

## **Praziquantel Stock Status in Cameroon, March 10–19, 2011: Technical Report**

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## **About SPS**

The Strengthening Pharmaceutical Systems (SPS) Program strives to build capacity within developing countries to effectively manage all aspects of pharmaceutical systems and services. SPS focuses on improving governance in the pharmaceutical sector, strengthening pharmaceutical management systems and financing mechanisms, containing antimicrobial resistance, and enhancing access to and appropriate use of medicines.

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## ACRONYMS AND ABBREVIATIONS

CAPR	Centre d'Approvisionnement Pharmaceutique Régional
CAPREN	Centre d'Approvisionnement Pharmaceutique Régional Extrême-nord
CAPRN	Centre d'Approvisionnement Pharmaceutique Régional Nord
CENAME	Centrale Nationale d'Approvisionnement en Médicaments Essentiels et Consommables Médicaux
FEFO	first-expiry, first-out
HKI	Helen Keller International
MDA	mass drug administration
MoE	Ministry of Education
MoH	Ministry of Health
NTD	neglected tropical disease
PNLSHI	Programme National de Lutte contre la Schistosomiase et les Helminthiases Intestinales
PZQ	praziquantel
STH	soil-transmitted helminthiasis
SPS	Strengthening Pharmaceutical Systems
RTI	Research Triangle International
USAID	U.S. Agency for International Development
WHO	World Health Organization



## EXECUTIVE SUMMARY

This assessment is part of the U.S. Agency for International Development (USAID) support for work in Cameroon to improve and reinforce the pharmaceutical management of neglected tropical diseases (NTDs). It responds to the concern of the World Health Organization (WHO), Research Triangle International (RTI), and stakeholders about the possibility of an overstock of donated praziquantel (PZQ) in Cameroon.

The assessment was conducted March 10–19, 2011, in five regions of Cameroon, targeted at the Centres d'Approvisionnement Pharmaceutique Régionaux (CAPRs; Regional Pharmaceutical Supply Centers), the Centrale Nationale d'Approvisionnement en Médicaments Essentiels et Consommables Médicaux (CENAME; Central Medical Stores), and the Programme National de Lutte contre la Schistosomiase et les Helminthiases Intestinales (PNLSHI; National Program for the Control of Schistosomiasis and Intestinal Helminthiasis). The activities undertaken include—

- Debriefing the USAID Mission
- Performing a comprehensive stock status review of PZQ at all levels of the supply chain in Cameroon
- Highlighting the strengths and weakness of the schistosomiasis pharmaceutical supply chain management system and making recommendations as required
- Submitting a draft report to Helen Keller International (HKI) and PNLSHI
- Preparing a final report

The goal of the technical assistance was to assess the level of PZQ stocks in Cameroon and to make a determination about the presence of an overstock of PZQ.

### Key Findings

The physical stock count of PZQ at the national and regional levels was 6,897,409 tablets, of which 499,615 tablets had expired. The total usable stock was therefore 6,395,794 tablets. Eighty-eight percent of usable stock, equivalent to 5,830,000 tablets, expires in August 2013, and the remaining 565,794 (12 percent) expire in August 2011.

Based on conservative assumptions—using an average of four tablets per child; providing logistics support at least at 2010 levels; issuing existing products on a first-expiry, first-out (FEFO) basis; and targeting (1,280,000 school-aged children)—a total of 5,120,000 tablets of PZQ ( $4 \times 1,280,000$ ) will be used in the 2011 mass drug administration (MDA) campaign. The expected closing stock of 1,275,794 with an expiry date of August 2013 will serve as a good opening stock for the 2012 campaign. No expiries are anticipated of PZQ in Cameroon for the

2011 and 2012 campaigns. Therefore, Cameroon cannot be considered as having a PZQ overstock.

This conservative estimate falls short of the projected 1,700,000 schoolchildren targeted to be treated in 2011, however. A more aggressive MDA (more than 10 percent coverage in the six new regions of Littoral, North-West, East, South-West, West, and Centre) will increase consumption of PZQ in 2011, further reducing the existing stock of PZQ in country.

## **Recommendations**

- Conduct an end of 2011 campaign stock use verification exercise.
- Support the PNLSHI’s monitoring and evaluation team to undertake supervision during and after MDAs to ensure effective use and retrieval of unused PZQ.
- Train staff of HKI and PNLSHI on supply planning to increase country-level understanding of the ordering process and increase ability to generate data for strategic decision making during national procurement of PZQ.
- Undertake an options analysis of the PZQ supply chain (full use of CENAME and the integrated public supply system, compared to present vertical system, etc.).
- Involve CAPR staff in PNLSHI training and review meetings to ensure buy-in and clear understanding of MDA processes.

