos afines del distrito, consolido la información de los balances de los centros y puestos de salud, así como los reportes consolidados de "*Control de Insumos Antimaláricos*" de los Colaboradores Voluntarios, de cada supervisor que me traslada el coordinador de vectores de distrito.
- Según el calendario mensual establecido, lleno la requisición y la envío junto con el balance de medicamentos y productos afines consolidado del distrito al responsable de logística de la Dirección de Área de Salud. La requisición debe llevar la firma del Director de distrito.
- El encargado de logística de la Dirección de Área de Salud revisa y autoriza las requisiciones para que sean despachadas por el encargado de bodega del Área.

3 ¿Qué debo hacer cuando recibo los medicamentos antimaláricos?

Debo revisar los medicamentos e insumos antimaláricos que me entregan, verificando que sean los que solicité.

REVISO

1. Nombre del medicamento antimalárico e insumo de diagnóstico, concentración y presentación.
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5. Forma y apariencia física de los medicamentos (que el blíster no tenga aire, que las tabletas no tengan rajaduras, cambio de color, no se vean mojadas).
6. Que la caja del empaque no esté dañada.

- Si hay errores o faltantes, comparado con lo solicitado, lo anoto en la requisición e informo al Director del distrito para que tome las medidas administrativas correspondientes.
- Si el medicamento antimalárico solicitado presenta alteraciones físicas visibles como las descritas anteriormente, elaboro un conocimiento con la información siguiente: nombre del medicamento, concentración, número de lote, fecha de vencimiento y marca comercial, si la tuviera. Envío copia del conocimiento y los medicamentos que presentan problemas al encargado de logística de medicamentos de la Dirección del Área de Salud.
- Anoto el ingreso de los medicamentos en la tarjeta de control de suministros (kardex), llenando cada columna descrita en el formulario.
- Archivo copia del balance de medicamentos y productos afines.
- Archivo copia de la requisición.

¿Cómo debo almacenar los medicamentos antimaláricos?

4

Es muy importante que almacene los medicamentos e insumos antimaláricos en un ambiente adecuado, en buenas condiciones. No los debo almacenar junto con productos tóxicos, como insecticidas.

La bodega de medicamentos debe ser:

- Un lugar seguro.
- Protegido de la luz solar.
- Un lugar fresco, no húmedo, evitando temperatura superior a los 30°C. Debo controlar la temperatura ambiental dos veces al día, anotando la temperatura máxima y mínima alcanzada.
- La bodega debe tener estanterías para colocar los medicamentos antimaláricos ordenados por fecha de vencimiento. Los que tienen fecha de vencimiento más cercana deben de estar más accesibles para consumirse primero. Debo aplicar el sistema: Primero en Expirar, Primero en Entregar (PEPE).

  → Verifico una vez al mes la fecha de vencimiento y las características físicas de los medicamentos antimaláricos, ya que pueden dañarse o vencerse.
- Si mi bodega no cumple con estas condiciones, debo informar a mis superiores.
- Cada vez que despache un medicamento antimalárico de la bodega, lo debo anotar en el kardex. Este documento sirve para llevar el control físico de cada medicamento y contiene información detallada y actualizada sobre ingreso, consumo y saldos.

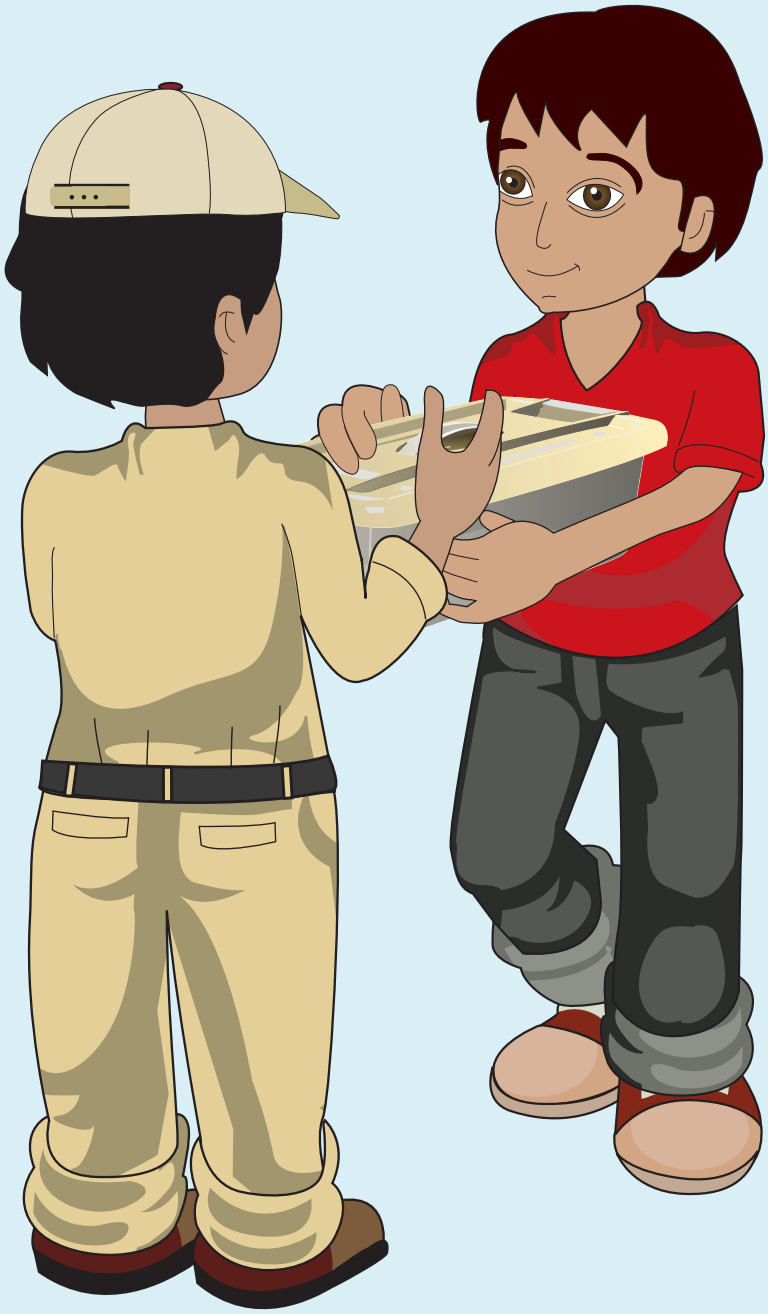
Al seguir estas indicaciones no tendré pérdida de medicamentos antimaláricos por vencimiento, daño o defectos de calidad. Pero si se diera el caso, debo:

- Separar los medicamentos antimaláricos que estén vencidos, dañados o con aparentes defectos de calidad.
- Notificar al nivel superior para iniciar el proceso administrativo de descargo y destrucción; el nivel superior deberá indicarles cuando tengan la autorización de descargarlos del kardex (ver Acuerdo Ministerial No. 534-2011).

  En el reporte de balance de medicamentos y productos afines, consolidado del distrito, los reporto con reajustes negativos, pues ya no son existencias disponibles.
- Solicitar medicamentos nuevamente a la bodega de distrito.

5 ¿Cómo entrego los medicamentos antimaláricos e insumos de diagnóstico?

- Recibo las requisiciones de cada supervisor, centro y puesto de salud.
- Abastezco a cada supervisor, centro y puesto de salud de acuerdo a la cantidad solicitada en la requisición, para garantizar que se mantengan las existencias máximas de acuerdo a los saldos reportados.
- Al terminar la entrega de medicamentos antimaláricos e insumos de diagnóstico, anoto las cantidades despachadas por producto en el kardex.
- No entrego medicamentos antimaláricos directamente a pacientes.



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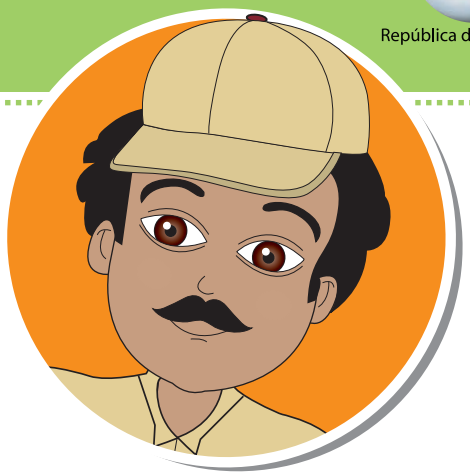
GUÍA DE GESTIÓN DE MEDICAMENTOS ANTIMALÁRICOS E INSUMOS DE DIAGNÓSTICO PARA SUPERVISORES DE LOS COLABORADORES VOLUNTARIOS

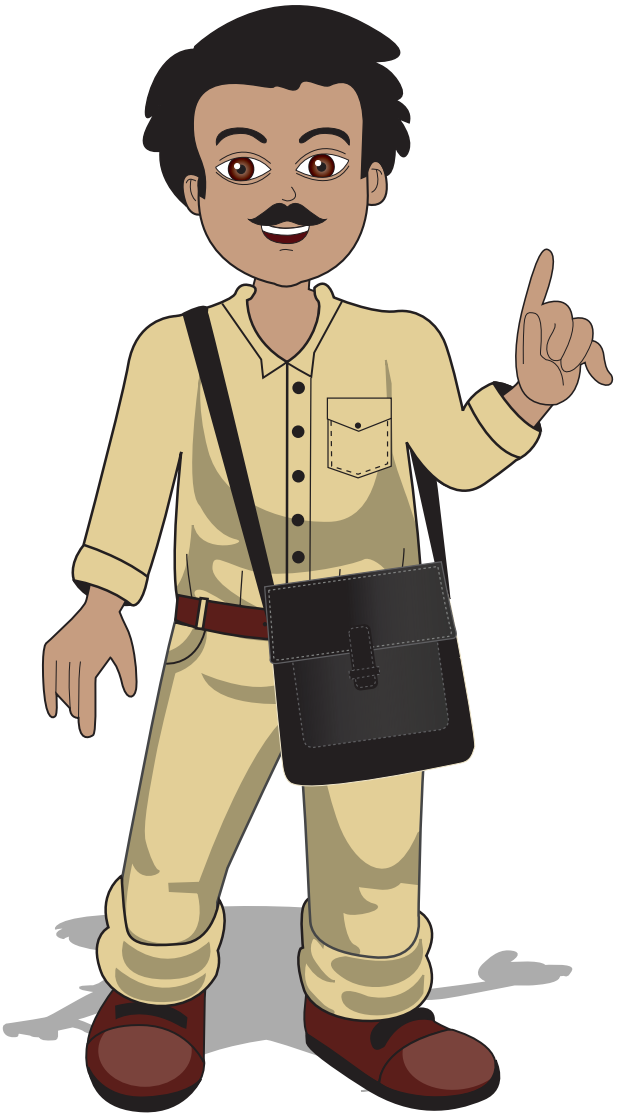
EN DISTRITOS DE SALUD

Ministerio de Salud Pública
República de Guatemala



La presente guía se elabora para orientar al personal que supervisa a los Colaboradores Voluntarios en la gestión de medicamentos e insumos, para el diagnóstico y tratamiento de malaria, a fin de asegurar el abastecimiento y uso racional de los mismos, de acuerdo con las Normas del Ministerio de Salud Pública y Asistencia Social.*

ASPECTOS IMPORTANTES PARA LA GESTIÓN DE LOS MEDICAMENTOS E INSUMOS ANTIMALÁRICOS



¿Qué cantidad solicito? 1

- Debo solicitar cantidades adecuadas de medicamentos e insumos antimaláricos para abastecer a los Colaboradores Voluntarios. Si pido pocos medicamentos e insumos, no podré abastecerlos a todos y si pido muchos medicamentos e insumos, no los utilizarán todos y se podrían vencer.
- Debo saber cuántos Colaboradores Voluntarios activos tengo a mi cargo que están reportando casos.
- Debo solicitar cada medicamento e insumo antimalárico de acuerdo a las cantidades máximas establecidas para distritos clasificados como en fase de control y distritos clasificados pre-eliminación, en el Reporte Consolidado de Control de Insumos Antimaláricos de los Colaboradores Voluntarios.
- En este reporte, calculo la cantidad máxima de cada medicamento e insumo antimalárico.

Cantidad máxima	=	Cantidad máxima por Colaborador Voluntario	x	No. de Colaboradores Voluntarios que cubro + stock de reserva

  - Cantidad máxima que debe tener un Colaborador Voluntario.
  - Número de Colaboradores Voluntarios que debo abastecer, más (+) un stock de reserva para el supervisor.
  - El stock de reserva es igual a la cantidad máxima para cubrir dos Colaboradores Voluntarios.

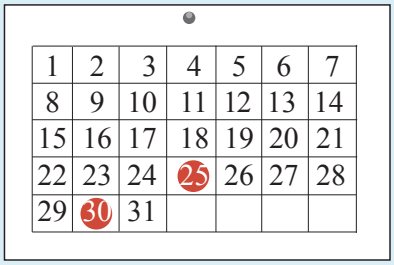
La cantidad a solicitar la calculo restando a la cantidad máxima el saldo actual que tengo en el reporte:

Cantidad a solicitar	=	Cantidad máxima	–	Saldo actual (saldo de todos los Colaboradores Voluntarios y el supervisor)

*El encargado de apoyar a los Colaboradores Voluntarios recibe varias denominaciones dependiendo del Área de Salud: supervisor, técnico de campo, polifuncional, evaluador, polivalente, etc.

2 ¿Cómo solicito los medicamentos e insumos antimaláricos?

- La solicitud de medicamentos antimaláricos e insumos de diagnóstico la realizo **cada mes.**
- Entre el **25 y el 30** de cada mes recolecto los Informes de Antimaláricos e Insumos de los Colaboradores Voluntarios.
- Elaboro el Reporte Consolidado de Control de Insumos Antimaláricos de los Colaboradores Voluntarios. En este reporte anoto los movimientos generales de cada colaborador voluntario y de mi stock de existencias por cada producto y lo sumo.
- Elaboro la requisición basándome en el punto 1 (¿Qué cantidad solicito?), con la cantidad a solicitar de los medicamentos e insumos antimaláricos:
  - Los medicamentos antimaláricos: cloroquina tabletas 150 mg, primaquina tabletas 5 mg y primaquina tabletas 15 mg.
  - Los insumos de diagnóstico: pruebas rápidas de diagnóstico, laminillas, lancetas, algodón y alcohol.



- Entrego el Reporte Consolidado de Control de Insumos Antimaláricos de los Colaboradores Voluntarios y la requisición al distrito, usualmente en la primera semana de cada mes (entre el 2 y 4) para que el coordinador de vectores del distrito de salud apruebe la requisición y se me abastezca con los medicamentos e insumos antimaláricos solicitados.

¿Qué hago al recibir los medicamentos e insumos antimaláricos? 3

Reviso los medicamentos e insumos de diagnóstico, verificando:

1. Nombre del medicamento e insumo antimalárico, concentración y presentación.
2. Cantidad recibida, comparada con la cantidad solicitada.
3. Fecha de vencimiento.
4. Forma y apariencia física de los medicamentos (que el blíster no tenga aire y que las tabletas no tengan rajaduras, cambio de color o se vean mojadas).
5. Que la caja del empaque no esté dañada.

- Los errores o faltantes los anoto en el formulario de requisición e informo al coordinador del distrito de salud para que tome las medidas administrativas correspondientes.
- Si el medicamento solicitado presenta alteraciones físicas visibles como las descritas anteriormente, elaboro un conocimiento con la información siguiente: nombre del medicamento, concentración, número de lote, fecha de vencimiento y marca comercial, si la tuviera. Envío copia de conocimiento y los medicamentos que presentan problemas al encargado de medicamentos del distrito quien informa al encargado de medicamentos de la Dirección del Área de Salud.
- Elaboro un cronograma para la entrega de los medicamentos e insumos antimaláricos a los Colaboradores Voluntarios según sus existencias.

¿Cómo almaceno los medicamentos e insumos antimaláricos? 4

- Mientras entrego los medicamentos antimaláricos a los Colaboradores Voluntarios, es importante que los guarde en un lugar en la sede del distrito, que cumpla con estas condiciones:
  - Para protegerlos del polvo, la humedad, el sol y evitar perdida o derrames, deben estar almacenados en una caja plástica o gabinete con puertas.
  - Estas cajas o gabinete deben estar en un lugar seguro bajo llave.
- La temperatura del lugar donde guardo los medicamentos antimaláricos no debe ser mayor de 30°C. Reviso la temperatura ambiental dos veces al día, llevando el control de temperatura máxima y mínima. Los medicamentos antimaláricos no deben estar cerca del suelo, ni cerca de productos tóxicos, como insecticidas.
- Reviso cada mes la fecha de vencimiento de mis medicamentos. Si hay medicamentos vencidos o dañados, los separo y elaboro un conocimiento, el cual debo presentar, al encargado de medicamentos del distrito y al coordinador de distrito quienes solicitan la autorización para dar de baja al medicamento de las fichas de stock y seguir el proceso de destrucción (ver Acuerdo Ministerial No. 534-2011). En mi reporte, anoto estos medicamentos como reajustes pues ya no son existencias disponibles.
- Si encuentro medicamentos vencidos con los Colaboradores Voluntarios, hago lo mismo; llevo los medicamentos vencidos al distrito. El Colaborador Voluntario tiene que evitar desabastecimiento haciendo una requisición.
- Anoto todos los movimientos de medicamentos e insumos antimaláricos en la ficha de stock de cada producto.
- Debo tener una ficha de stock por cada medicamento e insumo y la guardo con los productos.
- Realizo el registro de las salidas de medicamentos diariamente y el ingreso de medicamentos e insumos al momento de ser recibidos.
- Debo mantener actualizadas las fichas de stock de cada producto.

5 ¿Cómo entrego los medicamentos e insumos antimaláricos a los Colaboradores Voluntarios?

- ✓ Reviso la existencia de medicamentos y fechas de vencimiento, realizo un conteo con el Colaborador Voluntario.
- ✓ Reviso las condiciones en que almacena los medicamentos, lo felicito por las medidas correctas y corrijo las deficiencias.
- ✓ Cada mes, entrego directamente los medicamentos e insumos antimaláricos para alcanzar la cantidad máxima en el informe del Colaborador Voluntario, reviso con él o ella la cantidad entregada y las fechas de vencimiento.
- ✓ En mis fichas de stock, registro las salidas con las cantidades que entrego y a quién lo entrego, anotando el nombre o código del Colaborador Voluntario, la fecha, número de lote y cantidad de medicamentos e insumos antimaláricos entregados.
- ✓ Pido al Colaborador Voluntario que firme de recibido en el informe del Colaborador Voluntario.
- ✓ Archivo el original del informe y el Colaborador guarda la copia.
- ✓ Comparo la cantidad de casos confirmados con el consumo de medicamentos reportados para verificar el cumplimento del esquema de tratamiento y así asegurar el uso racional de medicamentos. Si observo diferencias, debo explicar y orientar al Colaborador a fin de reforzar su conocimiento y mejorar sus prácticas. Debo incorporar a mi informe mis intervenciones durante las visitas para favorecer el seguimiento.
- ✓ Verifico que los desechos infecciosos los esté colocando en la caja respectiva, y al llenarse las 3/4 partes la llevo al centro de salud para su tratamiento y disposición final. Reemplazo la caja llena por una nueva.

✓ **Recuerdo a los Colaboradores Voluntarios las indicaciones básicas de los antimaláricos:**

a) Se entregan medicamentos antimaláricos solamente a pacientes con síntomas de malaria y que tengan resultado positivo de prueba rápida o gota gruesa.

b) Que por cada paciente debe llenar un Formulario E-1 y quedarse con el codo para llevar un control de los casos a los que les dio tratamiento y les tomó muestra.

c) Al finalizar el mes, debe anotar la cantidad de medicamentos e insumos antimaláricos que tiene al terminar el mes o en la fecha de corte (25 de cada mes) en su informe.

d) Para curar la malaria los pacientes deben tomar los dos medicamentos antimaláricos: cloroquina y primaquina. El tratamiento debe ser completo según indicaciones del esquema terapéutico gráfico.

e) El **Colaborador Voluntario** entrega a los pacientes el tratamiento por partes, para asegurar la toma de los medicamentos antimaláricos.

f) Yo, como supervisor, aseguro el abastecimiento de formularios que se requieren en este proceso, solicitando estos al distrito cuando sea necesario.

g) El Colaborador debe llenar su Informe de Antimaláricos e Insumos cada mes.

Oriento a los Colaboradores Voluntarios para que den los siguientes consejos del uso correcto de los medicamentos antimaláricos, a los pacientes y sus familiares:

- ✓ Los medicamentos antimaláricos se deben tomar una vez al día, a la misma hora.
- ✓ Los medicamentos antimaláricos deben tomarse después de comer para evitar molestias en el estómago.
- ✓ Es importante tomar el tratamiento completo aunque hayan desaparecido los síntomas.
- ✓ Si los signos de malaria no desaparecen, se debe consultar otra vez.
- ✓ Guardar los medicamentos fuera del alcance de los niños.

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GESTIÓN DE MEDICAMENTOS ANTIMALÁRICOS E INSUMOS PARA DIAGNÓSTICO

PARA COLABORADORES VOLUNTARIOS

Ministerio de Salud Pública
República de Guatemala

Así debo guardar las medicinas

- En un lugar seco, pero no caliente.
- En una caja limpia y ordenada.
- Fuera del alcance de los niños.

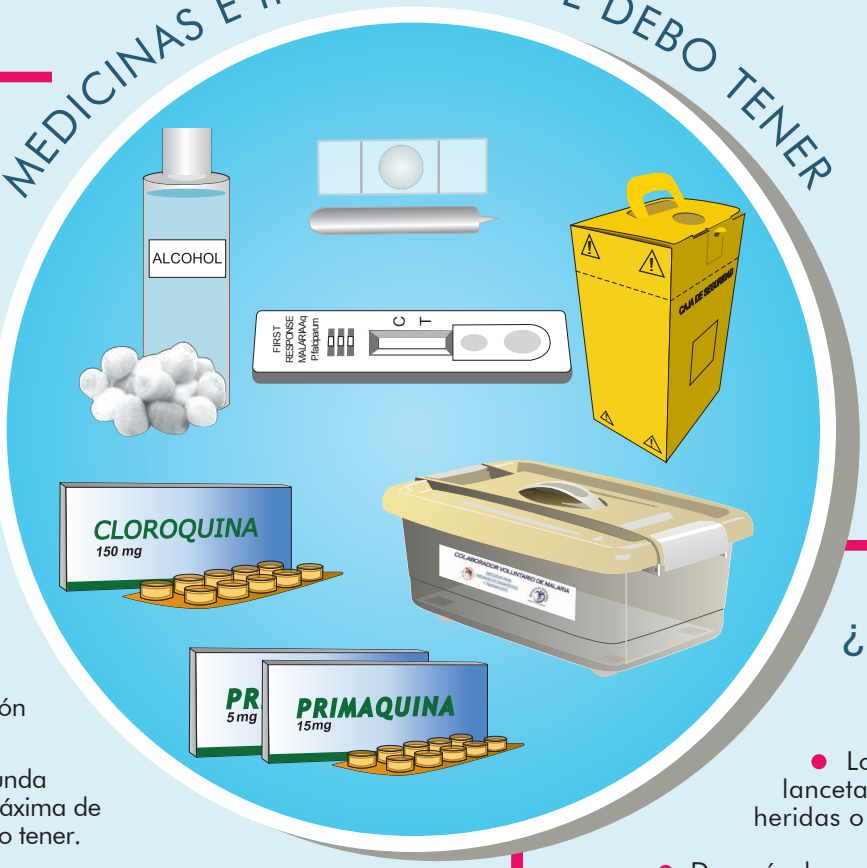
¿Cómo pido las medicinas e insumos y cuánto pido?

- Debo mantener suficiente medicina para atender a todas las personas que la necesiten.
- Cada mes tengo que llenar el Informe de Antimaláricos e Insumos que sirve como solicitud.
- Según la cantidad de medicinas que reporto en mi informe, el supervisor me trae o me envía lo que necesito.
- **La cantidad a solicitar se calcula de la siguiente manera:**

La cantidad máxima que debo tener, menos (-) la cantidad que tengo al corte (25 del mes).

El resultado se anota en la columna: "Cantidad entregada por el supervisor" del informe.

MEDICINAS E INSUMOS QUE DEBO TENER



Así llevo el control

- Debo llenar la información general del Informe de Antimaláricos e Insumos.
- Debo anotar en la primera columna la cantidad de medicina que tengo al terminar el mes o en la fecha de corte (el 25 de cada mes).
- Con apoyo del supervisor lleno el resto de información del informe:
  - Debo anotar, en la segunda columna, la cantidad máxima de cada medicina que debo tener.
  - Debo anotar, en la tercera columna, la fecha de vencimiento que trae cada medicina en el empaque.
  - Debo anotar, en la cuarta columna, la cantidad de medicina que me entregan.
  - Debo anotar, en el apartado, insumos en buen estado, la cantidad de medicina vencida o que no puedo utilizar por otras razones.
  - Debo anotar, en el apartado de detalle, la cantidad de casos que atendí y que anoté en los formularios **E-1**.
  - El informe lo entrego al supervisor de malaria o al personal de vectores entre el **25** y **30** de cada mes.

¿Qué hago con los insumos que usé?

- Los materiales usados, como lancetas y algodón, pueden causar heridas o infecciones.
- Después de usar estos materiales debo colocarlos dentro de la caja de desechos infecciosos o dentro de una botella de plástico con tapadera.
- No debo vaciar ni abrir la caja de desechos infecciosos, ni la botella de plástico. Cuando la caja o la botella está por llenarse, la entrego al supervisor o la llevo al centro de salud y solicito otra.

Esquema radical de tratamiento para la MALARIA por *Plasmodium vivax* y Asociados por 14 días

Edad	CICLOS DE VIDA														Tratamiento para embarazadas	
	16 años y más		11 a 15 años		7 a 10 años		3 a 6 años		1 a 2 años		6 a 11 meses		menor de 6 meses			
Día	Cloroquina 150mg	Primaquina 15mg	Cloroquina 150mg	Primaquina 15mg	Cloroquina 150mg	Primaquina 5mg	Cloroquina 150mg	Primaquina 5mg	Cloroquina 150mg	Primaquina 5mg	Cloroquina 150mg	Primaquina 5mg	Cloroquina 150mg	Primaquina 5mg	Cloroquina 150mg	Primaquina 15mg
1	4	1	3	1	2	2	1	1	1	½	½	½	¼	a partir de los 6 meses de edad dar 1/2 pastilla cada día hasta completar 14 días	4	1 pastilla diariamente después del parto hasta completar 14 días
2	3	1	2	1	1½	2	1	1	½	½	½	½	¼		3	
3	3	1	2	1	1½	2	1	1	½	½	½	½	¼		3	
4		1		1		2		1		½		½	Después del tercer día dar 1/4 de pastilla cada 21 días hasta cumplir los 6 meses de edad		después 2 pastillas cada semana hasta llegar al parto 2	
5		1		1		2		1		½		½				
6		1		1		2		1		½		½				
7		1		1		2		1		½		½				
8		1		1		2		1		½		½				
9		1		1		2		1		½		½				
10		1		1		2		1		½		½				
11		1		1		2		1		½		½				
12		1		1		2		1		½		½				
13		1		1		2		1		½		½				
14		1		1		2		1		½		½				

NOTA: El cumplimiento de todo el esquema de tratamiento asegura la eliminación del plasmodium y la recuperación de la salud, evitando recaidas.

Esquema radical de tratamiento para la MALARIA por *Plasmodium falciparum* por 3 días

Edad	CICLOS DE VIDA													Tratamiento para embarazadas
	16 años y más		11 a 15 años		7 a 10 años		3 a 6 años		1 a 2 años		6 a 11 meses		menor de 6 meses	
Día	Cloroquina 150mg	Primaquina 15mg	Cloroquina 150mg	Primaquina 15mg	Cloroquina 150mg	Primaquina 5mg	Cloroquina 150mg	Primaquina 5mg	Cloroquina 150mg	Primaquina 5mg	Cloroquina 150mg	Primaquina 5mg	Cloroquina 150mg	Cloroquina 150mg
1	4	1	3	1	2	2	1	1	1	½	½	½	¼	4
2	3	1	2	1	1½	2	1	1	½	½	½	½	¼	3
3	3	1	2	1	1½	2	1	1	½	½	½	½	¼	3

NOTA: El cumplimiento de todo el esquema de tratamiento asegura la eliminación del plasmodium y la recuperación de la salud, evitando recaidas.
Para menores de 10 años se recomienda administrar el medicamento triturado y con agua para consumo humano.

Cloroquina	1 pastilla entera	1
Cloroquina	1/2 de pastilla	½
Cloroquina	1/4 de pastilla	¼
Primaquina 15mg	1 pastilla entera	1
Primaquina 5mg	1 pastilla entera	1
Primaquina 5mg	1/2 pastilla	½

Recuerde siempre

VIGILAR QUE EL PACIENTE COMPLETE EL ESQUEMA DE TRATAMIENTO

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MINISTRY OF PUBLIC HEALTH

VECTOR CONTROL SERVICES

PROTECTING THE NATION
Vector Control Services
MINISTRY OF PUBLIC HEALTH

AGAINST
MALARIA, DENGUE FEVER, FILARIASIS,
LEISHMANIASIS, CHAGAS

SPRAYING

MOSQUITO PROTECTION

FOGGING

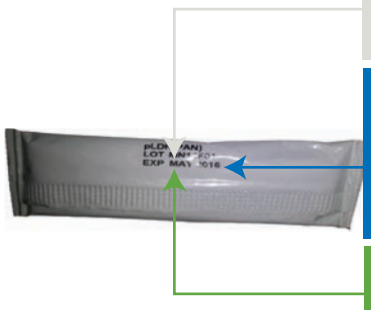
Make our community safe and healthy. Get more information on malaria, dengue, chikungunya, zika, filaria and more! Contact us via email vectorcontrolservices1@gmail.com or go to your nearest health facility for more information.

What you need • Lo que necesita • Você precisa de

1

1. Rapid test for malaria
   Prueba de diagnóstico rápido de malaria
   Teste rápido para malária
2. Alcohol swab
   Toallita desinfectante
   Lenço umedecido antiséptico
3. Lancet
   Lanceta
   Lanceta
4. Disposable gloves
   Guantes descartables
   Luvas descartáveis
5. Buffer
   Gotero con solución activa
   Solução reguladora
6. Timer
   Reloj
   Relógio
7. Forms
   Formularios
   Formulários
8. Pen or Pencil
   Lápiz o bolígrafo
   Lápis ou caneta

2

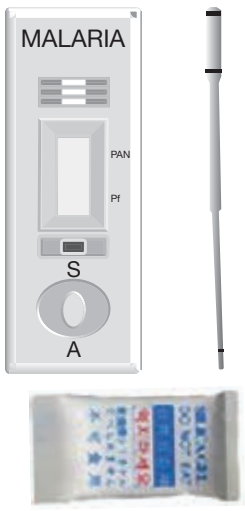


Check expiration before opening the test. Each test can be used only once.

Revise la fecha de vencimiento antes de abrir la prueba. Cada prueba sólo puede usarse una vez.

Verifique a data de vencimento antes de abrir o teste. Cada teste pode ser usada só uma vez.

3



Take out of the package:
- Rapid test for malaria
- Tube
- Dessicant sachet

Saque del paquete:
- Prueba de diagnóstico rápido de malaria
- Tubo
- Paquetito preservante

Tire do pacote:
- Teste rápido para malária
- Tubo
- Saché de dessecante

4

Write the patient's name on the back of the test.

Escriba el nombre del paciente en la parte posterior de la prueba.

Escreva o nome do paciente no verso do teste.

5

Put on new gloves for each patient.

Colóquese guantes nuevos para cada paciente.

Ponha luvas novas cada vez que for fazer um teste.

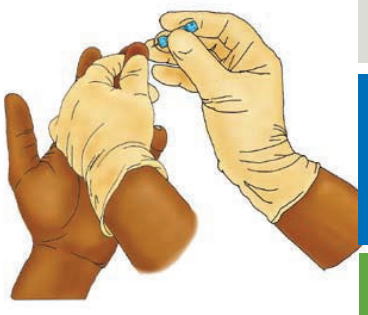
6

Use alcohol swab to clean the 4th finger of the patient's left hand and let dry.

Use una toallita desinfectante para limpiar el dedo anular de la mano izquierda del paciente y deje secar.

Use um lenço umedecido antiséptico para desinfetar o dedo anelar da mão esquerda do paciente e deixe secar.

7



Open new lancet and do not allow it to touch anything. Use it to prick 4th finger to get a drop of blood.

Abra una nueva lanceta y no deje que toque nada. Use la lanceta para pinchar el dedo anular hasta obtener una gota de sangre.

Abra uma nova lanceta e não deixe que toque em nada. Use-a para picar o dedo do paciente para obter uma gota de sangue.

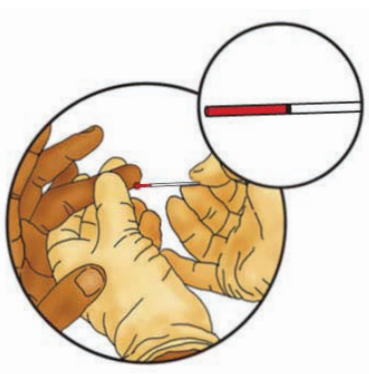
8

As soon as you get the drop of blood, discard the lancet in the safety container.

Inmediatamente deseche la lanceta en el contenedor de residuos sanitarios.

Após usar, jogue a lanceta fora em uma caixa de resíduos de risco biológico.

9

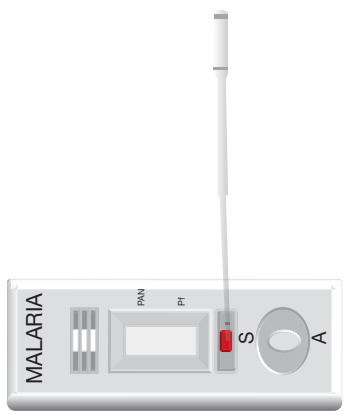


Squeeze and release the tube to collect the drop of blood, up to the 1st line of the tube.

Tome la muestra con el tubo aspirando y soltando la gota de sangre. Llene hasta la primera línea del tubo.

Aperte e solte o tubo para tomar a mostra de sangue. Encha o tubo até a primeira linha.

10



Put the drop of blood in the square hole marked S.

Vierta una gota de sangre en el cuadrado marcado con S.

Coloque a primeira gota de sangue na abertura quadrada marcada com S.

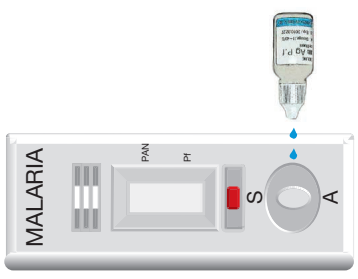
11

Discard the tube in the safety container.

Deseche el tubo en el contenedor de residuos sanitarios.

Jogue o tubo fora na caixa de resíduos de risco biológico.

12



Add 2 drops of buffer to the round hole marked A.

Añada 2 gotas de solución activa en el círculo marcado con A.

Adicione 2 gotas de solução reguladora na abertura redonda marcada com A.

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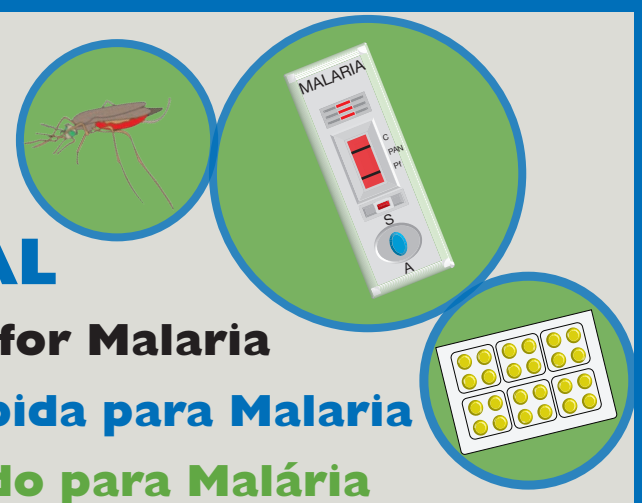
Pan American Health Organization

World Health Organization Americas

Support provided by USAID through the Amazon Malaria Initiative.



MANUAL

Rapid Test for Malaria

Prueba Rápida para Malaria

Teste Rápido para Malária

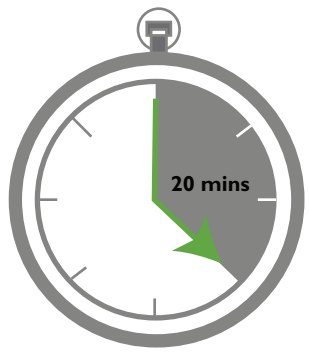
Carestart pLDH Pf (Pan)

13

Throw away gloves, swab, and packaging.

Descarte guantes, toallita y embalaje en el basurero.

Jogue as luvas, o lenço e a embalagem na lixeira.

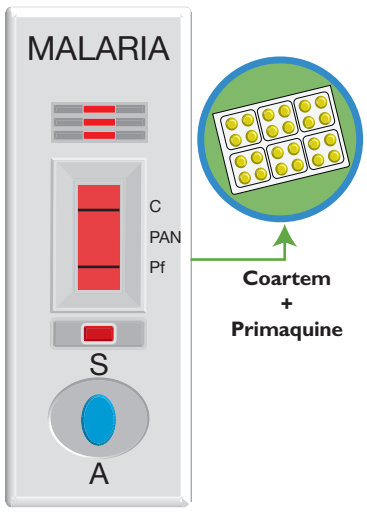


14

Wait 20 minutes. Read test results *after* 20 minutes.

Espere 20 minutos. Lea el resultado *después* de 20 minutos.

Espere 20 minutos. Leia o resultado do teste *após* 20 minutos.

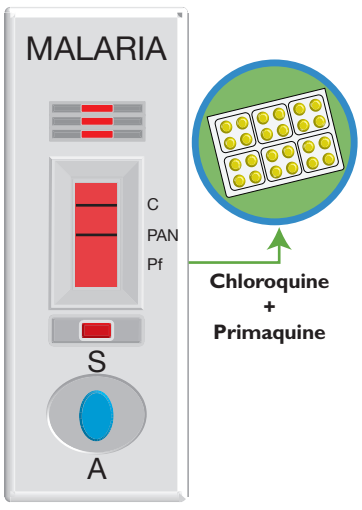


15

Test result:
Positive
P. falciparum
Line at C and line at Pf

Resultado de la prueba:
Positivo
P. falciparum
Línea en C y línea en Pf

Resultado do teste:
Positivo
Malária P. falciparum
Linha em C e linha em Pf

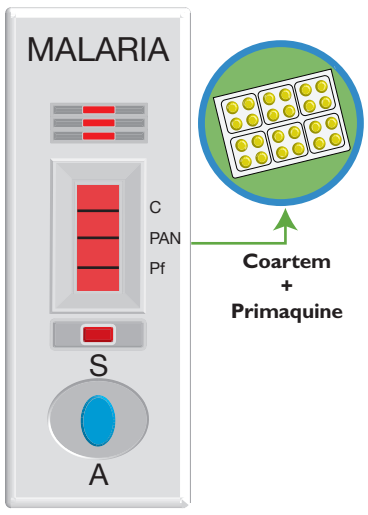


16

Test result:
Positive
P. vivax, P. malariae or P. ovale
Line at C and line at PAN

Resultado de la prueba:
Positivo
P. vivax, P. malariae o P. ovale
Línea en C y línea en PAN

Resultado do teste:
Positivo
Malária P. vivax, P. malariae ou P. ovale
Linha em C e linha em PAN

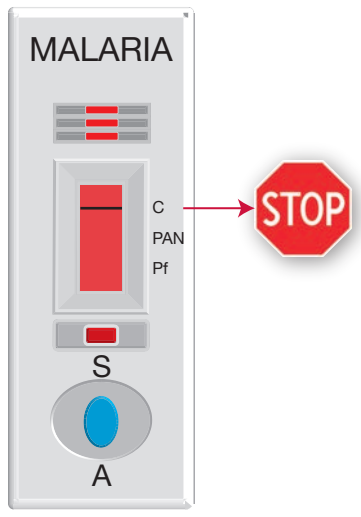


17

Test result:
Positive
Mixed malaria infection
Line at C, line at PAN, and line at Pf

Resultado de la prueba:
Positivo
Malaria mixta
Línea en C, línea en PAN y línea en Pf

Resultado do teste:
Positivo
Malária mixta
Linha em C, linha em PAN e linha em Pf

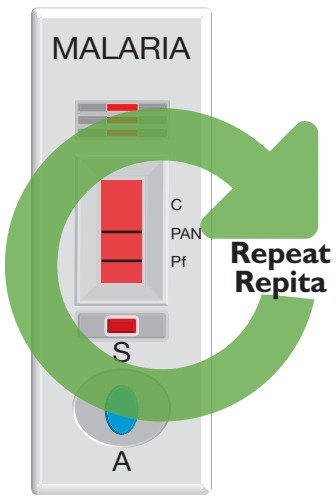


18

Test result:
Negative
Line only at C, no other lines.
Does not have malaria.

