



Activity Report 136

Intercountry Collaboration for
Improving Surveillance and
Control of Vector-borne Diseases

Final Report of EHP Support
in Bangladesh, Bhutan, India and Nepal

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Acronyms

AFRIMS	U.S. Armed Forces Research Institute for Medical Sciences (Bangkok)
ANE	Asia and the Near East
BBIN	Bangladesh, Bhutan, India, and Nepal
BPKIHS	B.P. Koirala Institute of Health Sciences (Nepal)
CDC	Centers for Disease Control and Prevention (USA)
CQ	chloroquine
EHP	Environmental Health Project
GAVI	Gates Alliance for Vaccines and Immunization
GFATM	Global Fund for HIV/AIDS, Tuberculosis, and Malaria
HMG	His Majesty's Government of Nepal
ICMR	Indian Council of Medical Research
IEC	information, education, and communication
JE	Japanese encephalitis
MDR	antimalarial drug resistance
MoH	Ministry of Health
MRC	Malaria Research Centre (India)
NAMP	National Antimalaria Program (India)
NIV	National Institute of Virology (India)
NPHL	National Public Health Library (Nepal)
PATH	Program for Appropriate Technology in Health (India)
PHC	Primary Health Center
RMRI	Rajendra Memorial Research Institute of Medical Sciences (India)
SAARC	South Asian Association for Regional Cooperation
SEARO	Regional Office for South East Asia (of WHO)
SP	sulfadoxine-pyrimethamine
USAID	United States Agency for International Development
VBD	vector-borne disease
VBDRTC	Vector-borne Disease Research and Training Center (Nepal)
VDC	Village Development Committee (Nepal)
WHO	World Health Organization



Executive Summary

This report describes the activities and results of a program to improve the surveillance and control of three vector-borne diseases—malaria, Japanese encephalitis, and kala azar—through bilateral and regional collaboration among four countries: Bangladesh, Bhutan, India and Nepal. The program was implemented over a four-year period (July 2000–June 2004) by the Environmental Health Project (EHP), with funding from the U.S. Agency for International Development (USAID).

In 1998, the USAID Mission to Nepal and the Ministry of Health, His Majesty’s Government of Nepal, launched a six-year development assistance project called the Program for Prevention and Control of Selected Infectious Diseases in Nepal. One key objective of the program was “to assist the Ministry of Health in establishing inter-country, cross-border linkages for addressing prevention and control of priority vector-borne diseases.”

In June 2000, the USAID Bureau for Asia and the Near East (ANE) approved a new regional strategy to address HIV/AIDS and other infectious diseases. The strategy emphasized support for surveillance, information-sharing among institutions, and monitoring regional trends in disease incidence and anti-microbial resistance. These priorities were closely consistent with the objectives of the inter-country component of the USAID program in Nepal. Thus, the cross-border activities described in this report were initiated to pursue objectives specifically for Nepal, with funding from the USAID mission in Nepal. As the program developed, opportunities arose to promote regional collaboration on vector-borne disease surveillance and control, and the ANE bureau contributed funds to support and expand the cross-border program.

The inter-country program focused on four principal areas of work:

1. Promoting collaboration and general dialogue among senior national officials responsible for public health in Bangladesh, Bhutan, India, and Nepal, to reach agreements on the use of common surveillance methods and information-sharing for the three priority vector-borne diseases.
2. Promoting the development of a South Asia regional network for monitoring resistance to antimalarial drugs and facilitating a joint program of *in vivo* assessments in neighboring districts in India and Nepal.
3. Strengthening collaboration between national-level officials in India and Nepal, and between district-level officials in adjoining districts along the Indo-Nepal border, for improving the surveillance, prevention, diagnosis, and case management of kala-azar.
4. Facilitating regional adoption of standard methods for diagnosis and surveillance of Japanese encephalitis, supporting improvements in laboratory capacity, and contributing to WHO regional guidelines on JE prevention and control.

This program made important strides forward in strengthening surveillance systems, the use of common methodology, and information-sharing among the participating

governments. The program contributed to important breakthroughs in India and Nepal regarding district-to-district collaboration on kala-azar control and monitoring resistance to antimalarial drugs, and to the preparation and acceptance of regional guidelines on Japanese encephalitis. Even more important for long-term sustainability, the program worked closely with a large number of regional institutions, facilitating supportive relationships and collaboration that should persist into the future.

The four-year program produced the following key results and outputs:

- Information sharing mechanism established — www.bbin.org.
- BBIN Malaria Drug Resistance Inventory developed.
- BBIN Insecticide Resistance Inventory developed.
- Standard case definition and laboratory diagnosis for Japanese Encephalitis (IgM Capture ELISA) adopted by four countries.
- Guidelines for Japanese Encephalitis surveillance and clinical management developed in partnership with WHO/SEARO (Draft).
- Malaria drug resistance *in-vivo* studies conducted through a collaborative effort in neighboring districts of India and Nepal, using standard WHO protocol 2001.
- Regional level partnerships and linkages with government and non-government counterparts established to support inter-country cross-border interventions.
- Indo-Nepal Orientation guidelines on Kala-azar developed.
- Population Movement Study for Treatment of Malaria and Kala-azar conducted in Dhanusha-Mahottari using joint Indo-Nepal protocol.
- Indo-Nepal “Kala-azar Week” conducted.
- Japanese encephalitis surveillance system initiated in Bhutan through a national workshop and policy advocacy.

Despite the important progress made under this effort over the last four years, malaria, kala-azar, and Japanese encephalitis continue to pose an important threat to public health in South Asia and efforts to promote regional collaboration must continue. The authors recommend that USAID continue its support for regional collaboration on the surveillance, prevention and control of these diseases and that the participating governments sustain their support for the specific actions and initiatives now underway.

1. Introduction

Vector-borne diseases (VBDs) have figured prominently in Nepal's history and likely have affected those living in the Terai lowlands since early times. The Ministry of Health of His Majesty's Government of Nepal (HMG/MoH) regards malaria, kala-azar, and Japanese encephalitis as high priority diseases because of concerns that their incidence and distribution appear to be increasing, posing a growing threat to the most populous areas of Nepal.

In 1998, USAID/Nepal and the Ministry of Health launched the Program for Prevention and Control of Selected Infectious Diseases in Nepal. One component of the program, implemented by the Environmental Health Project (EHP), has focused on the reemerging vector-borne diseases. This component had five objectives, one of which was to "assist the Ministry of Health in establishing intercountry, cross-border linkages for addressing prevention and control of priority vector-borne diseases."

This report summarizes the activities, progress, and benefits that have been realized from the project's cross-border activities over the past five years. This is one of several final reviews documenting the work and achievements realized under the EHP VBD program in Nepal.

2. Rationale and Objectives

Disease prevention and control can be especially complex in border areas, for several reasons. Neighboring districts in two different countries may not use the same case definitions, diagnostic criteria, or surveillance methods, making it difficult to compare information on disease incidence and outbreaks. Public health officials in one country may have administrative and political constraints to sharing information with their counterparts across the border. Residents may pass across some borders frequently to seek work, buy and sell goods, or visit family members, making it difficult for patients and health workers to follow up on diagnoses and treatment. In some cases, differences in health policies (e.g., the availability of specific drugs or the cost of treatment) may induce residents to travel across the border for specific health services.

Nepal shares a long border with India, encompassing most of the Terai and Nepal's most populous districts. Of the thirteen districts in Nepal in which kala-azar is endemic, eleven are along the border with India. Similarly, seven of the thirty-three districts in India endemic for kala-azar are along the Indo-Nepal border. For malaria, all 26 Nepali districts endemic for malaria, and 17 districts in India with high malaria incidence, are situated along the border. India also has extensive borders with Bangladesh and Bhutan, where similar issues affect disease transmission, prevention and control.

The principal objective of the cross-border activities was to improve disease prevention and control efforts, particularly in border districts. By collaborating with Indian counterparts, public health officials in Nepal should have better access to useful information and be able to coordinate educational campaigns and prevention programs with analogous efforts across the border.