Although the assessment did not focus on financial issues surrounding MDAs, several regional persons interviewed recommended that the existing per diem payment system for Community Drug Distributors (CDDs), schoolteachers, and supervisors involved in the MDAs should be stratified by making partial payment of their per diems before MDAs and holding final payment until after submission of drug use forms and return of unused PZQ.

## BACKGROUND

Cameroon, a Central African country with a population of approximately 18 million, shares its borders to the west with Nigeria, to the northeast with Chad, to the east with the Central African Republic, and to the south with Equatorial Guinea, Gabon, and the Democratic Republic of Congo. The majority of its population is rural (approximately 57 percent) and young (56 percent under 20 years). The governance structure of the country includes 10 administrative regions and a number of departments, *arrondissements*, and territorial communities.

The health situation of the Cameroonian population is characterized by a high mortality rate estimated at 14.2 per 1,000 persons attributable to malaria.<sup>1</sup> NTDs—lymphatic filariasis, schistosomiasis, trachoma, onchocerciasis, and soil-transmitted helminthiasis (STH)—remain endemic in Cameroon, and they typically affect rural and marginal populations, who tend to be poor and lack access to safe water, basic health services, and essential medicines. Sixty-four percent of the Cameroonian population does not have access to adequate modern sanitation facilities, and access to good drinking water is limited: approximately 25 percent of urban households and 70 percent of rural households use an unprotected and unhealthy source of water,<sup>2</sup> a situation that worsens during the dry seasons.

The Government of Cameroon through its Ministry of Health (MoH; Ministère de Santé Publique) seeks to address the scourge of NTDs through the activities of programs such as the PNLSHI and onchocerciasis control projects. These programs have been funded through a mixture of donor and government sources.

USAID supports the management of NTD treatment activities in a number of countries in Africa, including Cameroon. As part of this support, USAID in 2006 awarded the five-year Neglected Tropical Disease Control Program to RTI to support national NTD control and elimination programs.

RTI implements this program in Cameroon through its grantee, HKI, since 2009. HKI has been operating in Cameroon since 1992 and works in all regions of the country, with recent activities concentrated in the Centre, Far-North, and East Regions. HKI's current activities include supporting vitamin A supplementation through child health days and routine treatment of acute malnutrition, fighting against onchocerciasis, and promoting schistosomiasis and helminthes control.

Information provided by RTI indicates that poor pharmaceutical management practices have resulted in excess stock, waste, and expiry of medicines in some countries. In particular, Cameroon is reported to have significant stocks of unused PZQ tablets, the medicine used for MDA treatment of schistosomiasis.

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<sup>1</sup> Department of Control of Neglected Tropical Diseases, WHO. 2007. *Report of Global Partners Meeting on Neglected Tropical Diseases*. Geneva: WHO.

<sup>2</sup> UNICEF, Cameroon, Statistics, [http://unicef.org/infobycountry/Cameroon\\_statistics.html](http://unicef.org/infobycountry/Cameroon_statistics.html).

To help address these supply chain imbalances in Cameroon, USAID has requested the Strengthening Pharmaceutical System (SPS) Program to provide technical assistance to assess the stock status of PZQ.

### **Scope of Work**

The purpose of this technical assistance is to ascertain the stock status of PZQ in Cameroon and make recommendations.

Specific activities to be conducted include—

- Review relevant technical reports and other related documents.
- Meet with PNLSHI management and staff at all levels to gain an understanding of the management issues relating to PZQ pharmaceutical supply management in Cameroon.
- Provide an opinion on the strengths and weakness of the schistosomiasis pharmaceutical management system and make recommendations as required.
- Conduct a comprehensive stock status review of PZQ at all levels of the supply chain in Cameroon.
- Conduct an in and out brief of the USAID Mission as required.

According to e-mail correspondence from RTI, the original scope was revised to focus on the priority challenge of PZQ overstock in Cameroon. It was, however, anticipated that the NTD focal person in Cameroon might introduce additional tasks before the consultant was in country. However, the in-country discussions with the HKI country director and MoH-NTD focal person identified the PZQ stock status and schistosomiasis program supply chain management as priority activity. SPS plans to undertake a six-country NTD pharmaceutical system assessment in which it is anticipated that Cameroon will be included.

## INTRODUCTION

The Cameroonian MoH is made up of a central level, an intermediate level, and a peripheral level. The central level is represented by the Central Administrative Service and the University Hospital Center. The intermediate level is composed of Regional Delegations and assimilated hospitals. The peripheral level is represented by the district health services, which include the district hospitals and health centers. The MoH is split into two major entities: a central administrative entity and an external service entity.