Resultado de la prueba:
Negativo
Línea sólo en C, ninguna otra línea.
No tiene malaria.

Resultado do teste:
Negativo
Linha somente em C, nenhuma outra linha. Não tem malária.



19

Test result:
Invalid
No line at C.
Repeat with a new test.

Resultado de la prueba:
Inválido
Sin línea en C.
Repita el proceso con una nueva prueba.

Resultado do teste:
Inválido
Sem linha em C.
Repita o processo com um novo teste.

20

Record test results.
If the result is positive, complete the entire treatment to be cured.

Registre los resultados.
Si la prueba resulta positiva debe completar todo el tratamiento para curarse.

Registre os resultados.
Se o resultado for positivo, complete todo o tratamento para se curar.

21

Return used test and results to nearest health facility. Rapid tests for malaria are free. Nobody should pay to take the test.

Entregue la prueba y resultados en el centro de salud más cercano. Las pruebas rápidas para malaria son gratuitas. No hay que pagar para hacer la prueba.

Entregue o teste e resultados no centro de saúde mais próximo. Os testes rápidos para a malária são gratuitos. Não tem que pagar para fazer o teste.

22

Remember:
Keep rapid tests out of the sun.
Fragile! Do not put heavy things on top of tests.

Recuerde:
No deje las pruebas rápidas expuestas a la luz solar. ¡Frágil! No coloque peso sobre las pruebas rápidas.

Lembre-se:
Conserve os testes rápidos fora da luz do sol. Frágil! Não coloque peso sobre os testes.

Cartilla Informativa: Realización de Gota Gruesa/Frotis y Prueba de Diagnóstico Rápido (PDR) de Malaria

Instrumentos para la investigación diagnóstica

1

Formularios · Lápiz o lapicero · Guantes · Caja de bioseguridad · Alcohol y algodón · Reloj · Kit de la PDR · Lámina portaobjeto

Componentes del Kit de la PDR

2

Verificar la fecha de vencimiento y abrir el kit de la prueba de diagnóstico rápido. Sacar los componentes.

Diluyente de ensayo · Pipeta descartable (5µl) · Lanceta estéril · Dispositivo de la PDR empaquetado individualmente

3

Llenar la solicitud de investigación diagnóstica de malaria con los datos del paciente.

Recolectar 4 gotas de sangre en el siguiente orden: descartar la 1ra gota, utilizar la 2da y 3ra para la Gota Gruesa/ Frotis y la 4ta para la PDR.

Colocarse guantes nuevos para cada paciente.

4

Limpiar y desinfectar el dedo medio o anular de la mano izquierda con un algodón humedecido con alcohol. Dejar secar al medio ambiente.

Punzar la zona lateral del dedo con una lanceta estéril. Desechar la lanceta usada en la caja de bioseguridad.

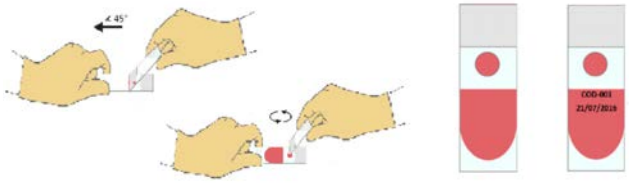
Gota Gruesa/Frotis

5

Descartar la 1ra gota de sangre, colocar la 2da a 1.5 cm del borde (Gota Gruesa) y la 3ra más pequeña en la mitad de la lámina porta objeto (Frotis), tal y como se muestra en la imagen.

6

Utilizar una lámina auxiliar para extender rápidamente una gota, formando una capa fina. Dar vueltas a la otra gota con la esquina, formando un círculo de 1cm de diámetro. Dejar secar por 15 minutos. Rotular la lámina en la cabeza del extendido.*

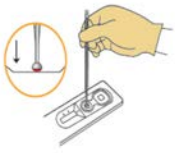


PDR

7

Abrir el empaque de la PDR y rotular el dispositivo. Recolectar la muestra de sangre (5µl) colocando la parte circular de la pipeta sobre el dedo para absorber la 4ta gota. Llenar hasta la primera línea, tal y como se muestra en la imagen.

8



Colocar la muestra (5µl) en el pocillo circular marcado con S. Desechar la pipeta en la caja de bioseguridad.

Agregar 4 gotas de diluyente de ensayo en el pocillo cuadrado.

Esperar 15 minutos para realizar la lectura de la prueba siguiendo la plantilla de resultados.*

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Ministerio de Salud · Instituto Nacional de Salud
Gore Loreto · Dirección Regional de Salud Loreto
Organización Panamericana de la Salud · Organización Mundial de la Salud Américas · USAID del pueblo de los Estados Unidos de América

Plantilla de Resultados de la PDR

Resultado Negativo
Banda SOLO en C
Descartar otras causas de enfermedad.

Resultado Indeterminado
SIN banda en C
Repita la prueba con un dispositivo nuevo.

Resultado Positivo
***P. vivax* (P.v pLDH)**
Banda en C + T3

Tratamiento Ira línea:
cloroquina + primaquina
Tratamiento 2da línea:
artesunato + mefloquina + primaquina

Resultado Positivo
***P. falciparum* (P.f HRP2)**
Banda en C + T1

Tratamiento Ira línea:
mefloquina + artesunato + primaquina
Tratamiento 2da línea:
quinina + clindamicina + primaquina

Resultado Positivo
***P. falciparum* (P.f pLDH)**
Banda en C + T2

Tratamiento Ira línea:
mefloquina + artesunato + primaquina
Tratamiento 2da línea:
quinina + clindamicina + primaquina

Resultado Positivo
***P. falciparum* (P.f HRP2) + (P.f pLDH)**
Banda en C + T1 + T2

Tratamiento Ira línea:
mefloquina + artesunato + primaquina
Tratamiento 2da línea:
quinina + clindamicina + primaquina

Resultado Positivo Mixto
P. vivax* + *P. falciparum
Banda en C + T1 + T3

Tratamiento Ira línea:
mefloquina + artesunato + primaquina
Tratamiento 2da línea:
quinina + clindamicina + primaquina

Resultado Positivo Mixto
P. vivax* + *P. falciparum
Banda en C + T1 + T2 + T3

Tratamiento Ira línea:
mefloquina + artesunato + primaquina
Tratamiento 2da línea:
quinina + clindamicina + primaquina

Resultado Positivo
Mixto *P. vivax* + *P. falciparum*
Banda en C + T2 + T3

Tratamiento Ira línea:
mefloquina + artesunato + primaquina
Tratamiento 2da línea:
quinina + clindamicina + primaquina

*Recuerde registrar los resultados de la PDR en la solicitud de investigación diagnóstica. Enviar las láminas de Gota Gruesa/Frotis envueltas individualmente al establecimiento de salud más cercano. Si el transporte demora más de 4 días, colorear las láminas con solución Giemsa.

MINISTERIO DE SALUD
INSTITUTO NACIONAL DE SALUD

Cartilla Informativa: Realización de Gota Gruesa y Frotis para el Diagnóstico de Malaria

Materiales para la toma de muestra

1

- Alcohol de 70⁰
- Algodón
- Contenedor de objetos punzocortantes
- Guantes protectores
- Láminas portaobjetos limpias y envueltas
- Lancetas estériles
- Lápiz y lapicero
- Solicitud de investigación diagnóstica

2

Llenar la solicitud de investigación diagnóstica con los datos del paciente y fecha.

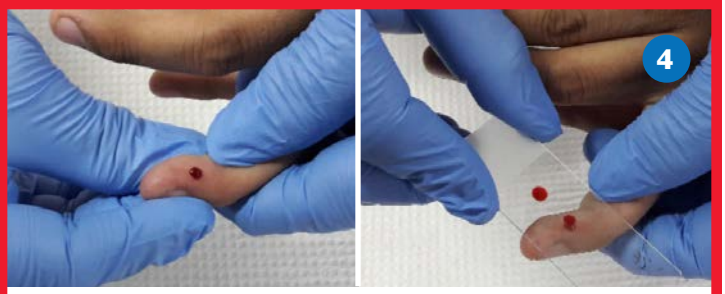
Usar guantes protectores durante la extracción y la manipulación de las muestras de sangre.

Limpiar y desinfectar el dedo medio o anular del paciente con algodón ligeramente humedecido en alcohol de 70⁰.

3

Frotar vigorosamente el dedo para estimular la circulación sanguínea y punzar la zona lateral de la yema con una lanceta estéril. Desechar la lanceta usada en el contenedor de objetos punzocortantes.

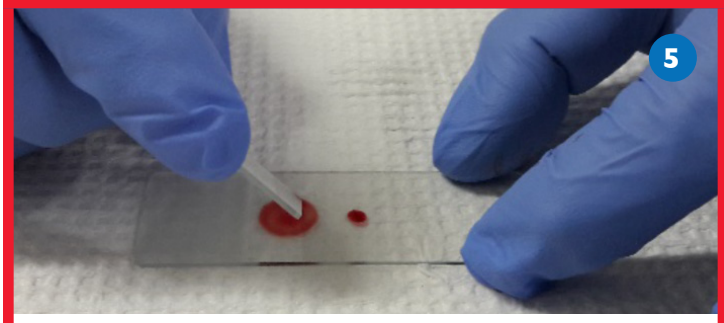
Aplicar una presión suave sobre el dedo para extraer la 1ra gota y limpiarla con algodón seco.



4

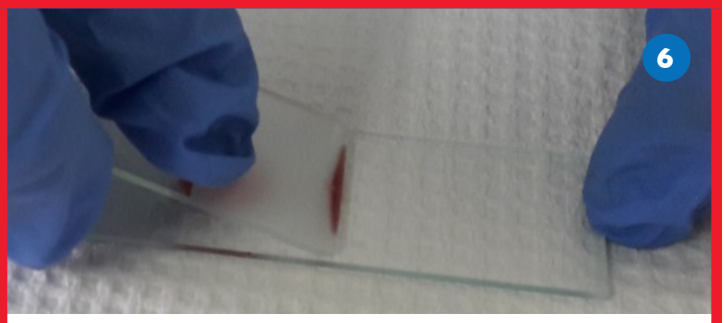
Extraer la 2da gota (volumen: 6-7 µl) y colocarla en el tercio superior de la lámina, a 1.5 cm del borde (Gota Gruesa).

Extraer la 3ra gota más pequeña (volumen: 3-3.5 µl) y colocarla en el centro de la lámina (Frotis).



5

Gota Gruesa: utilizar la punta de una lámina auxiliar para homogenizar la 2da gota con 3 a 6 movimientos circulares (de adentro hacia afuera y de afuera hacia adentro) formando una extensión gruesa circular de 1cm de diámetro.

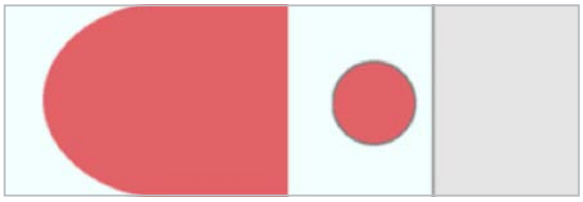


6

Frotis: utilizar el borde de una lámina auxiliar en un ángulo de 45º para extender la 3ra gota, del centro hacia el borde externo de la lámina, formando un extendido fino de 3 cm de largo (cabeza, cuerpo y cola).

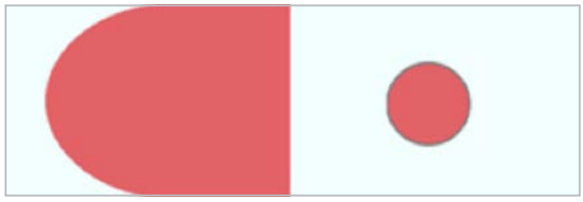
Láminas con extremo pavoneado

7



Láminas sin extremo pavoneado

8



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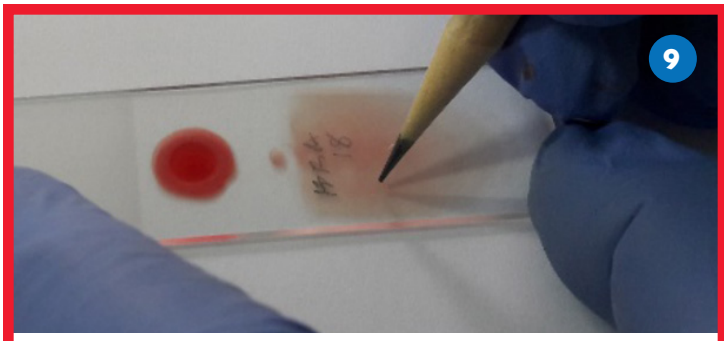


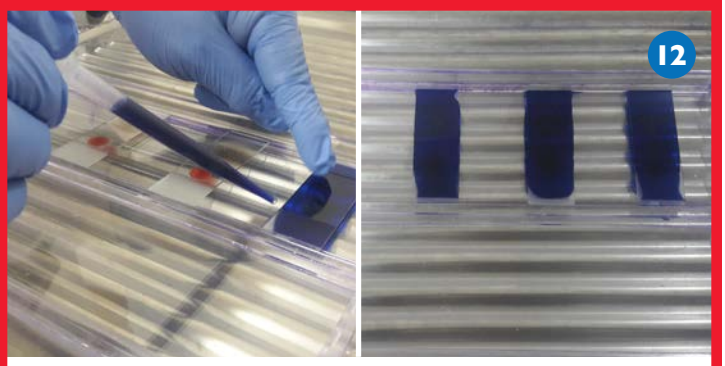
Utilizar un lápiz para rotular la lámina en la sección pavoneada o parte superior del frotis (incluir código del establecimiento de salud, código de lámina y fecha).

Materiales para la coloración

- Alcohol de 70º
- Metanol
- Solución buffer pH 7.2
- Colorante Giemsa madre
- Probeta
- Gotero
- Vaso de precipitado

Fijar el Frotis sumergiéndolo por 2 segundos en metanol. Evitar el contacto del metanol con la Gota Gruesa.

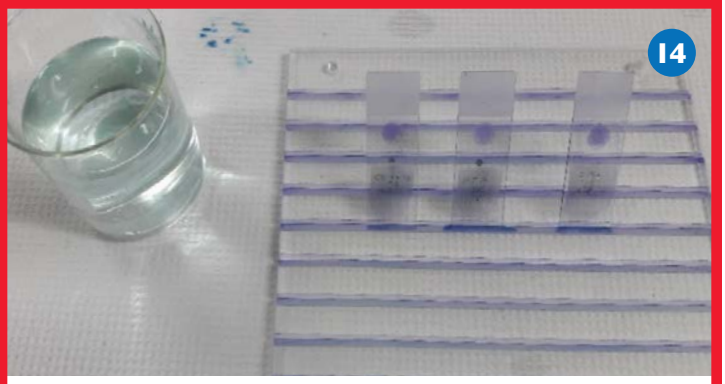
Colocar la lámina de manera horizontal para dejar que el metanol se evapore.



Colocar las laminas con la gota gruesa y frotis hacia abajo en la bandeja de coloración. Observar que las muestras se encuentren a una distancia adecuada para no tener contacto entre sí. Agregar el colorante Giemsa con una pipeta de transferencia.

Controlar 10 minutos de coloración.

Una vez transcurrido el tiempo, lavar individualmente cada lámina con solución buffer o agua de caño.



Colocar las láminas en los tableros de secado, con el Frotis hacia abajo, hasta su lectura microscópica.

Recuento parasitario: Sistema de cruces

15

Recuerde que para dar un resultado como negativo se deben revisar como mínimo 500 campos microscópicos.

Si observó menos de 40 parásitos en 100 campos, registre el número de parásitos encontrados.

Si observó más de 40 parásitos, use la siguiente escala:

+/2 De 40 a 60 parásitos en 100 campos
+ Un parásito por campo en 100 campos
++ De 2 a 20 parásito por campo en 100 campos
+++ De 21 a 200 parásitos por campo en 100 campos
++++ Más de 200 parásitos por campo en 100 campos

Recuento parasitario: Cálculo del número de parásitos por microlitro

16

Caso 1: Si después de contar 200 leucocitos, 10 o más parásitos han sido identificados y contados.

Caso 2: Si después de contar 200 leucocitos, menos de 10 parásitos han sido identificados y contados, continuar el recuento de leucocitos hasta llegar a 500 leucocitos.

Caso 3: En caso de parasitemia alta, realizar el recuento en función del número de parásitos, registrando su recuento hasta 500 parásitos.

En cualquiera de los casos reemplace los valores de parásitos identificados y leucocitos contados en la fórmula:

$$\frac{\text{Nº de parásitos x 6000}}{\text{Nº de leucocitos}} = \text{Parásitos/µL}$$

Donde:
N° de parásitos = Número de parásitos contados.
N° de leucocitos = Número de leucocitos contados.
µL= microlitro

Balance Final: Lecciones Aprendidas y Buenas Prácticas de Comunicación en Salud

5 de Abril del 2016

USAID
DEL PUEBLO DE LOS ESTADOS UNIDOS DE AMÉRICA

Comunicación Intercultural

Los Pueblos Indígenas

Percepción del mundo

- Valorar saberes locales, integrando los mensajes de salud dentro de la lógica indígena.

Idiomas

- Utilizar el idioma indígena facilita la difusión, comprensión e implementación.

Relaciones horizontales

- Reconocer como iguales el saber biomédico y los saberes locales.

Marco de Referencia Intercultural

Analizar el contexto de salud local

Establecer alianzas estratégicas

Diseñar un paquete de intervenciones

Incentivar la participación

Monitorear la implementación

Esquema de Comunicación Intercultural

Esquema de Comunicación Intercultural

Identificar Necesidades

Reconocer Expectativas

Determinar Problemática

Foto: OPS/OMS

Adaptar Políticas

Diseñar Intervención

Sensibilizar Población

Implementar Intervención

Delegar Funciones

Conseguir Sostenibilidad

Esquema de Comunicación Intercultural

Una Población Indígena Empoderada

Paternalismo
Discriminación
Menospreciar
Homogenización

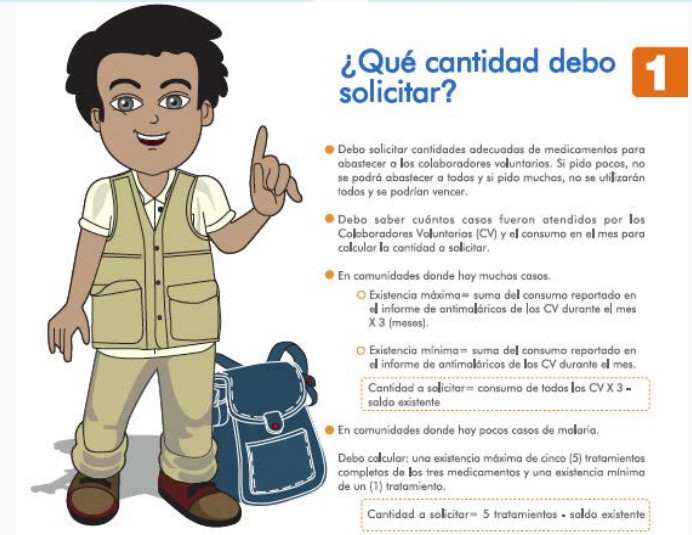
Información
Capacitación
Participación
Reconocimiento

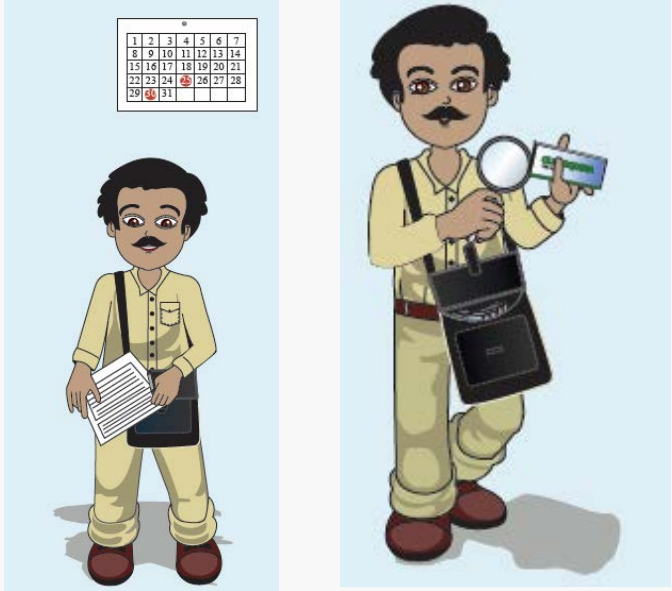
Comunicación Visual

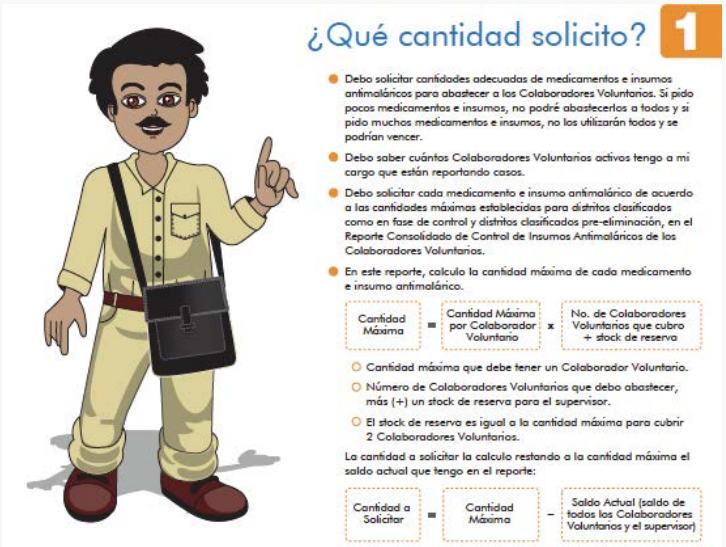
Apropiada vs Insensible

Creditos de foto: Chloe Hans Barrientos, OPS/OMS

Comunicación Visual: Antes y Después







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malariachampion@gmail.com

Esta presentación fue elaborada por:

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A través del Componente de Comunicación de la Iniciativa Amazónica contra la Malaria (AMI), contrato # AID-527-13-00004.

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Comunicación para la Prevención, el Control y la Eliminación de la Malaria

Julie de Carvalho, MPH
Lead Activity Manager

XV Reunión Anual de Evaluación de AMI/RAVREDA
Bogotá, Colombia
5 de mayo del 2016

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Cooperación Técnica Regional
Documentos de Orientación Estratégica (DOE):

Monitoreo de la Eficacia de los Antimaláricos

Control de Vectores

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FACT SHEET 2016-01

AMAZON MALARIA INITIATIVE

SELECTED REFERENCES ON MALARIA ELIMINATION

March 2016

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HOJA INFORMATIVA 2016-02

INICIATIVA AMAZÓNICA CONTRA LA MALARIA

La Malaria en Contextos de Transmisión Baja

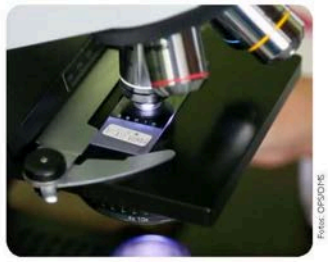
MANTENER LA CAPACIDAD DE DIAGNÓSTICO DE LOS LABORATORIOS

Abril de 2016

Actualmente, el análisis microscópico se mantiene como el método estándar para el diagnóstico de la malaria. Sin embargo, conforme los casos se vuelven menos frecuentes, el personal técnico de laboratorio puede tener menos oportunidades para practicar leer láminas de gota gruesa y frotis de sangre periférica bajo el microscopio. La supervisión, así como las oportunidades para la capacitación y educación continua, son esenciales para asegurar que los microscopistas desarrollen pericia en esta área y mantengan sus habilidades y capacidades para diagnosticar malaria apropiadamente. A la fecha, AMI ha apoyado en capacitaciones regionales y ha ayudado a desarrollar sistemas de calidad que permiten mejorar el diagnóstico de la malaria a través de los países de la región.

En contextos con baja incidencia de malaria, puede ocurrir que:

- Colaboradores voluntarios y profesionales de la salud confunden la malaria con otras enfermedades febriles, con lo que se retrasa su diagnóstico.
- Colaboradores voluntarios y profesionales de la salud no confirman el diagnóstico clínico de malaria con pruebas de laboratorio apropiadas.
- Trabajadores de la salud pierden las habilidades requeridas para diagnosticar la malaria y proporcionar el tratamiento.
- Se deja de notificar la totalidad de los casos de malaria que ocurren a los sistemas de vigilancia nacionales.
- Hay un aumento de la probabilidad de casos graves de malaria, así como de su re-introducción y de brotes.



Fotos: OPS/OMS

Recomendaciones de la OMS para el diagnóstico de la malaria en áreas con niveles de transmisión bajos[1]

1. La microscopía y las pruebas de diagnóstico rápido (PDR) de calidad asegurada son las principales herramientas de diagnóstico para la

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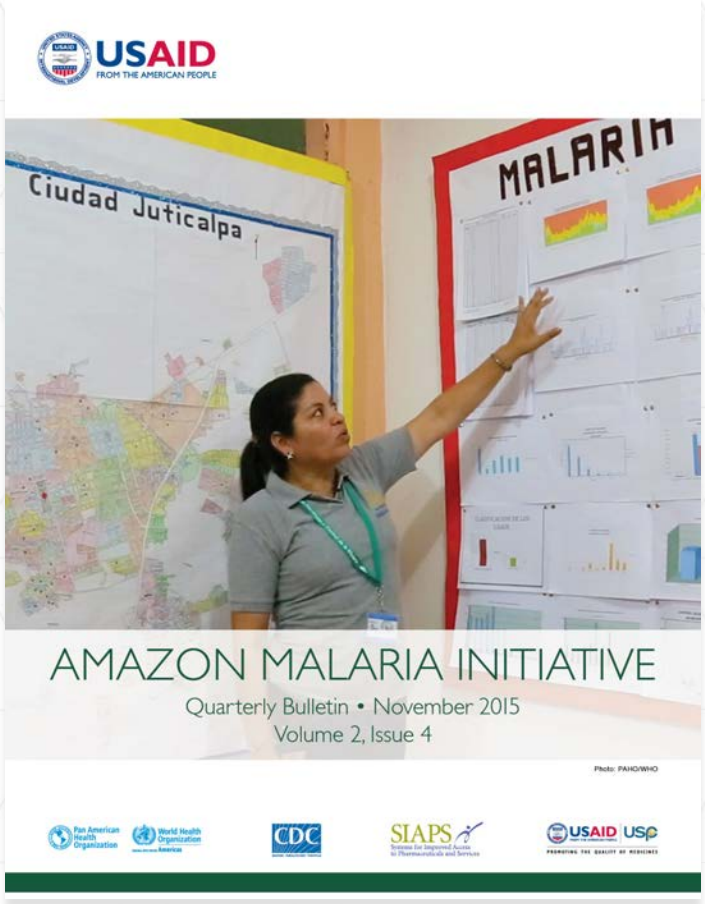

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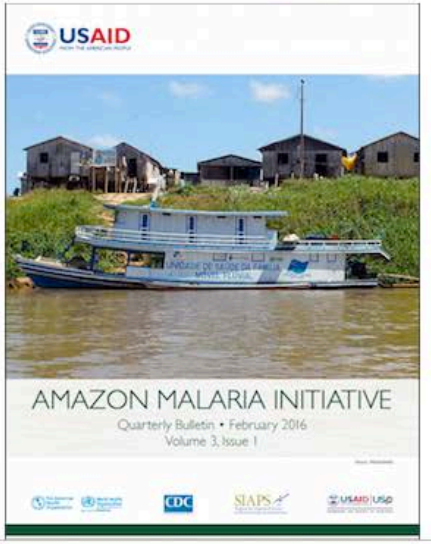


The Amazon Malaria Initiative has a new quarterly bulletin about malaria in the America's. **Click here to read the Amazon Malaria Initiative bulletin** or open the pdf atttachment.

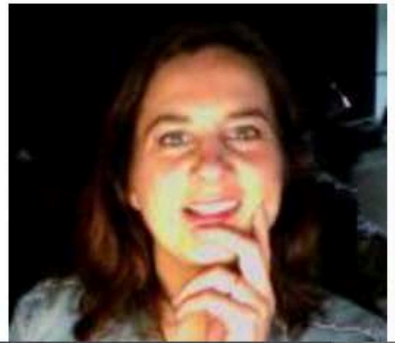
The Amazon Malaria Initiative (AMI) is an eleven country regional program in the Amazon basin and Central America with support from the U.S. Agency for International Development. AMI was launched in 2001 with the overall goal of preventing and controlling malaria in the Amazon basin.

Attachment	Size

MESA MALARIA ERADICATION SCIENTIFIC ALLIANCE

Author Information

Ingeborg van Schayk



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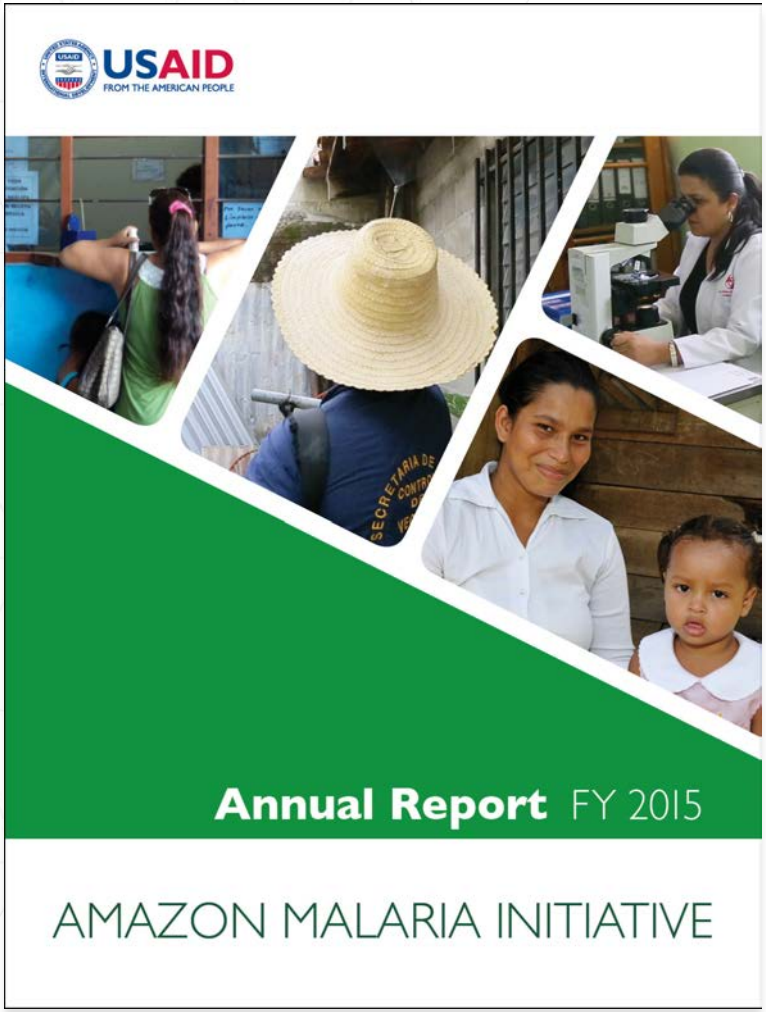
Informe Anual de los Socios de AMI



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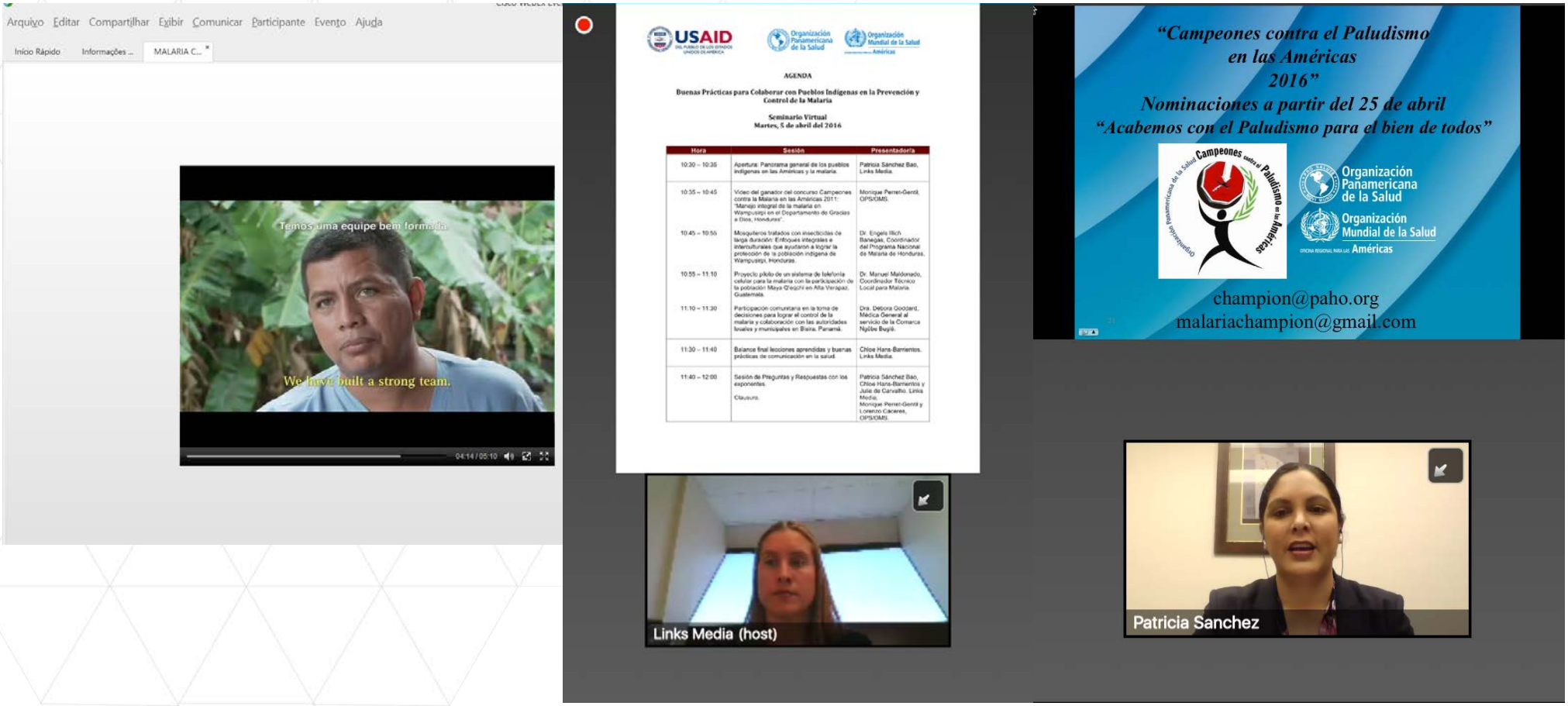
Apoyo Técnico Regional:
Seminario Virtual de Buenas Prácticas de Colaboración con Pueblos Indígenas y Uso de un Marco Intercultural para la Malaria



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Comisión Local de Caracolí, Necoclí, Antioquia

Comisión Local de Limoncito, Necoclí, Antioquia

Comisión Local Boca de Bebará, Medio Atrato, Chocó

Comisión Local de La Bonga, Puerto Libertador, Córdoba

Comisión Local de Puerto Meluk, Medio Baudó, Chocó

Comisión Local de Beté, Medio Atrato, Chocó

Comisión Local El Loro, Tierra Alta, Córdoba

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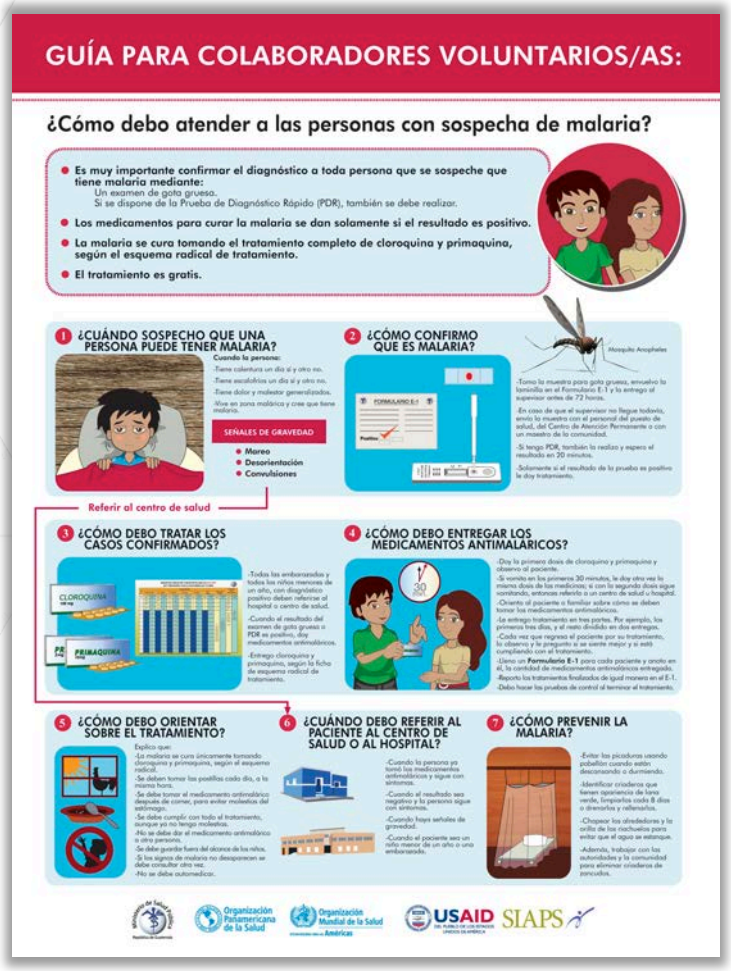
Apoyo a la Implementación con Base en la Planificación Estratégica



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Brasil

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Case Study

AMAZON MALARIA INITIATIVE

PRIVATE SECTOR ENGAGEMENT HELPS TO INTERRUPT MALARIA TRANSMISSION IN BRAZIL

March 2016

Malaria, a potentially fatal illness transmitted by mosquitoes, is endemic to nine states in the Brazilian Amazon. Scientific evidence shows that deforestation, environmental degradation, and population migration associated with large infrastructure projects may increase the incidence of malaria.[1] With over 45,000 cases, Porto Velho had the second highest number of malaria cases reported by any municipality in the Amazon region in 2005.

In 2008, the building of the Santo Antônio and Jirau hydroelectric dams in and around Porto Velho began. In a matter of months, thousands of people flooded into a district of Porto Velho and another area 120 km (75 miles) away to meet the demand for labor during dam construction. Numerous problems arose with the large influx of mostly male workers, from sexually transmitted infections, to alcoholism, drug use, and violence. As the local population doubled in size, malaria cases were bound to increase.

Despite the presence of competent vectors, environmental degradation propitious for malaria transmission, and considerable population growth, malaria incidence in Porto Velho decreased — contrary to what would have been expected. The number of cases fell from 34,865 in 2006 to just 3,600 cases in 2015.

From 2006–2015, Brazil has implemented a regulatory framework to bring together government, the private sector, and communities in the fight against malaria by requiring all large infrastructure projects in the Amazon to assess and mitigate their impact on malaria transmission. Effects of the regulations have been seen with the construction of two hydroelectric dams on the Madeira River in the vicinity of Porto Velho, Rondônia state.

Regulations require large infrastructure projects like the Santo Antônio and Jirau hydroelectric dams in the Brazilian Amazon to help mitigate the risk of increased malaria transmission in the surrounding areas. Map on right shows, in yellow, locations of the dams in relation to the city of Porto Velho.

Figure 1: Decline in Malaria Cases in Porto Velho, Rondônia state, Brazil

Line shows start of dam construction in 2008. Sources: Rondônia State Health Secretariat (SESAU), November 2015 and Brazilian National Malaria Control Program, March 2016.

The private sector supported the door-to-door installation of mosquito nets.

Fotos: Julie de Carvalho, OPS/OMS

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Perú:
Institucionalización de Buenas Practicas

Fotos: Patricia Sanchez Bao

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Surinam

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Guyana

Foto: Vector Control Services Guyana

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Gracias

Malaria en las Américas 2016 | Día Mundial de la Malaria

¿Cuáles son las actividades que la Iniciativa Amazónica contra la Malaria apoya para acabar con la malaria?

Para más, visite usaidami.org
#VencerlaMalaria

Diagnóstico y Tratamiento

- Expande el acceso al diagnóstico oportuno
- Monitorea la eficacia de los medicamentos
- Adquiere medicamentos para los países a través de compra conjunta

Comunicación

- Conecta a los interesados
- Cambia comportamientos
- Difunde éxitos
- Promueve la inversión

Gestión Farmacéutica

- Mantiene la calidad de los medicamentos
- Previene desabastecimientos
- Facilita el intercambio de medicamentos

Control de Vectores

- Analiza la distribución y comportamiento de los vectores
- Evalúa la efectividad de los mosquiteros e insecticidas

Control de la Calidad

- Trabaja para institucionalizar 3 niveles de análisis para el control de la calidad de los medicamentos
- Construye capacidades para la toma de muestras

Julie de Carvalho, MPH
jdecarvalho@linksmedia.net

Visiten el sitio web de AMI!
http://www.usaidami.org/

Recommendations for Advocacy Letter for Suriname

On the occasion of World Malaria Day, the Ministry of Health Malaria Program (MoH) reminds us all of the importance of the country's 2014 commitment to eliminate malaria by 2020. Controlling malaria is central to the economic growth and social advancement of our country.