Another objective of the cross-border activities has been to enhance the participation and stature of Nepali institutions in international fora. This was a complement to efforts under Objective 1 of the program, which focused on strengthening capabilities at the Vector-borne Disease Research and Training Center in Hetauda, Nepal.

In June 2000, the USAID Bureau for Asia and the Near East (ANE) launched a strategy for addressing HIV/AIDS and other infectious diseases, based on the newly developed Strategic Objective 29: *Increased Use of Effective Responses to Select Infectious Diseases in Asia and the Near East*. The ANE regional program emphasized support for sharing information among institutions and monitoring regional trends, including the prevalence and incidence of infectious diseases and antimicrobial resistance. South Asia is one of the priority areas for implementation of the ANE bureau program and priority diseases include malaria and other diseases for which antimicrobial resistance is potentially problematic (e.g., kala-azar). The initiative was designed to support the development and demonstration of new interventions, expand the application of proven interventions, and improve surveillance programs, especially monitoring for drug resistance and selected diseases for which prevalence data are weak or lacking (e.g., malaria, Japanese encephalitis, kala-azar, and dengue).

Thus, the cross-border activities described in this report were initiated to pursue objectives and benefits specifically for Nepal with funding from the USAID mission in Nepal. As the program developed, however, opportunities arose to promote regional collaboration on vector-borne disease surveillance and control. These opportunities were consistent with the objectives of the ANE Bureau's regional infectious disease program, and the bureau decided to contribute funds to support and expand the cross-border program.

In summary, the intercountry program has pursued three objectives:

- To strengthen collaboration between bordering districts in India and Nepal as a means of improving the surveillance, prevention and control of priority, vector-borne diseases.
- To enhance the participation and stature of Nepali institutions in regional efforts for VBD control.
- To promote regional collaboration among public health officials in Bangladesh, Bhutan, India, and Nepal (BBIN) for improving VBD surveillance, prevention, and control.

3. Description of Intercountry Initiatives and Activities

This section of the report describes the various initiatives and activities that have constituted the program. First, we describe the initial workshop at which the cross-border program was launched. We then present the four specific initiatives that have been pursued. Finally, we summarize the many partnerships that have been created as part of this program, both as means of implementing the activities and as a key strategy for sustaining the initiatives. Activities are described chronologically within each subsection, and an integrated chronology of activities is presented in Annex 1.

Many of the cross-border activities contributed simultaneously to two or all three of the objectives described above. EHP has used resources from USAID/Nepal and the ANE bureau to achieve an integrated program, matching funds from each source to appropriate activities. However, because the overall thrust and achievements of the program can be described more clearly by focusing on the initiatives, the text of this report does not distinguish between activities funded by the USAID/Nepal and those funded by the ANE bureau.

3.1. Forming the BBIN Network and Setting the Agenda

In July 2000, EHP and HMG Nepal Ministry of Health organized an *Intercountry Workshop on Cross-border Issues in Malaria, Kala-azar, and Japanese Encephalitis Prevention and Control* at the Vector-borne Disease Research and Training Centre (VBDRTC) in Hetauda, Nepal. Over fifty experts on vector-borne disease surveillance and control from Bangladesh, Bhutan, India and Nepal attended the four-day meeting.

Participants agreed to form a permanent network for promoting collaboration and sharing information on vector-borne disease surveillance and control. It would be known as the BBIN Network. EHP would establish a website and the VBDRTC would serve as a nodal center to facilitate communications and information exchange. Furthermore, members would meet periodically to pursue four specific technical initiatives:

- To establish consensus for standardizing VBD surveillance procedures and sharing information among BBIN members. This would include agreeing on operational definitions for monitoring each priority disease and producing a detailed reporting format for government review and adoption.

- To standardize procedures for laboratory diagnosis of Japanese encephalitis (JE), via a workshop at the National Institute of Virology in Pune, India and subsequent follow-up in each country.
- To study community-based approaches for preventing kala-azar in a collaborative effort in Bihar State, India, and Dhanusha District, Nepal, and to use findings from the study to develop behavior change messages for kala-azar prevention and management at the community level.
- To develop regional inventories of current data on drug resistance and vector susceptibility to insecticides relevant to the priority vector-borne diseases.

EHP developed and launched the website (www.bbin.org) soon after the workshop and has maintained it since that time. As the end of EHP's project in Nepal nears, plans for sustaining the website are under discussion.

3.2. Developing Action Plans

Representatives of WHO's Regional Office for South East Asia (SEARO) and the South Asian Association for Regional Cooperation (SAARC) attended the launch meeting for the BBIN network.¹ Both organizations viewed the meeting as a success in establishing momentum on cross-border collaboration for disease surveillance, which could be synergistic with a similar initiative SEARO was planning for surveillance of HIV/AIDS, tuberculosis, and malaria. Both SEARO and SAARC showed strong interest in supporting the BBIN network.

WHO/SEARO secured funding and established a project entitled "Joint Plan of Action for Cross-Border Control of Priority Communicable Diseases (HIV/AIDS, TB, Malaria and Kala-azar) in 11 Pilot Districts of Bangladesh, Bhutan, India, and Nepal." SEARO and SAARC then organized and funded a regional meeting in Kathmandu, March 6–9, 2001. Participants shared their experiences and perspectives regarding the current status of HIV/AIDS, TB, malaria, JE, kala-azar, and antimicrobial resistance in these diseases. Current disease prevention and management initiatives were discussed, and concerns regarding the spread of the diseases across shared borders were also communicated.

The participants prepared draft Joint Plans of Action for submission to SEARO, including specific pilot projects to promote practical and immediate collaboration between neighboring districts across the India-Nepal, India-Bhutan, and India-Bangladesh borders. Meeting organizers from SEARO agreed to secure and commit funding to support implementation of the Joint Plans of Action.

SEARO also organized a follow-up meeting, the "Informal Consultation to Finalize Joint Plans of Action on Cross-Border Control of HIV/AIDS, TB, Malaria and Kala-Azar" in New Delhi, July 24–27, 2001. The objectives of the meeting were:

- (i) To agree on coherent technical policies relating to the cross-border interventions
- (ii) To finalize Joint Plans of Action

¹ Dr. V.P. Sharma, Advisor for Vector Biology and Control, WHO/SEARO, New Delhi; and Mr. Thinley Dorji, Director of the Social Division, SAARC Secretariat, Kathmandu.

- (iii) To review and finalize the technical and operational guidelines on planning and implementing integrated control of priority communicable diseases in the cross-border districts.

Participants urged SEARO to commit funds and take prompt action for approving the Joint Plans of Action.

EHP actively participated in the SEARO meetings and helped develop the Joint Plans of Action. Unfortunately, these field activities have not been implemented due to a lack of sufficient resources, follow-through and coordination support.

3.3. Monitoring Resistance to Antimalarial Drugs

Treating malaria cases is becoming more complicated with the spread of resistance to antimalarial drugs. In the last decade, chloroquine-resistant *Plasmodium falciparum* has spread explosively in the Indian subcontinent, increasing the incidence of malaria epidemics, severe cases, and deaths.

The Mekong region in Southeast Asia is well recognized as the epicenter from which several drug-resistant strains of *P. falciparum* have arisen. The Mekong Region—consisting of Thailand, Cambodia, Yunnan Province of China, Laos, Vietnam, and Myanmar—faces serious problems with *P. falciparum* strains that are simultaneously resistant to several antimalarial drugs. Governments in the region have had to adopt more and more expensive drugs for first- and second-line treatment. Recent history has shown that the conditions favoring emergence of drug-resistant parasites are present throughout Asia and that these mutants can easily spread among countries via human population movements.²

The prevalence of antimalarial drug resistance appears to be growing in South Asia. There is a significant amount of cross-border migration along the borders that India shares with countries in the land bridge between Southeast Asia and South Asia, including Myanmar, Bangladesh, Bhutan, and Nepal. Various antimalarial drugs are available in the private markets in these countries and their use is not effectively controlled by government regulation or medical practice. It is unclear whether the spread of antimalarial drug resistance is attributable to transmission of *P. falciparum* strains from Southeast Asia, from strains that have arisen indigenously in South Asia, or both. Whatever the source or sources, governments of the BBIN countries are very concerned over the potential for an increasing frequency of malaria epidemics and deaths and the prospect of dramatic increases in the cost of providing treatment with effective drugs.