The central administrative entity of the MoH includes a General Secretariat, seven departments, and three divisions. The external services include 10 Regional Delegations, 143 health districts, and 1,689 health facilities that are classified into seven categories. Other institutions, including the Cameroon Pasteur Center, the University Hospital Center, CAPRs, the CENAME, and the Laboratoire National de Control de Qualité des Médicaments et de l'Expertise (National Medicine Quality Control and Assessment Laboratory), are classified in the category of specialized technical bodies.”<sup>3</sup>

The schistosomiasis program, the PNLSHI, is under the MoH. The national strategic plan 2005–2010 describes the mandate and strategies for the control of schistosomiasis. The main treatment strategy in Cameroon is preventive chemotherapy involving the annual PZQ mass administration to school-aged children living in high-prevalence communities (more than 50 percent of inhabitants in the geographical area have the parasite). After this MDA exercise, the PNLSHI organizes a national evaluation and feedback meeting to review the positives and drawbacks of the MDA. The national evaluation program is usually followed by similar meeting at the regional level. Table 1 shows the MDA projections of the national strategic plan through 2011 (year 5).

**Table 1. Overall PNLSHI Projections for Coverage and Medicine Package**

<b>Disease</b>	<b>Medicine package</b>	<b>Total number at-risk persons in country</b>	<b>Number of persons treated Year 3</b>	<b>Number of persons targeted (or treated) Year 4<sup>a</sup></b>	<b>Number of persons targeted Year 5</b>	<b>Epidemiological coverage planned Year 5 (%)</b>
Schistosomiasis	PZQ	10,514,335	881,906	1,148,818	1,716,542	16.33

a. The target population is defined as the population eligible for treatment, according to drug protocols.

The epidemiological coverage is the total number of districts treated as a percentage of the total number of districts known to be above treatment threshold; thus, an opportunity exists to increase coverage if available resources would allow. In 2010, for instance, the MDA was done in a total of 6,032 schools spread across five regions and districts (Adamawa, 9 districts; Centre, 2 districts; Far North, 28 districts; Littoral, 1 district; and North, 15 districts). Logistics for each

<sup>3</sup> Ministry of health, strategie sectorielle 2001-2010, Decree No 2002/209, August 19, 2002.

of these schools include PZQ distribution forms that allow each teacher (CDD) to indicate how many tablets of PZQ they received, how many were actually issued, and what the closing stock is as well as a PZQ dose pole. (The PZQ dose pole is a pregraduated height-to-number of tablets tape that teachers use to determine the total number of tablets each child will require without having to weigh the child or do any complex calculations.) After distribution of medicines, each school summarizes medicine distribution forms and returns unused PZQ to the district and then back to the CAPR.

The annual requirement of PZQ is based on data sent to RTI and WHO by the HKI country office and the PNLSHI after the MDAs. PZQ stock is shipped annually to meet the country's MDA needs.

Table 2 shows the number of PZQ tablets used and number of patients actually treated in the last three years.

**Table 2. Patients Treated and Amount of PZQ Used, 2007–2010**

	<b>2007</b>	<b>2009</b>	<b>2010</b>
Tablets used	2,500,100	3,226,800	4,192,824
Children dewormed	600,440	881,906	1,048,206

Note: These numbers are based on data submitted to WHO by the PNLSHI.

## METHODOLOGY

A literature review was conducted on the Cameroon health system. Reports, summaries of activities, and the PNLSHI strategic plan for 2005–2010 were also reviewed before undertaking the survey. The WHO-Global NTD Program provided historical data on supplies of PZQ for schistosomiasis MDAs for the years 2007, 2009, and 2010, and the PNLSHI provided summaries of PZQ distribution plans for these years. The distribution and supply information provided was jointly validated by the consultant, the HKI country director, and the schistosomiasis program manager.

The design of the assessment required that the five regions supplied with PZQ in the last three MDA exercises be visited. In each of the regions, PZQ stock records were reviewed and the quantities of PZQ in stock at the time of visit were recorded. Also, interviews of key personnel were conducted, and observations were made on schistosomiasis pharmaceutical management practices in each of these regions. Table 3 shows the regions and towns visited.

**Table 3. Regions and Towns Visited**

<b>Region</b>	<b>Site visited</b>	<b>Town</b>
Far-North	Centre d'Approvisionnement Pharmaceutique Régional Extrême-nord (CAPREN)	Maroua
North	Centre d'Approvisionnement Pharmaceutique Régional Nord (CAPRN)	Garoua
Adamawa	Centre d'Approvisionnement Pharmaceutique Régional Adamawa	Ngaoundéré
Littoral	Centre d'Approvisionnement Pharmaceutique Régional Littoral	Douala
Centre	PNLSHI	Yaoundé
Centre	CENAME	Yaoundé



## FINDINGS

### Pharmaceutical Sector of Cameroon

The pharmaceutical sector of Cameroon has three subsectors: the public sector, the private sector, and the traditional sector. The National Pharmaceutical Distribution System (Système national d'approvisionnement en médicaments) functions broadly around the CENAME.