We would like to continue to work together to:

• Mobilize the funds pledged for malaria elimination in a timely fashion.

• Enable the MoH Malaria Program to serve as an intermediary between the Ministry of Health and the mobile and migrant populations of the interior who are the most vulnerable to a variety of priority diseases.

• Fulfill the World Health Organization's requirements for malaria-free certification.

Within the current context, the main threats to malaria elimination in Suriname are:

• Losing the gains made against the disease over the last 15 years

Malaria has recently become a secondary concern to other infectious diseases. From 2000-2015, Suriname experienced a greater than 95% reduction in malaria cases reported each year. A large part of the country is virtually malaria-free. This includes many villages in the Interior, thanks to the partnership with the Medical Mission (MZ). However, gold mining areas still experience higher rates of malaria transmission, and the risk of reintroduction of malaria from mining areas to malaria-free areas remains. We must remain vigilant and continue to strengthen the country's institutions that provide prevention, diagnosis, and treatment. The timely disbursement of funds will help us sustain the gains made thus far. The MoH Malaria Program requires adequate funding to continue the early warning system for outbreaks throughout the entire country to ensure that the elimination target is met and sustained. Additionally, it is up to the government of Suriname to cover the cost of diagnosis and life-saving malaria treatment provided free of charge at the country's main hospitals and other diagnostic points.

• Drug resistant malaria parasites

With the possibility of artemisinin resistance in the interior, the treatment of severe malaria cases will become more difficult and more costly. Studies already show early signs that certain strains of Plasmodium falciparum parasites circulating in Suriname are becoming resistant to treatment with artemisinin, one of the main drugs in ACTs used to treat malaria. This trend may be the result of gold miners in remote areas self-medicating with ACTs, and failing to complete the recommended doses. Failure to complete antimalarial treatment creates a higher risk of drug resistance. If Suriname is unsuccessful in its efforts to eliminate malaria because of drug resistance, malaria will certainly re-emerge as a public health concern nationally. However, the rapid mobilization of funding for elimination can help us to preclude the development of resistance, by expanding the network of Malaria Service Deliverers (MSDs) who operate in priority risk mining areas of the interior.

• Lack of health infrastructure in remote mining areas, which makes the situation of illegal miners in remote areas more dire

A lack of steady access to health infrastructure in gold mining areas has caused miners to self-diagnose and self-treat their malaria, as described above. The existence of Malaria Service Deliverers (MSDs) has improved the situation by providing proper diagnosis and follow-up of malaria treatment to gold miners. This in turn helps to prevent drug resistance. Up until now, MSDs have been supported through a grant from the Global Fund to Fight HIV/AIDS, Tuberculosis, and Malaria international assistance, but this support will end in 2018. The government of Suriname needs to be prepared to cover the needs for malaria prevention and control from 2018 onward, to maintain the activities of MSDs, and to fulfill the World Health Organization's requirements for malaria-free certification. In addition, MSDs can be trained to function as integrated community health workers who can diagnose and treat other priority infectious diseases like HIV, tuberculosis, and leishmaniasis in remote areas as well. Besides ensuring that the cost to treat each malaria case does not become unmanageable due to drug resistance, expanding the health system to reach more people could bring tangible economic benefits to the tourism, mining, logging and the energy sector. On the other hand, inaction today could lead to higher health system costs in the future based on the foreseeable spread of diseases, especially malaria, from risk areas to areas where control had been achieved.

It is possible to stop the local transmission of malaria, but we must remember that malaria can be reintroduced easily if we are not vigilant. This is a critical period for national efforts to focus on attaining and maintaining malaria-free status. Upholding the work in both interior villages and mining areas is essential to keep the rest of the country free of malaria. Together, we can improve the health and well-being of our population by making a strategic investment in malaria elimination. The MoH Malaria Program looks forward to continuing joint efforts to eliminate malaria by 2020, through broad-based support for the policies and programs outlined above.

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So you say you want elimination? Using communication and advocacy to advance malaria elimination in the Americas

Author Block: Marisabel Sanchez, Julie de Carvalho, Ricardo Echalar
Links Media, Rockville, MD, United States

Abstract:
A qualitative assessment of the communication component of National Malaria Control Programs (NMCPs) in 11 countries in Latin America and the Caribbean was conducted from 2013-2014. The assessment surveyed the overall programmatic objectives, existing resources for communication, malaria stakeholders, target audiences, ongoing communication activities, and gaps. Among the main findings of the assessment showed challenges in providing information to decision-makers to support and sustain efforts, expanding and strengthening partnerships beyond the health sector, and reaching special populations that have a higher burden of disease including indigenous communities and migrant workers. Overall, communication activities were found to be focused at the community level with less attention paid to decentralized health system professionals, and very few if any activities directed at the policy-level. Two examples of the role of effective communication at the policy-level include Suriname, which made significant strides against malaria from 1995-2015 and is now on the path to elimination with help from a National Malaria Board that brings together technical advisors, civil society actors, and other government ministries to help guide the policy making process. In Brazil, new legislation was passed in 2014 to require companies completing infrastructure projects in the Amazon region to engage in a series of activities, including social mobilization, to assess the impact and mitigate the risk of greater malaria transmission in the surrounding area. As more countries in the Americas transition towards elimination, malaria communication will have a sizable role to create a shared understanding among key decision-makers and malaria partners of what it means for countries to be working towards elimination and beyond, in terms of funding levels, technical interventions, multi-sectoral engagement, and sustained surveillance and reporting requirements. Channels and mechanisms that have worked in some countries should be explored for use in others, especially at the policy-level to ensure long-term commitment.
:

Category (Complete): Malaria – Elimination
Presentation Preference (Complete): Oral
Keyword (Complete): communication ; advocacy ; Latin America
Disclosures (Complete):
Response : I did not indicate a conflict of interest.
Response: I confirm
Response: I confirm

Additional Info (Complete):
*** Required**: ASTMH Web Site
*** Required**: I am not an ASTMH member

*** Required**: Female

: Yes. There are an ongoing malaria elimination initiatives in Central America, the Caribbean, and select South American countries, but nothing has been published on the role of communication and advocacy in achieving the elimination targets set for 2020. This abstract provides new recommendations based on an assessment of 5 Central American and 6 South American countries' National Malaria Control Programs. Partial findings have been presented in PowerPoint at an AMI/RAVREDA steering committee meeting.

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64th Annual Meeting of the American Society for Tropical Medicine and Hygiene (ASTMH)

Philadelphia, PA
October 28, 2015

Amazon Malaria Initiative (AMI) Communication Component

Trip Report

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Submitted by
Ricardo Echalar
November 2015

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Recommended Citation

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Abbreviations and Acronyms

AMI	Amazon Malaria Initiative
ASTMH	American Society for Tropical Medicine and Hygiene
CCoP	Communication Community of Practice
CDC	U.S. Centers for Disease Control and Prevention
CHAI	Clinton Health Access Initiative
EMMIE	Initiative for the Elimination of Malaria in Mesoamerica and Hispaniola (Spanish acronym)
ICEMR	International Centers of Excellence for Malaria Research
NMCP	National Malaria Control Program
PAHO	Pan American Health Organization
RBM	Roll Back Malaria
TA	Technical Assistance
USAID	U.S. Agency for International Development
WHO	World Health Organization

I. Background

The United States Agency for International Development (USAID) launched the Amazon Malaria Initiative (AMI) in 2001 to improve the prevention and control of malaria in partner nations of the Amazon basin. The initiative's mission is to (i) ensure that national malaria control programs in the Amazon basin and selected Central American countries substantially incorporate best practices and (ii) promote evidence-based policy changes in the partner countries. From inception, AMI has maintained a comprehensive view of malaria prevention and control. Its initial focus was to build the evidence base to support the introduction of artemisinin-based combination therapy (ACT) for *P. falciparum* malaria in all Amazon basin countries, and to improve access to, and quality of, malaria diagnosis. As progress was made in introducing ACT, the areas of epidemiological surveillance, vector control and systems strengthening received further attention.

USAID established AMI as a collaborative partnership among organizations (the AMI technical partners) that provide technical and scientific expertise and collaborate with the nations' ministries of health and national malaria control programs grouped in the Amazon Network for the Surveillance of Antimalarial Drug Resistance (RAVREDA) to proactively address malaria prevention and control in a sustainable manner. The partner countries also collaborate with one another and maintain an ongoing exchange of information and expertise through South-South collaboration promoted and supported by AMI. Countries currently supported by AMI include Belize, Brazil, Colombia, Ecuador, Guatemala, Guyana, Honduras, Nicaragua, Panama, Peru, and Suriname.

The initiative's regional approach benefits partner countries through (i) training and technical assistance (TA), (ii) the development of standardized guidelines and protocols, (iii) the comparability of research and monitoring results within and across countries, and (iv) coordinated approaches to addressing shared problems.

II. Purpose of the Trip

On October 28, 2015, Mr. Ricardo Echalar, Technical Coordinator/Deputy Project Manager of Links Media traveled Philadelphia, PA for the 64th Annual Meeting of the American Society for Tropical Medicine and Hygiene (ASTMH). Mr. Echalar presented research that he conducted with Ms. Marisabel Sánchez, Senior Technical Advisor, Ms. Julie de Carvalho, Senior Project Manager as part of Links Media activities under the communication component of USAID's Amazon Malaria Initiative.

Links Media attended this conference in order to disseminate valuable experiences from the region of the Americas observed through its technical assistance (TA) to national malaria control programs (NMCPs) under AMI. In addition, Links Media was able to attend other sessions, including a symposium on Malaria in South America.

III. Scope of Work

The scope of work for Links Media included the following specific activities:

- Present a poster entitled, "So you say you want elimination? Using communication and advocacy to advance malaria elimination in the Americas," and
- Provide information about malaria communication and the Amazon Malaria Initiative to interested stakeholders.

IV. Source of Funding for the Trip

This trip was supported with budgeted funds from USAID/Peru contract No. AID-527-C-13-00004 with Links Media for the Amazon Malaria Initiative (AMI) Communication Component.

V. Trip Activities

The main activity for this trip was to attend and present at the 64th Annual ASTMH Meeting in Philadelphia, PA on October 28, 2015. Links Media's abstract titled, "So you say you want elimination? Using communication and advocacy to advance malaria elimination in the Americas" was accepted as a poster presentation. This poster was a result of Links Media's TA to NMCPs in Latin America and the Caribbean under AMI.

Links Media presented the poster during a lunch session from 12:00 – 2:00 pm in the conference ballroom. The poster received interest from several individuals who were beginning to work towards elimination in other regions. Mr. Michael Toso from the Johns Hopkins University Center for Communication Programs (JHU-CCP) who helps coordinate the Roll Back Malaria Communication Community of Practice (CCoP), in which Links Media participates, expressed interest in the work and asked if Links Media could present at one of the next CCoP teleconferences. Dr. Sara Canavati approached Links Media to learn more about our communication work and AMI in general. Dr. Canavati is working in Cambodia and is considered a leader in elimination efforts in Southeast Asia. Next to the Links Media poster were other posters that addressed elimination. One such poster was from Mr. Geoffrey Kirkwood from PATH, who presented on stakeholder analysis for malaria elimination in four African countries. Finally, other presentations by AMI partners and colleagues occurred during the poster session, including one by Dr. Maria Paz Ade on the Pan American Health Organization's (PAHO/WHO) external quality assurance for malaria microscopy diagnosis in the Americas and another by Dr. Darlene Bhavnani of the Clinton Health Access Initiative's (CHAI) on risk modeling in Honduras. Dr. Alex Macedo from the US Centers for Disease Control and Prevention (CDC) and AMI technical partner was also in attendance and visited the Links Media poster. Dr. Macedo was scheduled to present on Thursday, October 29th, on his AMI supported work in Acre, Brazil.

A later session that Links Media attended was a symposium entitled "Malaria in South America: the Amazon and Beyond." This symposium highlighted research from Colombia, the Guiana Shield, and Brazil through representatives from the International Centers of Excellence for Malaria Research (ICEMR) in Colombia, the Pasteur Institute, Fundação de Medicina Tropical

Dr. Heitor Viera Dourada in Manaus, and Brazil's Fundação Oswaldo Cruz (Fiocruz). Dr. Sócrates Herrera-Valencia, who has attended AMI/RAVREDA meetings, presented on behalf of ICEMR and gave an overall history and analysis of efforts in the region. Dr. Lise Musset from the Pasteur Institute in French Guiana addressed the threat of artemisinin resistance in the region. Dr. Marcos Lacerda from the Fundação de Medicina Tropical Dr. Heitor Viera Dourada (Manaus) presented on malaria in the Amazon region of Brazil. Finally, Dr. André Siqueira from Fiocruz presented on behalf of Dr. Claudio Ribiero on recent findings regarding possible zoonotic malaria in the Atlantic forest of Brazil. After this symposium, Links Media spoke with AMI/RAVREDA colleagues Dr. Dionicia Gamboa from Peru, Dr. Malti Adhin and Dr. Hélène Hiwat from Suriname, and with Dr. Lise Musset from French Guiana.

VI. Conclusions and Recommendations

Links Media found the annual ASTMH meeting to be very beneficial in disseminating experiences and lessons learned from malaria communication work in the field. Many of the participants focused on other regions and were very interested to learn more about the work in the Americas, including how many countries are refocusing their efforts towards elimination. The Americas region may be able to serve as a model for other regions as they transition their efforts as well. Two possible outcomes exist as a result of the poster presentation, including presenting the work under AMI to the RBM CCoP as requested by Mr. Toso. This would be a good opportunity to highlight the regional efforts supported by AMI/RAVREDA and the importance of continuing communication and advocacy despite the ongoing challenges with declining incidence in many countries. In addition, Links Media could develop grey literature to be published on the AMI website highlighting this poster and the work in the Americas region before the next AMI/RAVREDA or EMMIE meetings.

In attending the conference, AMI was once again reminded of the importance of supporting regional efforts to prevent and contain the threat of artemisinin resistance. The role of communication and advocacy is vital to ensure political and program commitment. Lessons from the Mekong region in Southeast Asia show the importance of addressing this issue in order to continue effective treatment for *P. falciparum* cases. It may benefit AMI/RAVREDA to create an information or communication product for key stakeholders and decision-makers on *P. vivax*, as the dominant species in Latin America, with key considerations for elimination.

Annex 1: Poster/Presentation Abstract

Presentation Abstract

Add to Itinerary

Print

Session: Poster Session C Presentations and Light Lunch

Abstract Number: 1545

Title: So you say you want elimination? Using communication and advocacy to advance malaria elimination in the Americas

Presentation Start: 10/28/2015 12:00:00 PM

Presentation End: 10/28/2015 1:45:00 PM

Authors: **Marisabel Sanchez**, Julie de Carvalho, Ricardo Echalar
Links Media, Rockville, MD, United States

Abstract: A qualitative assessment of the communication component of National Malaria Control Programs (NMCPs) in 11 countries in Latin America and the Caribbean was conducted from 2013-2014. The assessment surveyed the overall programmatic objectives, existing resources for communication, malaria stakeholders, target audiences, ongoing communication activities, and gaps. Among the main findings of the assessment showed challenges in providing information to decision-makers to support and sustain efforts, expanding and strengthening partnerships beyond the health sector, and reaching special populations that have a higher burden of disease including indigenous communities and migrant workers. Overall, communication activities were found to be focused at the community level with less attention paid to decentralized health system professionals, and very few if any activities directed at the policy-level. Two examples of the role of effective communication at the policy-level include Suriname, which made significant strides against malaria from 1995-2015 and is now on the path to elimination with help from a National Malaria Board that brings together technical advisors, civil society actors, and other government ministries to help guide the policy making process. In Brazil, new legislation was passed in 2014 to require companies completing infrastructure projects in the Amazon region to engage in a series of activities, including social mobilization, to assess the impact and mitigate the risk of greater malaria transmission in the surrounding area. As more countries in the Americas transition towards elimination, malaria communication will have a sizable role to create a shared understanding among key decision-makers and malaria partners of what it means for countries to be working towards elimination and beyond, in terms of funding levels, technical interventions, multi-sectoral engagement, and sustained surveillance and reporting requirements. Channels and mechanisms that have worked in some countries should be explored for use in others, especially at the policy-level to ensure long-term commitment.

Annex 2: Key Contacts

Dr. Maria Paz Ade
Pan American Health Organization
Washington, DC United States

Dr. Malti Adhin
Department of Biochemistry, Anton de Kom Universiteit van Suriname
Paramaribo, Suriname

Dr. Darlene Bhavnani
Clinton Health Access Initiative (CHAI)
Boston, MA United States

Dr. Sara Canavati
Mahidol-Oxford Tropical Medicine Research Unit
Bangkok, Thailand

Dr. Dionicia Gamboa
Universidad Peruana Cayetano Heredia
Lima, Peru

Dr. Hélène Hiwat
Malaria Program, Ministry of Health Suriname
Paramaribo, Suriname

Mr. Geoffrey Kirkwood
PATH
Seattle, WA United States

Dr. Alex Macedo
US Centers for Disease Control and Prevention
Atlanta, GA United States

Dr. Lise Musset
Institut Pasteur Guyana
Cayenne, French Guiana

Mr. Michael Toso
Johns Hopkins Center for Communication Programs
Baltimore, MD United States

Annex 3: Select Photographs

Photo 1: Links Media presenting Poster

Photo: Ricardo Echalar

Photo 2: AMI Partners (Links Media, PAHO/WHO, CDC) at ASTMH

Photo: Ricardo Echalar

Photo 3: Meeting Board/Symposium

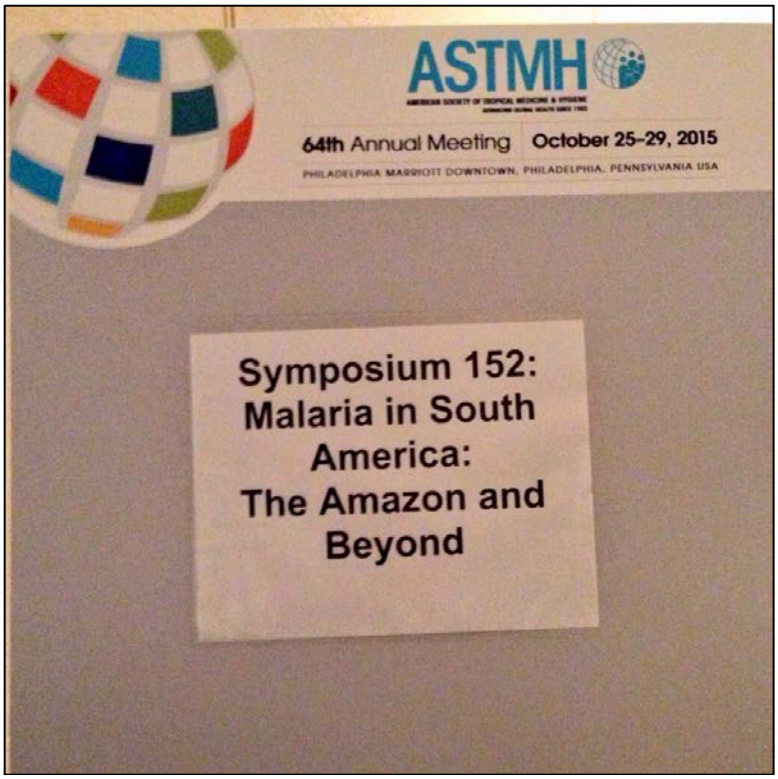

Photo: Ricardo Echalar

Annex 4: USAID COR Concurrence

Jaime Chang 10/6/2015, 12:39 PM

Re: Request for Action: Travel Concurrence_Echalar (Philadelphia, PA)

To Ricardo Echalar Copy Julie de Carvalho • Brian Kubiak

Dear Ricardo,

I concur with the proposed trip as it was planned and budgeted.

Cordially,

Jaime Chang

On Tue, Oct 6, 2015 at 11:32 AM, Ricardo Echalar <rechalar@linksmedia.net> wrote:

> Dear Jaime,
>
> This e-mail is to obtain travel concurrence for Mr. Ricardo Echalar, Links Media's Technical Coordinator/Deputy Project Manager for the Communication Component of the Amazon Malaria Initiative (AMI). Mr. Echalar will be traveling to Philadelphia, PA, on Wednesday, October 28, 2015.
>
> Mr. Echalar will be traveling to present at the annual American Society of Tropical Medicine & Hygiene conference.
>
> 1) Present the "So you say you want elimination? Using communication and advocacy to advance malaria elimination in the Americas" poster
>
> 2) Provide information on malaria communication and the Amazon Malaria Initiative with interested stakeholders
>
> This activity will be covered by Links Media using AMI funding which has been budgeted for FY16.
>
> Thank you for your action and support.
>
> Sincerely,
>
> Ricardo
>
> – – – –
>
> Ricardo Echalar, MPH | Technical Coordinator/Deputy Project Manager
> T 301.987.5495, ext 105 | F 301.987.5498
> 451 Hungerford Drive, Suite 503 • Rockville, MD 20850, USA
> www.linksmedia.net
>
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SO YOU SAY YOU WANT ELIMINATION?

Using communication and advocacy to advance malaria elimination in the Americas

Authors: Marisabel Sánchez, MPH, Julie de Carvalho, MPH, Ricardo Echalar, MPH, Links Media, Rockville, MD, United States

INTRODUCTION

The Americas region has seen a remarkable reduction of malaria mortality and morbidity since 2000. The 2014 *World Malaria Report* shows that 15 of the 21 malaria-endemic countries in the region will have reduced incidence by 75% by 2015, and three more will have reduced incidence between 50-75%. As a result, many countries in the region are now positioned to shift efforts towards elimination. However, advances can quickly disappear if there is a lack of political will to support and sustain necessary efforts. Several countries in the region have seen cases plateau or even begin to rise again since 2010, and this threatens progress in neighboring countries. Working towards malaria elimination can be considered as much a political undertaking as it is a technical issue. As such, communication and advocacy are necessary to engage other sectors, to obtain political commitment, and to establish an enabling environment for the movement towards elimination and beyond.

METHODS

With support from the USAID-funded Amazon Malaria Initiative (AMI), a qualitative assessment of the communication component of National Malaria Control Programs (NMCPs) in 11 countries in Latin America and the Caribbean was conducted from 2013–2014. We conducted stakeholder interviews both virtually and in-person to identify the overall programmatic objectives, existing resources for communication, malaria stakeholders, target audiences, ongoing communication activities, and gaps. To complement the interviews, a literature review was conducted on the utilization of malaria communication resources from the region and around the globe.

RESULTS

The main findings showed challenges in providing clear information to decision-makers, expanding and strengthening partnerships beyond the health sector, and reaching special populations that have a higher burden of disease such as indigenous communities and migrant workers.

Communication activities were found to be focused at the community level with less attention paid to health professionals at different levels of decentralized health systems, and very few if any activities addressing the policy level. Overall, NMCPs have not engaged with the full range of audiences that need to be reached to ensure resources and the institutionalization of evidence-based practices for malaria prevention and control.

Public information on malaria is not readily available, as many Ministry of Health websites do not have a dedicated malaria portal with prevention and control information. Communication with the general public is often managed through a different division within the Ministry of Health or through decentralized public health entities, which lack standardized practices for outreach. There are a limited number of individuals and organizations that speak on behalf of — or in support of — malaria prevention and control in the Americas. There are no perennial champions of the cause in the public eye.

There are examples of how effective communication has played an important role at the policy level in two countries:

- Suriname, which made significant strides against malaria from 1995–2015, is on the path to elimination with help from a National Malaria Board[1] that brings together technical advisors, civil society actors, and other government ministries to help guide the policy making process.
- Brazil, through environmental licensing procedures, requires companies carrying out infrastructure projects in the Amazon region to assess and mitigate the risk of greater malaria transmission in their intervention area.

Photo: PAHO/WHO

RECOMMENDATIONS

- NMCPs, as part of a social component, should use appropriate and cost-effective community-level interventions to reach at-risk populations. E.g., *Proyecto Malaria Colombia* (2010–2015) attained a statistically significant higher uptake of key interventions in communities where community agents for health communication were present.
- When feasible, community meetings should be held to foster greater social participation in the selection of social and behavior change communication (SBCC) objectives for malaria.
- NMCPs require additional support in communicating effectively with populations in special circumstances (e.g. itinerant miners, indigenous and Afro-descendant populations) who are at increased risk of malaria transmission. Such populations must be accounted for within the national malaria surveillance system.
- Communication interventions must be designed to engage with other key audiences in the framework for elimination, i.e., health professionals, political authorities, and non-traditional partners including but not limited to NGOs, private sector, and faith-based organizations that may deliver additional services and/or address gaps in the health system.
- Systematic communication is needed between NMCPs and health professionals to ensure overall awareness of national treatment guidelines, coordinated implementation, and use of evidence-based practices for malaria control.
- Two-way communication between Ministries of Health, health system actors, and the malaria research community must be strengthened to define operational research priorities and better disseminate key research findings.
- Communication and advocacy should be deemed as relevant as other technical interventions (surveillance, diagnosis and treatment, and vector control). Approaches will need to adjust to the changes in the epidemiological context of each country.

[1] Soon to be renamed "Infectious Diseases Board."

Photo: PAHO/WHO

CONCLUSION

Multi-level communication and advocacy for malaria have not been executed in a consistent and systematic fashion across the Americas. As more countries in the Americas transition towards elimination, malaria communication will have a sizable role to create a shared understanding among key decision-makers and malaria partners of what it means for countries to be working towards elimination and beyond, in terms of funding levels, technical interventions, multi-sectoral engagement, and sustained surveillance and case management, etc. In order to pursue malaria elimination across all countries, and serve as an example to other regions, the Americas must learn from failed attempts to eliminate the disease, such as the Global Malaria Eradication Program (1955–1969), and better use communication to secure political commitment and the resources to go beyond zero cases to eliminate malaria once and for all.

Channels and mechanisms that have worked in some countries should be explored for use in others, especially those at the policy level to ensure long-term commitment. Countries can benefit from sharing information and best practices with one another through regional collaborations such as AMI/RAVREDA.

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ACKNOWLEDGEMENTS

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Disclaimer: The authors' views expressed in this publication do not necessarily reflect the views of the United States Agency for International Development or the United States Government.

USAID FROM THE AMERICAN PEOPLE

Malaria in the Americas

2016 | **World Malaria Day**

What activities does the Amazon Malaria Initiative support to end malaria?

For more, see usaidami.org
#defeatmalaria

Diagnosis & Treatment

- Expands access to prompt diagnosis
- Monitors medicine efficacy
- Jointly acquires medicines for countries

Communication

- Connects stakeholders
- Changes behavior
- Spreads successes
- Promotes investment

Pharmaceutical Management

- Maintains medicine quality
- Prevents stockouts
- Enables exchange of medicines

Vector Control

- Analyzes vector distribution and behavior
- Assesses effectiveness of bednets and spraying

Quality Control

- Works to institutionalize 3 -level analysis to control medicine quality
- Builds capacity for field testing

Malaria en las Américas

2016 | Día Mundial de la Malaria

¿Cuáles son las actividades que la Iniciativa Amazónica contra la Malaria apoya para acabar con la malaria?

Para más, visite usaidami.org
#VencerlaMalaria

Diagnóstico y Tratamiento

- Expande el acceso al diagnóstico oportuno
- Monitorea la eficacia de los medicamentos
- Adquiere medicamentos para los países a través de compra conjunta

Comunicación

- Conecta a los interesados
- Cambia comportamientos
- Difunde éxitos
- Promueve la inversión

Gestión Farmacéutica

- Mantiene la calidad de los medicamentos
- Previene desabastecimientos
- Facilita el intercambio de medicamentos

Control de Vectores

- Analiza la distribución y comportamiento de los vectores
- Evalúa la efectividad de los mosquiteros e insecticidas

Control de la Calidad

- Trabaja para institucionalizar 3 niveles de análisis para el control de la calidad de los medicamentos
- Construye capacidades para la toma de muestras

Malária nas Américas 2016 | Dia Mundial da Malária

Quais são as atividades que a Iniciativa Amazônica contra a Malária apoia para acabar com a malária?

Visite usaidami.org
#VenceraMalária

Diagnóstico e Tratamento

- Amplia o acesso ao diagnóstico oportuno
- Monitora a eficácia dos medicamentos
- Compra medicamentos para os países de maneira conjunta

Comunicação

- Conecta as partes interessadas
- Muda os comportamentos
- Divulga os êxitos
- Promove o investimento

Gestão Farmacêutica

- Mantém a qualidade dos medicamentos
- Previne o desabastecimento
- Possibilita trocas de medicamentos

Controle de Vetores

- Analisa a distribuição e o comportamento dos vetores
- Avalia a efetividade dos mosquiteiros e da borrifação

Controle de Qualidade

- Trabalha para institucionalizar uma análise de 3 níveis para o controle da qualidade dos medicamentos
- Desenvolve capacidades para realizar testes de campo

Search Twitter

AMI
@AmazonMalaria

Malaria surveillance can't work on a country-by-country basis, so @pahowho @AmazonMalaria work regionally through AMI/RAVREDA #DefeatMalaria

RETWEETS
3

9:52 AM - 4 Nov 2015

Reply to @pahowho

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#malaria para el bien de todos! #WMD2016

Julie d., MPH @Julied48 · Apr 25
Juntos, vamos a #vencerlamalaria! @AmazonMalaria #Díamundialdelamalaria #WMD2016

Billy Shore @billshore · Apr 24
RT @AmazonMalaria: About 112 million people in 21 countries are estimated to be at risk of #malaria in the Americas #WMD2016

AMI @AmazonMalaria · Apr 23
@USAIDGH e @PAHOWHO apóiam a @AmazonMalaria para #VenceraMalária nas Américas. Vamos acabar com a #Malária de uma vez! #DiaMundialdaMalária

AMI @AmazonMalaria · Apr 22
@USAIDGH & @PAHOWHO support @amazonmalaria to #DefeatMalaria in the Americas. Let's end #malaria for good! #WorldMalariaDay2016

In reply to AMI

Carvalho @Rhanna_Lima · Apr 21
@AmazonMalaria @pahowho #StopCoupInBrasil

In reply to USAID

AMI @AmazonMalaria · Apr 21
@USAID Here's what the @AmazonMalaria project is doing:

SIAPS Program, MSH, U.S. Pharmacopeia and 4 others

AMI @AmazonMalaria · Apr 21
.@USAIDGH e @PAHOWHO apoiam a @AmazonMalaria para #VenceraMalária nas Américas. Vamos acabar com a #Malária de uma vez! #DiaMundialdaMalária

Malaria Guatemala @GuateMalaria · Apr 20

Inscribete al rally #malaria #BarrioelPorvenir #Petén. Abril 22 conmemorando #DiaMundialdelaMalaria @AmazonMalaria

laboratorio Olimpo @labolimpo · Apr 20

RT Gracias @AmazonMalaria #malaria o #paludismo, es una enfermedad producida por parásitos y transmitida por un zancudo Anopheles

Malaria Guatemala @GuateMalaria · Apr 15

#Petén invita conmemorar #DiaMundialdelaMalaria abril 22 #BarrioelPorvenir @saludguatemala @OPSGuate @AmazonMalaria

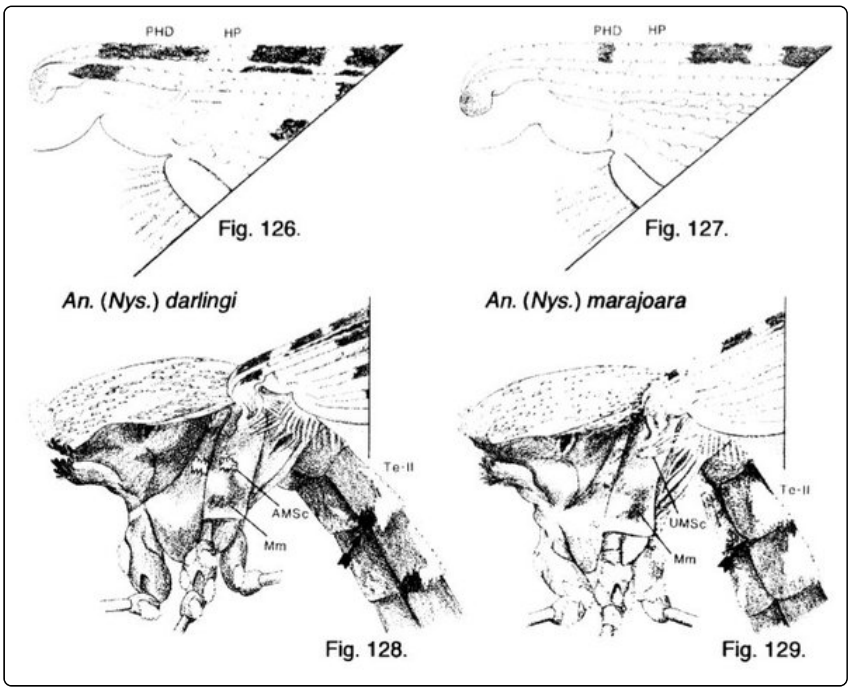
Malaria Guatemala @GuateMalaria · Apr 14

Inicia conmemoración #DiaMundialdelaMalaria.Caminata, charla, limpieza #Chimaltenango.@saludguatemala @AmazonMalaria

OPS/OMS Guatemala, World Malaria Day, World Malaria Day and 5 others

RainforestAP @RainforestAP · Apr 6
@AmazonMalaria Alternatives for stopping #deforestation in the #Amazon #Rainforest! Here are 3 Ways: goo.gl/XZM2uz

AMI @AmazonMalaria · Mar 1
Léa sobre la identificación de "anofelinas" de México y Centroamérica, aquí: bit.ly/1THgFG3 @AmazonMalaria



In reply to President Obama

AMI @AmazonMalaria · Feb 24
@POTUS We are also making big strides in Latin America & the Caribbean through the @AmazonMalaria Initiative: bit.ly/USAIDAMI

Lilia Quituisaca S @LiliaQuituisaca · Feb 19
¡Novedades disponibles! paper.li/LiliaQuituisac… Gracias a @orienta_and @AmazonMalaria

AMI @AmazonMalaria · Feb 18
Visite nuestra pagina @AmazonMalaria en Facebook para mantenerse al día con #malaria y #zika: on.fb.me/1PCPtV3

Links Media, LLC @LinksMediaUSA · Feb 17
Proud of our team's country technical assistance and work on quarterly bulletins for @AmazonMalaria @USAIDGH

> **AMI** @AmazonMalaria
> The latest AMI quarterly bulletin is now available: bit.ly/AMI_BULLETIN_F… @PMIgov @pahowho @CDCGlobal @USAIDLAC

U.S. Pharmacopeia @USPharmacopeia · Feb 11
Check out @AmazonMalaria latest bulletin @SIAPS_Program #malaria

> **AMI** @AmazonMalaria
> ICYMI: AMI's latest quarterly bulletin is now available bit.ly/AMI_BULLETIN_F… @USPharmacopeia @SIAPS_Program

Nili Majumder @NiliMajumder · Feb 5
Congratulations @AmazonMalaria for 900 followers. Lots of good wishes.

> **AMI** @AmazonMalaria
> We recently reached 900 followers & we want to thank each & everyone of you! Gracias! Obrigado! And please visit bit.ly/usaidami

U.S. Pharmacopeia @USPharmacopeia · Jan 4
Congratulations Jaime Chang of @AmazonMalaria for winning the @socmed4good award in fighting malaria - bit.ly/1mvZDx6 #MalariaHero

Dx Mobile @DxMobile999 · 25 Dec 2015
Discusions on Ethical Aspects Regarding Malaria Research and Control bit.ly/1OOXCT4 @INSColombia @AmazonMalaria

David Christenson @dchristenson6 · 20 Dec 2015
@AmazonMalaria Supreme Court Murdered Mankind with Katrina Virus/Ebola/Aids @CIJ_ICJ @dachristenson @reluctantpat

David Andrew Christenson
Visit Amazon.com's David Andrew Christenson Page and shop for all Davi…
amazon.com

Social Media Awards @socmed4good · 18 Dec 2015
#FF Latin America #Malaria Hero nominees: @surianna @PaolaMarchesini @AmazonMalaria

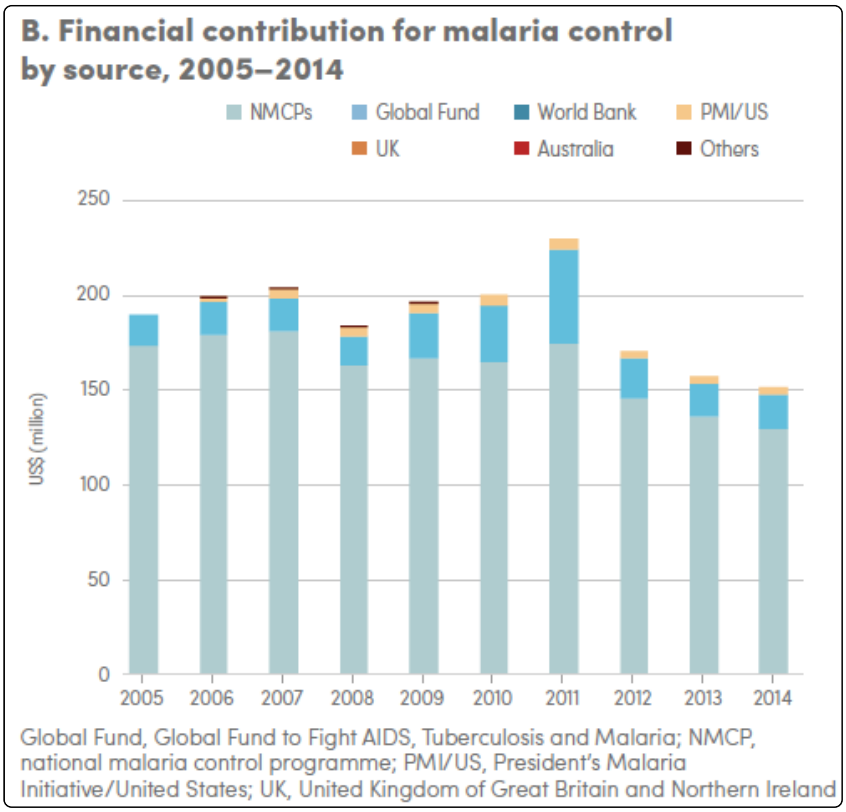
Social Media Awards @socmed4good · 18 Dec 2015
#FF #Malaria Hero Winners: @ckarema @KnolsMosquito @MatToddChem @SaraCanavati @donlaz4u and Jaime Chang @AmazonMalaria

Social Media Awards @socmed4good · 17 Dec 2015
A detailed intro to the work of Jaime Chang @AmazonMalaria bit.ly/JaimeProfile #DefeatMalaria @ISGLOBALorg

AMI @AmazonMalaria · 15 Dec 2015
.@USAID presta cooperação técnica e $ para controlar a #malária nas Américas através de @AmazonMalaria bit.ly/usaidami #WMR2015

AMI @AmazonMalaria · 10 Dec 2015
.@USAID presta cooperação técnica e $ para controlar a #malária nas Américas através de @AmazonMalaria bit.ly/usaidami #WMR2015

AMI @AmazonMalaria · 10 Dec 2015
.@USAID provides TA and $ for #malaria control in the Americas via @AmazonMalaria bit.ly/usaidami #WMR2015



Social Media Awards @socmed4good · 10 Dec 2015
Find out more about Jaime Chang's journey with @AmazonMalaria with some #ICT4D thrown in: bit.ly/InterviewJaime @francetim @ISGLOBALorg

APLMA @APLMA_Malaria · 27 Nov 2015
#FF @socmed4good #Malaria Hero Winners: @SaraCanavati @KnolsMosquito @donlaz4u @MatToddChem @ckarema & Jaime Chang @AmazonMalaria

SoE Malaria @SoE_Malaria · 23 Nov 2015
Thx @AmazonMalaria 4 a great snap! #SoEMalaria2015 regional course participants in São Paulo ow.ly/UZRcn fb.me/4lK3XyVpR

Defeating Malaria @HarvardMalaria · 23 Nov 2015
Thx @AmazonMalaria 4 a great snap! #SoEMalaria2015 regional course participants in São Paulo ow.ly/UZRcn ow.ly/i/eHamC

In reply to Social Media Awards

Nkwocha Kctony X. @kc2ony · 23 Nov 2015
@socmed4good @ckarema @SaraCanavati @MatToddChem @KnolsMosquito @AmazonMalaria @MedsforMalaria Congrats all, and to @donlaz4u cheers, Bro!

Roll Back Malaria @RollBackMalaria · 19 Nov 2015

From #MalariaDayAmericas to the @socmed4good Latin America Champion, show some love for @AmazonMalaria

Social Media Awards @socmed4good · 18 Nov 2015
Shout out to Jaime Chang @AmazonMalaria, winner @ISGLOBALorg Latin America #Malaria Hero bit.ly/SMAWinnerLatin…

You, ISGlobal, PAHO/WHO and 7 others

APLMA @APLMA_Malaria · 16 Nov 2015
Congrats @KnolsMosquito @ckarema @AmazonMalaria @SaraCanavati @MatToddChem @donlaz4u on winning @socmed4good Awards!