Updating Information on Resistance to Antimalarial Drugs in BBIN

Given this concern, participants in the inaugural meeting of the BBIN network committed themselves to assembling and sharing the most current information they could obtain on the status of antimalarial drug resistance (MDR). Soon after the BBIN launch, EHP hired consultants to prepare “An Inventory on Malaria Drug Resistance in Bangladesh, Bhutan, India, and Nepal.” EHP also commissioned a companion report, “Status of Insecticide Resistance of Malaria, Kala-Azar,

² Mekong Malaria: Malaria, Multidrug Resistance and Economic Development in the Greater Mekong Subregion of Southeast Asia, Southeast Asian Journal of Tropical Medicine and Public Health, Vol. 30 Supplement 4, 1999.

and Japanese Encephalitis Vectors in Bangladesh, Bhutan, India, and Nepal.” Draft reports were distributed to BBIN members for review in December 2001.

The draft report on MDR was a key contribution to the WHO/SEARO meeting on “Development of a South Asia Surveillance Network for Malaria Drug Resistance,” held in New Delhi, Jan. 9–10, 2002. One objective of the meeting was to update the current status and major trends of MDR and its control in South Asia. Participants reviewed data included in the draft MDR report and provided additional information. EHP then incorporated changes and distributed the revised report to meeting participants in September 2002.

Strains of *P. falciparum* that are resistant to treatment with chloroquine (CQ) and sulfadoxine-pyrimethamine (SP) are already well established in India and Nepal. In India, government policy specifies CQ as the first-line drug for treating uncomplicated malaria and SP as the second-line drug for cases in which parasitemia persists for 72 hours after initial treatment with CQ. The policy also requires that SP be used as the first-line drug in areas where CQ resistance is high (>25% RII + RIII), and SP has in fact been introduced as the first-line drug in many districts. Resistance to chloroquine was first detected in 1973 and gradually became more prevalent, first in Assam State in the northeast (which has common borders with Bhutan and Bangladesh) and then later in central and southern Indian states. The National Antimalaria Program monitors drug resistance routinely, with 12 teams that employ standard WHO protocols for *in vivo* trials. In West Bengal, studies performed in the year 2000 recorded resistance to chloroquine in 20% of *P. falciparum* cases tested (7% RI, 7% RII, and 6% RIII). Studies conducted in 1997 in four states, including West Bengal and Tripura, reported resistance to SP in about 2% of cases (20 cases total for RI, RII, and RIII, of 915 tested).

The final reports on antimalarial drug resistance and vector resistance to insecticides have been published as EHP activity reports.³

Improving MDR Surveillance in the BBIN Countries

USAID is supporting work to improve MDR surveillance in South Asia through two mechanisms. The first is financial support provided by the USAID ANE Bureau to WHO/SEARO for establishing a South Asia MDR surveillance network. SEARO used a portion of these funds to convene the informal consultation mentioned above (“Development of a South Asia Surveillance Network for Malaria Drug Resistance,” in New Delhi, Jan. 9–10, 2002). In addition to updating information on MDR status, participants also reviewed the most current WHO protocols for *in vivo* testing to evaluate the efficacy of antimalarial drugs, developed country-specific plans of action for establishing sentinel sites for MDR surveillance, and discussed mechanisms for strengthening intercountry communication and cooperation. The participating countries agreed to adopt the WHO standard protocols for clinical trials and prepare proposals for follow-on actions and support from SEARO.

³ An Inventory on Malaria Drug Resistance in Bangladesh, Bhutan, India and Nepal. EHP Activity Report 130. 2004; Status of Insecticide Resistance of Malaria, Kala-azar and Japanese Encephalitis Vectors in Bangladesh, Bhutan, India and Nepal (BBIN). EHP Activity Report 129. 2004.

USAID's second mechanism to improve MDR surveillance is financial and technical support for expanding *in vivo* testing of antimalarial drugs in Indo-Nepal border areas, funded in a coordinated effort by the USAID ANE Bureau and the USAID missions in India and Nepal. Under these activities, EHP worked with the National Antimalaria Program (NAMP) of India and the Malaria Research Centre (MRC) in New Delhi to support *in vivo* trials of antimalarial drugs at sites in West Bengal in areas adjacent to the Indo-Nepal border and with HMG Ministry of Health in Nepal to perform a similar set of trials in the adjoining Jhapa District of Nepal.

The Jhapa study was completed in December 2003 in two sites bordering West Bengal state of India. Of 107 *P. falciparum* cases enrolled, 102 completed the study. Subjects were given a strictly supervised regimen of SP as a single dose of 25 mg + 1.25 mg/kg body weight and were followed on day 0, 3, 7, 14, 21 and 28 or any other day of illness with symptoms of malaria for clinical and parasitological examination. Treatment failure (early and late) was observed in 21 (20.6%) patients.

The India study was conducted in the Darjeeling district of West Bengal. Results showed a high resistance to Chloroquine in *P. falciparum* malaria. A total of 88 subjects were enrolled in the study at two sites in Sukna and Naxalbari. The treatment course included 25mg/kg doses of CQ over a three-day period. Of the 50 cases treated in Sukna, 12 showed an adequate clinical response and treatment failed in 28 (4 showed early treatment failure, 11 showed late treatment failure and 13 showed late parasite failure). Of the 38 cases in Naxalbari, 20 cases showed an adequate clinical response and treatment failed in 10 (1 early, 1 late, and 8 late parasite failure). Thus, treatment with chloroquine failed in over 50% of the cases in which treatment was completed.

Results from the studies are being shared among Indian and Nepali officials. A dissemination workshop for results from the Jhapa study was held in Kathmandu in January 2004, with the director of the MRC/New Delhi in attendance. A similar meeting was held at MRC/New Delhi to review results from the West Bengal study.

Building a National MDR Surveillance Network in Nepal

Finally, we should note that HMG Ministry of Health is working to build a national network of sentinel sites for monitoring antimalarial drug resistance. Based on the protocols and experience gained in preparing for the Jhapa study, and with some support from EHP, the ministry included a proposal for establishing a national MDR network in its application to the Global Fund for HIV/AIDS, TB, and Malaria (GFATM). The application was approved and funds were awarded in 2003. Although the distribution of funds and start-up activities have been delayed by problems in organizing the GFATM Country Coordinating Mechanism, the ministry remains committed to this objective. As part of its final closeout activities for the Nepal project, EHP will help the ministry prepare an operational plan detailing the steps, schedule, resource requirements, and allocation of responsibilities for launching the national MDR surveillance network.

3.4. Sharing Information and Interventions for Kala-azar Control

Over the six-year period during which EHP has provided technical support for VBD programs in Nepal, EHP and HMG Ministry of Health have devoted substantial attention to gathering better data

on kala-azar; defining a set of interventions to improve case recognition, diagnosis, and care seeking behavior; and launching a field trial to test the new intervention strategy. This effort has recently been summarized in an EHP report.⁴

Public health officials in Nepal have long recognized the need to collaborate with their counterparts in India. Kala-azar is prevalent in the eastern border districts of Nepal and in the adjoining state of Bihar in India. Eleven of the thirteen districts affected by kala-azar in Nepal border on Bihar, considered to be the epicenter of kala-azar in the South Asia region. Indeed, kala-azar is endemic in 33 of Bihar's 37 districts and one of the largest kala-azar epidemics ever documented took place in northern Bihar in 1978, when over a half million people died from the disease.⁵ Ecological and behavioral factors are similar in the adjoining areas and residents of both countries are allowed to move freely across the border. However, there are significant differences between the health care delivery systems, diagnostic procedures, treatment practices, and vector control measures used in Nepal and India.