A review (interviews and literature review) of the operations of the CENAME and the CAPRs revealed a long history of structural and organizational changes culminating in their present form and mandate. A legal, financial, and performance framework was implemented in 2001 by the Government of Cameroon and development partners to restructure the operations of these two organizations toward financial sustainability.

The CENAME, which is run by a managing director with a board made up of representatives of the MoH, the Ministry of Finance, the CAPRs, and a representative of civil society, does national procurement of essential medicines and public health commodities through a mix of international and local mechanisms. It stores, distributes, and performs quality control tests on procured products for a management fee equivalent to 15 percent of invoice value. This income covers the following: statutory government payments such duties, demurrage, and the like at entry ports (7 percent) and storage, distribution, quality testing, staff time, and day-to-day management (8 percent).<sup>4</sup>

However, the Minister of Health in consultation with public health programs can request or negotiate discounts on the fees charged by the CENAME; for example, the national cancer program and the Global Fund to Fight AIDS, Tuberculosis and Malaria pay a 10 percent management fee. In some other instances, a program will still pay the 15 percent, but 10 percent of invoice goes to the CENAME and 5 percent to the CAPRs for regional distribution at no additional cost to the program.

The regional medical stores (CAPRs), however, have a mandate that allows them to resell other health commodities and essential medicines to the lower-level health facilities at a margin. The CAPRs play a strategic role as redistributors of over 95 percent of the products procured by the CENAME.

### Pharmaceutical Management of PZQ in Cameroon

Good pharmaceutical management involves a well thought through process of selection, procurement, distribution, and use of medicines and the presence of a good management support system; all are regulated by policies and laws to guide practices and activities. (See the illustration of the pharmaceutical management cycle in figure 1.) Effective management of these elements is required for consistent availability and rational use of NTD program medicines, which will improve treatment outcomes.

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<sup>4</sup> Interview with Dr. Souaibou, Director of Supply, CENAME.