In reply to Social Media Awards

Kelvin Ossai @KelvinOssai · 16 Nov 2015
@socmed4good @ckarema @UNDP @KnolsMosquito @MalariaNoMore @MatToddChem @MedsforMalaria @AmazonMalaria @ISGLOBALorg @SaraCanavati cograts

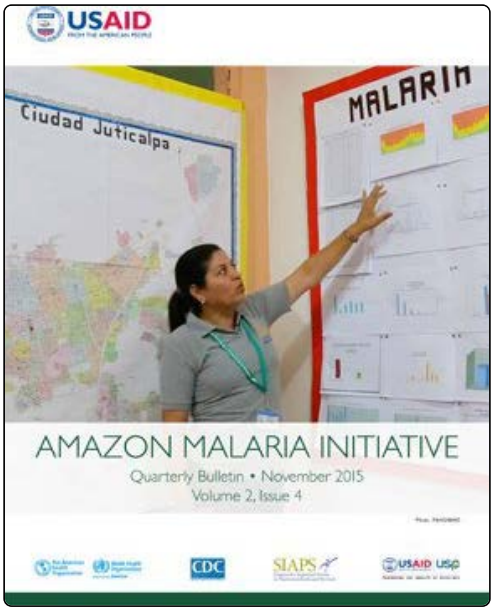
Malaria No More @MalariaNoMore · 16 Nov 2015
Congrats @KnolsMosquito, @ckarema, @AmazonMalaria, @SaraCanavati, @MatToddChem, and @donlaz4u on winning @socmed4good awards!

Social Media Awards @socmed4good · 16 Nov 2015
Winner of @ISGLOBALorg #Malaria Champion: Latin America Award, Jaime Chang @AmazonMalaria! bit.ly/SMAWinnerLatin…

You, ISGlobal and Social Media Awards

AMI @AmazonMalaria · 10 Nov 2015
The @AmazonMalaria Quarterly Bulletin, Vol 2, Issue 4 is now available (bit.ly/AMI_BULLETIN_N… …) #DefeatMalaria

PAHO/WHO, CDC Global Health, SIAPS Program and 5 others



PAHO Foundation @PAHOFoundation · 10 Nov 2015
We appreciate it! Great coverage on #MalariaDayAmericas, @AmazonMalaria!

> **AMI** @AmazonMalaria
> @PAHOFoundation You've been quoted in my #Storify story "Malaria Day in the Americas 2015 #MalariaDayAmericas" sfy.co/t10BV

In reply to USAID Global Health

Nili Majumder @NiliMajumder · 10 Nov 2015
Learn more about #MalariaDayAmericas 2015 bit.ly/campeonesmalar… … & @USAID's @amazonmalaria initiative usaidami.org v @USAIDGH

Nothing But Nets @nothingbutnets · 9 Nov 2015
Last week we celebrated #MalariaDayAmericas & honored Brazil for progress in

eliminating the disease: ow.ly/UrpBC @amazonmalaria

In reply to OPS/OMS Honduras

Rosa Lagos @LagosRosa76 · 7 Nov 2015
@OPSOMS_Honduras @saludhn @anatreasure @AmazonMalaria @YolanyBatres excelente trabajo de mi presidente y ministra de salud.

In reply to OPS/OMS Honduras

mike caceres @_miyelito · 7 Nov 2015
@OPSOMS_Honduras @saludhn @anatreasure @AmazonMalaria @YolanyBatres gran trabajo del equipo de Salud

In reply to (((Yangbo Du)))

Nili Majumder @NiliMajumder · 7 Nov 2015
@mitgc_cm:Inspire #GlobalResolutions:#MDGMomentum 4 #Action2015 paper.li/mitgc_cm/13413… …Stor v @Meghan_Hussey @AmazonMalaria @Mylegalforum

(((Yangbo Du))) @mitgc_cm · 6 Nov 2015
Inspire #GlobalResolutions: #MDGMomentum for #Action2015 paper.li/mitgc_cm/13413… Stories via @Meghan_Hussey @AmazonMalaria @Mylegalforum

In reply to AMI

thelittlekissingbug @kizziebug · 6 Nov 2015
@AmazonMalaria Thats the hope - but is it happening at a pace sufficient to stymie the spread of NTD's?

U.S. Pharmacopeia @USPharmacopeia · 6 Nov 2015
.@USAIDGH @pahowho and PQM support @amazonmalaria to #DefeatMalaria in the Americas #MalariaDayAmericas

Malaria Day in the Americas 2015
Almost half of the world's population is at risk of malaria. Malaria Day in the Ame

U.S. Pharmacopeia @USPharmacopeia · 6 Nov 2015
Learn more abt PQM & partner work on #MalariaDayAmericas bit.ly/1Hc3DeY @AmazonMalaria @USAIDGH @pahowho @CDCGlobal

Malaria Day in the Americas 2015

Almost half of the world's population is at risk of malaria. Malaria Day in the Ame

Dr Olasakinju @DrOlasakinju · 5 Nov 2015
Retweeted AMI (@AmazonMalaria):

Interested for more info on regional #malaria efforts? Visit... fb.me/5mxFnx9mE

In reply to AMI

Adnan SERPEN @adnanserpen · 5 Nov 2015
@AmazonMalaria @pahowho
Important.

Dr Olasakinju @DrOlasakinju · 5 Nov 2015
Retweeted AMI (@AmazonMalaria):

Here is the @pahowho video for 2015 #malaria champion finalist, Brazil:... fb.me/Og1enliR

Dr Olasakinju @DrOlasakinju · 5 Nov 2015
Retweeted AMI (@AmazonMalaria):

Malaria Champion Brazil has achieved the lowest amount of #malaria cases in the... fb.me/T1DCU5vN

USAID Global Health @USAIDGH · 5 Nov 2015
Since 2001 @USAID has provided funding & technical assist to NMCPs in the Americas to #DefeatMalaria thru @amazonmalaria #MalariaDayAmericas

USAID Global Health @USAIDGH · 5 Nov 2015
.@USAIDGH & @pahowho support @amazonmalaria to #DefeatMalaria in the Americas #MalariaDayAmericas

AMI @AmazonMalaria · 5 Nov 2015
.@USAID supports @amazonmalaria to #DefeatMalaria #MalariaDayAmericas bit.ly/usaidami

Dx Mobile @DxMobile999 · 5 Nov 2015
Hi @AmazonMalaria, we are DxMobile a Malaria diagnosis support entrepreneurship, we'd be glad to talk with you.

Roll Back Malaria @RollBackMalaria · 4 Nov 2015
RT @AmazonMalaria: #Paludismo en las Américas: hora de erradicarlo @HerveVerhoosel @RollBackMalaria periodistas-es.com/paludismo-en-a… #DíaDelPaludismo

Paludismo en América: hora de erradicarlo
En este es un artículo de opinión de Hervé Verhoosel sostiene que, gener…
periodistas-es.com

Social Media Awards @socmed4good · 4 Nov 2015
In time for #MalariaDayAmericas, meet the Latin America #Malaria Hero finalists: Jaime @AmazonMalaria and @surianna

You, Anna Surinyach and ISGlobal

In reply to Friends of the GF

Julie d., MPH @Julied48 · 4 Nov 2015
@theglobalfight You mean studies haven't found resistance. Efficacy monitoring is ongoing through @amazonmalaria @pahowho

AMI @AmazonMalaria · 4 Nov 2015
Malaria surveillance can't work on a country-by-country basis, so @pahowho @AmazonMalaria work regionally through AMI/RAVREDA #DefeatMalaria

AMI @AmazonMalaria · 4 Nov 2015
Larry Barat of @PMIgov speaks on USG investment in malaria to help countries of Lat Am & the Caribbean #defeatmalaria through @AmazonMalaria

PMI @PMIgov · 4 Nov 2015
Learn more about #MalariaDayAmericas 2015 bit.ly/campeonesmalar… & @USAID's @amazonmalaria initiative usaidami.org

USAID Global Health @USAIDGH · 4 Nov 2015
Learn more about #MalariaDayAmericas 2015 bit.ly/campeonesmalar… & @USAID's @amazonmalaria initiative usaidami.org

In reply to AMI

Jorge Iván Domínguez @jdominguezMD · 3 Nov 2015
@AmazonMalaria @USAIDGH In Quindío Colombia, we defeat Malaria in 1988 with education, community participation and early detection treatment

Julie d., MPH @Julied48 · 3 Nov 2015
Contagem regressiva para o foro do #DiaMalariaAmericas bit.ly/campeonesmalar… no dia 5 de novembro! @amazonmalaria

In reply to Social Media Awards

Dr. Ebirim Obinna @ebirimobinna · 2 Nov 2015
Congratulations @AmazonMalaria @surianna for making it to the finals. Together, we will #defeatmalaria everywhere @socmed4good @ISGLOBALorg

Social Media Awards @socmed4good · 2 Nov 2015
In the Regional #Malaria Champion #LatinAmerica category: Jaime Chang @AmazonMalaria and @surianna cc: @ISGLOBALorg

> **Social Media Awards** @socmed4good
> After much deliberation, we have the shortlist for the 2015 Social Media Awards! Meet the finalists: bit.ly/smafinalists #DefeatMalaria

Michael Toso @michaeltoso · 31 Oct 2015

.@amazonmalaria .@ACTconsortium .@PSIimpact .@PMIgov .@RollBackMalaria .@HealthCommCapacity eepurl.com/bErnVL

Ricardo Echalar @RicardoEchalar · 28 Oct 2015
Glad to represent @LinksGlobalUSA's @AmazonMalaria communication work at the @ASTMH #TropMed15 meeting in Philly.

troʊd @ingrx · 26 Oct 2015
READ: #Vaccines #Maternalhealth ln.is/paper.li/ingrx… #FF + Stories via @macepa_tweets @AmazonMalaria @HCIDproject

Social Media Awards @socmed4good · 26 Oct 2015
@ISGLOBALorg @AmazonMalaria @surianna @PaolaMarchesini

> **Social Media Awards** @socmed4good
> 3 weeks until winner announcements! Find out more about judging criteria & selection here: bit.ly/1jOtxuk

Social Media Awards @socmed4good · 22 Oct 2015
@ISGLOBALorg @AmazonMalaria @surianna @PaolaMarchesini

> **Social Media Awards** @socmed4good
> The nominations are closed, but there's more to come in the Social Media Awards! socmedawards.com/malaria2015/

Inis Communication @InisCom · 14 Oct 2015
Jaime Chang's work w @AmazonMalaria is a great example of multisectoral communication for #globalhealth!

Social Media Awards @socmed4good
Introducing Jaime Chang @AmazonMalaria, Latin America #malaria hero nominee: bit.ly/1CntY1T #DefeatMalaria

Social Media Awards @socmed4good · 13 Oct 2015
Introducing Jaime Chang @AmazonMalaria, Latin America #malaria hero nominee: bit.ly/1CntY1T #DefeatMalaria

You and ISGlobal

In reply to Social Media Awards

Scott Davis @scottGNARTN · 13 Oct 2015
@socmed4good @ISGLOBALorg @AmazonMalaria @PaolaMarchesini @surianna @Giovanna_Webb

Social Media Awards @socmed4good · 9 Oct 2015
#FF Latin America #malaria hero nominees: @surianna @PaolaMarchesini @AmazonMalaria bit.ly/MalariaLatinAm…

In reply to The Economist

Joe Niemczura, RN @ccnepal2013 · 8 Oct 2015
@TheEconomist @AmazonMalaria look at the photo. I do not believe the mosquito in the picture is an anopheles. ????

EDUCAMBLAM @educamblam · 18 Sep 2015
¡EDUCAMBLAM está disponible! paper.li/educamblam/140… Gracias a @snonell4 @ManelGolf @AmazonMalaria

Nili Majumder @NiliMajumder · 15 Sep 2015
Now available:Strategic Malaria Communication Guide4Central America2015-20(bit.ly/1ivcDRb) v @AmazonMalaria

U.S. Pharmacopeia @USPharmacopeia · 15 Sep 2015
#PQMprogram's collaborative efforts to improve medicines #quality in LAC region featured in new @AmazonMalaria report bit.ly/1K96dNH

U.S. Pharmacopeia @USPharmacopeia · 10 Sep 2015
Helping country and regional partners improve medicines #quality @AmazonMalaria @USAIDGH #PQMprogram

> **AMI** @AmazonMalaria
> .@USPharmacopeia presented in a workshop on the 3LA for 6 DIRESAS.To learn more click here: bit.ly/1JrprEi

U.S. Pharmacopeia @USPharmacopeia · 10 Sep 2015
#PQMprogram's collaborative efforts to improve medicines #quality in LAC region featured in new @AmazonMalaria report bit.ly/1K96dNH

In reply to AMI

VictoriaLopez @victoriasev89 · 1 Sep 2015
@AmazonMalaria ¡Te vienes a Berlín! Primera Casa para emprendedores e inversores. bit.ly/houseberlin?l5p

Social Media Awards @socmed4good · 29 Aug 2015
Latin America: Beating back #malaria bit.ly/1LFE8DX @surianna @AmazonMalaria @PaolaMarchesini

Click here to check out the 2015 Malaria Champions of the Americas.

Haz clic aquí para ver los Campeones contra la Malaria en las Américas de 2015.

Confira aqui os Campeões contra a Malária nas Américas 2015.

En conmemoración del 9º Día de la Malaria en las Américas, la Organización Panamericana de la Salud (OPS/OMS) será anfitrión del **Foro de Redes de Malaria y defensores y el lanzamiento regional de la Acción e Inversión para Vencer a la Malaria (AIM).**

¿Cuándo?: Jueves, 05 de noviembre 2015; 13:00–16:00
¿Dónde?: Sala B, Sede de la OPS, 525 23rd Street NW, Washington, DC – 20037
Para confirmar su presencia: http://bit.ly/1GWSzNm

El evento contará con vídeos, presentaciones y debates sobre el trabajo de los *Campeones contra la Malaria en las Américas de 2015*: Brasil, Paraguay y Honduras.

To commemorate the 9th annual Malaria Day in the Americas, the Pan American Health Organization (PAHO/WHO) will host the **Forum of Malaria Networks and Advocates and the regional launch of the Action and Investment to Defeat Malaria (AIM)** document.

When: Thursday, November 5, 2015; 1:00 – 4:00 PM
Where: Room B, PAHO Headquarters, 525 23rd Street NW, Washington, DC – 20037
RSVP: http://bit.ly/1GWSzNm

The event will feature videos, presentations, and discussions on the work of the *Malaria Champions of the Americas 2015*: Brazil, Paraguay and Honduras.

If you cannot make it, tune in via livestream and follow along on Twitter with the hashtags #MalariaDayAmericas #DefeatMalaria #InvestInTheFuture #malaria.

Access the AIM on our website in English, Spanish, and Portuguese now!

Em comemoração do 9º Dia da Malária nas Américas, a Organização Pan-Americana da Saúde (OPAS/OMS) sediará o **Foro de Redes e Defensores da Malária e o lançamento regional de Ação e Investimento para Vencer a Malária (AIM)** na quinta-feira, 5 de novembro de 2015.

Local: Sala B, Sede da OPAS, 525 23rd Street NW, Washington, DC – 20037
Hora: 13:00 – 16:00 horas
Para confirmar a sua presença: http://bit.ly/1GWSzNm

O evento contará com vídeos, apresentações e discussões sobre o trabalho dos *Campeões contra a Malária nas Américas 2015*: Brasil, Paraguai e Honduras.

Caso não puder

Malaria Day in the Americas 2015

Social Media Toolkit

Developed by Links Media

#MalariaDayAmericas
#DefeatMalaria

What is this event?

- On November 5, 2015, the Pan American Health Organization (PAHO/WHO), the UN Foundation, The Milken Institute School of Public Health at the George Washington University, and the Center for Communication Programs at The Johns Hopkins Bloomberg School of Public Health, will host **the Forum of Malaria Networks and Advocates and the regional launch of *Action and Investment to Defeat Malaria (AIM)*** in commemoration of Malaria Day in the Americas 2015.

- The event will feature videos, presentations, and discussions on the work of the Malaria Champions of the Americas 2015 finalists from Brazil, Honduras, and Paraguay.

#MalariaDayAmericas

Pan American Health Organization

World Health Organization Americas

UNITED NATIONS FOUNDATION

JOHNS HOPKINS Center for Communication Programs

Milken Institute School of Public Health
THE GEORGE WASHINGTON UNIVERSITY

In commemoration of Malaria Day in the Americas 2015

The Pan American Health Organization,
The UN Foundation,
The Milken Institute School of Public Health at The George Washington University, and
Center for Communication Programs at The Johns Hopkins Bloomberg School of Public Health

Cordially invite you to attend the

Forum of Malaria Networks and Advocates and the regional launch of the Action and Investment to defeat Malaria (AIM)

Featuring videos, presentations and discussions on

The work of the '*Malaria Champions of the Americas 2015*'

WHEN: Thursday, November 5, 2015
TIME: 1:00 p.m. to 4:00 p.m.
WHERE: Room B, PAHO Headquarters
525 23rd Street NW, Washington, DC—20037
RSVP: Please fill out the form at https://goo.gl/rqiM59

Light refreshments will be served

Malaria Day in the Americas

Join the Conversation

- The Amazon Malaria Initiative (AMI) will be posting live content on our Facebook, Twitter, and Instagram accounts during the #MalariaDayAmericas event and collecting content for Storify like we did last year.
- Please be sure to use the following hashtags in your social media posts: #MalariaDayAmericas #DefeatMalaria #InvestInTheFuture #malaria

AMI partner twitter Accounts:
@amazonmalaria
@pahowho
@opsoms
@CDCGlobal
@USPharmacopeia
@SIAPS_Program
@MSHHealthImpact
@LinksGlobalUSA

Event Organizer Twitter Accounts:
@pahowho
@unfoundation
@Gwpublichealth
@JohnsHopkinsCCP

Other Key Twitter Accounts
@PMIgov
@USAIDGH
@WHO
@RollBackMalaria

#MalariaDayAmericas

Sample Content: November 1-4, 2015

Twitter

- Join us on Nov 5 @pahowho to celebrate the 9th annual #MalariaDayAmericas http://bit.ly/campeonesmalaria

- The @RollBackMalaria Action and Investment to defeat #Malaria (AIM) regional launch will occur on Nov 5 @pahowho for #MalariaDayAmericas

- Learn more about #MalariaDayAmericas 2015 http://bit.ly/campeonesmalaria & @USAID's @amazonmalaria initiative http://www.usaidami.org

Facebook/Instagram:

On November 5th, we celebrate the 9th annual #MalariaDayAmericas and the region's efforts to #DefeatMalaria including USAID's support through the Amazon Malaria Initiative (AMI). http://bit.ly/campeonesmalaria http://www.usaidami.org

#MalariaDayAmericas

Sample Tweets: November 5 (1–4pm)

- Today @pahowho we gather to celebrate the 9th annual #MalariaDayAmericas with @unfoundation @GWpublichealth @JohnsHopkinsCCP http://bit.ly/campeonesmalaria
- .@USAIDGH & @pahowho support @amazonmalaria to #DefeatMalaria in the Americas #MalariaDayAmericas
- Confirmed #malaria cases in the Americas decreased by 67% and malaria-related deaths fell by 86% since 2000 #MalariaDayAmericas
- Seven of the 21 endemic countries in the Americas are currently categorized by @WHO to be in the pre-elimination stage. #MalariaDayAmericas
- Since 2001 @USAID has provided funding & technical assist to NMCPs in the Americas to #DefeatMalaria thru @amazonmalaria #MalariaDayAmericas
- Interested for more info on regional #malaria efforts on #MalariaDayAmericas, visit http://www.usaidami.org http://bit.ly/RAVREDA
- Fourteen of 21 endemic countries in the Americas met the MDG-6 target by 2014, reducing #malaria by at least 75% #MalariaDayAmericas
- On #MalariaDayAmericas learn more about the 2015 #Malaria Champions of the Americas @pahowho http://bit.ly/campeonesmalaria

#MalariaDayAmericas

To be distributed on November 5, 2015

These photos are also available here: https://app.box.com/s/8it0ltq7vpucymgt9m680batz5koyv62

#MalariaDayAmericas

Thank you!

- To RSVP to the event, click here: http://bit.ly/1GWSzNm

- Can't make it in-person? Tune in via: http://www.livestream.com/paho

Questions?

Ricardo Echalar rechalar@linksmedia.net

Julie de Carvalho jdecarvalho@linksmedia.net

#MalariaDayAmericas

Post Details

Reported stats may be delayed from what appears on posts

Amazon Malaria Initiative at Pan American Health Organization.

November 6, 2015 ·

Today is officially Malaria Day in the Americas!

And if you missed the #MalariaDayAmericas event at PAHO-WHO yesterday, you can visit http://bit.ly/campeonesmalaria to learn more about this year's Malaria Champions of the Americas finalists from Brazil, Honduras, and Paraguay, including videos! Congratulations to everyone!

Photo: PAHO/WHO

190 people reached

Dario Saraiva de Aguiar, Cássio Peterka and 4 others

Like Comment Share

190 People Reached

7 Likes, Comments & Shares

7 Likes	**6** On Post	**1** On Shares
0 Comments	**0** On Post	**0** On Shares
0 Shares	**0** On Post	**0** On Shares

20 Post Clicks

15 Photo Views	**0** Link Clicks	**5** Other Clicks

NEGATIVE FEEDBACK

0 Hide Post **0** Hide All Posts

0 Report as Spam **0** Unlike Page

Malaria Day in the Americas 2015 #MalariaDayAmericas

Forum of Malaria Networks and Advocates and the regional launch of Roll Back Malaria's Action and Investment to Defeat Malaria (AIM) 2016 - 2030

by AMI 9 months ago 73 Views

The Pan American Health Organization, United Nations Foundation, Milken Institute School of Public Health at the George Washington University, and Center for Communication Programs at the Johns Hopkins Bloomberg School of Public Health sponsored the 9th annual Malaria Day in the Americas event.

This forum took place on Thursday, November 5, 2015 in the PAHO/WHO Headquarters in Washington, DC. The forum featured videos, presentations and discussions on Malaria Networks and Advocates, the regional launch of Roll Back Malaria's Action and Investment to Defeat Malaria (AIM) 2016 - 2030, and the work of 'Malaria Champions of the Americas 2015' from Brazil, Honduras, and Paraguay. The event began with welcome remarks from Dr. Francisco Becerra, Assistant Director of PAHO/WHO, Dr. James Tielsch, Chair of the Global Health Department of the Milken Institute School of Public Health at the George Washington University, Gabrielle Hunter, from the Johns Hopkins Bloomberg School of Public Health, Mike Beard, Executive Director for Advocacy and Global Health at the United Nations Foundation, Dr. Fatoumata Nafo-Traoreé, Execu

The Forum on Malaria Networks and Advocates was moderated by Dr. Keith Carter, Senior Advisor, Malaria and other Communicable Diseases, PAHO/WHO, and featured prominent speakers including, Dr. Fatoumata Nafo-Traoré, Executive Director of the Roll Back

Malaria (RBM) Partnership, Dr. Bruno Moonen, Deputy Director for Malaria, Global Health Program in the Bill and Melinda Gates Foundation, and Dr. Michelle Chang, CDC, and Director of Malaria Zero.

This year's forum also named the 2015 Malaria Champions of the Americas finalists, including the National Malaria Control Program of Brazil, the Honduras Ministry of Health Health Surveillance Unit, and the National Malaria Eradication Service (SENEPA) of Paraguay. The National Malaria Control Program from Brazil won the overall prize and is the 2015 Malaria Champion of the Americas. To learn more about the three finalists, please visit: paho.org/campeonesmalaria

Read next page

Like

Related stories

World Malaria Day 2015

PPP4Malaria Twitter Chat

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Post Details

Reported stats may be delayed from what appears on posts

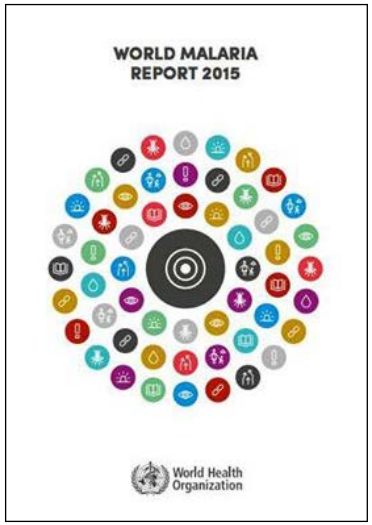
Amazon Malaria Initiative
December 9, 2015 ·

Lea el nuevo Informe Mundial de la #Malaria 2015 (http://bit.ly/1NbwvUc) publicado por la Organización Mundial de la Salud (OMS).

Algunos puntos clave sobre las Américas:

• Los casos de malaria en la región disminuyeron en un 67% entre 2000 y 2014.... See More

See Translation



383 people reached

Chloe Hans-Barrientos, Quacy Grant and 11 others

Like Comment Share

383 People Reached

20 Likes, Comments & Shares

18 Likes	**13** On Post	**5** On Shares
0 Comments	**0** On Post	**0** On Shares
2 Shares	**0** On Post	**2** On Shares

32 Post Clicks

13 Photo Views	**3** Link Clicks	**16** Other Clicks

NEGATIVE FEEDBACK

0 Hide Post
0 Hide All Posts
0 Report as Spam
0 Unlike Page

World Malaria Day 2016

Social Media Toolkit

#WorldMalariaDay
#DefeatMalaria
#WMD2016

How to use this toolkit

- From April 18-26, the Amazon Malaria Initiative (AMI) will be posting content on our Facebook, Twitter, and Instagram accounts for #WorldMalariaDay (April 25, 2016).

- Let's build critical mass! We invite you to post similar messages by copying and pasting directly from this toolkit.

- Be sure to use the following hashtags in your social media posts:

#WMD2016 #WorldMalariaDay #defeatmalaria #malaria

AMI partner Twitter Accounts:
@amazonmalaria
@pahowho
@opsoms
@CDCGlobal
@USPharmacopeia
@SIAPS_Program
@MSHHealthImpact
@LinksGlobalUSA

Other key Twitter accounts:
@WHO
@PMIgov
@USAIDGH
@RollBackMalaria

Theme

- The theme for 2016 is “**End Malaria For Good**.”
- Following the great progress made under the Millennium Development Goals, it is important to build on this success and “end malaria for good” under the Sustainable Development Goals.

World Malaria Day: Factoids

- On April 25th, people across the globe take part in a wide range of activities to mark World Malaria Day.
- Globally, 3.2 billion people in 106 countries are at risk of malaria.
- In 2015, 96 countries had ongoing malaria transmission
- In the Americas, approximately 112 million people in 21 countries and territories are estimated to be at risk of malaria.
- 10 countries in Central America and the Caribbean have joined a regional initiative that aims to eliminate malaria by 2020.
- Brazil (37%), Venezuela (23%) & Peru (17%) accounted for 77% of #malaria cases in the Americas in 2014.

Sources: WHO. *World Malaria Report 2015; PAHO/WHO. 2016. Regional Report on Malaria in the Americas: 2000-2014*

Sample Tweets

- Did you know that from 2000-2014, malaria incidence in the Americas decreased by 67%?
- Did you know that from 2000-2014, malaria deaths in the Americas decreased by 79%?
- On #WorldMalariaDay, 4/25, find out about the 2016 #Malaria Champions of the Americas competition: (http://bit.ly/1tolpTq) @pahowho
- In the Americas, an estimated 4 in 100 pregnancies are affected by #malaria @CDCGlobal #WorldMalariaDay2016 (http://1.usa.gov/1GmkJoV)
- April 25 2016: Argentina, Costa Rica, and Paraguay are currently working to end #malaria for good. #WorldMalariaDay2016 #defeatmalaria
- Currently, 18 of the Americas' 21 malaria endemic countries have expressed commitment towards malaria elimination #WorldMalariaDay2016.
- @USAIDGH & @PAHOWHO support @amazonmalaria to #DefeatMalaria in the Americas. Let's end #malaria for good! #WorldMalariaDay2016
- In 2014, Brazil experienced the lowest number of #malaria cases in 35 years, and in 2015, was Malaria Champion of the Americas: (http://bit.ly/1NIcw99)! #WMD2016 @rollbackmalaria
- About 112 million people in 21 countries are estimated to be at risk of #malaria in the Americas #WMD2016

Sources: PAHO/WHO. 2016. *Regional Report on Malaria in the Americas: 2000-2014* (forthcoming); WHO. *World Malaria Report 2015*; CDC website

Facebook and Instagram content

- On #WorldMalariaDay, learn more about what AMI is doing to #DefeatMalaria in the Americas: http://bit.ly/1WLPiJe

- Did you know that Argentina, Costa Rica, Paraguay, and 15 other countries in the Amerias are moving towards #malaria elimination?

- End #malaria for good. Including in the Americas! @pahowho @rollbackmalaria

Sources: PAHO/WHO. 2016. *Regional Report on Malaria in the Americas: 2000-2014*

Credit: PAHO/WHO

Credit: PAHO/WHO

Infographic

- World Malaria Day 2016 #DefeatMalaria

Facebook and Instagram content

- @AmazonMalaria partner @USPharmacopeia works with countries to detect counterfeit #malaria medicines. #WMD2016

- Partners @PAHOWHO and @CDCGlobal support countries of the #Americas w/ vector surveillance and insecticide resistance monitoring. #WMD2016

- @AmazonMalaria partner @LinksGlobalUSA develops communication strategies to reach key populations at risk of #malaria in the #Americas.

Sources: PAHO/WHO. 2016. *Regional Report on Malaria in the Americas: 2000-2014*

Credit: Links Media

Credit: Jorge Escobedo, MINSA/Peru

Facebook and Instagram content

- On #WorldMalariaDay2016, learn more about how @SIAPSProgram helps ensure people in remote areas of the Amazon and Central America have access to life-saving #malaria meds.
- Through AMI, @USAIDGH supports countries of the #Americas to end malaria for good. #WMD2016
- Want to learn more about #malaria in the #Americas? Visit the AMI website: http://bit.ly/1WLPiJe. #WMD2016

Sources: PAHO/WHO. 2016. *Regional Report on Malaria in the Americas: 2000-2014*

Facebook and Instagram content

- End malaria for good. Nominate the next #Malaria Champion of the #Americas: http://bit.ly/1tolpTq #WorldMalariaDay

Credit: PAHO/WHO

This toolkit was developed for partners of the Amazon Malaria Initiative (AMI) by:

Links Media, LLC
451 Hungerford Drive, Suite 503
Rockville, MD 20850
Tel: (301) 987- 5495, Fax: (301) 987 5498
http://www.linksmedia.net

Through the AMI Communication Component, contract # AID-527-13-00004.

Día Mundial de la Malaria 2016

Herramienta Modelo para Publicar en los Medios Sociales

#DíaMundialdelaMalaria
#VencerlaMalaria
#WMD2016

Uso de este recurso

- Del 18 al 26 de Abril, la Iniciativa Amazónica contra la Malaria (AMI) publicará contenido en sus cuentas de Facebook, Twitter e Instagram con el hashtag **#DíaMundialdelaMalaria** (25 Abril, 2016).

- ¡Colaboremos! Publiquen, copien y bajen directamente los mensajes de esta herramienta modelo.

- Utilicen los siguientes hashtags en sus publicaciones virtuales:
  #WMD2016 #DíaMundialdelaMalaria #VencerlaMalaria #malaria

Cuentas de Twitter de los socios de AMI:
@amazonmalaria
@pahowho
@opsoms
@CDCGlobal
@USPharmacopeia
@SIAPS_Program
@MSHHealthImpact
@LinksGlobalUSA

Otras cuentas de Twitter clave:
@WHO
@PMIgov
@USAIDGH
@RollBackMalaria

Tema

- El tema para el 2016 es “Acabemos con la malaria para siempre”.
- Luego del éxito en el logro de los Objetivos del Milenio, es importante continuar trabajando para #VencerlaMalaria y alcanzar las Metas del Desarrollo Sostenible.

Día Mundial de la Malaria: cifras

- El 25 de Abril, miles de personas alrededor del mundo participan en diversas actividades para conmemorar el Día Mundial de la Malaria
- Alrededor del mundo, 3,200 millones de personas en 106 países se encuentran en riesgo de contraer malaria (http://bit.ly/puntosclaveWMR2015)
- En el 2015, 96 países presentaron casos de malaria (http://bit.ly/puntosclaveWMR2015)
- En las Américas, aproximadamente 112 millones de personas en 21 países se encuentran en riesgo de contraer malaria (OMS. *Informe Mundial sobre el Paludismo 2015*: http://bit.ly/WMR2015)
- Diez países en Centroamérica y el Caribe se han unido a una iniciativa regional que busca eliminar la malaria para el 2020
- En el 2014, Brasil (37%), Venezuela (23%) y Perú (17%) representaron el 77% de los casos de #malaria en las Américas (http://bit.ly/WMR2015)

Ejemplos de Tweets

- ¿Sabías que entre el 2000 y 2014 la incidencia de #malaria en las Américas se redujo en un 67%? Fuente: @opsoms
- ¿Sabías que entre el 2000 y 2014 las muertes por #malaria en las Américas se redujeron en 79%? Fuente: @opsoms
- En el #DíaMundialdelaMalaria infórmate acerca del concurso Campeones contra la #malaria en las Américas 2016: http://bit.ly/campeonesmalaria @pahowho
- En las Américas, aproximadamente 4 de 100 embarazos son afectados por #malaria @CDCGlobal #DíaMundialdelaMalaria http://1.usa.gov/1GmkJoV
- 25 de Abril 2016: Argentina, Costa Rica y Paraguay están trabajando para eliminar la #malaria. #DíaMundialdelaMalaria @rollbackmalaria
- Actualmente 18 de los 21 países endémicos en las Américas se han comprometido a eliminar la #malaria #WMD2016 http://bit.ly/WMR2015
- @USAIDGH y @PAHOWHO apoyan a AMI para #VencerlaMalaria en las Américas ¡Acabemos con la #malaria para el bien de todos! #WMD2016
- En el 2014, Brasil tuvo el número de casos de #malaria más bajo de los últimos 35 años y en el 2015 fue Campeón contra la Malaria en las Américas: http://bit.ly/1Nlcw99! #WMD2016
- Aproximadamente 112 millones de personas en 21 países de las Américas se encuentran en riesgo de contraer #malaria: http://bit.ly/WMR2015

Fuentes: OPS/OMS. 2016. *Regional Report on Malaria in the Americas: 2000-2014*; OMS. *Informe Mundial sobre el Paludismo 2015*; sitio web del CDC

Contenido para Facebook e Instagram

- En el #DíaMundialdelaMalaria, infórmate sobre lo que hace AMI para #VencerlaMalaria en las #Américas: http://bit.ly/AMIEspanol.

- ¿Sabías que Argentina, Costa Rica, Paraguay y otros 15 países de las #Américas esperan eliminar la #malaria? #DíaMundialdelaMalaria

- ¡Acabemos con #malaria para el bien de todos en las #Américas! @pahowho @rollbackmalaria

Fuente: OPS/OMS. 2016. *Regional Report on Malaria in the Americas: 2000-2014*

Foto: OPS/OMS

Foto: OPS/OMS

Infográfico

- Día Mundial de la Malaria 2016 #VencerlaMalaria

Contenido para Facebook e Instagram

- @USPharmacopeia, un socio de @AmazonMalaria, trabaja con los países para detectar medicamentos para la #malaria falsificados. #WMD2016

- @opsoms y @CDCGlobal apoyan a los países de las #Américas en la vigilancia de vectores y el monitoreo de la resistencia a insecticidas #WMD2016

- @LinksGlobalUSA, un socio de @AmazonMalaria, desarrolla estrategias de comunicación para alcanzar poblaciones clave en riesgo de #malaria en las #Américas.

Fuente: OPS/OMS. 2016. *Regional Report on Malaria in the Americas: 2000-2014*

Foto: Links Media

Foto: Jorge Escobedo, MINSA/Peru

Contenido para Facebook e Instagram

- En el #DíaMundialdelaMalaria infórmate acerca de la ayuda brindada por el @SIAPSProgram para abastecer a poblaciones remotas en la Amazonia y Centroamérica con medicamentos para la #malaria.

- A través de AMI, @USAIDGH apoya a los países de las #Américas a #VencerlaMalaria #WMD2016

- ¿Quieres aprender más acerca de la #malaria el las #Américas? Visita la página de AMI: http://bit.ly/AMIEspanol. #WMD2016

Fuente: OPS/OMS. 2016. *Regional Report on Malaria in the Americas: 2000-2014*

Contenido para Facebook e Instagram

- Acabemos con la #malaria para siempre. Nomina al próximo Campeón contra la #Malaria en las #Américas: http://bit.ly/campeonesmalaria. #DíaMundialdelaMalaria

Foto: OPS/OMS

Esta presentación fue elaborada para los socios de la Iniciativa Amazónica contra la Malaria (AMI) por:

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http://www.linksmedia.net

A través del Componente de Comunicación de AMI, contrato # AID-527-13-00004.

Dia Mundial da Malária 2016

Toolkit para as redes sociais

#DiaMundialdaMalária
#VenceraMalária
#WMD2016

Como usar este recurso

- Entre os dias 18 e 26 de Abril, a Iniciativa Amazônica contra a Malária (AMI) publicará conteúdo nas suas contas em Facebook, Twitter, e Instagram para o #DiaMundialdaMalária (25 Abril, 2016).

- Construamos uma massa crítica! Convidamos todo mundo a publicar, copiando e colando as mensagens diretamente deste Toolkit.

- Utilize os seguintes hashtags nas suas publicações virtuais:
  #WMD2016 #DiaMundialdaMalária #VenceraMalária #Malária

<u>Contas em Twitter dos parceiros da AMI:</u>
@amazonmalaria
@pahowho
@opsoms
@CDCGlobal
@USPharmacopeia
@SIAPS_Program
@MSHHealthImpact
@LinksGlobalUSA

<u>Outras contas em Twitter importantes:</u>
@WHO
@opasbrasil
@PMIgov
@USAIDGH
@RollBackMalaria

Tema

- O tema do 2016 é “Vamos acabar com a malária de uma vez”.
- Trás os avanços significativos no sentido de alcançar os Objetivos de Desenvolvimento do Milênio, é importante continuar trabalhando para “Vencer a Malária”.

Dia Mundial da Malária: dados

- No dia 25 de abril, pessoas ao redor do mundo participam de diversas atividades para comemorar o Dia Mundial da Malária.
- Ao redor do mundo, 3,200 milhões de pessoas em 106 países se encontram em risco de contrair a #malária. (http://bit.ly/puntosclaveWMR2015)
- Em 2015, 96 países apresentaram casos de #malária. (http://bit.ly/puntosclaveWMR2015)
- Nas Américas, aproximadamente 112 milhões de pessoas em 21 países se encontram em risco de contrair a #malária.
- Dez países na América Central e o Caribe se uniram a uma iniciativa regional que busca eliminar a #malária até 2020.
- Brasil (37%), Venezuela (23%) e Peru (17%) representaram 77% dos casos de #malária nas Américas em 2014. (http://bit.ly/WMR2015)

Fontes: OMS. *World Malaria Report 2015; PAHO/WHO. 2016. Regional Report on Malaria in the Americas: 2000-2014*

Exemplos de Tweets

- Você sabia que entre 2000 e 2014, a incidência de #malária nas Américas foi reduzida em 67%?
- Você sabia que entre 2000 e 2014, as mortes por #malária nas Américas baixaram 79%?
- No #DiaMundialdaMalária, 25/4, confira os detalhes do concurso Campeões contra a #Malária nas Américas 2016: http://bit.ly/campeonesmalaria @opsoms
- Nas Américas, estima-se que 4 em cada 100 gestações são afetadas pela #Malária @CDCGlobal #DiaMundialdaMalária http://1.usa.gov/1GmkJoV
- 25 de Abril 2016: Argentina, Costa Rica e Paraguai estão trabalhando para eliminar a #Malária. #DiaMundialdaMalária @rollbackMalaria
- Até o momento, 18 dos 21 países com #malária endêmica nas Américas se comprometeram a eliminar a #malária #DiaMundialdaMalária
- @USAIDGH e @PAHOWHO apóiam a @AmazonMalaria para #VenceraMalária nas Américas. Vamos acabar com a #Malária de uma vez! #DiaMundialdaMalária
- Em 2014, o Brasil alcançou o número de casos de #malária mais baixo dos últimos 35 anos e em 2015, foi Campeão contra a Malária nas Américas: http://bit.ly/1Nlcw99! #WMD2016
- Nas Américas, aproximadamente 112 milhões de pessoas em 21 países se encontram em risco de contrair a #Malária.

