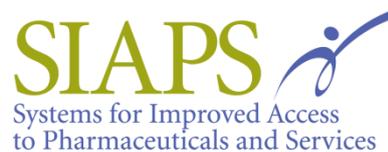


SIAPS/PMI - AMDM Scale-Up Sites Baseline Assessment

Hailu Tegegnetwork and Fikadu Deme

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The goal of the Systems for Improved Access to Pharmaceuticals and Services (SIAPS) Program is to assure the availability of quality pharmaceutical products and effective pharmaceutical services to achieve desired health outcomes. Toward this end, the SIAPS result areas include improving governance, building capacity for pharmaceutical management and services, addressing information needed for decision-making in the pharmaceutical sector, strengthening financing strategies and mechanisms to improve access to medicines, and increasing quality pharmaceutical services.

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Systems for Improved Access to Pharmaceuticals and Services
Center for Pharmaceutical Management
Management Sciences for Health
4301 North Fairfax Drive, Suite 400
Arlington, VA 22203 USA
Telephone: 703.524.6575
Fax: 703.524.7898
E-mail: siaps@msh.org
Website: www.siapsprogram.org

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ACRONYMS

ACT	Artemisinin-based combination therapy
AL	Artemether-lumefantrine
AMD	Antimalarial drug
AMDM	Antimalaria drugs management
ARV	Antiretroviral
CDC	US Centers for Disease Control and Prevention
DHO	District health office
E.C.	Ethiopian calendar
FMOH	Federal Ministry of Health
HC	Health center
HF	Health facility
IPD	Inpatient department
IPTp	Intermittent preventive treatment of malaria in pregnancy
IRS	Indoor residual spraying
ITN	Insecticide-treated net
LMIS	Logistics management information system
mg	milligram
MOH	Ministry of Health
MOP	Malaria operational plan
MSH	Management Sciences for Health
NMDTG	National Malaria Diagnosis and Treatment Guidelines
NMDTS	National Malaria Diagnosis and Treatment Strategy
OI	Opportunistic infection
OPD	Outpatient department
PF	Plasmodium falciparum
PM	Plasmodium malariae
PMI	President's Malaria Initiative
PMIS	Pharmaceutical management information system
PO	Plasmodium ovale
PSMS	Pharmaceutical supply management system
PV	Plasmodium vivax
RDT	Rapid diagnostic test
RHB	Regional health bureau
RHZE	Rifampicin + isoniazid + pyrazinamide + ethambutol
RTA	Regional technical advisor
SIAPS	Systems for Improved Access to Pharmaceuticals and Services
SNNPR	Southern Nations, Nationalities and Peoples' Regional State
SP	Sulfadoxine-pyrimethamine
SPS	Strengthening Pharmaceutical Systems
ZHD	Zonal health department

INTRODUCTION

The President's Malaria Initiative (PMI) is an interagency initiative led by the US Agency for International Development (USAID) with the US Centers for Disease Control and Prevention (CDC). PMI aims to reduce malaria-related mortality by 50% in 15 countries in sub-Saharan Africa by 2010. It plans to meet this goal by achieving 85% coverage of the most vulnerable groups—children under 5, pregnant women, and people living with HIV and AIDS—using proven preventive and therapeutic interventions, including artemisinin-based combination therapies (ACTs), insecticide-treated nets (ITNs), intermittent preventive treatment of malaria in pregnancy (IPTp), and indoor residual spraying (IRS).

Malaria in Ethiopia

Malaria is one of the leading communicable diseases in Ethiopia. Almost 75% of Ethiopia's land mass is malarious, whereby 68% of the population is at risk of contracting malaria. Furthermore, 60% of malaria cases are caused by *Plasmodium falciparum* (PF) and 40% by *Plasmodium vivax* (PV). In most parts of Ethiopia, the transmission of malaria is largely unstable in character and seasonal because of the altitude and climatic factors.

In October 2006, Ethiopia was selected as a focus country for PMI. The PMI resources allocated to Ethiopia target the Oromia Regional State, the country's largest administrative region and the one bearing the brunt of the country's malaria burden. Overall systems support that is provided will benefit central management at the federal Ministry of Health (FMOH) and in the other regions.

In 2007, the Ethiopia Malaria Operational Plan (MOP), which outlines activities to be supported by PMI, identified Strengthening Pharmaceutical Systems (SPS)/Management Sciences for Health (MSH) as its partner for providing technical assistance and support to PMI regarding antimalaria drugs management (AMDM). In 2012, Systems for Improved Access to Pharmaceuticals and Services (SIAPS), a successor of SPS implemented by MSH, continued to implement the AMDM activities to ensure the availability of high-quality pharmaceutical products and effective pharmaceutical services to achieve desired health outcomes. To that end, the SIAPS areas of focus include improving governance, building capacity for pharmaceutical management and services, addressing information needed for decision-making in the pharmaceutical sector, strengthening financing strategies and mechanisms to improve access to medicines, and increasing high-quality pharmaceutical services.

METHODOLOGY

Scope and Objective

This is a focused, rapid, participatory, and comprehensive baseline assessment, intended to gather operational information for the purpose of identifying immediate gaps and undertaking appropriate interventions.