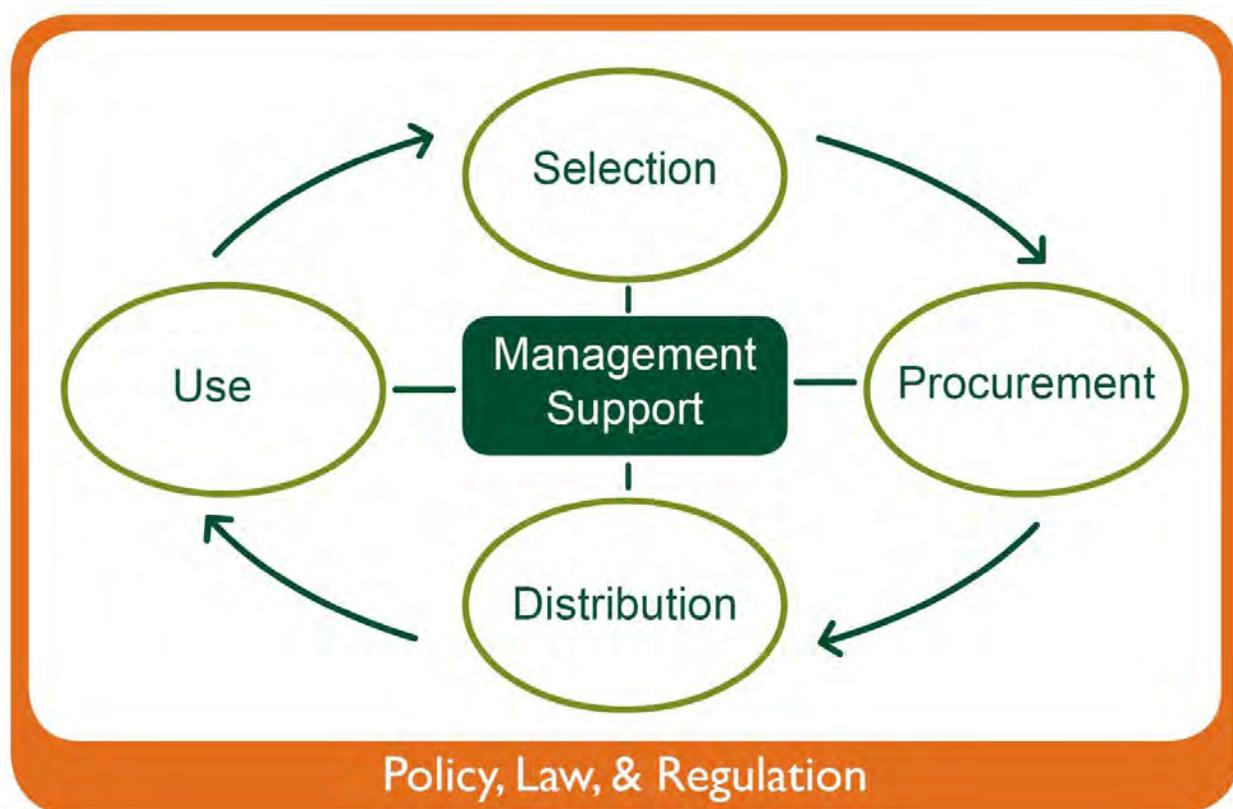


Figure 1. Pharmaceutical management cycle

### **Selection**

The WHO organization and its Global NTD partners have recommended treatment protocols for all NTDs including schistosomiasis. The schistosomiasis program of Cameroon is in line with the WHO recommendation for using PZQ tablets for mass treatment of schistosomiasis.

### **Procurement**

Cameroon receives PZQ from three sources: the Merck Donation Program, USAID donations, and Government of Cameroon procurements. In February 2011, the PNLSHI received 2,500,000 PZQ tablets from Merck and 3,800,000 tablets through USAID (see table 4).

Table 4. PZQ Procurements in the Last Three Years

Year	Quantity procured (tablets)
2008	2,519,000 (shipped November 2008)
2010	2,502,000 (shipped November 2009)
2011	5,830,000 (shipped November 2010)

An ordering tool developed by RTI is used to gather data from the field on morbidity and actual quantity distributed at the national level. These data feed into an ordering system at RTI that determines the quantities the country needs for the coming year. Decisions and processes involved in the ordering of PZQ appear to be unclear to the national program and to HKI in-country management. PZQ is shipped to Cameroon with WHO as consignee. WHO has the responsibility of clearing the PZQ from the port. All expenditures, including demurrage related to port clearing, are paid by HKI.

### ***Store Management and Distribution***

Good storage and distribution management is a critical function of pharmaceutical management that ensures products are stored in appropriate conditions and delivered to all sites, where they are administered to patients while maintaining medicine quality throughout the process. Observations from the sites visited revealed that good storage practices were largely not adhered to. FEFO was not in operation, products were kept on the floor instead of pallets, and returned products were kept in the general store with spare car parts and the like. The stock position review for this assessment was limited to the national (PNLSHI) level and the regional delegations only.

According to the MDA plans, PZQ stocks could be in any one or all of the following locations—

- Schools where they may remain unreturned after the MDA
- Health Districts
- Regional Delegation, either at the CAPR or with the director's logistics adviser
- PNLSHI—receives and stocks PZQ—donations, USAID, or country purchases

### ***Store Management***

At the central level, PZQ was stored in two offices at the PNLSHI. The stock count of medicines at the PNLSHI was tracked using Microsoft spreadsheets. Stocks were well arranged but kept on the floor although pallets were available for use. The management made the point that PZQ generally stayed at the PNLSHI for short periods prior to MDAs.

At the regional level, PZQ stocks could be found either in the CAPR or with the logistics department of the delegation. The logistics department is usually responsible for the storage and redistribution of nondrug items such as hospital stationery, and in some instances the hosting of the cold-chain equipment. At the Far-North and North Regions, contrary to the usual approach of sending PZQ stocks to the CAPRs, PZQ stocks were sent to the logistics store. None of the PNLSHI, the regional directors, or the CAPRs could explain this anomaly. In contrast to the logistics stores, the CAPREN had the necessary inventory control systems (both manual and electronic) to manage the PZQ and all other essential medicines.

The logistics units had no stock cards for PZQ inventory management in their stores. Expired and unexpired stocks were kept together. Physical counts were done to identify the expired and unexpired stocks available. CAPREN, CAPRN, and the logistics units all had large stocks of expired PZQ (table 5). In the Far-North Region, CAPREN and the logistics units (though in the

same compound) appeared not to communicate on stock position, and this apparent disconnect in communication between these two units may have caused the missed opportunity to use a first-in, first-out system for the PZQ closing stocks of 2009. A total of 315,315 tablets of PZQ had expired at CAPRN, and 147,300 tablets had expired in CAPREN.