Thus, at the inaugural meeting of the BBIN network in July 2000, participants agreed that “community-based approaches to kala-azar prevention will be investigated in Bihar State, India and Dhanusha District, Nepal. Findings from the study will be used to develop communication messages for behavioral changes in kala-azar prevention and management at the community level.”⁶ Nepali and Indian counterparts developed a specific proposal for this collaboration to complement the Joint Plans of Action prepared during the WHO/SEARO meetings in Kathmandu and New Delhi in 2001. USAID/Nepal, EHP, and HMG Ministry of Health proceeded with the activity, drawing on funds from USAID. The initiative has included the following three steps.

3.4.1. Formal Meetings to Develop a Consensus on Key Issues

In June 2002, HMG Ministry of Health hosted a “Meeting to Initiate Community-Based Cross-Border Collaboration for the Prevention and Control of Kala-Azar” in Dhanusha, Janakpur, Nepal. Despite invitations and advance notice, only the Joint Director of India's National Antimalaria Program⁷ attended the meeting from India, along with 19 participants from various levels and organizations in Nepal. Indian officials from Bihar State, Sitamarhi District, and Madhubani District were not able to attend. Even with this structure, the meeting was productive. The Joint Director made a thorough presentation on the kala-azar situation in Bihar and heard comparable information about the situation in Nepal. After discussing a range of problems and constraints affecting kala-azar surveillance, prevention and control, the participants made five recommendations:

⁴ The Evolution of a Pilot Strategy to Improve the Management of Kala-Azar and Malaria in Nepal. EHP Activity Report 131. 2004.

⁵ Medecins Sans Frontieres (MSF), <http://www.accessmed-msf.org/campaign/lsh01.shtm>

⁶ EHP/Nepal, “Proceedings of the Intercountry Workshop on Cross-border Issues in Malaria, Kala-azar, and Japanese Encephalitis Prevention and Control.” July 2000.

⁷ Dr. N.B.L. Saxena, Joint Director, National Antimalaria Program, Directorate General of Health Services, Ministry of Health and Family Welfare, Government of India, Delhi.

1. Sustainable mechanisms should be established for sharing information at the local level. These could include designating focal points at the district and central levels, and holding regular (e.g., quarterly) meetings of district managers of both countries.
2. Public health officials in Dhanusha and Mahottari districts in Nepal should adopt the treatment card and patient profile form that has been successfully introduced in Bihar.
3. Schedules for spraying residual insecticides for sandfly control should be synchronized in adjoining districts.
4. Nepal should conduct an annual information, education, and communication (IEC) campaign similar to the “Kala-azar Fortnight” used successfully in Bihar, with similar messages and schedules.
5. Diagnostic capacity should be improved at the Primary Health Center (PHC) level. Nepal is expanding use of the K39 dipstick test at PHCs, and India should consider adopting this test while it assesses the available diagnostic techniques.

Thus, the meeting produced two specific recommendations for joint action (recommendations 1 and 3), two for transferring experience from India to Nepal (2 and 4), and one for transferring experience from Nepal to India (5).

A complementary meeting was organized in Bihar in February 2003, during which two national-level officials from Nepal⁸ met with national, regional, and district-level officials from India. The Nepali visitors participated in a one-day meeting in Patna during which participants shared information on the state of kala-azar in the two countries. They then made field visits to PHCs on the Indian side of the Indo-Nepal border in Madhubani and Sitamarhi districts. The meetings produced agreement on recommendations 1, 3, and 4 above. Namely, that regular channels should be established for exchanging information, including district-to-district level meetings and that schedules and messages should be synchronized for insecticide spraying and IEC campaigns. The participants also recommended that EHP conduct a study of cross-border population movements for diagnosis and treatment of kala-azar and malaria. The senior Indian and Nepali officials agreed to present these recommendations to their governments and to cooperate in organizing a district-level meeting once they received the necessary approvals.

3.4.2. Study of Cross-border Population Movement for Kala-azar Diagnosis and Treatment

As agreed at the Patna Meeting, a study on cross-border population movement for the treatment of kala-azar and malaria was conducted in Dhanusha and Mahottari. The study protocol was developed

⁸ Dr. G.P. Ojha, Director, and Mr. R.K. Pokharel, Sr. Public Health Officer, Epidemiology and Disease Control Division, HMG/MoH/Dept. of Health Services, Kathmandu.

and implemented by staff at the Rajendra Memorial Research Institute of Medical Sciences (RMRI)⁹ in Patna.

The study focused on the Nepal-Bihar border and primarily on Dhanusha and Mahottari districts in Nepal. The study gathered information on the following topics:

1. The demographics of target population groups, i.e., their age, sex, socio-economic classification, education, occupation, migration status, and ethnicity
2. Existing health care delivery systems on both sides of the border, including diagnostic and treatment practices and the availability of facilities and services for kala-azar and malaria
3. Health-seeking behavior, including treatment compliance in general and relating to the key vector borne diseases in focus
4. The reasons for population movement across the Indo-Nepal border, especially for treatment of kala-azar and malaria
5. Socioeconomic impact of these diseases.

The study showed that about 2-4% of the population is infected with kala-azar or malaria, with a higher incidence of both diseases among low-income groups. About 55% of the people reporting cases had received treatment across the border in India. The cross border treatment of cases was higher among higher income groups (64%). Respondents reported that treatment had failed in more than 14% of the treated kala-azar cases.

The average expense reported due to the disease was in the range of Rs. 3,400 to Rs. 3,800, the majority (80%) of which was for purchasing medicines. Given that the average income is Rs. 3,900, this expense is clearly a heavy financial burden for most families.

People travel across the Indo-Nepal border in both directions to seek treatment for kala-azar and malaria. The main reason given by respondents who report traveling from India is to take advantage of the free medical treatment provided for kala-azar at district hospitals in Nepal. Most of the respondents from Nepal who seek treatment in India report that they do so because the hospitals and health facilities in India are closer than those in Nepal.

The National Antimalaria Program in India plans to conduct a similar study on the Indian side of the border in Sitamarhi and Madhubani districts in Bihar.

3.4.3. 'Kala-azar Week' and the First District-level Meeting

Following through on one of the earlier recommendations, EHP and HMG Ministry of Health organized the first Kala-azar Week in Nepal, Nov. 24–30, 2003. During this period, District Health Offices and District Public Health Offices in all 13 kala-azar affected districts conducted an

⁹ Dr. S.K. Bhattacharya, Director, Rajendra Memorial Research Institute of Medical Sciences, Patna and the National Institute of Cholera and Enteric Diseases, Kolkata, India

awareness campaign through various media using a wide range of communication tools. The campaign was intended to convey five key messages:

- If you have fever for more than 14 days, it may be kala-azar.
- Go to the nearest health facility if you suspect kala-azar.
- If you take the full course of medicine, kala-azar is a curable disease.
- The main medicine for kala-azar is given free of cost.
- If you do not get full and regular treatment, you may die from kala-azar.

The campaign employed a three-tiered approach. Throughout each of the affected districts, health officials aired messages on FM radio and TV, placed articles in newspapers, and distributed audio and video cassettes. They also checked to ensure that all health facilities had an adequate supply of drugs and diagnostic test kits (K39). In the villages most affected by kala-azar, officials focused more attention on supervising the campaign and used additional communication methods. These included orientation sessions for non-governmental organizations and community-based organizations; public address announcements (“miking”) in bazaars and at border check points; newspaper ads; and public displays employing posters, leaflets, banners, and “hoarding boards.” Finally, in villages along the border, officials also commissioned street dramas and went door-to-door to tea stalls and shops to distribute audio cassettes with songs and key messages.

The campaign was effective in raising awareness of kala-azar. In the high-risk VDCs of six highly endemic districts, 84% of respondents interviewed knew of kala-azar, with an even greater percentage among people who were also aware of the campaign. A large majority of the population (91.5%) recognized long-term fever as one of the main symptoms of kala-azar.