Fonte: OPAS/OMS. 2016. *Regional Report on Malaria in the Americas: 2000-2014* (forthcoming); OMS. *World Malaria Report 2015*; CDC website

Conteúdo para Facebook e Instagram

- No #DiaMundialdaMalária, confira o que a AMI faz para #VenceraMalária nas #Américas: http://bit.ly/1VtugiA

- Você sabia que a Argentina, Costa Rica, Paraguai e outros 15 países esperam alcançar a eliminação da #Malária? #DiaMundialdaMalária

- Vamos acabar com a #malária de uma vez nas #Américas! @opsoms @rollbackmalaria

Fonte: OPAS/OMS. 2016. *Regional Report on Malaria in the Americas: 2000-2014*

Foto: OPAS/OMS

Foto: OPAS/OMS

Infográfico

- Dia Mundial da Malária 2016 #VenceraMalária #DiaMundialdaMalária

Conteúdo para Facebook e Instagram

- O parceiro da @AmazonMalaria, @USPharmacopeia trabalha com os países para detectar medicamentos antimaláricos falsificados. #WMD2016

- @PAHOWHO e @CDCGlobal apóiam os países das #Américas na vigilância de vetores e no monitoramento da resistência a inseticidas #WMD2016

- O parceiro da @AmazonMalaria @LinksGlobalUSA desenvolve estratégias de comunicação para atingir as populações chave que são vulneráveis à #Malária nas #Américas.

Fonte: OPAS/OMS. 2016. *Regional Report on Malaria in the Americas: 2000-2014*

Foto: Links Media

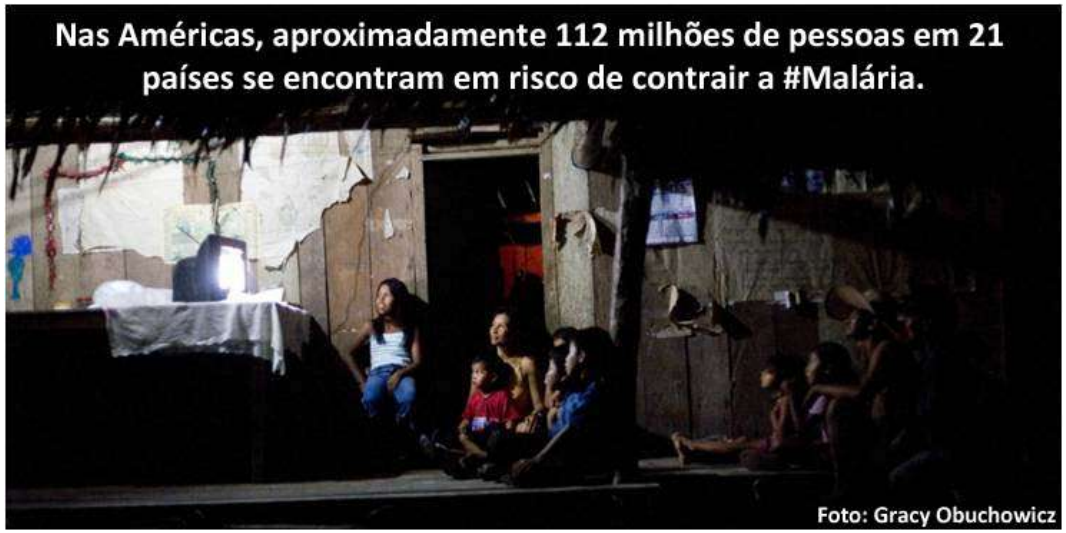
Foto: Jorge Escobedo, MINSA/Peru

Conteúdo para Facebook e Instagram

- No #DiaMundialdaMalária2016, saiba mais sobre o apoio que o @SIAPSProgram presta para assegurar o abastecimento de medicamentos antimaláricos para populações remotas da Amazônia e da América Central.

- Através da AMI, @USAIDGH apóia os países das #Américas a #VenceraMalária #WMD2016

- Quer saber mais sobre a #malária nas #Américas? Visite a página da AMI: http://bit.ly/1VtugiA #WMD2016



Fonte: OPAS/OMS. 2016. *Regional Report on Malaria in the Americas: 2000-2014*

Conteúdo para Facebook e Instagram

- Vamos acabar com a #malária de uma vez. Nomeia o próximo Campeão contra a #Malária nas #Américas: http://bit.ly/campeonesmalaria! #DiaMundialdaMalária

Foto: OPAS/OMS

Este recurso foi desenvolvido para os parceiros da Iniciativa Amazônica contra a Malária (AMI) por:

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Através do Componente de Comunicação da AMI, contrato # AID-527-13-00004.

World Malaria Day 2016: End Malaria for Good in the Americas

"End malaria for good," is the theme for World Malaria Day on April 25, 2016. In 2015, numerous countries in the Americas celebrated having reduced malaria by 67% since the year 2000, and so far 18 of them have committed to eliminating the disease in the coming years.

This is not the first time that countries of the Americas have set their sights on malaria elimination. Global eradication was proposed in the 1950s and 1960s. At that time, some countries successfully put an end to malaria, while others experienced a resurgence of the disease after coming very close to elimination. From this experience, we have learned that political and financial commitments have to be sustained over time. Moreover, we learned that we could not depend on the use of DDT as a single solution, but rather that the success of any elimination plan depends on the deployment of numerous components such as diagnosis, treatment, integrated vector management, surveillance, and communication.

Several countries in the Americas have been reducing national efforts against malaria, because cases are increasingly few in number. This is a mistake, especially for countries that are aiming for elimination. By diminishing the efforts, along with human and financial resources, health systems lose their capacity to prevent, detect, and control malaria. Furthermore, the situation worsens and the risk increases for populations in remote areas, such as those that reside in the Amazon region and have limited access to quality health services for diagnosis and treatment. For their part, vectors and parasites adapt quickly to prevention, detection, and control measures implemented by countries. Parasites that become resistant to medicines -- and malaria-transmitting mosquitoes that become resistant to insecticides -- present great challenges, and threaten the progress made to date.

In spite of the difficulties, countries of the Americas are better positioned to eliminate malaria now than ever before. Scientific advancements like combination treatments and new classes of insecticides have been adopted. Considering that no intervention is a panacea, a combination of evidence-based interventions has been used. Thanks to the technical assistance obtained through regional networks like the Amazon Malaria Initiative (AMI) and the Amazon Network for the Surveillance of Antimalarial Drug Resistance (RAVREDA, by its Spanish acronym), countries have accelerated efforts against malaria. Such networks enable the coordination of operational research, the exchange of data, the supply of life-saving medicines, and the reinforcement of local capacity to confront malaria.

Since the year 2000, countries of the region have invested a great deal of time and money in reducing the number of cases of malaria. Nonetheless, with nearly 121 million people at risk of contracting the disease in the Americas, malaria continues to be a problem, having rebounded in countries such as Guyana, Nicaragua, Peru, and Venezuela. Therefore, national authorities should continue with concerted efforts to eliminate malaria.

Día Mundial de la Malaria 2016: Acabemos con la Malaria para Siempre

"Acabemos con la malaria para siempre," es tema del Día Mundial de la Malaria, el 25 de abril del 2016. En el 2015, varios países de las Américas conmemoraron haber reducido el número anual de casos de malaria en 67% desde el año 2000 y 18 de ellos se comprometieron a eliminar dentro de los próximos años.

Esta no es la primera vez que países de las Américas vislumbran la eliminación de la malaria. Se propuso eliminar la enfermedad a nivel mundial en los años 1950s–1960s. En aquella época, algunos países tuvieron éxito en acabar con la malaria, mientras otros pasaron por una resurgencia de la enfermedad después de llegar muy cerca de la eliminación. A partir de esta experiencia se aprendió que los compromisos políticos y financieros tienen que sostenerse en el tiempo. Además, se aprendió que no se podía depender del uso de DDT como la única solución, más bien el éxito de cualquier plan de eliminación depende del despliegue de varios componentes como el diagnóstico, tratamiento, manejo integrado de vectores, vigilancia y comunicación social.

Algunos países en las Américas vienen reduciendo sus esfuerzos contra la malaria a nivel nacional, porque los casos son cada vez menos. Esto es un error, principalmente para países que tienen miras a la eliminación. Al disminuir los esfuerzos y recursos tanto humanos como financieros, los sistemas de salud pierden su capacidad de prevenir, detectar y controlar la malaria. Más aún, la situación se agrava y el riesgo aumenta para las poblaciones ubicadas en zonas remotas, como las que residen en región Amazónica y tienen poco acceso a servicios de salud de calidad para el diagnóstico y tratamiento. A su vez, los vectores y los parásitos se adaptan rápidamente a las medidas de prevención, detección y control implementadas por los países. Los parásitos que se vuelven resistentes a los medicamentos y los mosquitos trasmisores de la malaria que se vuelven resistentes a insecticidas presentan grandes retos y amenazan los avances obtenidos.

Pese a las dificultades, los países de las Américas ahora están mejor posicionados que nunca para eliminar la malaria. Varios avances científicos como tratamientos combinados y nuevas clases de insecticidas han sido adoptados. Considerando que ninguna intervención es una panacea, se usa una combinación de intervenciones basadas en las evidencias. Gracias al apoyo técnico obtenido a través de redes regionales como la Iniciativa Amazónica contra la Malaria (AMI) y la Red Amazónica de Vigilancia de la Resistencia a los Antimaláricos (RAVREDA), los países han acelerado sus esfuerzos contra la malaria. Estas redes posibilitan la coordinación de la investigación operativa, el intercambio de datos, el suministro de medicamentos de emergencia y el refuerzo de la capacidad local para hacer frente a la malaria.

Desde el año 2000, países de la región han invertido mucho tiempo y dinero en reducir el número de casos de malaria. Sin embargo, con casi 121 millones de personas en riesgo de contraer la enfermedad en el continente, la malaria sigue siendo un problema que incluso ha recrudecido en países de la región como Guyana, Nicaragua, Perú y Venezuela. Por lo tanto, las autoridades nacionales deben continuar trabajando enérgicamente para eliminar la malaria.

Post Details

Reported stats may be delayed from what appears on posts

Amazon Malaria Initiative
April 25 ·

¡Hoy es el Día Mundial de la Malaria!
¡Acabemos con #malaria para el bien de todos en las #Américas! PAHO-WHO

See Translation

807 people reached

Carla Romero, Carlos Felipe Castillo and 4 others 11 Shares

Like Comment Share

807 People Reached

25 Likes, Comments & Shares

11 Likes	**6** On Post	**5** On Shares
3 Comments	**0** On Post	**3** On Shares
11 Shares	**11** On Post	**0** On Shares

15 Post Clicks

9 Photo Views	**0** Link Clicks	**6** Other Clicks

NEGATIVE FEEDBACK

0 Hide Post **0** Hide All Posts
0 Report as Spam **0** Unlike Page

Post Details

Reported stats may be delayed from what appears o

1

Search...

Amazon Malaria Initiative
May 6 ·

The #Malaria Champions of the Americas seeks to honor successful initiatives in malaria prevention and elimination. Submit a Nomination: http://bit.ly/1rylWnY PAHO-WHO

PAHO WHO | "Malaria Champions of the Americas" seeks successful initiatives to...

PAHO WHO | "Malaria Champ Americas" seeks successful

144 people reached

6 1 Share

Like Comment Share

1 1

144 People Reached

8 Likes, Comments & Shares

6 Likes	**6** On Post	**0** On Shares
0 Comments	**0** On Post	**0** On Shares
2 Shares	**1** On Post	**1** On Shares

4 Post Clicks

0 Photo Views	**1** Link Clicks	**3** Other Clicks

NEGATIVE FEEDBACK

0 Hide Post **0** Hide All Posts
0 Report as Spam **0** Unlike Page

1st Workshop on Education and Social Mobilization for Malaria Surveillance and Control

Brasília, Brazil
October 5 – 8, 2015

Amazon Malaria Initiative (AMI) Communication Component

Trip Report

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Submitted by
Julie de Carvalho
October 2015

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About Links Media

Links Media, LLC is a management consulting company based in the Washington D.C. metropolitan area, specializing in information technology and marketing communications. We provide advanced management consultation services to governments and private sector clients in the areas of health, environment, science and technology, biotechnology, governance, human rights, economic prosperity, conflict resolution, education, public engagement, risk and crisis management, and social entrepreneurship.

Recommended Citation

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Abbreviations and Acronyms

ACE	Endemic Control Agent (acronym in Portuguese)
ACS	Community Health Agent (acronym in Portuguese)
AIS	Indigenous Health Agent (acronym in Portuguese)
AMI	Amazon Malaria Initiative
CGPNCM	General Coordination Office of the National Malaria Control Program (acronym in Portuguese)
ECMS	Education, Communication, and Social Mobilization (acronym in Portuguese)
ESF	Family Health Strategy (acronym in Portuguese)
INCRA	National Land Reform Institute (acronym in Portuguese)
IRS	Indoor Residual Spraying
KAP	Knowledge, Attitudes and Practices
LAC	Latin America and Caribbean
LLIN	Long-lasting insecticidal nets
M&E	Monitoring & evaluation
MS	Brazilian Ministry of Health
NMES	Municipal Education and Health Centers (acronym in Portuguese)
PAHO	Pan American Health Organization
RAVREDA	Amazon Network for the Surveillance of Antimalarial Drug Resistance
RDT	Rapid Diagnostic Test
SESAI	Indigenous Health Secretariat (acronym in Portuguese)
SGEP	Ministry of Health's Secretariat of Strategic and Participatory Management (acronym in Portuguese)
USAID	U.S. Agency for International Development

I. Background

When Brazil's present-day national malaria control program (CGPNCM) was established within the Ministry of Health in 2003, its founding document set forth a requirement that the program carry out education and social mobilization activities. The national malaria control program was also mandated to provide guidance on communication and advocacy activities for malaria at the national and decentralized levels. In recent years, the program has focused on diagnosis and treatment, vector control, and disease surveillance as its core interventions, with a lack of systematic involvement in the technical area known nationally as education, communication, and social mobilization (ECMS). In order to fill this gap, Links Media, the implementing partner responsible for the communication component of the USAID-funded Amazon Malaria Initiative (AMI), began assisting the program to reinstate education and social mobilization as core interventions in 2013. Links Media delivered the "Communication Plan to Increase the Political Sustainability of Malaria Control Efforts" to the program in 2014, followed by a review of the evidence base on ECMS for malaria control in 2015.

II. Purpose of the Trip

From October 5–8, 2015, Julie de Carvalho of Links Media traveled to Brasília, Brazil to participate in the 1st Workshop on Education and Social Mobilization for Malaria Surveillance and Control. This workshop was organized by the national malaria control program of the Brazilian Ministry of Health, and an invitation was extended to Links Media to participate with assistance from the Pan American Health Organization (PAHO) country office. Concurrence was provided by USAID/Peru.

Links Media attended in order to provide technical advice on the development of a national education and social mobilization strategy for malaria.

III. Scope of Work

The scope of work for Links Media included the following specific activities:

- Meet with the national malaria control program of the Brazilian Ministry of Health to follow up on the development of malaria communication strategies for populations in special circumstances, including *garimpeiros* (itinerant gold miners), indigenous, and riverine peoples in the Amazon basin.
- Together with Brazilian officials, select the topic for a USAID success story to be written on Brazil's national malaria control program, and collect information for the success story.
- Participate in a national workshop to ensure the technical soundness of selected approaches relating to national guidelines on education, communication, and social mobilization (ECMS).
- Brief USAID/Brazil on AMI technical assistance to Brazil and the region.

IV. Source of Funding for the Trip

Funds from USAID/Peru for the AMI project supported this trip. The travel was joined together with a previously planned international trip to attend a "Science of Eradication: Malaria" course in São Paulo, Brazil from September 21-October 2, 2015. Combining two trips into one made the most of limited resources.

V. Trip Activities

Day One, October 5, 2015

Continuing with Links Media's technical advice on the development of malaria communication strategies tailored to populations in special circumstances, particularly *garimpeiros* and indigenous populations, Julie de Carvalho met with Sheila Rodovalho, Technical Consultant, José Braz Padilha, Consultant, and Layana Alves, Consultant, at the CGPNCM in the Ministry of Health. Mr. Padilha and Ms. Alves reported that they had traveled to illegal gold mining areas (*garimpos*) in Pará state to observe the situation and systematize the differentiated interventions being carried out. Although a significant amount of information was obtained, Ms. Alves noted that much of the prevention, diagnosis, and treatment that occurred within the *garimpos* remained a "black box."

In other news, a workshop that was held in Roraima state in August 2015 included microscopists for the first time, which Ms. Alves said allowed her insight into the execution of diagnosis and treatment interventions in municipalities on the borders with Venezuela and Guyana. An operational research questionnaire that AMI partner Management Sciences for Health (MSH) developed with input from Links Media was in the process of being implemented by microscopists in Roraima in order to better understand the profiles of patients who were part of the mobile population. Subsequently, a communication campaign targeting the mobile population would be designed for implementation in the border areas. Links Media proposed to help the CGPNCM write the terms of reference for such a communication campaign before March or April 2016.

With regard to a list of potential success story ideas that USAID and Links Media had generated to document Brazil's recent progress against malaria, Ms. Rodovalho communicated the CGPNCM's decision to move forward with a success story about public-private partnerships with large infrastructure projects in the Amazon basin. Specifically, the CGPNCM requested that Links Media write a story about the Santo Antônio and Jirau hydroelectric dams in the area of Porto Velho, Rondônia state. These examples were selected based on the availability of detailed information, and on the clear impact of the malaria control action plan on mitigating disease transmission in an area that was highly malaria-endemic prior to the dams' construction. More information would be provided in email follow-up from Ms. Rodovalho.

Ms. Rodovalho noted that the launch of the national initiative to eliminate *Plasmodium falciparum* malaria would take place on or around November 10, 2015. Links Media

offered to leverage CGPNCM Coordinator Ana Carolina Santelli's travel to Washington, DC in November 2015 for the PAHO forum on Malaria Day in the Americas to garner earned media for the new initiative in selected international news outlets. Media pitching could help to build awareness and much-needed political support for the elimination initiative, in light of the fact that elimination often transcends technical issues and also requires political commitment. Ms. Rodovalho agreed to take the idea to Ms. Santelli for consideration, and requested that Links Media coordinate with the SVS' communications office (ASCOM) prior to taking any action. An embargo on information sharing was requested until confirmation is obtained in the following weeks. Pending USAID approval of the activity, noting that a few weeks of preparation will be required in order to ensure maximum efficacy, Links Media will engage in pitching efforts.

Day Two, October 6, 2015

Julie de Carvalho participated in the workshop held at the Ministry of Communications. Links Media was the only AMI technical partner present at the workshop. The first day of the workshop focused on health education. Paola Marchesini, Alternate Coordinator of the CGPNCM, provided an overview of the national-level strategy for malaria prevention, control, and elimination of *P. falciparum* malaria. Over 800 municipalities exist in the Legal Amazon region; of those, 219 are considered ready to eliminate *P. falciparum* malaria, 53 are in pre-elimination, 17 have medium transmission risk, and just five have high transmission risk. The remaining municipalities have no malaria transmission.[1] Presentations were made by the National Land Reform Institute (INCRA), the Ministry of the Environment, and the Ministry of Education about ongoing education programs, with discussion relating to the possible integration of malaria as a topic in these existing programs. The difficulty of communicating and coordinating with INCRA at the state-level was discussed, and INCRA's joining the workshop was praised.

Subsequently, the organizers divided participants into groups and invited the endemic states to 1) define "health education" for the general public, ACSs, ACEs, physicians, nurses, microscopists and other health professionals, and 2) share best practices in health education with each other. Representatives of Brazil's malaria-endemic states (Acre, Amapá, Amazonas, Maranhão, Pará, Rondônia, Roraima, and Tocantins) were placed at the center of workshop discussions in order to ensure that any strategies developed would be based on their local realities. Groups reported on examples of educational activities about Chagas disease, dengue, malaria, and lymphatic filariasis. One participant suggested that all of these diseases be addressed through integrated education efforts for greater efficiency. Currently, this makes sense because the same microscopists are trained to identify malaria and Chagas disease in a laboratory setting.

The most notable health education successes were:

- The construction of the hydroelectric dams UHE Santo Antônio and UHE Jirau on the Madeira River in Rondônia state contributed to considerable progress in education for malaria prevention and control, and a subsequent decline in

[1] A representative of the national association of municipal governments who was invited to the workshop made a statement that municipal authorities should be invited to the next workshop on education and social mobilization for malaria.

disease incidence. This occurred due to the introduction of environmental licensing legislation in 2006-2007, which required dam builders Furnas/Odebrecht to provide compensation to mitigate malaria transmission. The two new dams were built on the outskirts of the state capital of Porto, where malaria transmission was already high and controlling it was a priority. As a result, the municipal health secretariat of Porto Velho complemented the malaria compensation received for the dam construction with money from its own budget. Whereas the municipality had no system to receive financial resources from the private sector, compensation was provided in-kind in the form of equipment, supplies (rapid diagnostic tests (RDTs) and long-lasting insecticidal nets (LLINs)), and educational materials. First, the Federal University of Rondônia conducted a baseline study and census of the municipal district of Jaci Paraná. Local resources were then used to conduct cascade trainings for health workers in education and communication for malaria. Trained health workers went door-to-door to 100% of the residences educating the population about malaria risk, focusing on the importance of early diagnosis and treatment at public primary care facilities. The population got involved in developing education materials for malaria, and activities were implemented in collaboration with the Public Defender's Office. An inter-institutional committee was established to meet monthly and monitor the execution of RDTs for malaria, LLIN use, and educational interventions with the compensation funds. As a result, Rondônia state moved from medium risk of malaria transmission to the low risk category.

- Another successful multisectoral experience carried out in Roraima state was noteworthy for involving indigenous populations. In the municipality of Rorainópolis, the health secretariat has forged a partnership with the agency responsible for indigenous health in the state. Indigenous health agents (AIS) have been trained on diagnosis of malaria by microscopy and on other aspects of primary care. Indigenous communities' Social Control function has been important to keep the AISs accountable and to fire them when they are not performing up to standards. As of 2015, Roraima's state health secretariat began training AISs, ACSs and nurses in rural areas lacking microscopes on how to use RDTs and how to treat patients with malaria. Education about health and sanitation has recently been delivered together with a questionnaire, and it was explained to communities that a malaria intervention would follow. The health secretariat then advocated for sustained environmental sanitation work by the government agency responsible for such activities, in order to minimize vector breeding in specific locations. The state program manager highlighted the importance of training primary health care personnel about malaria case management, and conducting outreach with the population such as through schools, churches, community associations, and booths set up at local events.

- In Acre, health education is considered a key intervention in order to ensure that the population shares responsibility for its health as a public good. The program manager described ECMS strategies as being carried out on a daily basis, rather than on red-letter days or in times of crisis. She said that ECMS is a continuous process, and that rather than being complementary, it is the linchpin of all other program actions. For example, LLINs were distributed in the state in 2007, and their use was promoted through radio spots, billboards, banners, and other

means. A calendar with the schedule for washing LLINs was distributed to residents. Proper LLIN use was later evaluated.

Participants also commented on education efforts that have failed in the past. These included a carefully devised radio program on health that had a very limited audience, and an incident in which a bus was provided by the state to conduct mobile outreach in a riverine community where houses were accessible only by boat. The conclusion was that local realities must be considered in the planning of any ECMS activity.

Day Three, October 7, 2015

The second day of the workshop focused on the imperative of social participation within Brazil's Unified Health System (SUS) and the role of community input and social control in effective malaria programs. State and municipal health councils were described as having an adversarial relationship with malaria programs; however, the same bodies were discussed as potential allies if their awareness could be raised on the importance of directing sufficient resources to the challenge of malaria prevention and control. Financial incentives associated with successfully managing for results were raised as a possible point to emphasize when dialoguing with state and municipal decision-makers.

The first two presentations were made by Maria da Glória Campos da Silva and Isabela Maria Lisboa Blumm of the Ministry of Health's Secretariat for Strategy and Participatory Management (SGEP)[2]. The collective construction of knowledge was described as essential in the process of reforming the SUS to ensure that it keeps with its mission of promoting social justice, equity, the ideals of democratic rule, and other sectoral policies. It was stated that the Brazilian Ministry of Health considers continuing education for health professionals and citizens to be fundamental for "social control" (i.e. popular oversight) of the health system. Moreover, the Ministry of Health seeks to use SUS to promote economic development and the development of human capital. In addition to the social movement for the SUS, special programs for indigenous, Afro-descendant, LGBT, and homeless populations were discussed. The presentation was followed by a rich discussion of the goals and values of popular education for health, participation and social control.

The main points were the goals of:

- Liberating processes to improve people's individual autonomy
- Horizontality between popular and technical-scientific knowledge bases
- Formation of a critical consciousness
- Respect for diverse life forms
- Overcoming of social inequalities, discrimination, violence and oppression

Citizens should "fight for what is theirs" in the context of the SUS according to SGEP's vision. Methodological principles for ECMS for health were debated with state-level malaria coordinators including dialogue, loving kindness, problematization, shared building of knowledge, emancipation, and the commitment to the construction of a community-based democratic project.

[2] SGEP website: http://portalsaude.saude.gov.br/index.php/o-ministerio/principal/secretarias/sgep

Jorge Sayde of the Ministry of Health's Department of Surveillance of Environmental Health and Worker's Health presented the evolution of a Worker's Health Policy over the course of several decades, up to the present-day functioning of multisectoral commissions on workers' health within municipal health councils. The legal basis for this relatively recent policy was covered (ILO Convention 187 and Executive Order 1.823 from August 23, 2012). Participants expressed concern over ACE exposure to toxic chemicals during the execution of indoor residual spraying for malaria vector control; the insecticides being requisitioned were recently changed to reduce the human health risk to such workers.

Aldiney Doreto covered the technical actions in terms of health education by the Ministry of Health's Secretariat of Labor Management and Education in Health (DEGES/SGETS/MS).[3] The focus was on the provision of continuing education to ensure an adequately trained health workforce; 273,000 community agents have been trained so far in 2015. Specialized textbooks are created every several years, and malaria could be included along with other vector borne diseases. This is particularly relevant to updating the malaria knowledge of ACSs and ACEs. Participants mentioned the challenge that the total number of ACEs working nationally is unknown, due to irregular hiring schemes at the municipal level; Mr. Doreto commented that this will be resolved by a new ministerial policy launched this week.

Participants broke into groups to discuss the pre-established guidelines for ECMS under the CGPNCM. Links Media was asked to circulate among the groups to provide technical assistance with this activity. Target audiences (including local decision-makers and educators), action-oriented messages, communication channels, opportunities to reach the population, and other considerations were identified. The exercise was useful in helping malaria program managers to understand that different audiences must be segmented according to their role in malaria prevention, control and elimination, with consideration given to action-oriented messages that are appropriate to each one. Workshop participants gained a greater ability to articulate the objectives of ECMS interventions for malaria; they shifted from defining the objectives as merely "awareness raising" or "sensitization to the problem" and began to state the specific communication objectives as: 1) acceptance of household IRS, 2) better case management by ACSs and ACEs, 3) prompt diagnosis and treatment, 4) adherence to treatment, 5) LLIN use, and 6) inclusion of malaria and/or related diseases on the public policy agenda. Additionally, the program managers identified "benefits" that would accrue to the different audiences as a result of the desired behavior change, for incorporation into the key messages.

Brainstorming of best practices for reaching each target audience led to the entire group's completion of a worksheet with information about plans to reach specific target audiences. For instance, a good practice is to create technical surveillance committees for malaria and other infectious diseases within the municipal health councils. Many malaria programs have relied on Municipal Education and Health Centers (NMES) to help raise awareness of malaria and other disease according to the annual epidemiological calendar (i.e. schedule of awareness days). Multisectoral actions have included meeting with associations of fish farmers in Acre state to train them on the

[3] DEGES/SGETS/MS website: http://portalsaude.saude.gov.br/index.php/o-ministerio/principal/secretarias/sgtes/sgtes-gestao-da-educacao

management of their farms in a way that reduces the breeding of malaria mosquitoes, in collaboration with the Secretariat of Family Production. In addition, partnerships with hydroelectric dam construction projects in Rondônia state have yielded positive results in preventing and controlling illness (see description under Day Two).

In conclusion, state-level authorities (malaria program managers) acknowledged that they play an important role in advocating for attention to malaria as part of primary care and family health services in the Legal Amazon. They also noted that where public information campaigns are concerned, it is up to them to provide detailed technical guidance to the state health secretariats' social communication offices regarding the proper messages, channels, and objectives for outreach campaigns about malaria. In turn, the state health secretariats are responsible for execution.

Day Four, October 8, 2015

Approaches developed on the preceding day were stratified according to high-risk, low-risk, and special territories (i.e. indigenous territories and land reform settlements). Links Media circulated among the groups to ensure that the activity was well understood by the state coordinators and that all major audiences were given their due consideration. The workshop wrap-up provided an opportunity for participants to give their final remarks. As the next step in the process, a summary document will be drafted by Mr. Padilha and Ms. Alves and will be circulated to all workshop participants. Participants were encouraged to follow up on the contacts they made with other government ministries, and the Ministry of Health could offer assistance as needed in establishing connections with pre-existing education and social participation programs. Subsequently, the implementation of selected ECMS strategies would be supported by the state health secretariats, with the CGPNCM's direct oversight of three pilot projects related to malaria control in priority municipalities. Finally, it was mentioned that topics related to ECMS would likely be brought up again during a November 2015 meeting in Brasília on environmental licensing related to public-private partnerships in the Legal Amazon. State-level program managers would be participating in that meeting as well.

Julie de Carvalho proceeded to the US Embassy in Brasília where she briefed USAID/Brazil Director Michael Eddy, as well as staff Alexandre Alves, Fernanda Carvalho, Bernardo Portela, and Mary Townswick, on several recent AMI technical assistance activities in the country. Discussions included public-private partnerships, environmental education, and the shared need to have research findings applied in the health and environmental policy spheres. Links Media provided some examples from AMI information dissemination and technical assistance work related to malaria that could be applied to USAID/Brazil's efforts to improve information available to decision-makers on environmental policy.

VI. Conclusions and Recommendations

The 1st Workshop on Education and Social Mobilization for Malaria Surveillance and Control provided useful information and ideas about ECMS for communication in the context of the Brazilian Amazon. Representatives of the malaria-endemic states participated actively in the sharing of best practices and definition of priorities for a future national strategy to be developed.

Based on the work conducted during this meeting, Links Media recommends:

- Greater integration of malaria within the delivery of primary health care and the family health strategy (ESF) should be carried out in order to ensure effective and sustainable ECMS activities related to malaria in Brazil.
- Outmoded ways of communicating about population-level behavior change for malaria prevention and control persist at the decentralized level in many parts of the Brazilian Amazon. The tendency towards an aggressive, top-down, authoritarian tone should be replaced with more concerted efforts to understand and persuade the population affected by malaria to take an active role in their health, in line with the latest national policy guidelines from the Ministry of Health's SGEP on social participation.
- Basic educational materials on malaria should be created for teachers to ensure that they cover vector-borne and other infectious diseases even when there is not an active outbreak of disease.
- While the overall consensus among state-level malaria program coordinators is that indigenous populations are not within their purview, more could be done to coordinate with SESAI, NGOs, and indigenous associations at the state and local levels similar to the planning that is currently underway in Roraima state.
- Special consideration may need to be given to those populations residing in land reform settlements in Amazonian states.
- Partnerships should be developed with existing programs SGEP, INCRA's Pronera, the Ministry of Health's *Escola da Terra* program, and others. Local coordination with other programs will be paramount in order to overcome resource limitations; however, the CGPNCM has a key role in helping to orchestrate this coordination from the ministerial level.
- Additional financial resources are needed to carry out systematic ECMS activities at the state and municipal level; some monies should be made available from the central level, possibly on a competitive basis.

Next steps for Links Media, with CGPNCM's agreement:

- Follow up with CGPNCM regarding readiness to develop terms of reference for a communication campaign for mobile populations on the borders with Venezuela, Guyana, French Guiana and Suriname.
- Obtain USAID concurrence for the outreach activity about Brazil's *P. falciparum* elimination program on Malaria Day in the Americas 2015 and coordinate with ASCOM on execution.
- Obtain more details from the state of Rondônia's malaria coordinator Rute Bessa on the success story about malaria control undertaken with support from the Santo Antônio and Jirau hydroelectric dam projects.
- Involve Roraima state representatives in a January 2016 webinar on best practices with indigenous peoples (pending completion of planned activities).

Annex 1
Invitation Letter

MINISTÉRIO DA SAÚDE
SECRETARIA DE VIGILÂNCIA EM SAÚDE
DEPARTAMENTO DE VIGILÂNCIA DAS DOENÇAS TRANSMISSÍVEIS
COORDENAÇÃO GERAL DO PROGRAMA NACIONAL DE CONTROLE DA MALÁRIA
Setor Comercial Sul, Quadra 04, Bloco A, Edifício Principal 6º Andar.
Cep:70.304.000 - Brasília/DF
Tel. (61) 3213-8083

Ofício n.º CC/4 - 2015/CGPNCM/DEVIT/SVS/MS

Brasília, 14 de agosto de 2015

A Sua Senhoria, a senhora
Julie N. de Carvalho – Senior Project Manager
Links Media, LLC
451 Hungerford Drive, Suite 503
Rockville, MD 20850
USA (EUA)

Assunto: **Convite à 1ª Oficina de Educação em Saúde e Participação Social para Vigilância e Controle da Malária**

Prezado Senhor,

A Coordenação Geral do Programa Nacional de Controle da Malária (CGPNCM) realizará, com o objetivo de discutir e propor estratégias e ações de educação em saúde e participação social à malária, a 1ª Oficina de Educação em Saúde e Participação Social para vigilância e controle da Malária no período de 06 a 08 de outubro, no Salão Nobre do Ministério das Comunicações, em Brasília.

2. Em razão das iniciativas e experiências locais de educação em saúde, educação no campo e educação ambiental, participarão do evento: representantes dos programas estaduais de malária, profissionais com atuação na área de educação em saúde e/ou participação social, representantes de instituições de ensino e pesquisa, técnicos do Ministério da Saúde, Ministério da Educação, Ministério do Meio Ambiente, Ministério das Cidades e INCRA.

3. Considerando o exposto convidamos vossa senhoria ou um representante, , para participar do referido evento contando com comentários e participação no mesmo. Solicitamos confirmação e/ou indicação de representante até do dia 27 de agosto de 2015.

4. Para informações adicionais, favor entrar em contato com a Coordenação Geral do Programa Nacional de Controle da Malária – CGPNCM, pelo telefone: (61) 3213-8289.

Atenciosamente,

Ana Carolina Faria e Silva Santelli
Coordenadora-geral do Programa Nacional de Controle da Malária

Annex 2
USAID Concurrence with Travel

Julie N. de Carvalho

From: Jaime Chang [jachang@usaid.gov]
Sent: Tuesday, August 18, 2015 4:13 PM
To: Julie N. de Carvalho
Subject: Re: Brazil TA request -- October 2015

Dear Julie,

I concur.

Please coordinate with our colleagues from MSH/SIAPS and PAHO to include any topics they have been working at that could be included in your conversation with Ms Sheila Rodovalho at the MOH, and other colleagues from the MOH and from the States.