The central-level closing stock submitted by PNLSHI does not reflect the closing stocks at region. Interviews with CAPR personnel as well as with logistics officers suggest a push mechanism from PNLSHI based on a target for the year. It is therefore doubtful whether the closing stocks are actually being incorporated in the following year's stock orders. The PNLSHI indicated otherwise and explained that the regions are supposed to factor in closing stocks when indicating the regional need for an upcoming MDA exercise. Another source of concern is the quantities at the district stores. For instance, Djohong and Meiganga Districts in Adamawa Region, which were randomly selected, were found to have 19,673 and 19,121 tablets of PZQ, respectively, in stock. If this is a districtwide trend, then a potential exists for overstocks and expiries in the districts.

**Table 5. Comprehensive Stock Status Review of PZQ at All Levels of the Supply Chain**

Location	Usable quantity available (tablets)	Expiry date	Quantity expired	Brand	Funding source	Total available as of March 10, 2011
PNLSHI	432,000	August 2011	0	Cesol	Merck/KGaA/ Donation Program	
	2,502,000	August 2013	0	Cesol	Merck/KGaA/ Donation Program	
	3,328,000	December 2010	0	Cipla	USAID	6,262,000
Far-North Region/ CAPREN	94,000	August 2011	147,300	Cesol	Merck/KGaA/ Donation Program	94,000
Nord Region/CAPRN Garoua	0	0	316,315	CIPLA	MoH	0
Adamawa Region/ Ngaoundéré <sup>a</sup>	38,794	August 2011	36,000	Medpharma	MoH	38,794
Littoral	1,000	August 2011	0	Cesol	Merck/KGaA/ Donation Program	1,000
CENAME	0	0	0	0	0	0
<b>Total Stock</b>			<b>499,615</b>			<b>6,395,794</b>

a. Districts of Adamawa: Djohong 19,673 and Meiganga 19,121.

### *Stock Status Analysis of PZQ*

The schistosomiasis program has drawn up a five-year plan showing the target number of school-aged children to be dewormed per region per year.

A concern exists that Cameroon is presently overstocked with PZQ. To assess the stock status (number of years of campaign stock available), SPS first reviewed the historical coverage as shown table 6.

**Table 6. Historical Coverage**

<b>Region</b>	<b>Year</b>	<b>Total children registered</b>	<b>Number of children treated, 2009</b>	<b>Percent coverage</b>	<b>Number of tablets used</b>	<b>Average number of tablets used</b>
Adamawa	2009	189,146	149,956	79	477,000	3.18
	2010	176,075	163,222	93	650,000	3.98
Far-North	2009	568,870	460,877	81	1,718,000	3.73
	2010	602,082	563,469	94	2,100,000	3.73
North	2009	327,286	258,446	79	977,000	3.78
	2010	353,249	260,727	74	1,100,000	4.22
Centre	2009	686,400		0		0
	2010	686,400	46,153	7	260,000	5.63
Littoral	2009	265,399	12,627	5	54,000	4.28
	2010	335,714	14,635	4	58,500	3.99

Based on historical consumption of PZQ, the mapping exercise done so far, and discussion on planned coverage for 2011 and 2012, the following assumptions were made—

- The average number of PZQ tablets administered to each child is four (calculated by averaging last column of table 6). This number is based on historical data of number of children treated in 2009 and 2010.
- Coverage will be 100 percent in three regions of Adamawa, Far North, and North.
- Up to 10 percent coverage will exist in Centre and Littoral Regions. The mapping exercise in these regions is still not complete. The program will pursue the year 5 (2011, see table 1) targets with resources as originally planned.
- Existing products will be issued on a FEFO basis, targeting school-aged children.

The projected number of tablets for each region = projected number of children to be covered × average number of tablets per child.

In Adamawa, Far-North, and North Regions, scale-up has been consistent every year based on actual use. Therefore, up to 100 percent coverage is achievable in these regions.

The total expected need for PZQ per region will be computed as shown in table 7. The total number of schoolchildren expected to be treated in 2011 will be approximately 1,280,000 children.

**Table 7. Computation of PZQ Needs**

Region	Coverage (%)	Number of children expected to be treated	Average number of tablets per child	Total PZQ needs to reach projected level of coverage (tablets)
Adamawa	100	163,222	4	652,888
Far North	100	602,082	4	2,408,328
North	100	353,249	4	1,412,996
Centre	10	102,960	4	411,840
Littoral	10	59,357	4	237,428
Total		1,280,870		5,123,480

Based on preceding assumptions of four tablets per child, 5,123,480 tablets of PZQ will be needed for 2011. The physical stock count of PZQ at the national and regional levels was 6,887,409 tablets, of which 489,615 had expired. The total usable stock was 6,397,794. Eighty-eight percent, equivalent to 5,830,000, expires in August 2013, and the remaining 565,794 (12 percent) expires August 2011. Based on the conservative assumptions already enumerated, a total of 5,120,000 tablets of PZQ ( $4 \times 1,280,000$ ) will be used in the 2011 MDA campaign. The closing stock 1,275,794, with an expiry date of August 2013, will serve as a good opening stock for the 2012 campaign. No expiries are anticipated of PZQ in Cameroon, and Cameroon cannot be considered as having an overstock of PZQ.