The kickoff event for Kala-azar Week was a cross-border meeting in Dhanusha that included district-level officials from adjoining districts in Nepal and India. EHP devoted great effort to obtaining administrative clearance for this district-to-district meeting. Medical officers and disease control officers from both countries shared detailed information on case numbers, diagnosis and treatment protocols, laboratory and clinical facilities, and strategies for communications and outreach. EHP shared results from the study of cross-border population movements. Participants discussed their expectations for positive results from clinical trials of miltefosine, a new oral drug¹⁰ that could make kala-azar treatment much simpler and could potentially reduce the economic impact of the disease on families.

Participants expressed hope that with aggressive tactics such as semiannual pesticide spraying, active case surveillance, and a simple and effective drug, it might one day be feasible to eliminate reservoirs of kala-azar in the region. By written and verbal accounts, the meeting was a keen success. Participants appreciated the effort on the part of senior officials to obtain the necessary approvals and from EHP to organize the meeting. They agreed to establish regular mechanisms for exchanging information and looked forward to developing and implementing a regional strategy for eliminating kala-azar. Whether or not such an ambitious goal becomes feasible, it is clear that the

¹⁰ EHP is facilitating the Phase IV trial of miltefosine in Nepal through BPKIHS, Dharan to complement the Indian trial. The Phase IV of the miltefosine trial has already been completed in India and the drug has been registered.

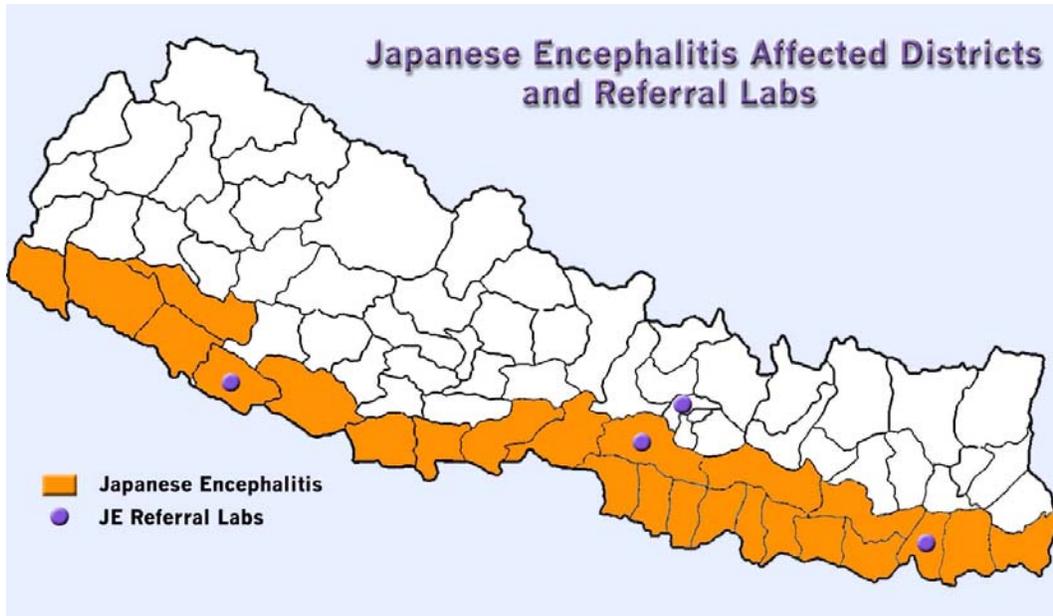
opportunity to meet and work together was an occasion for hope and enthusiasm among those who could attend.

A mechanism has been set in place to continue the Indo-Nepal cross-border collaboration for kala-azar control. Regular periodic meetings will be held between the central- and district-level officials of both countries. Both governments are committed to continuing the coordinated awareness campaigns and further strengthening the collaboration that has been initiated with EHP facilitation. The governments are also in the process of establishing a simple procedure for obtaining approval to move forward in the implementation of joint activities and information-sharing. Discussions are continuing with WHO to ensure support for follow-up activities.

3.5. Standardizing Diagnosis and Surveillance for Japanese Encephalitis

Members of the BBIN network agreed at their initial meeting in July 2000 to work toward standardizing surveillance methods for Japanese encephalitis (JE). They proposed meeting for this purpose early in 2001 at the National Institute of Virology (NIV) in Pune, India. NIV is a WHO Collaborating Center for arboviruses and hemorrhagic fever and is also the National Monitoring Center for Influenza and Hepatitis in India. The meeting was deferred in 2001–2002, as the BBIN members focused their attention on developing Joint Plans of Action and initiating collaborative projects to improve surveillance for HIV/AIDS, TB, malaria drug resistance, and kala-azar. The series of meetings sponsored by SEARO during this period did not address JE.

Meanwhile, in Nepal, EHP and HMG/MoH were working to establish analytical capabilities for JE diagnosis at four reference laboratories distributed throughout the country. These laboratories are situated in the B.P. Koirala Institute of Health Sciences (BPKIHS), Dharan; the Vector-borne Disease Research and Training Center (VBDRTC), Hetauda; the National Public Health Laboratory (NPHL), Kathmandu; and Bheri Zonal Hospital, Nepalgunj. The U.S. Armed Forces Research Institute for Medical Sciences (AFRIMS) in Bangkok supported this effort by training laboratory staff in the use of the IgM ELISA test method and providing reagents and quality control services. The quality control program includes routine, confirmatory analysis at AFRIMS of a portion of the samples tested at the Nepali laboratories, and periodic analysis by Nepali laboratories of a set of blind reference samples provided by AFRIMS. AFRIMS provides regular feedback to the Nepali laboratories on the accuracy of their work and has made consultative visits when required to sort out problems with analytical procedures and instrumentation.



EHP, in collaboration with SEARO and the Health Department, Royal Government of Bhutan, organized one of the periodic meetings of the BBIN network in Paro, Bhutan in May 2002.¹¹ Participants in the initial BBIN meeting in July 2000 had agreed to host the future BBIN meetings in each of the member countries by rotation, to enhance partnership and collaboration among the member countries. The Paro meeting in May 2002 was an EHP/USAID—WHO/Bhutan joint partnership program with support from the MoH/Bhutan. This workshop further strengthened the BBIN network initiative in identifying common approaches to vector-borne disease surveillance among BBIN countries. Participants reiterated their commitment to reach agreement on standard surveillance methods for the priority vector-borne diseases and called again for an opportunity to focus on methods for JE.

EHP began preparing for an intensive, hands-on workshop in Pune on JE analysis and surveillance, in coordination with the Indian NAMP and the Council of Medical Research and consultants from the NIV. During this period, EHP was invited to describe recent progress on JE surveillance in Nepal at a meeting sponsored by the Gates Alliance for Vaccines and Immunizations (GAVI) on “JE Control in South East Asia and the Western Pacific,” held in Bangkok. At the GAVI meeting, the Children’s Vaccine Program at Program for Appropriate Technology in Health (PATH) became very interested in EHP’s work and offered to cosponsor the Pune workshop.

The intercountry workshop on “Standardization of Japanese Encephalitis Surveillance in Bangladesh, Bhutan, India and Nepal” was held at NIV in Pune on March 10–13, 2003. Participants shared key facts concerning the status of JE in each of the BBIN countries.

- In Bangladesh, JE is rarely reported. Although the ecological conditions conducive to JE transmission (extensive paddy cultivation, presence of pig and bird intermediate hosts) and the known vectors of JE are present, the last recognized outbreak occurred in 1977. Because JE is

¹¹ EHP/Nepal, “Standardization Of Cross-Border Surveillance Of Priority Vector-Borne Diseases In Bangladesh, Bhutan, India And Nepal – Paro, Bhutan, 20-22 May 2002.”

rare, the MoH does not maintain routine surveillance for JE and has not established a standard case definition or treatment guidelines.