Jaime

Sent from my iPhone

> On 18/8/2015, at 10:17, Julie N. de Carvalho <jdecarvalho@linksmedia.net> wrote:
>
> Greetings Jaime,
>
> I believe you are traveling to Colombia today.
>
> We received the attached invitation to attend the Brazilian NMCP's
> "1st Workshop on Education and Social Participation for Malaria
> Surveillance and Control." It will be held in Brasília from October
> 6-8. Our contact Braz Padilha, at the NMCP, told me that he does not
> expect Links Media to lead any of the sessions. However, he expects us
> to participate in discussions with representatives of the health
> secretariats from endemic states and other government ministries that
> will be present. Links Media considers this an important first for
> Brazil's NMCP, and we appreciate that they took our suggestion to
> include actors from outside the health sector in the planning process.
> It would make sense for me to go as Links Media's representative, to
> help ensure that the NMCP takes full advantage of this opportunity to work with a wide
range of stakeholders.
>
> In addition, I have requested a working meeting with Sheila Rodovalho
> at the Ministry on Monday, October 5, 2015 to follow-up on the Brazilian states'
> plans for working with the itinerant mining population. Once we have
> the update on those local plans, Links Media will be able to
> facilitate any necessary coordination with Guyana and Suriname.
>
> Please let me know if you concur with my participation in this
> workshop immediately following the Science of Eradication course in
> São Paulo, Brazil.
>
> Best,
>
> Julie
>
> -----Original Message-----
> From: José Braz Damas Padilha [mailto:jose.damas@saude.gov.br]
> Sent: Tuesday, August 18, 2015 9:37 AM

```
> To: jdecarvalho@linksmedia.net
> Subject: Ofício nº004/2015/CGPNCM - Linksmedia
>
>    Cara Julie,
>
> Segue convite para participação na Oficina sobre Educação em Saúde e
> Participação Social.
> Espero que possa participar!
> Sigo a disposição para esclarecimentos.
> Att,
>
>
> José Braz D. Padilha
> Biólogo
> Coordenação Geral do Programa Nacional de Controle da Malária -
> CGPNCM/SVS/MS
> TELEFONE: (61)3213.8288 (61)8149.7696
> Ministério da Saúde - Unidade VI
> Setor Comercial Sul, Quadra 4, Edifício Principal, 6º andar.
> CEP 70304-000  BRASÍLIA-DF
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Annex 3
Event Agenda

1st Workshop on Education and Social Mobilization for Malaria Surveillance and Control

1ª Oficina de Educação em Saúde e Participação Social para vigilância e controle da Malária

Coordenação Geral do Programa Nacional de Controle da Malária
Departamento de Vigilância de Doenças Transmissíveis
Secretaria de Vigilância em Saúde
Ministério da Saúde

Local: MINISTÉRIO DAS COMUNICAÇÕES – SALÃO NOBRE
Esplanada dos Ministérios – Bloco R, Asa Norte. Brasília/DF.

Período: 06 a 08 de outubro de 2015.

Participantes: Coordenadores estaduais dos Programas de Malária e Técnicos das Secretarias Estaduais de Saúde, Técnicos da SVS (Coordenação Geral do Programa Nacional de Controle da Malária e Coordenação de Saúde do Trabalhador), da SESAI, da SGEP, da SGTES, FIOCRUZ, Ministério do Meio Ambiente, Ministério da Educação, Ministério das Cidades, INCRA, OPAS, e especialistas.

06 de outubro de 2015 – terça-feira

8:30 – 9:00 **9:00 - 9:30**	*Credenciamento* *Abertura da Reunião* Apresentação do Programa Nacional de Controle de Malária. Paola Marchesini – Coordenadora substituta da CGPNCM/SVS/MS.
9:30	*MESA 1 Educação no Campo / Educação Ambiental*
9:30 – 10:00	Política Nacional de Educação Ambiental – Ministério do Meio Ambiente (MMA) Palestrante: Renata R Maranhão – Diretora de Educação Ambiental (DEA/MMA)
10:00 – 10:30	Escola da Terra e Educação no campo – Ministério da Educação (MEC) Palestrante: Xavier Neto – Coordenação Geral de Políticas de Educação do Campo (CGPEC/MEC)
10:30 – 11:00	Programa Nacional de Educação na Reforma Agrária/PRONERA – INCRA/MDA Palestrante: Maria Ronizia Pereira Gonçalves – Superintendência INCRA do Acre
11:00 – 11:30	Iniciativas de Educação em Saúde para Habitações Populares – DUAP/ MCidades Palestrante: Elzira Marques Leão
11:30 – 12:00	DISCUSSÃO
12:00 – 13:45	INTERVALO PARA ALMOÇO
14:00 – 15:45	Apresentação de metodologia da oficina para Educação em Saúde e desenvolvimento das atividades.
15:45 – 16:00	INTERVALO
16:00 – 18:00	Continuação de atividades e Apresentação dos resultados/produtos.

07 de outubro de 2015 – quarta-feira.

9:00	*MESA 2 - Participação e Mobilização Social*
9:00 – 9:30	Gestão Participativa e Controle Social no âmbito do Ministério da Saúde – Secretaria de Gestão Estratégica e Participativa (SGEP/MS) Palestrante: Maria da Glória Campos da Silva – Psicóloga/Equipe de Apoio à Gestão Participativa e ao Controle Social/ DAGEP/SGEP/MS
9:30 – 10:00	Educação Popular e Mobilização Social à saúde – Secretaria de Gestão Estratégica e Participativa (SGEP/MS) Palestrante: Isabela Maria Lisboa Blumm – Analista Técnica de Políticas Sociais/DAGEP/SGEP/MS
10:30 – 11:00	Estratégias de Ensino, Informação e Comunicação para o controle e vigilância de doenças tropicais (FIOCRUZ) Palestrante: Milton Moraes – Pesquisador/Vice-Presidência de Ensino, Informação e Comunicação (VPEIC/FIOCRUZ)
11:00 – 11:30	Educação na Saúde no âmbito do Ministério da Saúde. Secretaria de Gestão do Trabalho e da Educação na Saúde /SGETS/MS Palestrante: Aldiney Doreto – Coordenador – Coordenação Geral de Ações Técnicas em Educação na Saúde/Departamento de Gestão da Educação na Saúde /SGETS/MS
11:30 – 12:00	Participação social na Política de Saúde do Trabalhador. Coordenação Geral de Saúde do Trabalhador (CGSAT)/Departamento de Vigilância em Saúde Ambiental e Saúde do Trabalhador (DSAST/SVS/MS) Palestrante: Jorge Sayde – Coordenação Geral de Saúde do Trabalhador/DSAST/SVS/MS
12:00 – 12:30	DISCUSSÃO
12:30 – 14:00	INTERVALO PARA ALMOÇO
14:00 – 15:45	Apresentação de metodologia da oficina para Participação e Mobilização Social e desenvolvimento das atividades
15:45 – 16:00	INTERVALO
16:00 – 18:00	Continuação de atividades e Apresentação dos resultados/produtos.

08 de outubro de 2015 – quinta-feira.

8:00 – 8:30	Apresentação da **minuta de proposta metodológica** para educação em saúde e participação social à vigilância e controle da malária
8:30 - 10:30	Atividade em grupo – revisão da minuta
10:30- 10:45	INTERVALO
10:45 - 12:00	Apresentação dos grupos
12:00 - 13:30	INTERVALO PARA ALMOÇO
13:30 – 15:30	Atividade de consolidação da proposta
15:30 – 16:30	Apresentação da Proposta
16:30 – 17:00	Encaminhamentos
17:00	ENCERRAMENTO

Annex 4
Workshop Documents

5. Educação em Saúde, Comunicação e Mobilização Social (ESMS)

O objetivo deste componente é promover uma consciência crítica, na sociedade, a respeito do problema da malária no Brasil, principalmente nas regiões endêmicas, possibilitando a elaboração e desenvolvimento de estratégias de ação, de acordo com a realidade local. Quanto mais informada estiver a população, sobre as manifestações clínicas das doenças, sua gravidade e tratamento, os fatores determinantes e colaboradores da sua incidência e as medidas disponíveis para redução da influência desses fatores, provavelmente, participará mais ativamente de seu controle.

5.1. Objetivos de processos

a) elaborar instrumentos técnicos didáticos e pedagógicos para o desenvolvimento de ações de educação em saúde e mobilização social, voltados para os diversos públicos, como gestores, técnicos, instituições de controle social e população;

b) desenvolver ações de educação em saúde e mobilização social em parcerias com instituições militares, públicas e religiosas, que executam missões especiais em áreas endêmicas de malária, para esclarecimento sobre riscos e cuidados em relação à doença;

c) desenvolver ações de educação em saúde e mobilização social em parcerias com as empresas de viagens e ecoturismo, que atuam em áreas endêmicas de malária, para esclarecimento sobre riscos e cuidados em relação à doença;

d) desenvolver ações educativas, com ênfase nas ações de controle da malária, na população escolar da rede de ensino do país, por intermédio do Parâmetro Curricular Nacional (PCN);

e) divulgar informações aos governadores, prefeitos e secretários de saúde, sobre as ações estaduais e municipais a serem adotadas na prevenção e controle da malária;

f) veicular campanha publicitária sobre as ações de prevenção e controle da malária, durante todo o ano, observando a sazonalidade da doença;

g) promover entrevistas coletivas com gestores da área da saúde para divulgar o PNCM;

h) inserir conteúdos de educação em saúde, prevenção e controle da malária, nos programas de grande audiência, formadores de opinião pública;

i) adotar mecanismos de divulgação (imprensa, "Voz do Brasil", cartas aos órgãos legislativos e conselhos estaduais e municipais) do PNCM;

j) manter a mídia permanentemente informada, por meio de comunicados ou notas técnicas, quanto à situação do controle da malária.

5.2. Atividades

a) pactuar entre gestores, por meio da PPI-ECD, o compromisso para desenvolver as ações de ESMS para o controle da malária, em todos os municípios;

b) desenvolver ações de educação em saúde e mobilização social, com ênfase na malária, junto às comunidades indígenas, por intermédio de parcerias entre SES, SMS, Core/FUNASA e ONG, em todos os municípios com transmissão de malária;

c) pactuar com instituições representativas das áreas da indústria, do comércio, da agricultura e de serviços, para que desenvolvam as ações de prevenção e controle da malária junto a seus funcionários, em todos os municípios com transmissão;

d) desenvolver, anualmente, em todos os municípios com transmissão de malária, pelo menos duas campanhas de mobilização social na televisão ou no rádio, para orientação da população quanto aos seguintes assuntos: diagnóstico, tratamento e prevenção;

e) realizar pelo menos duas audiências públicas, por ano, nas Assembleias Legislativas, nos Conselhos Estaduais de Saúde, nas Comissões Intergestores Bipartites (CIB), Ministérios Públicos e nos Conselhos Distritais Indígenas, para esclarecer a importância de integrar as ações de controle da malária, na formulação de políticas de desenvolvimento, em todos os estados com transmissão de malária;

f) realizar pelo menos duas audiências públicas, por ano, nas Câmaras de Vereadores, conselhos municipais de saúde e conselhos locais indígenas, para esclarecer a importância de integrar as ações de controle da malária, na formulação de políticas de desenvolvimento, em todos os municípios com transmissão de malária.

Extraído do Guia do Programa Nacional do Controle da Malária, p.32-35, 2003.

- Público alvo
  - Quem são as pessoas que você pretende alcançar?
- Objetivos
  - O que você espera que seu público faça após ouvir, assistir, ou entender a mensagem?
- Obstáculos
  - Que tipo de crenças, práticas culturais, pressão dos envolvidos, falta de entendimento existem entre o público alvo e o objetivo desejado?
- Benefício
  - Qual benefício que o público terá em participar da atividade?
- Tom
  - Que tipo de tom sua mensagem deve ter? Deve ser autoritária, leve, emocional?
- Meio
  - Que canais usará para transmitir a mensagem?
  - Quem será o mensageiro? Rádio? Tv? Jornais? Cartazes? Folhetos? Pessoa? Todos?
- Aberturas
  - Quais as oportunidades existem para alcançar seu público alvo?
- Considerações
  - Existe algo a mais que deva ser considerado na produção dessa estratégia? O material precisa ser em mais de uma língua?

Annex 5
Selected Photographs

Workshop facilitator José Braz Padilha introduces Maria da Glória of SGEP.

Sheila Rodovalho of the Brazilian Ministry of Health's NMCP makes a remark during the workshop.

Julie de Carvalho of Links Media with representatives of malaria-endemic states in the Brazilian Amazon who attended the workshop.

Annex 6
Attendance Certificate

MINISTÉRIO DA SAÚDE
SECRETARIA DE VIGILÂNCIA EM SAÚDE
DEPARTAMENTO DE VIGILÂNCIA DAS DOENÇAS TRANSMISSÍVEIS
Esplanada dos Ministérios, Bloco G, Ed Sede – 1º andar
70058-900 Brasília/DF
(61) 3315-3646 / 3213-8083

DECLARAÇÃO

Declaro para os devidos fins, **Julie de Carvalho**, esteve presente na "1ª Oficina de Educação em Saúde e Participação Social para Vigilância e Controle da Malária", realizada de 06 a 08 de outubro de 2015, em Brasília/DF.

Brasília, 08 de outubro de 2015.

Paola Barbosa Marchesini
Coordenadora-geral do Programa Nacional de Controle da Malária - Substituta

Input for the *Strategy and Plan of Action for Malaria in the Americas 2016 – 2020* on a Communication and Knowledge Management Line of Action

The following points may add precision to the wording of Goal 4, making it more consistent with the formulation of Component 4 (p. 18 of *Strategy and Plan of Action for Malaria in the Americas 2016-2020*). A reformulation of a few of the objectives may better cover the scope of actions under Component 4. The new objectives below imply community, sub-national, national, and multi-country level interventions.

Goal 4: Use advocacy, communication, partnerships, and collaboration to foster an environment that promotes sustainability and the use of best practices against the disease.

Objectives

- Raise awareness about the need for continued efforts against malaria in order to achieve strong political commitment, sustain robust financing, and enhance multi-sector collaboration.
- Disseminate scientific evidence and evidence-based best practices on a consistent, timely, and frequent basis to decision-makers, medical educators, program managers, health professionals, and vector control agents to improve the selection and implementation of malaria interventions.
- Mobilize all communities at-risk of malaria to take an active and empowered role in malaria prevention, control, and elimination interventions supported by the public health system.

Indicators

Advocacy/Stakeholder Engagement[1]

- Number of international donors who provide financial and/or operational resources for malaria prevention and control.
- Overall investment for malaria prevention and control, research and innovation.
- Information disseminated to stakeholders and public policy makers on a consistent, timely, and frequent basis to inform the budgetary process and ensure that malaria control efforts are adequately funded.
- Number of new laws/policies that support malaria prevention and control.
- Number of meetings that bring together multisectoral partners.
- Number of countries with multisectoral stakeholder engagement in their malaria plans. **[Adjusted from the current PAHO strategy]**
- Number of countries with at least one non-governmental partner or collaborator contributing to the implementation of community engagement activities for malaria (public-private partnerships, NGOs, etc.).

[1] Modified from the *Advocacy for Resource Mobilization (ARM) for Malaria Guide* (http://archiverbm.rollbackmalaria.org/docs/2014/ARMGuide.pdf, page 69) and *Action and Investment to Defeat Malaria (AIM 2016–2030)* (http://www.rollbackmalaria.org/about/about-rbm/aim-2016-2030, page 75).

- Number of non-traditional partners, including private-sector, who provide financial and/or operational resources towards malaria prevention and control.

Information Dissemination

- % of weekly epidemiological reports shared between decentralized malaria programs and health authorities in priority municipalities each year.
- Number of countries with a dedicated public information channel on malaria prevention and control, such as a website.
- Number of unique visitors to dedicated websites on malaria prevention and control.
- Number of informational products that are shared on a consistent, timely, and frequent basis with key stakeholders and actors in malaria prevention and control.
- % of malaria-endemic countries reporting to the regional antimalarial medicine stock monitoring system each quarter.
- % of health professionals that have awareness, knowledge, and recall of national treatment guidelines, coordinated implementation, and use of evidence-based practices for malaria control.
- Number of countries with laws that require continuing education for professionals involved in malaria prevention/control.

Social Mobilization/Social and Behavior Change Communication (SBCC)

- Number of countries with social mobilization or community engagement strategies in their malaria plans. **[Adjusted from the current PAHO strategy]**
- % of population in target communities that seeks diagnosis within 24 hours of onset of symptoms.
- % of households in target communities that accept IRS.
- % of patients diagnosed with malaria that complete their treatment with antimalarial medicines.
- % of population in target communities that sleeps under mosquito bed nets (LLINs or ITNs) every night.
- % of population in target communities that participates in larval source management.
- % of population that understands the need to participate in mass blood surveys.

Issues and Challenges

Communication approaches for malaria need to be adjusted as the epidemiological situation changes. For instance, information, education and communication (IEC) may play a more prominent role in control programs, while risk/crisis communication is more relevant in post-elimination scenarios to prevent re-establishment of transmission.

Whereas malaria incidence is extremely low in most urban population centers in the Americas, successful social and behavior change communication (SBCC) is more difficult in the general population due to lower perceived risk of disease. Other diseases and community concerns have come to take precedence over malaria. For this reason, NMCPs need to develop targeted

and cost-effective social and health communication interventions that in some cases are integrated across other health programs to further reduce morbidity and mortality.

NMCPs have insufficient financial and human resources for capacity development and communication. Additional training and logistical resources are especially needed at the sub-national levels, which are largely responsible for implementation of malaria communication activities. Alternative communication approaches may need to be selected in light of scarce resources.

Targeted stakeholder engagement, education, and social mobilization are needed at the community level in order to prepare populations in malaria-endemic countries of the Americas to collaborate on malaria elimination and prevent the re-establishment of transmission.

Selected mobile and migrant populations work and travel across international borders, which can result in delayed diagnosis and interruptions in the treatment of malaria.

Institutional Strengths and Experiences/Scaling-up Opportunities

From 2013-2015, 11 countries received USAID-funded technical assistance to design comprehensive communication strategies for malaria. The communication strategies identify relevant malaria stakeholders, highlight the key communication issues, and outline approaches such as advocacy, IEC, social marketing, and SBCC. Existing communication strategies can be used as the basis for developing operational plans for communication and enlisting local partners to implement the work.

Five countries have received USAID-funded technical assistance on community engagement and advocacy for malaria communication at the decentralized level.

USAID sponsors an Amazon Malaria Initiative project website that serves as a central repository of information for 11 countries in the Americas and a wide range of other malaria partners. Resources include training materials, reports, journal articles, success stories, lessons learned, quarterly bulletins, and others.

Colombia, Guatemala, and Suriname have executed IEC and health communication activities in selected at-risk communities, with support from the Global Fund to Fight AIDS, Tuberculosis, and Malaria. Proven approaches can be continued locally, as well as replicated in other countries as appropriate.

Strategic Approaches

<u>Advocacy/Stakeholder Engagement</u>

Strengthen the enabling environment on a consistent, timely, and frequent basis by raising the awareness of multisectoral decision-makers about economic and other benefits associated with reducing malaria and the need to maintain adequate funding for control/elimination programs.

Promote the adoption of legislation to stimulate public-private partnerships against malaria, following the example of Brazilian laws that require corporate malaria mitigation plans as part of environmental licensing.

Promote public policies that support community- and individual-level behavior change.

Identify and map key stakeholders including government, non-governmental organizations including the private-sector, donors, and other influential actors.

Identify opportunities for private-sector and/or non-traditional partner engagement for new and innovative funding and resource mobilization.

Partner with non-governmental actors to reach at-risk populations that may avoid or distrust the public health system.

Use strategic integrated marketing communications to keep malaria prevention, control and/or elimination in the spotlight.

Information Dissemination

Communication and knowledge management should be strengthened to inform decision-makers, stakeholders, and the public on malaria activities and result to create better conditions and impact for systems strengthening.

For the purpose of monitoring and evaluation, establish internal and external standards, guidelines, processes, and protocols to improve documentation of efforts and increase knowledge exchange within regional, national, sub-national, and local-level networks.

Improve capacity for and performance in knowledge management, documenting and disseminating best practices in the right context and via the appropriate networks. This includes the cataloguing of key information products (e.g. article abstracts, reports, presentations, newsletters, regular epidemiological reports, and social media posts) so that they are searchable by a wide range of actors.

Strengthen communication between ministries of health, decentralized program managers, and health professionals on a consistent, timely, and frequent basis to ensure overall awareness, knowledge, and recall of national treatment guidelines, coordinated implementation, and use of evidence-based practices for malaria control.

Promote the adoption of legislation that supports continuing education for health professionals.

Establish two-way communication between ministries of health and the malaria research community in order to define operational research priorities and disseminate key research findings.

Share weekly epidemiological reports with health authorities in priority municipalities to encourage timely and accurate community-level disease surveillance.

Strengthen capacity to communicate risk and crisis communication for outbreaks in low and extremely low incidence communities.

Social Mobilization/SBCC

Ensure that community-level interventions are targeted to key clusters. Assist NMCPs to identify most at-risk communities where SBCC could have an impact on malaria incidence and prevalence.

Foster social mobilization involving municipal councils, community associations, faith-based groups, local businesses, NGOs, and other actors. Encourage selection of behavior change objectives at the local level to increase community buy-in and chances of success.

Provide training support on how to communicate effectively with populations in special circumstances resulting in an increased risk of malaria transmission (e.g. remote and/or mobile populations, pregnant women, indigenous, Afro-descendant, and others).

Integrate community-level malaria communication interventions and messages with primary health care and/or family health programs.

Science of Eradication: Malaria Regional Course

São Paulo, Brazil
September 21 – October 3, 2015

Amazon Malaria Initiative (AMI) Communication Component

Trip Report

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October 2015

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About Links Media

Links Media, LLC is a management consulting company based in the Washington D.C. metropolitan area, specializing in information technology and marketing communications. We provide advanced management consultation services to governments and private sector clients in the areas of health, environment, science and technology, biotechnology, governance, human rights, economic prosperity, conflict resolution, education, public engagement, risk and crisis management, and social entrepreneurship.

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Abbreviations and Acronyms

AMI	Amazon Malaria Initiative
DIRESA	Regional Directorate for Health
ISGlobal	Barcelona Institute for Global Health
MINSA	Ministry of Public Health - Peru
NMCP	National Malaria Control Program
PAHO	Pan American Health Organization
SoE	Science of Eradication: Malaria
TA	Technical Assistance
USAID	U.S. Agency for International Development
USP	University of São Paulo (Portuguese acronym)
WHO	World Health Organization

I. Background

The United States Agency for International Development (USAID) launched the Amazon Malaria Initiative (AMI) in 2001 to improve the prevention and control of malaria in partner nations of the Amazon basin. The initiative's mission is to (i) ensure that national malaria control programs in the Amazon basin and selected Central American countries substantially incorporate best practices and (ii) promote evidence-based policy changes in the partner countries. From inception, AMI has maintained a comprehensive view of malaria prevention and control. Its initial focus was to build the evidence base to support the introduction of artemisinin-based combination therapy (ACT) for *P. falciparum* malaria in all Amazon basin countries, and to improve access to, and quality of, malaria diagnosis. As progress was made in introducing ACT, the areas of epidemiological surveillance, vector control and systems strengthening received further attention.

USAID established AMI as a collaborative partnership among organizations (the AMI technical partners) that provide technical and scientific expertise and collaborate with the nations' ministries of health and national malaria control programs grouped in the Amazon Network for the Surveillance of Antimalarial Drug Resistance (RAVREDA) to proactively address malaria prevention and control in a sustainable manner. The partner countries also collaborate with one another and maintain an ongoing exchange of information and expertise through South-South collaboration promoted and supported by AMI. Countries currently supported by AMI include Belize, Brazil, Colombia, Ecuador, Guatemala, Guyana, Honduras, Nicaragua, Panama, Peru, and Suriname.

The initiative's regional approach benefits partner countries through (i) training and technical assistance (TA), (ii) the development of standardized guidelines and protocols, (iii) the comparability of research and monitoring results within and across countries, and (iv) coordinated approaches to addressing shared problems.

II. Purpose of the Trip

On September 21 – October 3, 2015, Mr. Ricardo Echalar, Technical Coordinator/Deputy Project Manager of Links Media traveled São Paulo, Brazil to participate in the Science of Eradication: Malaria (SoE) Regional Course sponsored by the Amazon Malaria Initiative. The course was organized by the University of São Paulo (USP) School of Public Health, The Harvard T.H. Chan School of Public Health, Barcelona Institute for Global Health (ISGlobal), and the Swiss Tropical Medicine and Public Health Institute. Ms. Julie de Carvalho, Lead Activity Manager, also traveled and participated in this course.

Links Media attended this course to gain additional technical knowledge of best practices in malaria prevention and control and important considerations for malaria elimination. In addition, this meeting provided a valuable opportunity for Links Media to share experiences and information with regard to communication and advocacy in the region of the Americas with over 100 course participants representing over 40 countries.

III. Scope of Work

The scope of work for Links Media included the following specific activities:

- Attend and participate in the Science of Eradication: Malaria regional course at the University of São Paulo School of Public Health.
- Share information with regard to malaria prevention and control efforts in Latin America and the Caribbean, including Portuguese-language entomology training videos, and information from the communication and advocacy activities implemented in the region.
- Meet with AMI country participants in the course to finalize strategies and identify possible communication technical assistance.

IV. Source of Funding for the Trip

This trip was supported through budgeted funds from the USAID/Peru contract (No. AID-527-C-13-00004) with Links Media for the Communication Component for the Amazon Malaria Initiative (AMI).

V. Trip Activities

The main activity for this trip was to attend and participate in the regional course of the Science of Eradication: Malaria (SoE) course in São Paulo, Brazil from September 22 – October 3, 2015. This course was hosted at the USP School of Public Health as part of the series of leadership development courses to achieve global malaria control and eradication with the support of the Harvard T.H. Chan School of Public Health, Barcelona Institute for Global Health (ISGlobal), and the Swiss Tropical and Public Health Institute.

The course provided an overview of the history of malaria control and elimination efforts in the Americas, as presented by Dr. Keith Carter from the Pan American Health Organization/World Health Organization (PAHO/WHO). In addition, there was a general overview of what is needed for elimination including technical feasibility, operational feasibility, and financial feasibility. This was based on a framework, which was published within a *Malaria Journal* article by Bruno Moonen in 2010[1]. Technical feasibility pertains to the tools and skills needed to achieve elimination, operational feasibility pertains to the ability to achieve elimination within a given area or time with the needed tools and resources, and financial feasibility pertains to resources that are dedicated and sustained to achieve elimination and beyond. In order to achieve elimination, national programs must have all three, which is difficult and can pose challenges.

[1] Moonen, B, et al. 2010. A framework for assessing the feasibility of malaria elimination. *Malaria Journal*. 9(322).

During the course, there were also presentations with specific information on *Plasmodium falciparum* and *Plasmodium vivax*, including the epidemiology, pathophysiology of disease, determinants of disease (including social and environmental), and diagnosis and treatment. *P. Vivax* causes the majority of cases in Latin America and a great number of cases in Africa and Asia. *P. falciparum* receives more attention in Africa as it can cause more severe disease, especially in children and pregnant women. The key difference between the two diseases is how the parasite is able to replicate within the liver of the host, in which *P. vivax* can remain in the liver and cause delayed symptoms, no symptoms, and even relapses of disease. *P. falciparum* on the other hand will clear the liver and can cause a more severe immunological reaction and can result in cerebral malaria, severe anemia, acute respiratory distress syndrome, acute kidney failure, hyperparasitemia, and hypoglycemia. There are also key considerations in the treatment of both, especially in regard to antimalarial resistance. *P. falciparum* can be treated with artemisinin-based therapies, however resistance has been observed in Southeast Asia, which has caused concern in other regions including Africa and Latin America. There has also been observed antimalarial resistance in *P. vivax* cases, including chloroquine in South America.

During the course, there was a lot of emphasis on the development of new drugs and vaccines to prevent malaria transmission. There were three points in the infection cycle that were addressed to end the infectious cycle, including modifying mosquitoes so that they are unable to transmit the disease (by introducing bacteria to the mosquito), targeting cell receptors in the host, and preventing parasite replication within the host. In addition, information was presented on why the burden of disease may be higher in children and people who are new to an endemic area during a presentation on the naturally acquired immunity that may result from repeated infections when individuals remain in a given area over a long period of time. Currently, one vaccine is being considered for wider application, the RTS,S/AS01 vaccine. Unfortunately, this vaccine is only 30-50% effective and requires multiple doses. Many course participants did not agree with this vaccine being approved, and, given the history of other vaccines they believed it would not meet qualification standards.

Entomology and vector control practices were also covered in-depth. Unfortunately, research and development of insecticides has declined significantly since the 1980s. While other technical interventions continue to improve and adapt, vector control continues to use methods that have been used for decades. Presenters indicated that there is a real gap and need for additional research to identify new insecticides and vector control measures. There are currently three main ways to address the vector, which include: managing breeding sites, killing adult mosquitoes, and rendering the mosquito incapable of transmitting the pathogen. Links Media provided approximately 50 Portuguese-language training videos on basic field entomology techniques to Dr. Maria Anise Mureb Sallum for distribution to health secretariats in Brazil's malaria-endemic states. The videos had been developed by RTI International in 2011 with support from AMI.

On Saturday, September 26th, the class was divided into three groups. Each group was selected based on their professional background and interests to visit a research facility in the state of São Paulo. Links Media traveled to the USP Biomedical Institute, where Dr. Marcelo Ferreira (the course organizer) has his lab for malaria research. During this visit, Links Media was able to visit labs for drug research and development, molecular genetics, molecular biology including the effects of malaria on pregnancy, and experimental immunoparasitology, in addition to learning

about recent research in the Amazon region of Brazil, including *in vivo* studies in the state of Acre.

The course also allowed for course participants to present posters highlighting their research. Links Media did not present a poster, but did provide critical feedback and received valuable information during the poster sessions. Links Media also interacted with researchers studying gold miner behaviors, attitudes, and practices in French Guiana and surveillance of artemisinin resistance in South America. During October 1 – 2, Links Media also attended sessions at the XIV National Meeting on Malaria Research as part of the SoE course. This meeting brought together Brazilian and global leaders in malaria research. During the sessions, panels addressed the current status of malaria in Brazil and research on vaccine discovery and development.

During the duration of the course, Links Media had several opportunities to speak directly with PAHO/WHO country malaria focal points and headquarters staff, in addition to PAHO/WHO sponsored AMI country partners, including National Malaria Control Program (NMCP) representatives from Belize, Honduras, Guyana, Brazil, and Peru. Two such opportunities allowed for Links Media to discuss the finalization of country malaria communication strategies. With regard to Ecuador, Links Media will continue to work with PAHO/Ecuador to identify a Ministry of Health malaria focal point now that the national malaria program has been restructured in order to review and accept the Country Communication Strategy, which was drafted in 2014. With regard to Peru, Links Media will update the draft communication strategy as discussed with the NMCP Director who was also a SoE course participant. The NMCP Director and the Regional Directorate for Health (DIRESA) Health Officer, who was also a SoE participant, indicated that there was a need to develop a Terms of Reference (ToR) for a communication specialist to be mobilized in response to the ongoing malaria emergency in the Loreto Region. Peru also identified the need for useful stakeholder mapping materials/examples to help in the coordination of the emergency response efforts in Loreto.

VI. Conclusions and Recommendations

Links Media found the overall trip to be very beneficial in strengthening its knowledge base, which in turn will help further its TA under AMI. Having a deeper understanding of the biological mechanisms and cycle of infection, pathology of disease, considerations for drug and vaccine discovery, and the leading guidance on malaria prevention and control will have a lasting impact on communication deliverables and products that are created with technical and country partners. Overall, the course provided a greater orientation on the science that goes into malaria prevention and control efforts, however it would have been good to have more representation/input from individuals working in countries' NMCPs. Their perspective could have allowed the participants to understand the realities the NMCPs may experience including a lack of funding and resources, political commitment, and competing priorities due to other health issues. For future courses, Links Media has recommended to the organizers that they include a primer with key terminologies including elimination vs. eradication. These two terms were often used interchangeably, which is incorrect according to current WHO definitions. Links Media will share the forthcoming AMI Malaria Elimination Frequently Asked Questions (FAQs) with course participants via the Facebook alumni page, which may help with this issue. This will be in

addition to disseminating these products to existing AMI channels including Facebook in order to expand the knowledge base of regional malaria actors.

One of the key takeaways from the course is that there needs to be more coordinated efforts to bring the scientific/academic community together with the NMCPs in the region. Too often, they are operating in parallel. There needs to be better communication between the two to shape research that addresses the needs of NMCPs. Links Media actively shares published research from the scientific/academic community with the AMI network including members from NMCPs via AMI social media and e-mails. Moving forward, Links Media can continue to facilitate the dissemination of these materials and encourage communication between NMCPs and the scientific/academic community as needed.

In Links Media's TA supporting countries in their efforts moving towards elimination, Links Media believes that one of the particular areas of emphasis will be with regard to *P. vivax*. The pathophysiology of disease caused by *P. vivax* is different than *P. falciparum*, in that the parasite can stay in the liver and cause asymptomatic cases, delayed symptoms, and/or relapses. Whereas *P. vivax* is the parasite that causes the majority of cases in the LAC region, this could pose problems to the elimination efforts where all cases must be properly diagnosed and treated.

Overall, the presentations and discussions throughout the course reinforced Links Media's findings and recommendations in working with NMCPs and other country partners that in order to achieve elimination, there must be political will to maintain technical, operational, and financial resources. Elimination cannot be achieved solely through one intervention, but through a combination of interventions, including communication and advocacy. Elimination begins at the local level, and by addressing it through a regional approach, countries must strengthen their ability to coordinate and respond to new cases, especially in areas with low to no incidence.

Annex 1: Draft Course Agenda

Day/time	Activity	Speaker
Tue 22 September		
16:00h - 17:00h	Welcome remarks	M. Ferreira (USP), F. Costa (UNICAMP), M. Castro (Harvard)
17:00h - 18:30h	Opening lecture: Setting the stage for malaria elimination in the Americas	K. Carter (PAHO)
18:30h - 20:00h	**Welcome cocktail party**	
Wed 23 September		
8:30h - 9:30h	Lecture: History of malaria eradication	M. Castro (Harvard)
9:30h - 10:30h	Lecture: FAPESP: grant opportunities and international cooperation	W. Colli (USP)
10:30h - 10:45h	**Coffee break**	
10:45h - 11:45h	Video presentation followed by discussion: The biology of malaria and biological opportunities for eradication	D. Wirth (Harvard); F. Costa (UNICAMP), D. Bargieri (USP)
11:45h - 12:30h	Lecture: *Plasmodium vivax*: specific challenges for elimination	M. Ferreira (USP)
12:45h - 14:00h	**Lunch**	
14:00h - 15:00h	Lecture: Vector biology and dynamics of malaria transmission	M. Jacobs-Lorena (Johns Hopkins)
15:00h - 17:00h	Panel discussion: Alternative methods for malaria vector control	M. Jacobs-Lorena (Johns Hopkins), P. Ribolla (UNESP), J. Souza-Neto (UNESP), J. Conn (SUNY), M.Sallum (USP)

Thu 24 September		
8:30h - 9:30h	Lecture: Mathematical modeling for malaria eradication	M. Gabriela Gomes (Liverpool STH)
9:30h - 10:30h	Lecture: Environmental determinants of malaria incidence	M. Castro (Harvard)
10:30h - 10:45h	**Coffee break**	
10:45h - 11:45h	Lecture: Social determinants of malaria transmission	M. Castro (Harvard)
11:45h - 12:30h	Lecture: Epidemiology and control of malaria in Brazil	M. Ferreira (USP)
12:45h - 14:00h	**Lunch**	
14:00h - 15:00h	Lecture: Epidemiology and control of malaria in Africa	C. Lengeler (Swiss TPH Institute)
15:00h - 17:30h	Video presentation followed by discussion: Real-life experiences of malaria control in the Americas	K. Carter (PAHO), M. Castro (Harvard), M. Ferreira (USP)
Fri 25 September		
8:30h - 9:30h	Lecture: Tools to reduce the entomological inoculation rate	C. Lengeler (Swiss TPH Institute)
9:30h - 10:30h	Lecture: Molecular tools for malaria surveillance	I. Felger (Swiss TPH Institute)
10:30h - 10:45h	**Coffee break**	
10:45h - 11:45h	Lecture: Diagnostics for malaria eradication	I. Felger (Swiss TPH Institute)
11:45h - 12:30h	Video presentation: Political analysis for malaria	Michael Reich (Harvard)
12:30h - 14:00h	**Lunch**	
14:00h - 18:00h	Poster viewing and project discussion: Epidemiology and Control	M. Ferreira (USP), M. Castro (Harvard), I. Felger (Swiss TPH Institute), M. Gabriela Gomes (Liverpool STH), C. Lengeler (Swiss TPH Institute)

Sat 26 September		
8:00h - 17:30h	Guided visit to malaria research laboratories in São Paulo State	S. Boscardin, M. Ferreira, C. Marinho, C. Wrenger, G. Wunderlich (USP); F. Costa (UNICAMP); P. Ribolla, J. Souza-Neto (UNESP)
Mon 28 September		
8:30h - 9:30h	Evaluation of the first week	M. Ferreira (USP), F. Costa (UNICAMP), M. Castro (Harvard)
9:30h - 10h30h	Lecture: Malaria vaccines: types and clinical trials	Q. Bassat (ISGlobal)
10:30h - 10:45h	**Coffee break**	
10:45h - 12:30h	Panel discussion: Antimalarial therapy for malaria eradication and the threat of resistance	Q. Bassat (ISGlobal), C. Sibley (WWARN)
12:30h - 14:00h	**Lunch**	
14:00h - 15:00h	Lecture: Antimalarial drug development	C. Wrenger (USP)
15:00h - 17:00h	Panel discussion: Pathophysiology of severe malaria: cytoadherence, inflammation and cerebral malaria	F. Costa (UNICAMP), C. Marinho (USP), G. Wunderlich (USP)
Tue 29 September		
8:30h - 12h30h	Poster viewing and project discussion: Diagnosis, Treatment, and Clinical Management	M. Ferreira (USP), C. Wrenger (USP), C. Sibley (WWARN)
12:30h - 14:00h	**Lunch**	
14:00h - 15:00h	Lecture: Population genetics of malaria elimination	A. Escalante (Tempe)
15:00h - 17:00h	Practical session: Taxonomy, phylogeny and evolution of Neotropical Anophelinae	M. A. Sallum (USP), P. Ribolla (UNESP), J. Conn (SUNY)

Wed 30 September		
8:30h - 12h30h	Poster viewing and project discussion: Vector Biology and Control	P. Ribolla (UNESP), M. Jacobs-Lorena (Johns Hopkins), J. Conn (SUNY), M. Sallum (USP), J. Souza-Neto (UNESP)