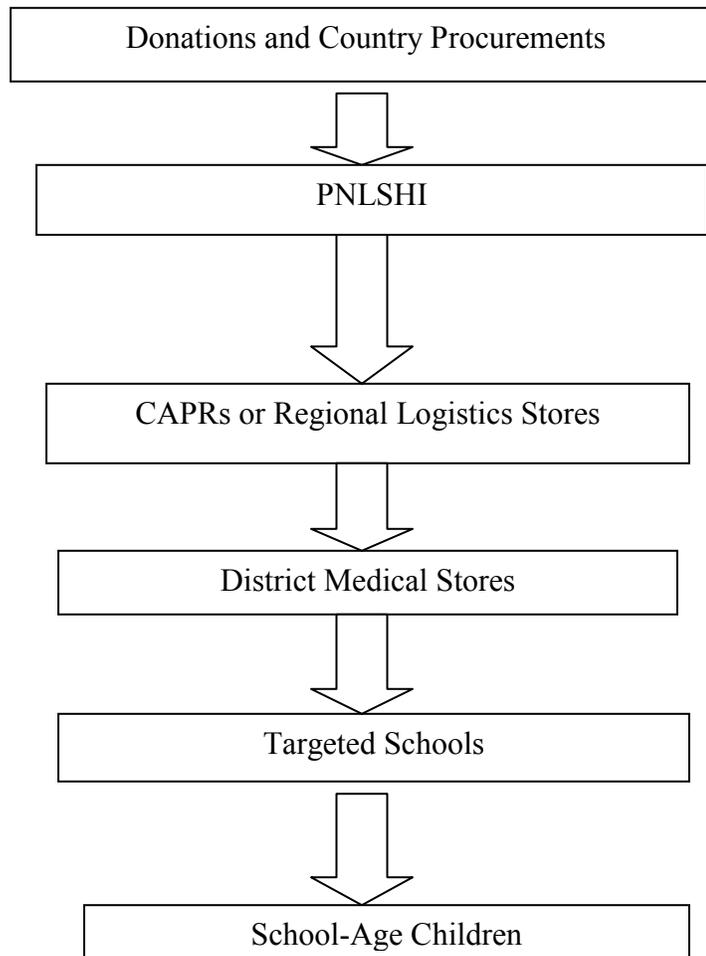
However, this conservative estimate falls short of the projected 1,700,000 schoolchildren targeted to be treated in 2011. A more aggressive MDA (more than 10 percent coverage in the two new regions of Littoral and Centre) will increase consumption of PZQ in 2011, further reducing the risk of an overstock.

### *Distribution*

The schistosomiasis program has a vertical supply system that uses the national pharmaceutical distribution system only at the lower levels. The strategic plan 2005–2010 recommends integration with other diseases at all levels. So far, the schistosomiasis and STH mass administration activities are fully integrated.

Delivery of PZQ starts from the central PNLSHI level through the regional-level CAPRs or regional logistics offices, as the case may be, to the district stores, and finally to the schools. This operation is facilitated by excellent cooperation and collaboration between MoH and Ministry of

Education (MoE). As shown in figure 2, the PZQ distribution chain has four levels of storage (national, regional, district, and schools).



**Figure 2. The PZQ distribution system**

### ***Management Support for Pharmaceutical Management System***

To track PZQ consumption and improve reporting, the PNLSHI has developed and distributed a set of tools to be filled out by the schools and stores during MDA. Each school is asked to summarize the school's total consumption. This summary is in turn passed on to the district education officer for districtwide collation of consumption data, which is then submitted to the district health management team for onward submission to the regions and finally to the PNLSHI. However, this process is usually not adhered to, and where it is done, data are sent very late, thereby reducing their availability of timely strategic supply planning information for procurement decisions.

Increased supervisory visits and resources for supervision by the program are required to verify the opening stocks, consumption, and closing stocks of PZQ during and after MDAs. The current

focus of the program appears to be on tracking the stock at the national level, but capacity of the program to monitor stocks along the supply chain needs to be improved. The information flow back up the supply chain needs strengthening to support the quantification for the next campaign year. With approximately 6,000 schools, 80 districts, and five CAPRs distributing PZQ during MDAs, a statistically sound sampling frame for post-MDA use verification may be required to estimate the stock position.

Despite limitations of time and long travel distances, as well as inability to visit districts and schools, the stock status assessment at the PNLSHI, the four regional stores, and two district stores and observations made revealed a number of strengths of the pharmaceutical management of PZQ in the PNLSHI supply system as well as some weakness meriting action.