- Bhutan has no recorded evidence of JE cases and has not established surveillance or treatment protocols for the disease. Nonetheless, officials are concerned because the ecological conditions and vectors necessary for JE transmission are present, and JE is a serious problem in the Indian border areas in Assam and West Bengal.
- In India, JE is an important public health problem with repeated outbreaks reported in parts of the country. The NAMP has responsibility for JE control and has maintained a national surveillance system since 1978. Annual reported deaths attributed to JE have been as high as 2,755 (in 1978) and the case fatality rate ranges as high as 55% in some locations. India has established definitions for suspect, probable, and confirmed cases of JE and uses IgM ELISA analysis of cerebrospinal fluid and other tests for definitive diagnosis. The surveillance program includes entomologic, ecological, and zoonotic monitoring in addition to definitive diagnosis of cases. The control program includes IEC campaigns, vector control, and limited vaccination in some areas. From 1998 to 2002, by far the largest number of cases was reported in Uttar Pradesh, which shares a border with western Nepal. JE is also common in Assam and West Bengal and is known to occur in Bihar. These three states have common borders with Nepal, Bhutan, and Bangladesh.
- In Nepal, all 24 inner terai and terai districts bordering India have reported JE cases. In recent years, the number of cases reported has varied from 446 (108 deaths) in 1993 to 1,888 (with 275 deaths) in 2001. Nepal has established a standard case definition and uses IgM ELISA for laboratory diagnosis; however, laboratory capacity is limited and has been unavailable in most of the country until recently. Control efforts include improved case management, eliminating breeding sites of the *Culex* vector species, and an extensive vaccination program in the six districts with highest incidence.

On the second through the fourth days of the workshop, participants divided their time between lectures, discussion, and laboratory exercises. They held detailed technical discussions on case definitions, clinical and laboratory diagnosis, and methods for routine surveillance and outbreak investigations. They also received hands-on training in the use of the IgM ELISA analytical method for definitive diagnosis, during which each participant analyzed 13 coded specimens and three control samples. By the close of the workshop, participants had agreed on uniform case definitions for syndromic (clinical) surveillance and laboratory-confirmed diagnoses and uniform recommendations for the use of IgM ELISA, which should be proposed to all BBIN governments for national adoption. They also agreed to activities and a schedule for carrying the initiative forward.

Since the meeting, EHP has taken three steps to continue progress on JE surveillance.

- EHP participated in the “JE Working Group Meeting” at WHO headquarters in Geneva, April 1, 2003. This meeting reviewed progress on JE control following the GAVI meeting in Bangkok and the methodology workshop in Pune, to further define the JE agenda and action items. EHP provided input to identify regional needs and priorities for addressing JE.
- EHP has collaborated with WHO/SEARO to help prepare regional guidelines on JE diagnosis and surveillance, clinical case management, and prevention and control (including

immunization). The guidance is a modular document including clear, comprehensive guidelines on each component.

- EHP also helped organize a national-level advocacy and training workshop in Bhutan in March 2004 to raise awareness on JE. The workshop facilitated national-level advocacy for JE and provided a framework and key elements for JE surveillance in Bhutan, including outlining national action points for implementation.

In India, the NAMP held a national JE policy review and training to review the national JE diagnosis policy in relation to the standardized JE diagnosis. Representatives from JE endemic states of India, along with other local partner organizations, e.g., PATH/India, attended the meeting.

3.6. Partnerships for Promoting Cross-border Collaboration

One of the important objectives of EHP's project in Nepal and the broader regional effort in the BBIN network was to help the national ministries of health establish sustainable partnerships and collaborative relationships with each other and with regional and international institutions. Such relationships are crucial to the success of cross-border interventions and collaboration. Thus, EHP worked closely with officials of the following national counterpart agencies:

- Ministry of Health, His Majesty's Government of Nepal
- Ministry of Health, Directorate General of Health Services, Bangladesh
- Ministry of Health, Bhutan
- Ministry of Health and Family Welfare, Bihar and New Delhi, India.

The national, regional, and international institutions with which partnerships were built through the years in relation to malaria, kala-azar and Japanese encephalitis are summarized below.

International Centre for Diarrheal Disease Research, Bangladesh (Dhaka)

ICDDR, B was an EHP partner for work on antimicrobial resistance.

WHO/Bhutan

Collaborative activities included:

- WHO/Bhutan—The UN-funded support program is the only foreign aid program assisting the health sector in Bhutan, which has collaborated with EHP/USAID to conduct a regional intercountry workshop on standardization of surveillance for priority vector-borne diseases in the BBIN countries in May 2002.
- WHO/Bhutan and EHP/USAID organized a two-day National JE Advocacy and Orientation Workshop in partnership with Ministry of Health Bhutan. This workshop was held in Thimpu, Bhutan, March 26–27, 2004.

Malaria Research Center (MRC), New Delhi, India

Malaria Research Center has been one of EHP's key partners for technical consultation. Areas of collaborative work with MRC include:

- Compilation of a regional Insecticide Resistance Inventory by a senior research officer from MRC
- Introduction of malaria dipsticks for *P. falciparum* in Nepal
- Malaria drug resistance surveillance in border areas of India
- Implementing partner for Malaria Drug Resistance Study in West Bengal component and technical consultant for MDR Study in Jhapa/Nepal
- Review of the Malaria Drug Resistance Inventory by a senior research officer for technical accuracy and data compilation.

National Antimalaria Program (NAMP), Delhi, India

NAMP, Delhi, as a national nodal agency for prevention and control of vector-borne diseases, is responsible for national level policy formulation, strategy planning, and support to states for outbreak investigations. As a collaborative partner, the focus areas of work with NAMP are malaria, kala-azar and JE.

Collaborative Activities with NAMP:

- Supported and participated in the intercountry workshop on standardization of surveillance for malaria, kala-azar and JE in the countries of BBIN to formulate common standardized approaches to surveillance of three priority diseases in BBIN—May 2002.
- Supported and participated in the workshop on Standardization of Surveillance for JE in BBIN countries held at the National Institute of Virology, Pune, India—March 2003.
- Partners for the collaborative activities in kala-azar prevention and control programs as part of the Indo-Nepal cross-border initiative to combat KA in Dhanusha—Bihar.
- Potential future collaborators and implementing partners on Malaria Drug Resistance Studies in India along the borders of Bangladesh, Bhutan and Nepal.

National Institute of Virology, Pune, India

Formally known as the Virus Research Center (VRC), Pune, the National Institute of Virology (NIV) is part of the global program of investigation on the arthropod-borne group of viruses. NIV is identified as the WHO Collaborating Center for arboviruses reference and hemorrhagic fever reference and research. NIV is also the National Monitoring Center for Influenza and Hepatitis.

Collaborative Activities with NIV:

- NIV participated in the July 2000 workshop at which the BBIN Network was launched and has been part of the cross-border initiatives from the beginning of the planning phase.

- In support of the intercountry cross-border initiative, regional partnership program on combating priority VBDs in the BBIN countries. NIV offered to host a workshop on the Standardization of JE Surveillance.
- NIV hosted the BBIN workshop in Pune. The workshop resulted in an agreement on a common Laboratory Diagnosis Technique – IgM ELISA in BBIN member countries.
- NIV, as a focal institute for JE, provided technical resources for the above workshop.
- Senior scientist consultants from NIV are working in partnership with EHP in formulating and designing the Module I, i.e., Surveillance and Diagnosis for the SEARO JE guidelines.
- Future collaborations include assistance to the National Public Health Laboratory (NPHL) in providing IgM ELISA kits for diagnosis of JE.

Indian Council of Medical Research (ICMR), New Delhi

ICMR is the apex institute in medical science in India and serves as a governing body to the MRC and the NIV:

- ICMR, as a partner, has provided support and authorized collaborative activities from the Indian side to the BBIN regional initiative and collaborative partnerships with its related institutions like MRC and NIV.
- ICMR serves as the GFATM Country Coordination Mechanism for India and has expressed its full support to the future collaboration activities in MDR surveillance with India and neighboring countries like Nepal, Bangladesh and Bhutan.
- ICMR has shown an interest in sustaining the BBIN initiative and continuing its support to this network recognizing the development of strengthened partnerships and the achievement of significant outcomes/results in the cross-border regional initiative over a short period of time.