Sample Sites

All selected sites were assessed except Gambella Region health facilities (HFs), from which data was not collected due to security problems in that area during the assessment period.

USAID/PMI selected the sites and the PMI/AMDM office conducted the mapping of the assessment locations. The assessment target areas included the following:

- Hospitals and health centers (HCs) = 76 HFs (with their respective laboratories and pharmacy units)
- Regional, zonal, and district health offices

Sites were selected from all regions of the country except Oromia region.

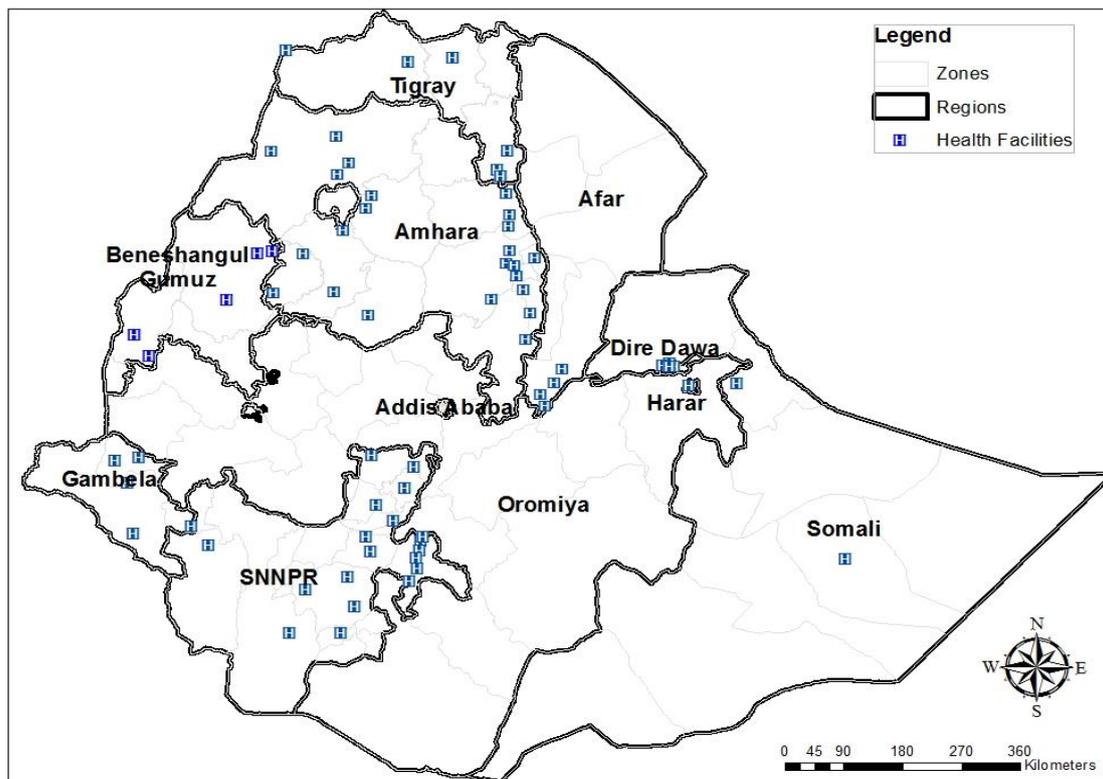


Figure 1. Assessment map

Assessment Teams and Training

SIAPS regional technical advisors (RTAs) conducted the assessment, and the respondents of the assessment were staff members from the Regional Health Bureau (RHB), District Health Office (DHO) and health facility personnel. A training and orientation program was organized for the data collection team on the AMDM assessment. The training focused on the national and international incidence of malaria, the purpose of the assessment, the assessment questionnaires, and how to conduct the assessment.

Assessment Tools and Informants

- Three structured questionnaires were used to collect the baseline assessment.
- The assessment tools included both qualitative and quantitative questions.
- The respondents were pharmacists, laboratory personnel, prescribers from HFs, and personnel representing the supply sector from RHBs, Zonal Health Departments (ZHDs), and DHOs.

Limitations

- The baseline assessment did not contain a pre-test of the questionnaires, but they were discussed with the RTAs, who were familiar with the questionnaires.
- The sample sites were not statistically selected but chosen based on prevalence and representation of intervention targets.
- The assessment is not designed to be a scientific study but a guide for intervention planning.
- Five HFs (one hospital and four HCs) in Gambella Region were not assessed due to the security problems at the time of the assessment.
- Quantitative data such as the number of malaria cases tested and cases treated were not complete due to the weak recording systems at the HFs assessed.