### **Strengths of the Schistosomiasis Program**

- Operation of a national schistosomiasis and helminthiasis control program based on excellent cooperation and collaboration among the MoH, the MoE, WHO, and donors, with HKI technical assistance
- Presence of a documented memorandum of understanding on collaboration for medicine distribution between the MOE and the MOH from central to lower level
- Institutionalized post-MDA feedback and evaluation meetings at the national and regional level to review the MDA identify weaknesses and activities that went well and make recommendations for improving the next MDA

### **Weaknesses of the Schistosomiasis Program**

- Retrieval of information on consumption for strategic decision making along the supply chain after an MDA appears poor or delayed.
- Poor storage conditions for PZQ exist across the whole supply system.
- The PNLSHI is a vertical program independent of the CENAME and the CAPRs, unlike other public health programs.
- FEFO methodology is not used at the regional level, leading to large quantities of expired medicines.

## RECOMMENDATIONS

- Conduct an end of 2011 campaign stock use verification exercise to ascertain the true level of distribution, which should then be incorporated into the forecast and quantification for the coming years.
- Support the PNLSHI's monitoring and evaluation team to undertake supervision during and after MDAs to ensure effective use and retrieval of unused PZQ.
- Train staff of HKI and PNLSHI on supply planning to increase country-level understanding of the ordering process and increase ability to generate data for strategic decision making during national procurement of PZQ.
- Undertake an options analysis of the PZQ supply chain (function of CENAME and the integrated public supply system compared to present vertical system).
- Link the PZQ distribution to the essential medicine supply system at the regional level, and task the CAPRs to be involved in data and information collection.
- Involve CAPR staff in PNLSHI training and review meetings to ensure buy-in and clear understanding of MDA processes.

Although the assessment did not focus on financial issues surrounding MDAs, a number of regional persons interviewed recommended that the existing per diem payment system for CDDs, schoolteachers, and supervisors involved in the MDAs should be stratified by making partial payment of their per diems before MDAs but not paying the final portion until after submission of drug use forms and return of unused PZQ.



## APPENDIX 1A. ACTUAL PERFORMANCE, 2009

Regions	Number of health districts	Number of sub-divisions	Number of schools targeted	Number of schools dewormed	Total number of children registered	Schistosomiasis			Praziquantel			
						Total number of children treated for schistosomiasis in schools	Treatment coverage for schistosomiasis (%)	School coverage (%)	Number of PZQ tablets available in 2009 at PNLSHI	Number of PZQ tablets sent by PNLSHI to regions	Number of PZQ tablets remaining in the regions	Number of PZQ tablets remaining at PNLSHI
Adamawa	8	21	679	653	189,146	149,956	79	96		477,000		
Far North	28	43	1,769	1,734	568,870	460,877	81	98		1,718,000		
North	13	21	1,004	596	327,286	258,446	79	59		977,800		
Centre	28	60	2,426	2,077	686,400	0		86		0		
East	14	33	777	494	223,923	0		64		0		
Littoral	18	34	1,141	1,107	265,399	12,627	5	97		54,000		
North-West	18	33	1,592	1,444	356,081	0		91		0		
West	20	39	1,730	1,715	463,309	0		99		0		
South-West	18	28	964	740	160,158	0		77		0		
South	10	29	808	619	117,848	0		77		0		
Total Cameroon	175	341		11,179		881,906		87	4,110,000	3,226,800		883,200

## APPENDIX 1B. ACTUAL PERFORMANCE, 2010

Regions	Number of health districts	Number of sub-divisions	Number of schools targeted	Number of schools dewormed	Schistosomiasis		Praziquantel		
					Total number of children treated for schistosomiasis in schools	Treatment coverage for schisto- (%)	Number of PZQ tablets available in 2010 at PNLSHI	Number of PZQ tablets sent by PNLSHI to the regions	Number of PZQ tablets remaining at PNLSHI
Adamawa	8	21	682	681	163,222	93		0	
Far North	28	61	1,782	1,842	563,469	94		0	
North	15	22	1,150	1,077	260,727	74		0	
Centre	29	64	2,518	2,196	46,153	7		0	
East	14	33	825	742	0			0	
Littoral	19	34	1,498	1,472	14,635	4		0	
North-West	18	34	1,876	1,559	0			0	
West	20	40	1,721	1,715	0			0	
South-West	18	28	940	880	0			0	
South	10	29	817	756	0			0	
Total Cameroon	179	366	13,809	12,902	1,048,206		4,268,400	3,836,400	432,000

## APPENDIX 2. COLLABORATORS AND PARTNERS

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