12:30h - 14:00h	**Lunch**	
14:00h - 15:00h	Lecture: Spatial analysis tools for malaria eradication	M. Castro (Harvard)
15:00h - 17:30h	Panel Discussion: Challenges for malaria vector control in the Americas	P. Ribolla (UNESP), J. Conn (SUNY), M. Sallum (USP), M. Jacobs-Lorena (Johns Hopkins), J. Souza-Neto (UNESP)
18:00h - 19:00h	Optional Lecture: Malaria in the context of endemic tropical infections in Brazil **(IN PORTUGUESE)**	G. Werneck (UERJ)
Thu 1 October		
8:30h - 12:30h	Poster viewing and project discussion: Biochemistry, Molecular Biology and Genetics	C. Wrenger (USP), G. Wunderlich (USP), F. Costa (UNICAMP), A. Escalante (Tempe)
12:30h - 14:00h	**Lunch**	
14:00h - 15:30h	Panel discusion: Challenges for malaria vaccine development	S. Boscardin (USP); F. Zavala (Johns Hopkins)
15:30h - 17:30h	Workshop: Developing a plan for malaria elimination	M. Castro (Harvard), M. Ferreira (USP), P. Marchesini (Ministry of Health of Brazil)
Fri 2 October		
8:30h - 10:30h	Panel Discussion: Vaccine development	
	Vivax malaria vaccines: types and current candidates	S. Herrera (CLAIM)
	Design of *P. vivax* malaria vaccines	A. Reyes-Sandoval (Oxford)
	Transmission blocking vaccines targeting mosquito factors	R. Dinglasan (Johns Hopkins)
	Spleen-dependent immune protection elicited by reticulocyte-derived exosomes from malaria infections	H. del Portillo (ISGlobal)

	revealed by T cell population changes	
10:30h - 10:45h	**Coffee break**	
10:45h - 12:30h	Poster viewing and project discussion: Immunity and Vaccine Development	S. Boscardin (USP), F. Costa (UNICAMP), C. Marinho (USP), F. Zavala (Johns Hopkins)
12:30h - 14:00h	**Lunch**	
14:00h - 15:30h	Keynote lecture: Recent progresses in malaria control and prospects for elimination in Brazil	A. C. Santelli (Ministry of Health of Brazil)
15:30h - 17:00h	Course evaluation and closing remarks	M. Ferreira (USP), F. Costa (UNICAMP), M. Castro (Harvard)

Annex 2: Participants List

	Last Name (Surname):	First Name:	Institution	Area of expertise (for poster discussion)	Current place of residence	Nationality (Country):
1	Abd-Elfarag	Gasim	Liverpool School of Tropical Medicine, Liverpool, UK	Diagnosis, Treatment, and Drug Development	Liverpool, UK; will depart from South Sudan	South Sudan
2	Alemu	Sisay	Menzies School of Health Research, Darwin, Australia	Biochemistry, Molecular Biology, and Genetics	Adis Abeba, Ethiopia	Ethiopia
3	Almeida	Fábio	Instituto Butantã, São Paulo, Brazil	Vector Biology and Control	São Paulo, Brazil	Brazil
4	Alvarenga	Denise	Fiocruz, Belo Horizonte, Brazil	Biochemistry, Molecular Biology, and Genetics	Belo Horizonte, Brazil	Brazil
5	Awandu	Shehu	University of Pretoria, Pretoria, South Africa	Epidemiology and Control	Pretoria, South Africa	Kenya
6	Baldeviano	Geral	US Navy Medical	Epidemiology and	Lima, Peru	Peru

			Research Unity 6, Lima, Peru	Control		
7	Bittencourt	Najara	State University of Campinas Campinas, Brazil	Immunity and Vaccine Development	Campinas, Brazil	Brazil
8	Blume	Liana	Ministry of Health of Brazil, Brasilia, Brazil	Epidemiology and Control	Brasilia, Brazil	Brazil
9	Bourgard	Catarina	State University of Campinas Campinas, Brazil	Biochemistry, Molecular Biology, and Genetics	Campinas, Brazil	Portugal
10	Campos	Melina	State University of São Paulo, Botucatu, Brazil	Vector Biology and Control	Botucatu, Brazil	Brazil
11	Carrasco-Escobar	Gabriel	Cayetano Heredia University, Lima, Peru	Epidemiology and Control	Lima, Peru	Peru
12	Carvalho Costa	Pedro Augusto	Fiocruz, Belo Horizonte, Brazil	Immunity and Vaccine Development	Belo Horizonte, Brazil	Brazil
13	Costa	Gabriel	Fiocruz, Belo Horizonte, Brazil	Diagnosis, Treatment, and Drug Development	Belo Horizonte, Brazil	Brazil
14	Couto	Joana	Universidade Nova de Lisboa, Portugal	Vector Biology and Control	Lisbon, Portugal	Portugal
15	Curra	Chiara	IMBB-Forth, Heraklion, Greece	Vector Biology and Control	Greece	Italy
16	Dantur Juri	Maria Julia	National University of Tucumán, Tucumán, Argentina	Vector Biology and Control	Tucumán, Argentina	Argentina
17	DINIZ	SUELEN	Fiocruz, Belo Horizonte, Brazil	Immunity and Vaccine Development	Belo Horizonte, Brazil	Brazil
18	DOBRESCU	Irina	University of São Paulo, São Paulo, Brazil	Biochemistry, Molecular Biology, and Genetics	São Paulo, Brazil	France
19	Dos-Santos	João	State University of Campinas Campinas, Brazil	Biochemistry, Molecular Biology, and Genetics	Campinas, Brazil	Brazil

20	douine	maylis	University of France Guyana, Cayenne, France Guyana	Epidemiology and Control	Cayenne, France Guyana	France
21	Elahi	AEM Rubayet	Virginia Polytechnic Institute and State University, Virginia, USA	Biochemistry, Molecular Biology, and Genetics	Blacksburg, Virginia, USA	Bangladesh
22	Elizalde	Aleix	ISGlobal, Barcelona, Spain	Biochemistry, Molecular Biology, and Genetics	Barcelona, Spain; will depart from Manaus, Brazil	Spain
23	Endo	Noriko	Massachusetts Institute of Technology, Cambridge, MA, USA	Vector Biology and Control	Boston, USA	Japan
24	Ferreira	Tiago	University of São Paulo, São Paulo, Brazil	Epidemiology and Control	São Paulo, Brazil	Portugal
25	Ferreira Gonçalves	Maria Jacirema	Fiocruz, Manaus, Brazil	Epidemiology and Control	Manaus, Brazil	Brazil
26	Fola	Abebe	University of Melbourne, Melbourne, Australia	Biochemistry, Molecular Biology, and Genetics	Melbourne, Australia	Ethiopia
27	Franco	Ana	Instituto Gulbenkian de Ciência, Oeiras, Portugal	Epidemiology and Control	Lisbon, Portugal	Portugal
28	Gimenez	Alba Marina	Federal University of São Paulo, São Paulo, Brazil	Immunity and Vaccine Development	São Paulo, Brazil	Argentina
29	Glowacka	Paulina	University of São Paulo, São Paulo, Brazil	Diagnosis, Treatment, and Drug Development	Ribeirão Preto, Brazil	Poland
30	Gomane	Sergio	Ministry of Health of Mozambique, Maputo, Mozambique	Vector Biology and Control	Maputo, Mozambique	Mozambique
31	Gregorio Dombrowski	Jamille	University of São Paulo, São Paulo, Brazil	Epidemiology and Control	São Paulo, Brazil	Brazil

32	Hawkes	Simon	University of São Paulo, São Paulo, Brazil	Biochemistry, Molecular Biology, and Genetics	Ribeirão Preto, Brazil	Ireland
33	Hoffmann	Angelika	University of Heidelberg, Germany	Biochemistry, Molecular Biology, and Genetics	Heidelberg, Germany	Germany
34	Inoue	Juliana	University of São Paulo, São Paulo, Brazil	Diagnosis, Treatment, and Drug Development	São Paulo, Brazil	Brazil
35	Kannady	Khadija	Dar es Salaam City Council, Dar es Salaam, Tanzania	Vector Biology and Control	Dar es Salam, Tanzania	Tanzania
36	Kluck	George	Federal University of Rio de Janeiro, Rio de Janeiro, Brazil	Biochemistry, Molecular Biology, and Genetics	Rio de Janeiro, Brazil	Brazil
37	Krake	Susann	State University of Campinas Campinas, Brazil	Diagnosis, Treatment, and Drug Development	Campinas, Brazil	Germany
38	Labora	Maitia	Federal University of São Paulo, São Paulo, Brazil	Diagnosis, Treatment, and Drug Development	São Paulo, Brazil	Uruguay
39	Lautu-Ninda	Dulcie	PNG Institute of Medical Research, Madang, Papua New Guinea	Diagnosis, Treatment, and Drug Development	City?, Papua New Guinea	Papua New Guinea
40	Lima	Giselle	University of São Paulo, São Paulo, Brazil	Diagnosis, Treatment, and Drug Development	São Paulo, Brazil	Brazil
41	Lima	Luciana	University of São Paulo, São Paulo, Brazil	Immunity and Vaccine Development	São Paulo, Brazil	Brazil
42	Lima	Nathália	University of São Paulo, São Paulo, Brazil	Immunity and Vaccine Development	São Paulo, Brazil	Brasil
43	Lima Silva Santos	Marina	Fiocruz, Belo Horizonte, Brazil	Biochemistry, Molecular Biology, and Genetics	Belo Horizonte, Brazil	Brasil
44	Liyanage	Hasitha	University of Colombo, Sri Lanka	Diagnosis, Treatment, and Drug Development	Colombo, Sri Lanka	Sri Lanka

45	Loaiza	Jose	Institute of Scientific Investigations and High Technology Services, Panama City, Panama	Vector Biology and Control	Panama City, Panama	Panama
46	Lunev	Sergey	University of Groningen, Gröningen, Netherlands	Diagnosis, Treatment, and Drug Development	Groningen, Netherlands	Russia
47	Marzluf	Tanja	University of Heidelberg, Germany	Immunity and Vaccine Development	Heidelberg, Germany	Germany
48	McGough	Sarah	Harvard T. H. Chan School of Public Health, Boston, USA	Epidemiology and Control	Boston, USA	USA
49	Mendonca Gomes	Fabio	National Institute of Allergy and Infectious Diseases, Bethesda, USA	Vector Biology and Control	Baltimore, USA	Brazil
50	Monte	Carlos	Federal University of Pará, Belém, Brazil	Immunity and Vaccine Development	Belém, Brazil	Brazil
51	Moreira	José	Fiocruz, Rio de Janeiro, Brazil	Diagnosis, Treatment, and Drug Development	Rio de Janeiro, Brazil	Mozambique
52	Moreno Leirana	Marta	University of California San Diego, San Diego, USA	Vector Biology and Control	San Diego, USA?	Spain
53	Muguande	Olinda Francisco	Ministry of Health of Mozambique, Maputo, Mozambique	Vector Biology and Control	Maputo, Mozambique	Mozambique
54	Murillo	Oscar	University of São Paulo, São Paulo, Brazil	Immunity and Vaccine Development	São Paulo, Brazil	Colombia
55	Niemand	Jandeli	University of Pretoria, Pretoria, South Africa	Biochemistry, Molecular Biology, and Genetics	Pretoria, South Africa	South Africa
56	Nikpour Alkaran	Fatemeh	Tehran University of Medical Sciences, Tehran, Iran	Vector Biology and Control	Teeran, Iran	Iran

57	Nyonda	Mary Akinyi	Claude Brenard University, Lyon, France	Diagnosis, Treatment, and Drug Development	Lyon, France	Kenya
58	Ogboi	Johnbull Sonny	University of Camerino, Marserata, Italy	Diagnosis, Treatment, and Drug Development	Abuja, Nigeria	Nigeria
59	Passos Maia	Lígia	University of São Paulo, São Paulo, Brazil	Diagnosis, Treatment, and Drug Development	Santo André, Brazil	Brazil
60	Pina-Costa	Anielle	Fiocruz, Rio de Janeiro, Brazil	Epidemiology and Control	Rio de Janeiro, Brazil	Brazil
61	Pincelli Cintra	Anaclara	Federal University of Santa Catarina, Florianopolis, Brazil	Epidemiology and Control	Florianopolis, Brazil	Brazil
62	PINEDO CANCINO	VIVIANA VANESSA	National University of the Peruvian Amazon, Iquitos, Peru	Epidemiology and Control	Lima or Iquitos, Peru?	Peru
63	Pinilla Beltran	Yudi Tatiana	State University of Amazonas, Manaus, Brazil	Vector Biology and Control	Manaus, Brazil	Colombia
64	Rodovalho	Sheila	Ministry of Health of Brazil, Brasilia, Brazil	Epidemiology and Control	Brasilia, Brazil	Brazil
65	Rufalco-Moutinho	Paulo	University of São Paulo, São Paulo, Brazil	Vector Biology and Control	São Paulo, Brazil	Brazil
66	Salazar	Luis	State University of Amazonas, Manaus, Brazil	Immunity and Vaccine Development	Manaus, Brazil	Colombia
67	Salgado	Perla	University of São Paulo, São Paulo, Brazil	Immunity and Vaccine Development	São Paulo, Brazil	Chile
68	Salla	Lais	University of São Paulo, São Paulo, Brazil	Diagnosis, Treatment, and Drug Development	São Paulo	Brazil
69	Samano-Sanchez	Hugo	Mexico City, Mexico	Biochemistry, Molecular Biology, and Genetics	Mexico City, Mexico	Mexican

70	Sanou	Antoine	Liverpool School of Tropical Medicine, Liverpool, UK	Vector Biology and Control	Liverpool, UK	Burkina Faso
71	Santos	Emili	Federal University of Paraná, Curitiba, Brazil	Vector Biology and Control	Curitiba, Brazil	Brazil
72	Saraiva	Raul	Johns Hopkins University, Baltimore, USA	Vector Biology and Control	Baltimore, USA	Portugal
73	Secato Fontoura	Pablo	University of São Paulo, São Paulo, Brazil	Epidemiology and Control	São Paulo, Brazil	Brazil
74	Soares	Roberta	Federal University of Juiz de Fora, Juiz de Fora, Brazil	Immunity and Vaccine Development	Juiz de Fora, Brazil	Brazil
75	Sousa	Antonio	Fiocruz, Belo Horizonte, Brazil	Vector Biology and Control	Belo Horizonte, Brazil	Brazil
76	Suárez-Mutis	Martha	Fiocruz, Rio de Janeiro, Brazil	Epidemiology and Control	Rio de Janeiro, Brazil	Colombia
77	Tavella	Tatyana	State University of Campinas Campinas, Brazil	Diagnosis, Treatment, and Drug Development	Campinas, Brazil	Brazil
78	Thihara Rodrigues	Priscila	University of São Paulo, São Paulo, Brazil	Biochemistry, Molecular Biology, and Genetics	São Paulo, Brazil	Brazil
79	Tobgay	Tashi	University of Medical Sciences of Buthan, Thimphu, Buthan	Epidemiology and Control	City?, Buthan	Bhutan
80	Torres	Katherine	Cayetano Heredia University, Lima, Peru	Immunity and Vaccine Development	Lima or Iquitos, Peru?	Peru
81	Tsuboi	Cristiane	University of São Paulo, São Paulo, Brazil	Epidemiology and Control	São Paulo, Brazil	Brazil
82	Tyagi	Suchi	National Institute of Malaria Research, Gujarat, India	Biochemistry, Molecular Biology, and Genetics	Nadiad, Gujarat, India	India

83	Utami	Retno Ayu Setya	Eijkman Institute for Molecular Biology, Kakarta, Indonesia	Immunity and Vaccine Development	Jakarta, Indonesia	Indonesia
84	Valdivia	Hugo	Fiocruz, Belo Horizonte, Brazil	Diagnosis, Treatment, and Drug Development	Belo Horizonte, Brazil	Peru
85	Valenzuela Sánchez	Gabriela	Pontificia Universidad Catolica del Ecuador, Quito, Ecuador	Diagnosis, Treatment, and Drug Development	Quito, Ecuador	Ecuador
86	Vargas Rodriguez	Rosa Del Carmen Miluska	University of São Paulo, São Paulo, Brazil	Diagnosis, Treatment, and Drug Development	São Paulo, Brazil	Peru
87	Verlinden	Bianca	University of Pretoria, Pretoria, South Africa	Diagnosis, Treatment, and Drug Development	Pretoria, South Africa	South Africa
88	vieira	michelle	Federal University of Pará, Belém, Brazil	Epidemiology and Control	Belém, Brazil	Brazil
89	Virginio Fonseca	Flávia	University of São Paulo, São Paulo, Brazil	Vector Biology and Control	São Paulo, Brazil	Brazil
90	Camargo	Tarsila	University of São Paulo, São Paulo, Brazil	Immunity and Vaccine Development	São Paulo, Brazil	Brazil
91	Ferrer-Castillo	Patricia	US Navy Medical Research Unity 6, Lima, Peru	Immunity and Vaccine Development	Lima, Peru	Peru
92	Bautista	Kim	Ministry of Health of Belize, Belize	Epidemiology and Control	Belize	Belize
93	Mercedes Rivera	Luz	Ministry of Public Health and Social Assistance of Dominican Republic, Santo Domingo, Dominican Republic	Epidemiology and Control	Domincan Republic	Dominican Republic
94	Romero Chevez	Eduardo	Ministry of Health of El Salvador, San Salvador, El Salvador	Vector Biology and Control	El Salvador	El Salvador
95	Roberto Huertas Cordero	Edgar Roberto	Ministry of Health of Guatemala,	Epidemiology and Control	Guatemala	Guatemala

			Guatemala City, Guatemala			
96	Cox	Horace	La Penitence, Greater Georgetown, Guyana	Diagnosis, Treatment, and Drug Development	Guyana	Guyana
97	Blanco Guido	Julio Mauricio	Ministry of Health of Nicaragua, Managua, Nicaragua	Epidemiology and Control	Nicaragua	Nicaragua
98	Ayarza García	Cipriano	Ministry of Health of Panama, Arraijan, Panama	Vector Biology and Control	Panama	Panama
99	Carey	Cristiam A	Ministry of Health of Peru, Iquitos, Peru	Diagnosis, Treatment, and Drug Development	Peru	Peru
100	Escobedo Paredes	Jorge	Ministry of Health of Peru, Iquitos, Peru	Epidemiology and Control	Peru	Peru
101	Ndofor	Eric	Pan Health Organization, Washington, DC, USA	Epidemiology and Control	USA	Cameroon
102	Perret-Gentil	Monique	Pan Health Organization, Washington, DC, USA	Epidemiology and Control	USA	Venezuela
103	Singh	Prabhjot	Pan Health Organization, Washington, DC, USA	Epidemiology and Control	USA	India
104	de Carvalho	Julie	Links Media, Rockville, USA	Epidemiology and Control	USA	USA
105	Echalar	Ricardo	Links Media, Rockville, USA	Epidemiology and Control	USA	USA
106	Chang	O. Jaime	USAID, Washington, DC, USA	Diagnosis, Treatment, and Drug Development	Peru	Peru
107	Diaz	Cesar	Pan Health Organization, Quito, Ecuador	Epidemiology and Control	Ecuador	Ecuador

Annex 3: Select Photographs

Photo 1: SoE: Malaria Group Photo

Photo: Tim Linden

Photo 2: AMI/RAVREDA SoE: Malaria Participant Group Photo

Photo: Jaime Chang

Photo 3: SoE: Malaria Lecture

Photo: Ricardo Echalar

Annex 4: USAID COR Concurrence/Country Clearance

Julie N. de Carvalho 8/24/2015, 2:36 PM

FW: FW: Science of Eradication: Malaria - Regional Edition in Brazil (September 2015)

To Ricardo Echalar

Dear Ricardo,

Jaime's concurrence with our attendance of the Science of Eradication is below.

Best,

Julie

From: Jaime Chang [mailto:jachang@usaid.gov]
Sent: Monday, August 10, 2015 2:40 PM
To: Julie N. de Carvalho
Subject: Re: FW: Science of Eradication: Malaria - Regional Edition in Brazil (September 2015)

Dear Julie,

The utilization of project funds to finance your participation and that of Ricardo Echalar in the course is approved as long as it does not impact on activities planned under the contract.

This approval is based on the importance of building a knowledge base that is shared with colleagues from national malaria control programs in AMI countries, particularly as we will soon be collaborating with PAHO in the formulation of the next Strategy and Action Plan for Malaria in the Americas.

Cordially,

Jaime Chang

On Mon, Aug 10, 2015 at 12:43 PM, Julie N. de Carvalho <jdecarvalho@linksmedia.net> wrote:
Dear Jaime,

Last week Ricardo and I both received our acceptance letters to attend the course in São Paulo (see mine, attached here). Before we RSVP "yes" and proceed with our travel arrangements, please confirm that you support our using project funds for two people to attend the course.

Best,

about recent research in the Amazon region of Brazil, including *in vivo* studies in the state of Acre.

The course also allowed for course participants to present posters highlighting their research. Links Media did not present a poster, but did provide critical feedback and received valuable information during the poster sessions. Links Media also interacted with researchers studying gold miner behaviors, attitudes, and practices in French Guiana and surveillance of artemisinin resistance in South America. During October 1 – 2, Links Media also attended sessions at the XIV National Meeting on Malaria Research as part of the SoE course. This meeting brought together Brazilian and global leaders in malaria research. During the sessions, panels addressed the current status of malaria in Brazil and research on vaccine discovery and development.

During the duration of the course, Links Media had several opportunities to speak directly with PAHO/WHO country malaria focal points and headquarters staff, in addition to PAHO/WHO sponsored AMI country partners, including National Malaria Control Program (NMCP) representatives from Belize, Honduras, Guyana, Brazil, and Peru. Two such opportunities allowed for Links Media to discuss the finalization of country malaria communication strategies. With regard to Ecuador, Links Media will continue to work with PAHO/Ecuador to identify a Ministry of Health malaria focal point now that the national malaria program has been restructured in order to review and accept the Country Communication Strategy, which was drafted in 2014. With regard to Peru, Links Media will update the draft communication strategy as discussed with the NMCP Director who was also a SoE course participant. The NMCP Director and the Regional Directorate for Health (DIRESA) Health Officer, who was also a SoE participant, indicated that there was a need to develop a Terms of Reference (ToR) for a communication specialist to be mobilized in response to the ongoing malaria emergency in the Loreto Region. Peru also identified the need for useful stakeholder mapping materials/examples to help in the coordination of the emergency response efforts in Loreto.

VI. Conclusions and Recommendations

Links Media found the overall trip to be very beneficial in strengthening its knowledge base, which in turn will help further its TA under AMI. Having a deeper understanding of the biological mechanisms and cycle of infection, pathology of disease, considerations for drug and vaccine discovery, and the leading guidance on malaria prevention and control will have a lasting impact on communication deliverables and products that are created with technical and country partners. Overall, the course provided a greater orientation on the science that goes into malaria prevention and control efforts, however it would have been good to have more representation/input from individuals working in countries' NMCPs. Their perspective could have allowed the participants to understand the realities the NMCPs may experience including a lack of funding and resources, political commitment, and competing priorities due to other health issues. For future courses, Links Media has recommended to the organizers that they include a primer with key terminologies including elimination vs. eradication. These two terms were often used interchangeably, which is incorrect according to current WHO definitions. Links Media will share the forthcoming AMI Malaria Elimination Frequently Asked Questions (FAQs) with course participants via the Facebook alumni page, which may help with this issue. This will be in

Global Health Mini-University 2016 Session Proposal Application

Provide the following information:

First Name

Julie

Last Name

de Carvalho

Title

Senior Project Manager

Organization

Links Media, LLC

Email Address

jdecarvalho@linksmedia.net

Phone Number

2022306404

Session title (no more than 10 words):

Regional malaria efforts: promoting capacity building and country ownership

Select the track/topic area of your session:

Infectious disease

Select the category that best describes your intended session type:

Panel Discussion

Select the option or options that best describe your session's intended audience:

Introductory / Undergraduate Student
Young Professional / Graduate Student
Mid-level Professional
Experienced Professional

We will be live streaming several of the sessions during the Mini-University. Please confirm if you are open to live-streaming your session (pending availability):

Yes

Please select the number of speakers or panelists for your session, including yourself:
NOTE: No more than five speakers or panelists

5

Additional speakers' names and email addresses:

Speaker Name

Edgar Barillas

Speaker Email

ebarillas@msh.org

Speaker Name

Victor Pribluda

Speaker Email

vsp@usp.org

Speaker Name

Maria de la Paz Ade

Speaker Email

ademarap@paho.org

Speaker Name

Jaime Chang

Speaker Email

jachang@usaid.gov

Write 2 or 3 learning objectives for your session:

1. : The learner will be able to identify the 6 technical areas related to successful malaria control in Latin America and the Caribbean.
2. : The learner will be able to explain the benefits of controlling malaria on a regional as opposed to a country-by-country basis in Latin America and the Caribbean and give concrete examples.

Write a brief narrative overview describing the content of your session (no more than 125 words)

Countries of the Americas have made substantial progress in reducing malaria cases, however achieving elimination will require sustaining country efforts beyond zero cases. The USAID-funded Amazon Malaria Initiative (AMI) has provided assistance through a framework of six technical interventions to strengthen health systems to achieve elimination. AMI promotes regional collaboration to improve malaria diagnosis, access to quality treatment, resistance monitoring, vector control, surveillance, and communication. For example, regional management of antimalarial medicines has helped save lives by facilitating procurement, preventing stock-outs, and enabling the redistribution of antimalarial medicines. This session will share lessons learned and challenges from regional efforts to build capacity and promote country ownership to accelerate towards elimination, as well as considerations to prevent reintroduction of malaria in the Americas.

Please outline the schedule (timing, transitions, etc.) of your session:

After a brief introduction by the moderator, 4 panelists will each devote 10 minutes to a different technical component of USAID's Amazon Malaria Initiative. The panel presentations will be followed by a 5-minute summary by the moderator focusing on the interplay between the different technical components and countries participating in the Initiative, and 15 minutes will be allotted to Q&A from the audience.

Each room will be equipped with a computer, projector, and audio system. Please describe below if you have any other specific requirements for your session (pending availability):

NA

So that the Mini-University runs smoothly, we will require any PowerPoint presentations to be submitted no later than January 25, 2016. Please check the box below to confirm acknowledgement:

I agree to the above deadline

AGENDA

Buenas Prácticas para Colaborar con Pueblos Indígenas en la Prevención y Control de la Malaria

Seminario Virtual
Martes, 5 de abril del 2016

Hora	Sesión	Presentador/a
10:30 – 10:35	Apertura: Panorama general de los pueblos indígenas en las Américas y la malaria.	Patricia Sánchez Bao, Links Media.
10:35 – 10:45	Video del ganador del concurso Campeones contra la Malaria en las Américas 2011: "Manejo integral de la malaria en Wampusirpi en el Departamento de Gracias a Dios, Honduras".	Monique Perret-Gentil, OPS/OMS.
10:45 – 10:55	Mosquiteros tratados con insecticidas de larga duración: Enfoques integrales e interculturales que ayudaron a lograr la protección de la población indígena de Wampusirpi, Honduras.	Dr. Engels Illich Banegas, Coordinador del Programa Nacional de Malaria de Honduras.
10:55 – 11:10	Proyecto piloto de un sistema de telefonía celular para la malaria con la participación de la población Maya Q'eqchi en Alta Verapaz, Guatemala.	Dr. Manuel Maldonado, Coordinador Técnico Local para Malaria.
11:10 – 11:30	Participación comunitaria en la toma de decisiones para lograr el control de la malaria y colaboración con las autoridades locales y municipales en Bisira, Panamá.	Dra. Débora Goddard, Médica General al servicio de la Comarca Ngöbe Buglé.
11:30 – 11:40	Balance final lecciones aprendidas y buenas prácticas de comunicación en la salud.	Chloe Hans-Barrientos, Links Media.
11:40 – 12:00	Sesión de Preguntas y Respuestas con los exponentes. Clausura.	Patricia Sánchez Bao, Chloe Hans-Barrientos y Julie de Carvalho, Links Media; Monique Perret-Gentil y Lorenzo Cáceres, OPS/OMS.

AGENDA

Boas Praticas para Colaborar com Povos Indígenas na Prevenção e Controle da Malária

Seminário Virtual
terça-feira, 5 de abril de 2016

Hora	Sessão	Apresentador/a
10:30 – 10:35	Abertura: Panorama geral dos povos indígenas nas Américas e a malária.	Patricia Sánchez Bao, Links Media.
10:35 – 10:45	Vídeo do vencedor do concurso Campeões contra a Malária nas Américas 2011: “Manejo integral da malária em Wampusirpi na região de Gracias a Dios, Honduras”.	Monique Perret-Gentil, OPAS/OMS.
10:45 – 10:55	Mosquiteiros tratados com inseticidas de longa duração: Abordagens interculturais e integrais que contribuíram à proteção da população indígena de Wampusirpi, Honduras.	Dr. Engels Illich Banegas, Coordenador do Programa Nacional de Malária na Honduras.
10:55 – 11:10	Projeto piloto de um sistema de telefonia móvel para a vigilância da malária com a participação da população Maya Q’eqchi em Alta Verapaz, Guatemala.	Dr. Manuel Maldonado, Coordenador Técnico Local para Malária.
11:10 – 11:30	Participação comunitária na tomada de decisões e colaboração com as autoridades locais e municipais para o controle da malária em Bisira, Panamá.	Dra. Débora Goddard, Médica Geral a serviço da Comarca Ngöbe Buglé.
11:30 – 11:40	Balanço final das lições aprendidas e boas práticas de comunicação em saúde.	Chloe Hans-Barrientos, Links Media.
11:40 – 12:00	Sessão de Perguntas e Respostas com os apresentadores. Encerramento.	Patricia Sánchez Bao, Chloe Hans-Barrientos e Julie de Carvalho, Links Media; Monique Perret-Gentil e Lorenzo Cáceres, OPAS/OMS.

Learner Verification Tool

Purpose: To verify that the information presented is understood by the target audience.

Target Audience: miners, kitchen staff (cooks) and mining camp managers in Guyana's malaria endemic region, Region 8.

Facilitators:

1. (1) RDT trainer – evaluator (A).
2. (1) Focus group specialist – pocket guide evaluator (B).

Dynamic: The evaluation of the pocket guide will occur during two separate sessions using a validation questionnaire (annex 1). The first session will evaluate the target audience's ability to conduct an RDT using the pocket guide after receiving RDT training. The second session (open group discussion) will evaluate the target audiences understanding of the pocket guide instructions after receiving RDT training.

1. Facilitator (A) carries out the RDT training using the pocket guide.
2. Facilitator (A) uses a validation questionnaire (annex 1) to verify that the 5 trained miners/kitchen staff/managers understood the training and the pocket guide instructions.
3. Facilitator (B) uses a validation questionnaire (annex 1) during an open group discussion or focus group with trained miners/kitchen staff/managers to evaluate the pocket guide instructions.

The main objectives of the training on the illustrative pocket guide are to:

1. Educate miners/kitchen staff/managers on the RDT procedures during field training.
2. Align the instructions provided during the training with the pocket guide's messages.
3. Enhance the capacity of miners/kitchen staff/managers to perform RDTs after receiving a short training.

The main objectives of the learner verification tool are to:

1. Evaluate the capacity of miners/kitchen staff/managers to perform a test themselves after receiving a short training.
2. Verify that the learning objectives in the guide are understood by the audience.

Day 1	Instructions
Pick 5 miners/kitchen staff/managers	Facilitator (A) provides training to target audience. Facilitator (A) randomly selects 5 miners/kitchen staff/managers to participate in a small RDT demonstration session using the illustrated pocket guide as a support tool. Facilitator (A) selects a proper space to conduct the evaluation, separating the 5 miners from the larger group that received training. Using a validation questionnaire (annex 1), facilitator (A) asks the group to conduct an RDT on themselves and evaluates their understanding of the training and pocket guide instructions/illustrations.

	These miners/kitchen staff/managers will not participate in the open group discussion in order to assess the groups' comprehension separately.
Open group discussion	Facilitator (A) provides training to the target audience. Facilitator (B) conducts an open group discussion or focus group with the larger group of miners/kitchen staff/managers that received training. Using a validation questionnaire (annex 1), facilitator (B) asks the group to discuss and evaluate the pocket guide. <u>Group discussion topics:</u> • Collection of blood sample: what part of the finger do you prick to collect the blood sample? How do you squeeze the patient's finger to get enough blood? How much blood needs to be collected? • Results: what should you do with a patient that receives a negative result but has a fever?
Day 2	Instructions
Pick 5 miners/kitchen staff/managers that did not participate in day 1 of the training.	Facilitator (A) provides training to the target audience. Facilitator (A) randomly selects 5 miners/kitchen staff/managers to participate in a small RDT demonstration session using the illustrated pocket guide as a support tool. Facilitator (A) selects a proper space to conduct the evaluation, separating the 5 miners from the larger group that received training. Using a validation questionnaire (annex 1), facilitator (A) asks the group to conduct an RDT on themselves and evaluates their understanding of the training and pocket guide instructions/illustrations. These miners/kitchen staff/managers will not participate in the open group discussion in order to assess the groups' comprehension separately.
Open group discussion with miners/kitchen staff/managers that did not participate in day 1 of the training.	Facilitator (A) provides training to the target audience. Facilitator (B) conducts an open group discussion or focus group with the larger group of miners/kitchen staff/managers that received training. Using a validation questionnaire (annex 1), facilitator (B) asks the group to discuss and evaluate the pocket guide. <u>Group discussion topics:</u> • Collection of blood sample: what part of the finger do you prick to collect the blood sample? How do you squeeze the patient's finger to get enough blood? How much blood needs to be collected? • Results: what should you do with a patient that receives a negative result but has a fever?

Annex 1: Validation Questionnaire

1. Look at the materials in Step 1. What materials are needed to carry out a rapid diagnostic test (RDT) for malaria?

2. Look at the picture in Step 2. Why is it important to check the expiration date on each test before opening it?

3. Look at the materials in Step 3. What materials are found in the RDT package?

4. Look at the picture in Step 4. Why is it important to write the patients name on the back of the test?

5. Look at the picture in Step 5. How often should you put on new gloves?

6. Look at the picture in Step 6. Which of the patient's finger should you clean with an alcohol swab?

7. Look at the picture in Step 7. What should you do with the lancet and the patient's 4th finger? Does the image transmit this message clearly?

8. Look at the picture in Step 8. Where does the used lancet need to be discarded?

    (a) Safety container
    (b) Trash can

9. Look at the picture in Step 9. What material from the package should be used to collect the drop of blood?

10. Look at the picture in Step 10. Once the drop of blood is collected, where should you place it?

11. Look at the picture in Step 11. Once the drop of blood is put into the square hole marked S, where should the tube be discarded?

    (a) Safety container
    (b) Trash can

12. Look at the picture in Step 12. Where do you add two drops of buffer?

    (a) Square hole marked S
    (b) Round hole marked A

13. Look at the picture in Step 13. Where should the gloves, swab and packaging be thrown away?

    (a) Safety container
    (b) Trashcan

14. Look at the picture in Step 14. How long must you wait to read the test results?

15. Indicate which of the following test results is positive for malaria:

    (a) Line at C and line at Pf
    (b) No line at C
    (c) Line at C and line at PAN
    (d) Line only at C
    (e) Line at C, line at PAN, and line at Pf

16. Look at Step 18. How do you know if the test result indicates the patient does not have malaria (negative result)?

17. If a patient tests positive for malaria, what does the illustration tell you to do?

18. Look at Step 19. What should you do if the test result shows no line at C?

19. Look at Step 20. What must you do with the test result?

20. Which of the following is *not* recommended for storage of RDTs?

    (a) Keep RDTs out of direct sunlight
    (b) Do not place weight on top of RDTs
    (c) Leave RDTs outdoors for an extended period of time
    (d) Do not allow for RDTs to be exposed to heat

For Reviewers Only: Answer Key

Manual: Rapid Test for Malaria

1. The materials needed include: rapid test for malaria (RDT) package, alcohol swab, lancet, disposable gloves, buffer, timer, forms and pen or pencil.
2. Never use RDTs after they have expired; they may not result in a reliable test.
3. The materials in the RDT package include: a rapid test for malaria, tube and dessicant sachet
4. It is important to the patient's name on the back of the test in order to be able to identify and diagnose the patient once you receive the test result.
5. You must put on new gloves for each patient.
6. You should only clean the patient's fourth finger.
7. Use the lancet to prick the patient's fourth finger.
8. (a) Safety container
9. To collect the drop of blood, use the tube that can be found in the RDT package.
10. Once the drop of blood is collected and inside the tube, squeeze the tube over the square hole marked S on the RDT, to release the drop of blood in the square hole marked S.
11. (a) Safety container
12. (b) Round hole marked A
13. (b) Trashcan
14. Wait 20 minutes before reading the test result.
15. (a) Line at C and line at Pf, (c) line at C and line at PAN, and (e) line at C, line at PAN, and line at Pf
16. If the test result presents a line at C and no other line, then the patient does not have malaria. The STOP sign in this picture indicates that the patient does not need treatment for malaria.
17. If the test result shows no line at C, then the result is invalid and the test should be repeated with new materials.
18. As soon as you receive a test result, the result must be recorded on a form.
19. If a patient tests positive for malaria, they must complete the appropriate treatment per infection.
20. (c) Leave RDTs outdoors for an extended period of time

Instrumento de validación

Propósito: verificar que la información presentada en la capacitación y guía de bolsillo es entendida por la audiencia clave.

Audiencia clave: mineros, personal de cocina y administradores de campos mineros de la Región 8 – Guyana.

Facilitador: la dinámica requiere de 2 facilitadores.

1. Capacitador – evaluador de la PDR (A).
2. Especialista en focus group - evaluador de la guía de bolsillo (B).

Dinámica: la evaluación de la guía de bolsillo se llevara a cabo durante pequeñas sesiones de demonstración de la PDR y focus groups utilizando un cuestionario de validación (anexo 1).

1. Facilitador (A) conduce la capacitación en PDR usando la guía de bolsillo.
2. Facilitador (A) aplica el cuestionario de validación (anexo 1) durante pequeñas sesiones de demonstración de la PDR con 5 mineros/personal de cocina/administradores capacitados.
3. Facilitador (B) aplica el cuestionario de validación (anexo 2) durante discusiones abiertas o focus groups con mineros/personal de cocina/administradores capacitados.

Los principales objetivos de las capacitaciones para el uso de la guía de bolsillo son:

1. Educar a los mineros/personal de cocina/administradores en los procedimientos correspondientes a la PDR durante capacitaciones en el campo.
2. Alinear las instrucciones provistas durante las capacitaciones con los mensajes de la guía de bolsillo.
3. Mejorar la capacidad de los mineros/personal de cocina/administradores de llevar a cabo PDR luego de recibir una corta capacitación.

Los principales objetivos del instrumento de validación son:

1. Evaluar la capacidad de los mineros/personal de cocina/administradores de realizar una PDR en sí mismos luego de recibir una corta capacitación.
2. Verificar que los objetivos de aprendizaje de la guía de bolsillo sean comprendidos por los mineros/personal de cocina/administradores

Día 1	Instrucciones
Escoger 5 mineros/personal de cocina/administradores	Facilitador (A) lleva a cabo la capacitación de la audiencia clave. Facilitador (A) escoge al azar 5 mineros/personal de cocina/administradores que participaran de una pequeña sesión de demonstración de la PDR utilizando la guía de bolsillo como una herramienta de soporte. Facilitador (A) selecciona un espacio apropiado para lleva a cabo la dinámica, separando al pequeño grupo del grupo que recibió la capacitación. Utilizando el cuestionario de validación (anexo 1), facilitador (A) pide al grupo que lleven a cabo una PDR en ellos mismo y evalúa el proceso. Este grupo de mineros/personal de cocina/administradores no participara de la discusión grupal de manera que se pueda evaluar la comprensión del

	segundo grupo independientemente.
Discusión grupal abierta	Facilitador (A) lleva a cabo la capacitación de la audiencia clave. Facilitador (B) lleva a cabo una discusión grupal o focus group con el grupo de mineros/personal de cocina/administradores que recibió la capacitación. Utilizando el cuestionario de validación (anexo 1), facilitador (B) pide al grupo discutir y evaluar la guía de bolsillo. <u>Ejemplos de temas para la discusión grupal:</u> • Recolección de la muestra de sangre: que parte del dedo debe ser pinchada para recoger la muestra de sangre? como puedo asegurarme de obtener suficiente sangre del dedo del paciente? como debo tomar la muestra de sangre? • Resultados: que debe hacerse con un paciente que recibe un resultado negativo pero tiene fiebre?
Día 2	Instrucciones
Escoger 5 mineros/personal de cocina/administradores que no participaron en el día 1 de capacitación.	Facilitador (A) lleva a cabo la capacitación de la audiencia clave. Facilitador (A) escoge al azar 5 mineros/personal de cocina/administradores que participaran de una pequeña sesión de demonstración de la PDR utilizando la guía de bolsillo como una herramienta de soporte. Facilitador (A) selecciona un espacio apropiado para lleva a cabo la dinámica, separando al pequeño grupo del grupo que recibió la capacitación. Utilizando el cuestionario de validación (anexo 1), facilitador (A) pide al grupo que lleven a cabo una PDR en ellos mismo y evalúa el proceso. Este grupo de mineros/personal de cocina/administradores no participara de la discusión grupal de manera que se pueda evaluar la comprensión del segundo grupo independientemente.
Discusión grupal abierta con mineros/personal de cocina/administradores que no participaron en el día 1 de capacitación.	Facilitador (A) lleva a cabo la capacitación de la audiencia clave. Facilitador (B) lleva a cabo una discusión grupal o focus group con el grupo de mineros/personal de cocina/administradores que recibió la capacitación. Utilizando el cuestionario de validación (anexo 1), facilitador (B) pide al grupo discutir y evaluar la guía de bolsillo. <u>Ejemplos de temas para la discusión grupal:</u> • Recolección de la muestra de sangre: que parte del dedo debe ser pinchada para recoger la muestra de sangre? como puedo asegurarme de obtener suficiente sangre del dedo del paciente? como debo tomar la muestra de sangre? • Resultados: que debe hacerse con un paciente que recibe un resultado negativo pero tiene fiebre?

Anexo 1: Cuestionario de validación

1. Mire las imágenes en el paso 1. Qué materiales son necesarios para llevar a cabo una prueba de diagnóstico rápido de malaria (PDR)?

2. Mire la imagen en el paso 2. Porqué es importante revisar la fecha de vencimiento de cada prueba antes de abrirla?

3. Mire las imágenes en el paso 3. Qué materiales se encuentran en el paquete de la PDR?

4. Mire la imagen en el paso 4. Porqué es importante escribir el nombre del paciente en la parte posterior de la prueba?

5. Mire la imagen en el paso 5. Cuándo se debe colocar nuevos guantes?

6. Mire la imagen en el paso 6. Cuál de los dedos del paciente se debe limpiar con la toallita desinfectante?

7. Mire la imagen en el paso 7. Qué se debe hacer con la lanceta y el dedo del paciente? Esta imagen transmite ese mensaje claramente?

8. Mire la imagen en el paso 8. Dónde debe descartarse la lanceta usada?

    (a) Contenedor de residuos sanitarios
    (b) Basurero

9. Mire la imagen en el paso 9. Qué material del paquete debe ser utilizado para tomar la gota de sangre?

10. Mire la imagen en el paso 10. Una vez que se tomo la gota de sangre, donde debe ponerla?

11. Mire la imagen en el paso 11. Una vez que vertió la gota de sangre en el cuadrado marcado con S, donde debe descartar el tubo?

    (a) Contenedor de residuos sanitarios
    (b) Basurero

12. Mire la imagen en el paso 12. Dónde debe añadir las 2 gotas de solución activa?

        (a) Cuadrado marcado con S
        (b) Círculo marcado con A

13. Mire la imagen en el paso 13. Dónde debe desechar los guantes, toallita desinfectante y embalaje?

    (a) Contenedor de residuos sanitarios

(b) Basurero

14. Mire la imagen en el paso 14. Cuánto tiempo debe esperar para leer los resultados?

15. Indique cuál de los siguientes resultados es positivo para malaria:

(a) Línea en C y línea en Pf o
(b) Sin línea en C o
(c) Línea en C y línea en PAN o
(d) Línea sólo en C o
(e) Línea en C, línea en PAN, y línea en Pf o

16. Mire el paso 18. Cómo sabe si es que la prueba indica que el paciente no tiene malaria (resultado negativo)?

17. Si el paciente tiene un resultado positivo de malaria, que es lo que la imagen le indica que debe hacer?

18. Mire el paso 19. Qué debe hacer si la prueba no marca línea en C?

19. Mire el paso 20. Qué debe hacer con los resultados de la prueba?

20. Cuál de las siguientes frases *no* es una recomendación para el almacenamiento de las PDRs?

(a) No deje las PDR expuestas a la luz solar.
(b) No coloque peso sobre las PDR.