Rajendra Memorial Research Institute of Medical Sciences (RMRI), Patna

RMRI participated in the regional Patna meeting on the control of kala-azar. The Institute helped develop the protocol for the cross-border population movement study. As well, they conducted the Miltefosine trial in India. BPKIHS is doing a similar study in Nepal and is using the RMRI as a reference and information source while conducting research.

Vector-borne Research and Training Center (VBDRTC), Hetauda, Nepal

In partnership with VBDRTC, EHP provided support to the government in research and operations research for prevention and control of VBD and in providing technical assistance for cross-border and intercountry activities. VBDRTC, Hetauda, was the venue for the first cross-border meeting in 2000. VBDRTC has also participated in the majority of the cross-border regional meetings since then. The VBDRTC has been designated as a malaria focal point for the South Asian Association for Regional Cooperation (SAARC).

B.P. Koirala Institute of Health Sciences (BPKIHS), Dharan

BPKIHS was established with a mandate to work towards developing a competent health work force and was envisioned to function as a center of excellence in the field of tropical and infectious

diseases. In 2001, BPKIHS was established as one of the referral labs for JE in Nepal with EHP's assistance. EHP is supporting BPKIHS to conduct the Phase IV of the miltefosine trial in Nepal to complement the one done in India.

Armed Forces Research Institute of Medical Sciences (AFRIMS), Bangkok, Thailand

AFRIMS signed an interagency agreement to carry out the following:

- *In vitro* malaria drug resistance studies in the border districts of India and Nepal. This will be expanded to the regional level as part of the cross-border network.
- Quality assurance for JE laboratory diagnosis and related arboviruses, including the West Nile Virus.
- Standardization of approaches towards surveillance.

South Asian Association of Regional Cooperation (SAARC)

EHP has established linkages with SAARC to facilitate cross-border interactions at the government level in BBIN countries. EHP is also collaborating with SAARC to broaden the scope of VBDRTC as the SAARC malaria center for BBIN.

Program for Appropriate Technology in Health (PATH)

EHP collaborated with PATH/India for the workshop on Standardization of JE Laboratory Diagnosis and case definitions in the BBIN region, held at Institute of Virology, Pune, India. Additionally:

- Potential collaboration on creating a platform where countries can share information on disease burden and control programs, particularly in JE, is being explored.
- Potential future collaboration exists with MoH/Nepal on JE disease burden studies and the subsequent introduction of a vaccination strategy.

Global Fund for HIV/AIDS, Tuberculosis and Malaria (GFATM)

GFATM offers a unique opportunity for an intercountry cross-border regional initiative to address the issue of malaria drug resistance in the region as well as Nepal.

- EHP provided technical assistance to the Ministry of Health, Nepal in formulating the first round of proposals, which has been accepted by GFATM.
- In the future, GFATM could play a potential role in addressing the malaria drug resistance issue by providing assistance to the MoH/Nepal in MDR surveillance—specifically, by handling the antimalarial drugs prescribing practices to complement drug resistance surveillance and effective treatment.

Centers for Disease Control and Prevention (CDC), Atlanta, GA, USA

EHP has worked with the CDC on the enhancement of the effectiveness of surveillance and response to epidemics as part of the Early Warning Reporting System (EWARS) in Nepal through

staff training and data management and use. Additionally, joint research studies have been conducted on:

- Kala-azar case control study
- Malaria surveillance sensitivity assessment
- *In vivo* malaria drug resistance at district level.

4. Benefits and Recommendations

4.1. Principal Results

The following are the key results and outputs generated through the inter-country collaboration on vector-borne disease surveillance and control among Nepal, India, Bangladesh and Bhutan over the period 2000–2004:

- Information sharing mechanism established—www.bbin.org.
- BBIN Malaria Drug Resistance Inventory developed.
- BBIN Insecticide Resistance Inventory developed.
- Standard case definition and laboratory diagnosis for Japanese Encephalitis (IgM Capture ELISA) adopted by four countries.
- Guidelines for Japanese Encephalitis surveillance and clinical management developed in partnership with WHO/SEARO (Draft).
- Malaria drug resistance *in-vivo* studies conducted through a collaborative effort in neighboring districts of India and Nepal, using standard WHO protocol 2001.
- Regional level partnerships and linkages with government and non-government counterparts established to support inter-country cross-border interventions.
- Indo-Nepal Orientation guidelines on Kala-azar developed.
- Population Movement Study for Treatment of Malaria and Kala-azar conducted in Dhanusha-Mahottari using joint Indo-Nepal protocol.
- Indo-Nepal “Kala-azar Week” conducted.
- Japanese encephalitis surveillance system initiated in Bhutan through a national workshop and policy advocacy.

4.2. Benefits of the Intercountry Program

As described in Section 2, the intercountry program was launched with funds from USAID/Nepal as part of the Program for Prevention and Control of Selected Infectious Diseases in Nepal and was later expanded with support from the USAID Bureau for Asia and the Near East. Thus, the program was intended to support disease control efforts in Nepal and to facilitate a broader regional initiative.

The intercountry collaboration has produced important benefits for vector-borne disease control efforts in Nepal. These include practical, tangible collaboration with Indian counterparts responsible for kala-azar surveillance and control in border districts, resulting in coordinated IEC campaigns and mechanisms for sharing information on disease trends. It also includes the creation of regular channels for sharing information on drug efficacy, including recent data on resistance to antimalarial drugs and results from trials of miltefosine for treating kala-azar. Sharing such information should help Nepali officials to anticipate and respond to increasing problems with drug resistance and to facilitate bilateral collaboration on treatment protocols.

The intercountry program has also produced some institutional benefits in Nepal that should help sustain and expand the impact of the more practical developments. For example, participating in a regular series of regional meetings has led to Nepali MoH officials better understanding the need for and process of collaborating with their cross-border neighbors. These officials have provided leadership for the BBIN network, enhancing their personal profile and the status of the MoH within the South Asia region.

At the regional level, the most tangible benefits are multicountry agreements on standardized methods for JE diagnosis, surveillance, case management, prevention and control, and information sharing. These methods and agreements have arisen largely from the regional meetings organized by EHP, and will soon be captured in the form of regional guidelines issued by WHO/SEARO. Participants in the BBIN network have also agreed to use standard WHO protocols for monitoring resistance to antimalarial drugs, and regular *in vivo* testing is now an established practice in India and Nepal.

More generally, the intercountry collaboration has helped focus attention on vector-borne diseases. Participants discovered there are significant differences among countries in methodological approaches to disease surveillance and control, and they gained some enthusiasm and momentum for addressing these differences. Particularly with regard to Japanese encephalitis and antimalarial drug resistance, participants have recognized the value of standardizing definitions and procedures to facilitate information sharing and comparability.

This collaboration has also helped boost the momentum of regional initiatives promoted by WHO/SEARO, including regional guidelines for JE control, a regional network for monitoring antimalarial drug resistance, and an “elimination framework” for kala-azar. The program initiated or strengthened collaboration among a diverse group of regional and international organizations, including SEARO, SAARC, PATH, AFRIMS, NIV, ICMR, MRC, NAMP, GFATM, and GAVI.

4.3. Recommendations

The authors recommend that USAID continue its support for regional and bilateral collaboration among India, Nepal, Bangladesh, and Bhutan to strengthen surveillance, prevention and control, and information sharing for vector-borne diseases. The collaboration among these countries over the past five years has been productive and USAID’s technical and financial support has been critical to the initiative.

This initiative should be continued on two levels concurrently. Periodic regional meetings of senior public health officials are important for sustaining technical and political dialogue and creating a

supportive environment in which provincial, state, and district officials can operate. At the same time, it is the joint peer-to-peer actions at the local and district levels that bring practical progress and improve people's health. Both types of collaboration are important.