(c) Deje las PDRs a la intemperie por un largo periodo de tiempo.
(d) No permita que las PDRs estén expuestas al calor.

Cartilla de respuestas - sólo para evaluadores

Manual: prueba de diagnóstico rápido de malaria

1. Los materiales incluyen: prueba de diagnóstico rápido de malaria, toallita desinfectante, lanceta, guantes descartables, gotero con solución activa, reloj, formularios, lápiz o bolígrafo.
2. Nunca use una PDR luego de que ha expirado, podría no dar un resultado confiable.
3. Los materiales en la PDR incluyen: prueba de diagnóstico rápido de malaria, tubo, paquetito preservante.
4. Es importante escribir el nombre del paciente en la parte posterior de la prueba para poder identificar y diagnosticar al paciente una vez los resultados estén listos.
5. Debe cambiarse los guantes cada vez que atiende a un paciente nuevo.
6. Debe limpiar el cuarto dedo del paciente
7. Use la lanceta para punzar el cuarto dedo del paciente.
8. a. Contenedor de residuos sanitarios
9. Para tomar la gota de sangre use el tubo que viene en el paquete de la PDR.
10. Una vez que tomo la gota de sangre con el tubo, presione el tubo sobre el cuadrado marcado con S en la PDR y vierta la gota de sangre.
11. a. Contenedor de residuos sanitarios
12. b. Circulo marcado con A
13. b. Basurero
14. Espere 20 minutos antes de leer los resultados.
15. (a) Línea en C y línea en Pf, (c) Línea en C y línea en PAN, y (e) Línea en C, línea en PAN, y línea en Pf.
16. Si la prueba arroja una línea sólo en C, el paciente no tiene malaria. La imagen STOP indica que el paciente no requiere tratamiento para la malaria.
17. Si la prueba arroja ninguna línea en C, el resultado es inválido y debe repetirse la prueba con una nueva PDR.
18. Apenas tenga los resultados estos deben registrase en los formularios.
19. Si la prueba arroja un resultado positivo para malaria, el paciente debe completar el tratamiento indicado para su tipo de infección.
20. (c) Deje las PDRs a la intemperie por un largo periodo de tiempo.

Instrumento de Validação

Objetivo: conferir que a informação apresentada é devidamente compreendida pelo público alvo.

Público Alvo: garimpeiros equipe de cozinha (cozinheiros), e responsáveis pelos acampamentos de mineração na região endêmica da Guiana, Região 8.

Facilitadores:

1. (1) instrutor do teste de diagnostico rápido – avaliador (A)
2. (1) especialista em grupos de enfoque – avaliador do guia de bolso (B)

Dinâmica: A avaliação do guia de bolso ocorrerá em duas sessões, com dois grupos diferentes, utilizando o questionário de validação (anexo 1). A primeira sessão irá avaliar a capacidade do público-alvo de realizar um teste de diagnóstico rápido usando o guia de bolso após ter recebido informação no uso do teste. A segunda sessão (discussão em grupo) irá avaliar o entendimento do público-alvo sobre o guia de bolso após ter recebido a informação no uso do teste.

1. Usando o guia de bolso como referência, o facilitador (A) realiza uma capacitação sobre o uso do teste de diagnóstico rápido.
2. Usando o questionário de validação (anexo 1), o facilitador (A) avalia o entendimento das Instruções do guia de bolso dos 5 garimpeiros, cozinheiros e responsáveis do acampamento.
3. Usando o questionário de validação (anexo 1) durante uma discussão em grupo com garimpeiros, cozinheiros e responsáveis do acampamento capacitados no uso do teste, o facilitador (B) avalia as instruções do guia de bolso.

Os principais objetivos da capacitação sobre o guia de bolso ilustrativo são:

1. Capacitar garimpeiros, cozinheiros e responsáveis do acampamento no uso do teste de diagnóstico rápido em campo.
2. Verificar que as instruções apresentadas durante a capacitação estão de acordo com as mensagens do guia de bolso.
3. Após a capacitação, avaliar se o grupo (garimpeiros, equipe de cozinha, e responsáveis pelos acampamentos de mineração) estará apto para realizar teste de diagnóstico rápido.

Os principais objetivos do instrumento de verificação são:

1. Avaliar a capacidade dos garimpeiros, equipes de cozinha e responsáveis dos acampamentos de realizar testes neles mesmos, após receberam um breve treinamento.
2. Verificar que o público-alvo atingiu os objetivos de aprendizado do guia de bolso

Dia 1	Instruções
Escolha cinco garimpeiros/cozinheiros/responsáveis do acampamento	Facilitador (A) fornece a capacitação ao público-alvo Facilitador (A) seleciona 5 garimpeiros/cozinheiros/responsáveis do acampamento para participar de uma capacitação sobre o uso do teste de diagnóstico rápido, utilizando o guia de bolso como ferramenta de apoio. Facilitador (A) escolher um local apropriado para realizar a avaliação, separando os 5 garimpeiros do grupo maior que participou da capacitação. Utilizando o questionário de validação (anexo 1), o facilitador (A) pede para os participantes a realizarem um teste de diagnóstico rápido com o objetivo de avaliar sua compreensão da capacitação e das ilustrações/instruções do guia de bolso. O facilitador deve avaliar o nível de compreensão do garimpeiro, do guia de bolso e o uso da prova de diagnóstico rápido da malária com o questionário de validação (anexo 1). Estes cinco participantes não irão participar do grupo de discussão para poder avaliar separadamente a compreensão de cada grupo.
Discussão em grupo	Facilitador (A) fornece a capacitação ao público-alvo Facilitador (B) realiza uma discussão em grupo ou grupo de enfoque com o grupo maior de garimpeiros/cozinheiros/responsáveis do acampamento que receberam a capacitação. Utilizando o questionário de validação (anexo 1), facilitador B pede ao grupo para discutir e avaliar o guia de bolso. <u>Questões para discussão em grupo</u> • Coleta de amostras de sangue: qual parte do dedo você pica para colher a amostra de sangue? Como você aperta o dedo do paciente para obter sangue suficiente? Quanto sangue precisa ser coletado? • Resultados: o que você deve fazer com um paciente que recebe um resultado negativo para malária, mas

	continua com febre?
Dia 2	Instruções
Escolhe cinco garimpeiros/cozinheiros/responsáveis do acampamento que não participaram do primeiro dia de capacitação	Facilitador (A) fornece a capacitação ao público-alvo Facilitador (A) seleciona 5 garimpeiros/cozinheiros/responsáveis do acampamento para participar de uma capacitação sobre o uso do teste de diagnóstico rápido, utilizando o guia de bolso como ferramenta de apoio. Facilitador (A) escolhe um local apropriado para realizar a avaliação, separando os 5 garimpeiros do grupo maior que participou da capacitação. Utilizando o questionário de validação (anexo 1), o facilitador (A) pede para os participantes a realizarem um teste de diagnóstico rápido com o objetivo de avaliar sua compreensão da capacitação e das ilustrações/instruções do guia de bolso. Estes cinco participantes não irão participar do grupo de discussão para poder avaliar separadamente a compreensão de cada grupo.
Discussão em grupo com garimpeiros/cozinheiros/responsáveis do acampamento que não participaram do primeiro dia de capacitação.	Facilitador (A) fornece a capacitação ao público-alvo Facilitador (B) realiza uma discussão em grupo ou grupo de enfoque com o grupo maior de garimpeiros/cozinheiros/responsáveis do acampamento que receberam a capacitação. Utilizando o questionário de validação (anexo 1), facilitador B pede ao grupo para discutir e avaliar o guia de bolso. <u>Questões para discussão em grupo</u> • Coleta de amostras de sangue: que parte do dedo você pica para recolher a amostra de sangue? Como você aperta o dedo do paciente para obter sangue suficiente? Quanto sangue precisa ser coletado? • Resultados: o que você deve fazer com um paciente que recebe um resultado negativo para malária, mas continua com febre?

Anexo 1: Questionário de Validação

1. Veja os materiais no primeiro passo. Que materiais são necessários para realizar um teste de diagnóstico rápido para malária?

2. Olhe a imagem no passo 2. Por que é importante conferir a data de validade do teste antes de abri-lo?

3. Olhe os materiais no passo 3. Que materiais se encontram no pacote do teste de diagnóstico rápido?

4. Olhe a imagem no passo 4. Por que é importante escrever o nome do paciente no verso do teste?

5. Olhe a imagem no passo 5. Quantas vezes você deve colocar luvas novas?

6. Olhe a imagem no passo 6. Qual dedo do paciente você deve limpar com o lenço umedecido antisséptico?

7. Olhe a imagem no passo 7. O que deve fazer com a lanceta e o dedo anelar da mão esquerda do paciente? Será que a imagem transmite esta mensagem de forma clara?

8. Olhe a imagem no passo 8. Onde é que a lanceta usada precisa ser descartada?

    (a) Caixa de resíduos de risco biológico
    (b) Lixeira

9. Olhe a imagem no passo 9. Qual material do pacote se deve usar para colher a gota de sangue?

10. Olhe a imagem no passo 10. Uma vez que a gota de sangue é coletada, onde você deve colocar?

11. Olhe a imagem no passo 11. Uma vez que a gota de sangue é colocada na abertura quadrada marcada S, onde o tubo deve ser descartado?

        (a) Caixa de resíduos de risco biológico
        (b) Lixeira

12. Olhe a imagem no passo 12. Onde você adicionar duas gotas de solução reguladora?

        (a) Abertura quadrada marcada S
        (b) Abertura redonda marcada A

13. Olhe a imagem no passo 13. Onde devem ser jogados fora as luvas, o lenço e embalagem?

        (a) Caixa de resíduos de risco biológico
        (b) Lixeira

14. Olhe a imagem no passo 14. Quanto tempo você deve esperar para ler os resultados do teste?

15. Indicar quais dos seguintes resultados é positivo para malária:

    (a) Linha em C e linha em Pf

    (b) Sem linha em C

    (c) Linha em C e linha em PAN

    (d) Linha somente em C

    (e) Linha em C, linha em PAN, e linha em Pf

16. Olhe a imagem no passo 18. Como você sabe se o resultado do teste indica que o paciente não tem malária (resultado negativo)?

17. Se o paciente apresentar um resultado positivo para malária, o que a imagem indica e o que vai você fazer?

18. Olhe a imagem no passo 19. Que você deve fazer se o resultado não apresenta uma linha em C?

19. Olhe a imagem no passo 20. Que você deve fazer com o resultado do teste?

20. Qual das seguintes instruções *não* é recomendada para o armazenamento dos testes?

    (a) Conserve os testes rápidos for a da luz do sol
    (b) Não coloque peso sobre os testes
    (c) Deixar os testes ao ar livre durante um período de tempo prolongado
    (d) Não permita os testes a serem expostos ao calor

Somente para Avaliadores: Gabarito

Manual: Teste Rápido para Malária

1. Os materiais necessários para o teste são: pacote do teste rápido para malária, lenço umedecido antisséptico, lanceta, luvas descartáveis, solução reguladora, relógio, formulários, e lápis ou caneta.
2. Nunca use os testes com a data de validade vencida; o resultado não será confiável.
3. Os materiais no pacote do teste incluem: um teste rápido para malária, tubo e saché dessecante.
4. É importante colocar o nome do paciente no verso do teste para poder passar o resultado à pessoa certa.
5. É necessário colocar luvas novas para cada paciente.
6. Você só deve limpar o quarto dedo do paciente.
7. Utilize a lanceta para furar o quarto dedo do paciente.
8. (a) Caixa de resíduos de risco.
9. Para colher a gota de sangue, utilize o tubo que se encontra no pacote do teste.
10. Uma vez que a gota de sangue é colhida, apertar o tubo sobre a abertura quadrada marcada S no teste, para colocar a gota de sangue.
11. (a) Caixa de resíduos de risco biológico
12. (b) Abertura redonda marcada A
13. (b) Lixeira
14. Espere 20 minutos antes de ler o resultado do teste
15. (a) Linha em C e linha em Pf, (c) linha em C e linha em PAN, e (e) linha em C, linha em PAN, e linha em Pf
16. Se o resultado do teste apresenta uma linha em C e nenhuma outra linha, então o paciente não tem malária. O sinal de STOP neste quadro indica que o paciente não precisa de tratamento para a malária.
17. Se o resultado do teste não mostra nenhuma linha em C, então o resultado é inválido e o teste deve ser repetido com materiais novos.
18. Assim que você receber o resultado do teste, o resultado deve ser registrado no formulário.
19. Se o teste do paciente for positivo para malária, o paciente deve completar o tratamento adequado para sua infecção.
20. (c) Deixar os testes ao ar livre durante um período de tempo prolongado

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FROM THE AMERICAN PEOPLE

AMAZON MALARIA INITIATIVE

Find us at the ASTMH 64th Annual Meeting!

See below for the schedule of oral presentations and posters to be made by technical and country partners of the Amazon Malaria Initiative.

Tweet us your comments and photos @AmazonMalaria using the hashtag #TropMed15, or tag the Amazon Malaria Initiative on Facebook.

ASTMH 2015 Annual Meeting - Amazon Malaria Initiative

AMI Technical and Country Partner Presentations & Posters

Date	Time	Session	Room	URL
Mon, Oct 26	12:00 PM - 1:45 PM	Poster Session A, Abstract 226, "Molecular surveillance for K13 gene and other Plasmodium falciparum molecular markers associated with antimalarial resistance in Suriname"	Convention Center - Ballroom AB	bit.ly/1M1vIBA
Tues, Oct 27	12:00 PM - 1:45 PM	Poster Session B, Abstract: LB-5163, "Characterization of the K-13 propeller domain in Guyana for suspected artemisinin resistance."	Convention Center - Ballroom AB	bit.ly/1M1vH0o
Wed, Oct 28	12:00 PM - 1:45 PM	Poster Session C, Abstract Number: 1545, "So you say you want elimination? Using communication and advocacy to advance malaria elimination in the Americas"	Convention Center - Ballroom AB	bit.ly/1QN4CCs

FOR IMMEDIATE RELEASE
November 1, 2015
Links Media Contact: Julie de Carvalho
Telephone: 301 987 5495 Ext. 109
Email: jdecarvalho@linksmedia.net
Website: usaidami.org

Washington, DC – To commemorate the ninth annual Malaria Day in the Americas, the Pan American Health Organization (PAHO/WHO) will co-host an event focused on accelerating regional malaria elimination efforts. Sponsoring organizations of the event include PAHO/WHO, the UN Foundation, the Milken Institute School of Public Health at George Washington University (GWU), and the Center for Communication Programs at the Johns Hopkins Bloomberg School of Public Health.

The event will feature videos, presentations, and discussions about malaria in the region of the Americas with a focus on elimination. The work of the nominees for Malaria Champions of the Americas 2015, Brazil, Honduras, and Paraguay, will also be highlighted.

What:	Malaria in the Americas Forum 2015: *Forum of Malaria Networks and Advocates and the regional launch of Action and Investment to defeat Malaria (AIM)*
When:	Thursday, November 5, 2015
Time:	1:00 p.m. – 4:00 p.m.
Where:	Room B, Pan American Health Organization Headquarters 525 23rd St, NW Washington, DC 20037
RSVP:	Fill out the online form at: https://goo.gl/rqiM59

In collaboration with PAHO/WHO, the United States Agency for International Development (USAID) supports priority countries in Latin America and the Caribbean in their malaria prevention, control, and elimination efforts to reduce the incidence of the disease through the Amazon Malaria Initiative (AMI). Malaria control is part of the United States government's comprehensive global health strategy to reduce the burden of disease and strengthen communities around the world. To learn more about AMI, please visit: usaidami.org.

###

The Spanish, English, and Portuguese versions of the AMI/RAVREDA Strategic Orientation Documents, originally developed in 2011, are now available.

Las versiones en español, inglés y portugués de los Documentos de Orientación Estratégica de AMI/RAVREDA, elaborados inicialmente en el 2011, se encuentran disponibles.

As versões em espanhol, inglês e português dos Documentos de Orientação Estratégica da AMI/RAVREDA, elaborados inicialmente em 2011, já estão disponíveis.

Strategic Orientation Document for Malaria Vector Surveillance and Control in Latin America and the Caribbean
In English

Documento de orientación estratégica para la vigilancia y el control de los vectores de la malaria en América Latina y el Caribe
En español

Documento de orientação estratégica para vigilância e controle de vetores da

Strategic Orientation Document on Supply Management and Quality Assurance for Drugs and Supplies Used in Malaria Diagnosis and Treatment
In English

Documento estratégico para la gestión del suministro y garantía de la calidad de los medicamentos e insumos para el diagnóstico y tratamiento de la malaria
En español

Strategic Orientation Document on Monitoring the Efficacy of and Resistance to Antimalarials in the Current Epidemiological Context
In English

Documento estratégico para el monitoreo de la eficacia y resistencia de los antimaláricos en el contexto actual epidemiológico
En español

Documento estratégico

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AMAZON MALARIA INITIATIVE

Links Media lo invita a asistir al siguiente seminario virtual:

Buenas Prácticas para Colaborar con Pueblos Indígenas en la Prevención y Control de la Malaria

Es necesario inscribirse en este evento para recibir certificado de participación.

Fecha y hora: martes, 5 de abril de 2016 10:30 am
Horario de verano del este (Nueva York, GMT-04:00)

martes, 5 de abril de 2016 9:30 am
Hora del este de Estados Unidos (Panamá, GMT-05:00)

martes, 5 de abril de 2016 8:30 am
Hora de Honduras (Tegucigalpa, GMT-06:00)

martes, 5 de abril de 2016 11:30 am
Hora estándar del este de Sudamérica (Brasilia, GMT-03:00)

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AMAZON MALARIA INITIATIVE

Faltan dos semanas para el siguiente seminario virtual:
Faltam duas semanas para o seguinte seminário virtual:

Buenas Prácticas para Colaborar con Pueblos Indígenas en la Prevención y Control de la Malaria

¡Inscríbase hoy para asegurar su lugar en el evento en vivo!
Faça a sua inscrição hoje para assegurar o seu lugar no evento ao vivo!

Fecha y hora: martes, 5 de abril de 2016 10:30 am
Horario de verano del este (Nueva York, GMT-04:00)

martes, 5 de abril de 2016 9:30 am
Hora del este de Estados Unidos (Panamá, GMT-05:00)

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AMAZON MALARIA INITIATIVE

Buenas Prácticas para Colaborar con Pueblos Indígenas en la Prevención y Control de la Malaria

Estimados colegas,

Esperamos que este correo los encuentre bien. Les escribimos para agradecerles por su participación en el seminario virtual sobre buenas prácticas para colaborar con pueblos indígenas en la prevención y control de la malaria.

El seminario tuvo una buena acogida de parte de profesionales de varios países de la región que incluyeron Brasil, Bolivia, Colombia, Costa Rica, Ecuador, Guatemala, Guyana, Honduras, Nicaragua, México, Panamá y Perú.

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AMAZON MALARIA INITIATIVE

Boas Práticas de Colaboração com Povos Indígenas na Prevenção e Controle da Malária

Prezados colegas,

Gostaríamos de agradecer sua presença e participação no seminário virtual sobre boas práticas de colaboração com povos indígenas na prevenção e controle da malária.

COMUNICADO DE PRENSA
10 de mayo del 2016
Contacto: Chloe Hans-Barrientos
Teléfono: 301 987 5495 Ext. 115
Correo-e: chbarrientos@linksmedia.net
Sitio web: usaidami.org

La comunicación intercultural y el control de la malaria en comunidades indígenas

El día 5 de abril del 2016, representantes de los ministerios de salud y de la sociedad civil de la región de las Américas participaron en un seminario virtual sobre el tema de salud intercultural, en el cual se compartieron buenas prácticas para colaborar con pueblos indígenas en la prevención y control de la malaria. El evento fue impulsado por la Iniciativa Amazónica contra la Malaria – AMI, la cual brinda cooperación técnica a 6 países sudamericanos y a 5 países centroamericanos.

Aunque el número de casos de malaria en la región de las Américas se redujo en un 67% entre 2000 y 2014, la malaria continúa afectando de manera desproporcionada a las comunidades indígenas. Por ejemplo, en Brasil el riesgo relativo de adquisición de malaria es tres veces mayor en la población indígena. En Guyana, en las zonas del interior del país donde la malaria es endémica, más de dos tercios de la población residente son indígenas; mientras que, en Panamá y Perú, más del 90% de la transmisión de malaria ocurre en las zonas indígenas. El seminario buscó estimular el intercambio de experiencias exitosas y conocimientos prácticos para controlar la malaria en zonas remotas y de alta incidencia, donde residen muchos de los pueblos indígenas, a fin de establecer prácticas de colaboración eficaces para prevenir y tratar la enfermedad.

Durante el intercambio de información, los programas nacionales de malaria de Guatemala, Honduras y Panamá compartieron sus experiencias sobre cómo brindar servicios de salud culturalmente apropiados en el contexto de las etnias Q'eqchi, Misquito y Ngöbe, respectivamente. Asimismo, Links Media realizó una presentación sobre algunos elementos de la comunicación intercultural y su importancia en el diseño e implementación de programas de malaria. Con el apoyo de la Agencia de los Estados Unidos para el Desarrollo Internacional (USAID), el seminario presentó un resumen de lecciones aprendidas para la prevención y control de la malaria en esas poblaciones, así como mostró ejemplos sobre cómo la población indígena afectada por la malaria aporta al bienestar de sus comunidades y a la gestión de su propio desarrollo.

Post Details

Reported stats may be delayed from what appears on posts

Amazon Malaria Initiative
May 7 ·

Nominations for the 2016 #Malaria Champions of the Americas are now being accepted until June 20, 2016. Learn more at: http://bit.ly/1rylWnY

Organización Panamericana de la Salud
Organización Mundial de la Salud
Oficina Regional para las Américas

PAHO WHO | "Malaria Champions of the Americas" seeks successful initiatives to eliminate malaria...

Malaria initiatives that demonstrate concrete technical and programmatic changes geared…

PAHO.ORG | BY CRISTINA MITCHELL

23 people reached

Amazon Malaria Initiative and Julie Niemczura de Carvalho

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23 People Reached

2 Likes, Comments & Shares

2 Likes	**2** On Post	**0** On Shares
0 Comments	**0** On Post	**0** On Shares
0 Shares	**0** On Post	**0** On Shares

0 Post Clicks

0 Photo Views	**0** Link Clicks	**0** Other Clicks

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0 Hide Post
0 Hide All Posts
0 Report as Spam
0 Unlike Page

GOBIERNO REGIONAL DE LORETO
DIRECCION REGIONAL DE SALUD LORETO

BASES ADMINISTRATIVAS PARA LA CONVOCATORIA PÚBLICA DE PERSONAL BAJO EL REGIMEN ESPECIAL DE CONTRATACION ADMINISTRATIVA DE SERVICIOS – CAS

CONVOCATORIA PÚBLICA CAS Nº XXX -2016-GRL-DIRESAL

1. ENTIDAD CONVOCANTE

Dirección Regional de Salud de Loreto – Estrategia Sanitaria Nacional de Enfermedades Metaxénicas.
Actividad: Educación, Comunicación y Movilización Social contra la Malaria (Enfermedades Transmitidas por Vectores)

2. OBJETO DE LA PRESENTE CONTRATACIÓN ADMINISTRATIVA DE SERVICIOS – CAS

Contratar, bajo el régimen de Contratación Administrativa de Servicios del Decreto Legislativo Nº 1057, un Especialista en Educación, Comunicación y Movilización Social contra la Malaria (Enfermedades Transmitidas por Vectores) para la Dirección Regional de Salud de Loreto, de acuerdo a relación señalada en el **ANEXO Nº 2** de las Bases del presente Proceso de Selección.

3. BASE LEGAL

- Ley Nº 30372 – Ley del Presupuesto del Sector Público para el Año Fiscal 2016.
- Ley Nº 27444 – Ley del Procedimiento Administrativo General.
- Decreto Legislativo Nº 1057 que regula el Régimen Especial de Contratación Administrativa de Servicios.
- Decreto Supremo Nº 075-2008-PCM – Reglamento del Decreto Legislativo Nº 1057.
- Decreto Supremo Nº 065-2011-PCM que establece modificaciones al Reglamento del Régimen de Contratación Administrativa de Servicios.
- Sentencia del Tribunal Constitucional recaída en el Expediente Nº 000002-2010-PI/TC, que declara la constitucionalidad del régimen contratación administrativa de servicios y su naturaleza laboral especial.
- Decreto Legislativo N° XXX – Ley Orgánica del Ministerio de Salud.
- AGREGAR LEGISLACION PERTINENTE A LA CONVOCATORIA.

4. PROCEDIMIENTO DE EVALUACIÓN Y SELECCIÓN

4.1. Cuestiones Generales

La conducción del proceso de selección en todas sus etapas estará a cargo de un Comité de Selección, en función al servicio convocado a cargo de la Dirección Ejecutiva de Recursos humanos de la DIRESA Loreto, integrada por tres (03) miembros, designados que son responsables del Proceso en forma solidaria.

El presente proceso de selección consta de dos etapas:

- ✓ Evaluación curricular
- ✓ Entrevista personal

El presente proceso de selección se regirá por un Cronograma. Asimismo, es de absoluta responsabilidad del postulante el seguimiento permanente del proceso en el portal Institucional del Gobierno Regional de Loreto: www.regionloreto.gob.pe

El Cronograma del Proceso se encuentra establecido en el **ANEXO Nº 3** de la presente Base Administrativa.

4.2. De las Etapas de Evaluación

La evaluación se realizará por Etapas y de acuerdo al siguiente procedimiento:

4.2.1. Primera Etapa: Evaluación Curricular (EC)

Tiene puntaje y es de carácter eliminatorio. (60 puntos máximo)

Los postulantes remitirán su Ficha Resumen de acuerdo al formato establecido en el **ANEXO Nº 4.** Deben presentar la Ficha Resumen en Mesa de Partes de la Dirección Regional de Salud de Loreto, en la av. 28 de Julio S/N la Punchana, durante el plazo establecido en el **Cronograma**.
En esta Etapa, se verificará lo informado por el postulante en la Ficha Resumen en términos de si cumple totalmente o no con los requisitos exigidos en los **Términos de Referencia**, **ANEXO N° 01.**

La información consignada en la Ficha Resumen tiene carácter de **Declaración Jurada,** por lo que el postulante es el responsable de la veracidad de la información que presenta y se somete al proceso de fiscalización posterior que realice la Dirección Regional de Salud de Loreto.

Pasarán a la siguiente Etapa del proceso los postulantes que hayan obtenido el (o los) más alto (s) puntaje (s) en estricto orden de mérito.

En caso de empate, pasarán todos aquellos que hayan obtenido el mismo puntaje y se encuentren en el orden de prelación.

La lista de postulantes que pasan a la siguiente Etapa se publicará en el portal del Gobierno Regional de Loreto, y en la vitrina de la Dirección Regional de Salud de Loreto, ubicada en la av. 28 de Julio S/N la Punchana, en la fecha establecida en el **Cronograma**.

Luego de publicado los resultados; el postulante deberá presentar copia de su Currículo Vitae documentado durante el plazo establecido en el **Cronograma**.

4.2.1.1. Contenido del Currículo

a) Ficha Resumen – **ANEXO Nº 4.**
b) Copia simple del Documento Nacional de Identidad (DNI).
c) Copia simple de la documentación sustentoria del Currículo Vitae. (Título, Grado, Certificados, etc.).
d) Declaración Jurada de No Tener Inhabilitación, Nepotismo y Doble Percepción – **ANEXO N° 05.**
e) Declaración Jurada de No tener Deudas por Concepto de Alimentos – Ley Nº 28970. – **ANEXO N° 06.**
f) Registro Único de Contribuyente (RUC) en el caso de CAS.

4.2.2. Segunda Etapa: Entrevista Personal (EP)

Tiene puntaje y es de carácter eliminatorio. (40 puntos máximo)

La entrevista personal será realizada por el Comité de Selección en la que se evaluará el desenvolvimiento, actitud, cualidades y competencias del postulante requeridas para el servicio al que postula.

Tiene un puntaje máximo de CUARENTA (40) puntos. El puntaje en esta sección se otorga promediando el puntaje individual de los tres integrantes del Comité.

4.2. Puntaje Final (PF)

El puntaje final es el resultante de la suma de puntaje de la evaluación curricular más el puntaje de entrevista personal:

PF = EC + EP

El postulante que obtenga el **Puntaje Final (PF)** más alto, en cada servicio convocado, será declarado ganador de la presente convocatoria.

5. RESULTADOS DEL PROCESO

El Comité de Selección, redactará un Acta en la que se consigne sucintamente los procedimientos aplicados, los problemas más importantes presentados durante el proceso de selección y los resultados.

La calificación se hará sobre la base de los criterios de evaluación descritos en las presentes Bases y el postulante que obtenga el **Puntaje Final (PF)** más alto, en cada servicio convocado, será seleccionado como adjudicatario del Régimen de Contratación Administrativa de Servicios del Decreto Legislativo Nº 1057 del presente proceso.

El resultado del proceso de selección se publicará en la página Web del Gobierno Regional de Loreto: www.regionloreto.gob.pe., y en el Periódico Mural de la Dirección Regional de Salud de Loreto ubicado en la av. 28 de Julio S/N la Punchana.

El Comité una vez culminado el proceso, entregará la documentación de sustento a la oficina de Administración – Personal, con el fin de que se proceda a la suscripción del contrato, dentro de los CINCO (05) días hábiles de publicado los resultados.

No se devolverá la documentación entregada por los postulantes calificados, por formar parte del expediente del presente proceso de selección.

Cualquier controversia o interpretación a las Bases que se suscite o se requiera durante el proceso de selección, será resuelta por el Comité de Selección.

6. DURACIÓN DEL CONTRATO

El contrato que se suscriba como resultado de la presente convocatoria tendrá un plazo contado desde el día siguiente de su suscripción y por un período de TRES (03) MESES, pudiendo prorrogarse o renovarse, según sea el caso, de común acuerdo y previa evaluación, como máximo hasta el 31/12/2016.

ANEXO Nº 1

CONVOCATORIA PÚBLICA CAS N° XXX -2016-GRL-DIRESAL

TERMINOS DE REFERENCIA

DIRECCION REGIONAL DE SALUD DE LORETO

OFICINA DE XXX (1) PLAZA:

Especialista en Educación, Comunicación y Movilización Social contra la Malaria (Enfermedades Transmitidas por Vectores) bajo la Estrategia Sanitaria Nacional de Enfermedades Metaxénicas.

1. OBJETIVO DE LA ACTIVIDAD A DESARROLLAR

El aumento de casos de Malaria y otras enfermedades metaxénicas en la Región Loreto presenta una amenaza a la continuación de los avances contra estas enfermedades en el Perú. Para muchas comunidades en situación de riesgo de contraer la malaria, el acceso y la disponibilidad de la atención sanitaria es limitada. Es así que la educación, comunicación y movilización social se vuelven cruciales para ayudar a las acciones sostenibles y para que los actores nacionales se apropien de los esfuerzos de prevención y control de la malaria. Esta necesidad de comunicación y promoción de la salud se hace más evidente en situaciones de crisis o de epidemia, en donde es fundamental dar orientaciones precisas a los actores sociales como a la población en general de manera que tengan comportamientos que contribuyan a la mitigación o solución del problema. El objetivo de este puesto concursado es:

- Mejorar el proceso de educación, comunicación y movilización social contra la malaria en las localidades de la Región Loreto donde hay poblaciones de alto riesgo (con especial énfasis en las comunidades indígenas y zonas alejadas de frontera).
- Fortalecer y promocionar los canales de información con especial atención a las localidades de la Región Loreto donde hay poblaciones de alto riesgo (con especial énfasis en las comunidades indígenas).
- Promover, en los profesionales de la salud y comunidad en general, estrategias de comunicación que ayuden a orientar los comportamientos y acciones frente a contextos de crisis o epidemia.

2. FUNCIONES PRINCIPALES

- Desarrollar una estrategia de comunicación y movilización social contra la malaria y otras enfermedades metaxénicas para la Región Loreto y, actualizarla por lo menos una vez al año.
- Desarrollar tácticas de educación, comunicación y movilización social apropiadas para trabajar con poblaciones en situación de riesgo y en contextos de crisis o epidemia en la Región Loreto.
    a. Los servicios de salud deben estar involucrados en los esfuerzos de control de la malaria.
    b. Se debe mejorar la comunicación entre los profesionales de salud y las poblaciones en situación de riesgo.
    c. Establecer canales de comunicación pública tipo cabildos abiertos y reuniones comunitarias teniendo en cuenta las costumbres y cosmovisión de las poblaciones indígenas.
- Desarrollar mensajes y materiales de comunicación para apoyar al programa de control de la malaria y otras enfermedades metaxénicas.
    a. Los mensajes deben ser sencillos y fáciles de entender por la población en general. Cuando sea necesario se debería traducir dichos mensajes en los idiomas indígenas predominantes de las comunidades indígenas.
    b. Siempre que sea posible, se debe priorizar el uso de materiales ilustrados con un mínimo de texto para alcanzar a los públicos objetivos que no dominan el idioma español, especialmente los hablantes de idiomas indígenas.

c. Realizar actividades de divulgación social que proporcionen información a las comunidades sobre las brigadas medicas del MINSA, su función, y como sacar el máximo provecho de su atención.

- Proporcionar capacitación a los Agentes Comunitarios de Salud y dar seguimiento a la ejecución del trabajo comunitario en educación, comunicación y movilización.
    a. Organizar capacitaciones y presentaciones en jornadas de sensibilización.
    b. Proporcionar capacitaciones para la sensibilización cultural y la comunicación interpersonal antes de salir al campo.
    c. Proporcionar educación con materiales sobre la malaria sobre cómo conducir campañas de difusión que sean culturalmente apropiadas.
- Responder a situaciones de brotes con buenas prácticas de comunicación de crisis y de riesgo.
    a. Anuncios de servicio público.
    b. Precisar los actos y comportamientos adecuados para estas situaciones.
- Facilitar el establecimiento y sostenimiento de una mesa de trabajo sobre la malaria que incluya a las Organizaciones No Gubernamentales y Organizaciones de la Sociedad Civil, instituciones de investigación, instituciones religiosas y sector privado.
    a. Realizar actividades de mapeo de las partes interesadas para identificar a ONG, OSC y grupos multidisciplinarios que realicen esfuerzos de prevención y control de la malaria a nivel comunitario para formar alianzas. Esta acción debe apoyarse en la Dirección de Promoción de la Salud.
    b. Usar un abordaje multisectorial para enfrentar los factores que contribuyen al aumento de la malaria y otras enfermedades metaxénicas en Loreto. Estas enfermedades no son solo un asunto de la salud, sino mas bien impacta a otros sectores socioeconómicos (ej. educación, economía, turismo, medio ambiente, agricultura, vivienda y saneamiento).
    c. Establecer reuniones trimestrales multisectoriales de la mesa de trabajo sobre la malaria para crear un entendimiento compartido entre los actores clave.
    d. Mantener y fomentar una buena comunicación a través de compartir información oportuna sobre los planes de intervención y actividades.
    e. Presentar resúmenes de políticas presentados por los actores clave en malaria.
    f. Establecer compromisos de políticas acordadas por los actores participantes de la mesa.
    g. Fomentar visitas de campo de los actores participantes de la mesa que permitan establecer una mejor comprensión de las condiciones locales y demostrar compromiso a las comunidades.

3. REQUISITOS DEL PERSONAL PARA DESARROLLAR LA ACTIVIDAD

a. EDUCACION:
Bachiller en alguna de las siguientes especialidades:
    - Ciencias Sociales (Antropología, Sociología)
    - Ciencias de la Comunicación (Comunicación para el Desarrollo o Comunicación Social)
    - Psicología (Social o Comunitaria)
    - Educación (Bilingüe o Intercultural)

b. EXPERIENCIA:
Bachiller con experiencia mínima de 3 años, o, Licenciado con experiencia mínima de 1 año en una o más de las siguientes actividades:
    - Educación intercultural.
    - Comunicación y movilización social.
    - Salud, de preferencia en enfermedades infecciosas o tropicales.
    - Poblaciones indígenas en región selva.

c. CONOCIMIENTO Y/O CAPACITACIONES:
De preferencia con conocimientos en el área de comunicación social, gestión pública, o comunidades indígenas.

d. COMPETENCIAS:

Conocimiento de idiomas nativos de la región Loreto: Candoshi, Ticuna, Muniche/Otonabe, Taushiro, Urarina/Shimaco, Cahuapana, Bora-Huitoto, Jivara, Pano,Tacana, Peba, Yagua, Tucano, Tupi, Zaparoana, Quechua norteño.

4. TIEMPO REQUERIDO

a. **XXX**

5. HONORARIO MENSUAL PROPUESTO

a. **XXX**

6. SEDE

a. DIRESA - Loreto.

7. VACANCIAS A CUBRIR

a. 1.

8. FUENTE DE FINANCIAMIENTO

a. **XXX**

LA COMISION

ANEXO Nº 2

CONVOCATORIA PÚBLICA CAS N° XXX -2016-GRL-DIRESAL

RELACION DE SERVICIOS A CONVOCARSE

N°	PERSONAL REQUERIDO	CARGO	REGIMEN LABORAL	HONORARIO MENSUAL	SEDE/TRABAJO
1	1	Educación, Comunicación y Movilización Social contra la Malaria (Enfermedades Transmitidas por Vectores)	CAS	XXX	Actividad: Educación, Comunicación y Movilización Social contra la Malaria (Enfermedades Transmitidas por Vectores) para la Dirección Regional de Salud de Loreto.

LA COMISION

ANEXO Nº 3

CONVOCATORIA PÚBLICA CAS N° XXX -2016-GRL-DIRESAL

CRONOGRAMA DE LA CONVOCATORIA

ETAPAS DEL PROCESO	CRONOGRAMA - 2016
Convocatoria.	Xx al xx 2016
Presentación de Ficha Resumen vía Electrónica (*) o en Físico.	xx.xx.2016
Evaluación de la Ficha Resumen.	xx.xx.2016
Presentación de Currículo Vitae de Postulantes Aptos.	xx.xx.2016
Resultado de Postulantes Aptos para la Entrevista.	xx.xx.2016
Entrevista Personal.	xx.xx.2016
Publicación de Resultados.	xx.xx.2016
Suscripción del Contrato.	xx.xx.2016

(*) Portal Web: www.regionloreto.gob.pe

a. DE LA ETAPA DE EVALUACIÓN

Los factores de evaluación dentro del proceso de selección tendrán un máximo y un mínimo de puntos, distribuyéndose:

EVALUACIONES	PESO	PUNTAJE MINIMO	PUNTAJE MAXIMO	%
Evaluación Curricular.				60 %
a. Formación Académica y/o Grado Académico.	30 %	5	30	
b. Cursos y/o Estudios de Especialización.	10 %	4	10	
c. Experiencia.	20 %	6	20	
Entrevista Personal.		15	40	40 %
Puntaje Final.				100 %

*En relación al Punto b. solamente presentar los Certificados y Diplomas obtenidos a partir del 2009 a la fecha.

- EL PUNTAJE APROBATORIO SERÁ DE: 70

b. DE LA DOCUMENTACION A PRESENTAR

a. De la presentación del Currículo:

La información consignada en la Ficha Resumen tiene carácter de **Declaración Jurada,** por lo que el postulante es el responsable de la veracidad de la información que presenta y se somete al proceso de fiscalización posterior que realice la Dirección Regional de Salud de Loreto.

c. DE LA DECLARATORIA DE DESIERTO O DE LA CANCELACION DEL PROCESO

a. Declaratoria del proceso como desierto:

El proceso podrá ser declarado desierto en alguno de los siguientes supuestos:

i. Cuando no se presenten postulantes al proceso de selección.
ii. Cuando ninguno de los postulantes cumpla con los requisitos mínimos.

iii. Cuando habiendo cumplido con los requisitos mínimos, ninguno de los postulantes obtiene puntaje mínimo en las etapas de evaluación del proceso.

b. Cancelación del procese de selección:

El proceso podrá ser cancelado en alguno de los siguientes supuestos, sin que sea responsabilidad de la entidad:

i. Cuando desaparece la necesidad del servicio de la entidad con posterioridad al inicio del proceso de selección.
ii. Por restricciones presupuestales.
iii. Otras razones debidamente justificadas.

LA COMISION

ANEXO Nº 4

CONVOCATORIA PÚBLICA CAS N° XXX -2016-GRL-DIRESAL

FICHA RESUMEN

SERVICIO AL QUE POSTULA:

IMPORTANTE
La información consignada en la Ficha Resumen tiene carácter de Declaración Jurada, por lo que el postulante es el responsable de la veracidad de la información que presenta por la Dirección Regional de Salud de Loreto podrá solicitar el sustento documental de la misma.

DATOS PERSONALES

APELLIDO PATERNO	
APELLIDO MATERNO	
NOMBRES	
DIRECCION DOMICILIARIA	
DNI/C.E.	
TELEFONO/CELULAR	
CORREO ELECTRONICO	

ESTUDIOS REALIZADOS

ESTUDIOS / GRADO / TITULO OBTENIDOS	INSTITUCION / UNIVERSIDAD	PERIODO

CAPACITACIÓN

ESPECIALIDAD	INSTITUCION / UNIVERSIDAD	PERIODO

EXPERIENCIA LABORAL O PROFESIONAL

¿Cuenta con experiencia laboral en el Sector Público? (*)	SI	NO

(*) Marque con una “x” la respuesta a la pregunta y luego detalle los trabajos que sustenten este requisito mínimo.

INSTITUCION	ACTIVIDAD O FUNCION DESEMPENADA (*)	PERIODO (EN MESES)

(*) Describa brevemente la principal actividad o función realizada que acredite el cumplimiento del requisito.

LA COMISION

ANEXO Nº 5

CONVOCATORIA PÚBLICA CAS N° XXX -2016-GRL-DIRESAL

DECLARACION JURADA SIMPLE

DECLARACIÓN JURADA SIMPLE

Yo, ……..……..…, identificado con D.N.I. Nº…….. y domiciliado en …….……....., distrito de ……, Provincia ……, Departamento de Loreto, con relación a la **Convocatoria Pública CAS Nº XXX - 2016-GRL-DIRESAL, DECLARO BAJO JURAMENTO** lo siguiente:

INCOMPATIBILIDAD

No tener impedimento de contratar con el Estado en la modalidad de Servicios ni estar dentro de las prohibiciones e incompatibilidades señaladas en el Decreto Supremo Nº 019-02-PCM (*), que no tengo antecedentes penales ni policiales así como no tengo conflicto de intereses con la Dirección Regional de Salud de Loreto.

NEPOTISMO

No tener grado de parentesco hasta el cuarto grado de consanguinidad, segundo de afinidad y por razón de matrimonio con los funcionarios de dirección y/o personal de confianza de la Dirección Regional de Salud de Loreto, que gozan de la facultad de nombramiento y contratación de personal o tengan injerencia directa o indirecta en el Proceso de Selección, y La presente Declaración Jurada para prevenir en casos de Nepotismo, la presento dentro del marco de la Ley Nº 26771 y su Reglamento aprobado por Decreto Supremo Nº 021-2000-PCM y sus modificatorias.

DOBLE PERCEPCIÓN

No estar percibiendo otros ingresos del Estado, salvo por actividad docente o por ser miembro únicamente de un órgano colegiado.

- Que acepto y me someto a las normas y resultados del proceso.
- Que me comprometo a cumplir con las actividades señaladas en los Términos de Referencia del servicio al cual postulo en caso sea seleccionado.

Por lo expuesto, asumo la responsabilidad por la veracidad de la información antes mencionada.

(Firma): …….....

Nombre:

D. N. I. Nº:

Iquitos,…… de…… del 2016

NOTA:
(*) Establece prohibiciones e incompatibilidades de funcionarios u servidores públicos, así como de las personas que presten servicios al Estado bajo cualquier modalidad contractual.

ANEXO Nº 6

CONVOCATORIA PÚBLICA CAS N° XXX -2016-GRL-DIRESAL

DECLARACION JURADA SIMPLE

LEY Nº 28970
"LEY QUE CREA EL REGISTRO DE DEUDORES ALIMENTARIOS MOROSOS"

Yo, ……..……..…, identificado con D.N.I. Nº…….. y domiciliado en …….……....., distrito de ……, Provincia ……, Departamento de Loreto, con relación a la **Convocatoria Pública CAS Nº XXX - 2016-GRL-DIRESAL, DECLARO BAJO JURAMENTO** lo siguiente:

No tener deudas por concepto de alimentos, ya sea por obligaciones alimentarias establecidas en sentencias o ejecutorias, o acuerdos conciliatorios con calidad de cosa juzgada, así como tampoco mantengo adeudos por pensiones alimentarias devengadas en un proceso cautelar o en un proceso de ejecución de acuerdos conciliatorios extrajudiciales sobre alimentos, que haya ameritado la inscripción del suscrito en el Registro de Deudores Alimentarios creado por la Ley Nº 28970.

Suscribo la presente con carácter de **Declaración Jurada**.

(Firma): …….....
Nombre:
D. N. I. Nº:
Iquitos,…… de…… del 2016

ANEXO Nº 7

CONVOCATORIA PÚBLICA CAS N° XXX -2016-GRL-DIRESAL

RESULTADOS FINALES

N°	CARGO	NOMBRE Y APELLIDOS	HONORARIO MENSUAL	SEDE/TRABAJO
1	Educación, Comunicación y Movilización Social contra la Malaria (Enfermedades Transmitidas por Vectores)		XXX	Actividad: Educación, Comunicación y Movilización Social contra la Malaria (Enfermedades Transmitidas por Vectores) para la Dirección Regional de Salud de Loreto.
	SERVICIOS A CONTRATAR	**01**		

NOTA: LOS POSTULANTES **GANADORES** DEBERAN PRESENTARSE DENTRO DE LOS CINCO (05) DIAS HABILES DE PUBLICADO LOS RESULTADOS EN LA OFICINA DE ADMINISTRACION DE LA DIRECCIÓN REGIONAL DE SALUD DE LORETO, UBICADA EN XXX.

LA COMISION