The regional activities described in this report were orchestrated by EHP in collaboration with a set of key contacts, or focal points, at three levels: a national point of contact in the Ministry of Health in each participating country; a point of contact in the WHO country office in each participating country; and at the regional level, a key contact at WHO/SEARO. Such positions are critical to sustaining regional activities and the authors urge each of the organizations to continue its support for this function.

Judging from experiences over the past five years, regional institutions such as WHO/SEARO and SAARC are best suited for sustaining the higher-level dialogue and for institutionalizing agreements, once achieved, in the form of programmatic guidelines. Facilitating district-to-district, cross-border projects requires sustained work with national and local officials and is more readily achieved by organizations with a substantial in-country presence. Such presence is probably best provided by a donor-funded project, although the country office of WHO or other regional and international institutions could play the same role with sufficient resources and interest.

We also recommend the continuation or completion of the following actions, which were initiated under this project:

- The governments of Nepal and India should continue the cross-border collaboration recently established for improving kala-azar surveillance and control. District-level officials are enthusiastic about the opportunity to collaborate with their peers and cross-border counterparts. To do so, they will need the continued approval and support of central government officials.
- The governments of Nepal, India, Bangladesh, and Bhutan should continue collaboration and information-sharing regarding the current status of resistance to antimalarial drugs (MDR) and should work with WHO/SEARO toward the formal creation of a regional MDR network.
- The governments of Nepal and India should use the agreed, standard methods for JE diagnosis and surveillance to estimate the incidence and distribution of JE in their countries, as part of an effort to plan and implement JE immunization programs.
- The governments of Bangladesh and Bhutan should use the agreed, standard methods in special studies and surveys to establish the incidence of JE within their populations.
- HMG Ministry of Health and its supporters should identify a capable unit to continue the maintenance and operation of the BBIN website at www.bbin.org, which has provided a convenient and valuable mechanism for sharing information.
- WHO/SEARO should identify funding for implementing the Joint Plans of Action for improving surveillance and control of selected vector-borne diseases in Bangladesh, Bhutan, India, and Nepal.

Annex 1. Chronology of Key Events 2000–2004

HMG/MoH USAID Program for the Prevention and Control of Selected Infectious Diseases in Nepal

Highlights of Intercountry Cross-Border Activities, First Intercountry Cross-Border Workshop, Hetauda, Nepal, July 25–28, 2000

An Intercountry Workshop on Cross-border Issues in Malaria, Kala-azar and Japanese Encephalitis Prevention and Control was organized by EHP at the Vector-borne Disease Research and Training Center (VBDRTC), Hetauda, Nepal, 25-28 July 2000. Over fifty experts on vector-borne disease surveillance and control from Bangladesh, Bhutan, India and Nepal (BBIN), as well as representatives from selected related organizations, participated in the workshop. Five technical activities were agreed upon at the workshop for follow-up. These are being implemented and coordinated with the support of EHP.

WEBSITE: <http://www.bbin.org>, 2001

A BBIN website was established to share information on vector-borne diseases - malaria, kala-azar and Japanese encephalitis. This World Wide Web site has now been expanded to include regional trends of infectious diseases and antimicrobial resistance.

MALARIA DRUG RESISTANCE INVENTORY, July 2002

To address the issue of malaria drug resistance and its surveillance in Bangladesh, Bhutan, India and Nepal, EHP conducted a detailed review. The report, Malaria Drug Resistance Inventory of Bangladesh, Bhutan, India, and Nepal, was preliminarily disseminated among the BBIN countries for review prior to publication.

MALARIA DRUG RESISTANCE SURVEILLANCE NETWORK, New Delhi, India, Jan. 9–10, 2002

Following a mandate given to Nepal by a WHO/SEARO meeting on Development of a South Asia Surveillance Network for Malaria Drug Resistance in New Delhi, Jan. 9–10, 2002, EHP, with the Ministry of Health (MoH), initiated the establishment of a Malaria Drug Resistance Surveillance Network out of Nepal.



MALARIA DRUG RESISTANCE STUDIES, 2002 and 2003

The MoH and EHP conducted *in vitro* and *in vivo* malaria drug resistance studies in border districts. The *in vitro* efficacy trial was conducted in Jhapa district, Nepal, in collaboration with the U.S. Armed Forces Research Institute of Medical Sciences (AFRIMS), Bangkok. This was extended to the regional level through an Indo-Nepal study in the West Bengal State of India and in Jhapa district of Nepal.

INSECTICIDE RESISTANCE INVENTORY, 2002

An inventory of insecticides used in Bangladesh, Bhutan, India, and Nepal, primarily against vectors of malaria, and also kala-azar and Japanese encephalitis through a review of documented reports, publications, and published data was developed.

STANDARDIZATION OF SURVEILLANCE, Paro, Bhutan, May 20–22, 2002

EHP, in collaboration with WHO/SEARO, organized a Workshop on Standardization of Cross-border Surveillance for Priority Vector-borne Diseases in BBIN that was held May 20–22, 2002, in Paro, Bhutan. This workshop arrived at consensus in adopting standardized methodologies and data exchange systems on surveillance, to be operationalized among the BBIN countries.

BIHAR (INDIA) AND DHANUSHA/MAHOTTARI (NEPAL) CROSS-BORDER COLLABORATION

A cross-border meeting to provide a forum to share information on the kala-azar and malaria situation in Dhanusha/Mahottari districts, Nepal, and the adjoining districts (Sitamarhi and Madhubani) of Bihar State, India, took place in Dhanusha district on June 7, 2002, followed by a meeting in Patna, India, Feb. 19, 2003, and a field visit to the districts. On Nov. 24, representatives from India and Nepal met in Dhanusha, Nepal and agreed to work together towards the elimination of kala-azar in the region. These meetings identified collaborative activities towards community-based kala-azar prevention and control in Bihar and Dhanusha/Mahottari and fostered greater cross-border collaboration at the local and community level. Joint intervention activities with Bihar State, India for the prevention and control of kala-azar and malaria were initiated.

STANDARDIZATION OF JAPANESE ENCEPHALITIS SURVEILLANCE IN THE BBIN COUNTRIES, Pune, India, March 10–13, 2003

A workshop to address the needs for standardization of Japanese encephalitis (JE) surveillance in the countries of Bangladesh, Bhutan, India, and Nepal was held at the National Institute of Virology (NIV), Pune, India, March 10–13, 2003. The primary outcomes of the workshop were:

A uniform case definition for JE was outlined for adoption in all BBIN countries.

A standard laboratory diagnostic test and procedure for JE in BBIN—IgM ELISA—as the best test for JE confirmation in BBIN until simplified diagnostic technique became available.

KALA-AZAR WEEK, Janakpur, Dhanusha, Nepal, Nov. 24–30, 2003

An awareness campaign focusing on specific messages for the prevention and control of kala-azar was conducted through various media in the kala-azar affected districts of Nepal, targeting the border population and community vulnerable to kala-azar with active participation of community leaders and health personnel. To start off the week, a district-level Indo-Nepal cross-border meeting was organized, Nov. 24.

POPULATION MOVEMENT STUDY, October 2003

This study was carried out in Dhanusha and Mahottari districts in Nepal. Due to the open border between India and Nepal, people cross the border in both directions to seek diagnosis and treatment for malaria and kala-azar. Travelers from India are generally seeking free treatment provided at Nepali health centers; travelers from Nepal are generally attending health facilities that are closer than the nearest facility in Nepal.

MALARIA DRUG RESISTANCE REVIEW MEETING, Jan. 19, 2004, Kathmandu, Nepal

After the completion of the Malaria Drug Resistance (MDR) Study in Jhapa, Nepal, the Ministry of Health in partnership with EHP/USAID organized a review meeting. The results of the study were presented and the possible next steps were discussed. Participants concluded that further studies need to be conducted before a change in the first-line drug is considered.

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