Table 1. Topics Covered in the Questionnaires

Parameters	Explanations
Providers` knowledge status	The questionnaire to providers (e.g., physicians, health officers, nurses, and pharmacy personnel) contained questions regarding malaria diagnosis and treatment, and other issues. The responses obtained were compared with the correct answers as indicated in the <i>National Malaria Diagnosis and Treatment Guideline</i> .
Training status	The interviewees were asked whether they had received training on the new malaria treatment guidelines.
Availability of malaria treatment guidelines	The respondents were asked if they have received guidelines (i.e., the <i>National Malaria Strategy Manual</i> and the <i>National Malaria Diagnosis and Treatment Guideline</i>).
Availability and expiry of malaria, tuberculosis (TB), and HIV/ opportunistic infection (OI) medicines and of laboratory reagents and commodities	On the day of the assessment visit, the data collectors went into the drug stores, dispensary areas, and laboratories to check the availability of important key tracer medicines and laboratory products. They also checked for the presence of expired products and asked for how long they had had stock-outs.
Storage status	Proper storage was assessed through direct observations on such factors as cleanliness, how stocks were arranged, labeling, the existence of adequate space, and the availability of shelves and pallets. The responses show the percentage of facilities with the indicated variables.
Disposal status	Disposal status was assessed by checking such factors as the presence of expired or damaged products, quantity of the expired stock, and whether expired or damaged items are stored separately from active stock. The responses show the percentage of facilities that claimed to have disposed of expired, obsolete, or damaged products.
Logistics management information system (LMIS) and reporting status	The assessment examined the presence and use of stock cards, bin cards, treatment registers, and computers, including reporting their status to higher levels. The responses show the percentage of facilities that respond whether they have the elements assessed.

SURVEY FINDINGS AND ANALYSIS

General Assessment and Targets

The general questions about health services were designed to obtain information on the types of facilities, the services they provide, staffing, testing results, morbidity, and treatment through interviews and document reviews at the facility level.

In total, 141 public health service units from all PMI/AMDM new expansion regions except Gambella were included in the assessment (table 2 and figure 1). Of those, the greatest number, 37%, were in the Amhara region and the lowest, 2%, were in the Harari region. The health service units surveyed included 72 (51%) that were ZHDs and DHOs, while 69 (49%) were HFs, including hospitals and HCs.

Table 2. Survey Area

Region	Hospital	HC	DHO	ZHD	Total	Percentage
Tigray	4	6	6	-	16	11.3
Harari	1	1	-	-	2	1.4
Dire Dawa	1	4	-	-	5	3.5
Afar	2	2	2	-	6	4.3
Amhara	5	16	24	7	52	37
Somali	1	2	1	-	4	3
Benishangul-Gumuz	2	5	5	2	14	10
Southern Nations, Nationalities, and Peoples' Regional State (SNNPR)	7	10	15	10	42	30
Total	23	46	53	19	141	100

In total, 204 health service providers were included in the assessment, as shown in table 3. The breakdown is as follows—

- 69 (34%) were in clinical practice—medical doctors, health officers, and nurses
- 67 (33%) were pharmacy professionals—pharmacists, druggists, and pharmacy technicians and nurses assigned to a pharmacy practice
- 68 (33%) were laboratory professionals—laboratory technologists and technicians

Table 3. Number and Professional Category of Providers Interviewed

Region	Pharmacy Professionals				Prescribers			Laboratory Staffs		
	Pharmacist	Pharmacy Technician	Druggist	Nurse	Health Officer	Internist	Medical Director	Nurse	Laboratory Technician	Laboratory Technologist
Tigray	3	5	2	0	5	0	0	5	7	3
Harari	1	0	1	0	1	0	0	1	2	0
Dire Dawa	2	0	3	0	4	0	0	1	2	3
Afar	0	1	2	1	2	0	0	2	3	1
Amhara	8	7	6	0	14	1	0	6	11	9
Somali	2	1	0	0	0	0	0	3	3	0
Benshangul-Gumuz	2	1	2	0	5	0	1	1	4	3
SNNPR	6	4	7	0	7	0	5	5	10	7
Total	24	19	23	1	38	1	6	24	42	26
	67				69			68		

All hospitals and HCs are expected to have outpatient departments (OPDs) and inpatient departments (IPDs) that provide outpatient and inpatient (i.e., admitted patient) services (table 4).

Table 4. Availability of Selected Services

Indicators		Type of HF			
		Hospital and %		HC and %	
Does the facility have an OPD?	Yes	23	100%	46	100%
	No				
Does the facility have an IPD?	Yes	22	96%	38	83%
	No	1		8	
Does the facility have a pharmacy unit with a dispensary?	Yes	23	100%	44	96%
	No	0		2	4%
Does the facility have a counseling area?	Yes	8	36%	16	35%
	No	14	64%	30	65%
Does the facility have a separate store?	Yes	13	59%	24	52%
	No	9	41%	22	48%
Is the DHO located in the facility?	Yes	0	0%	13	30%
	No	19	95%	30	68%
	NA	1	5%	1	2%
Does the facility drug store also serve as the district drug store?	Yes	2	67%	9	20%
	NA	1	33%	1	2%
Are HIV, OI, malaria, and TB drugs stored in the same store?	Yes	16	73%	43	93%
	No	6	17%	3	7%

Health service facilities comprised of 23 hospitals and 46 HCs were asked about the type of patient and pharmacy services they provide. Important observations made include the following:

- All of the hospitals and HCs are functional in that they all have an OPD unit while almost all (96%) of the hospitals and most of the HCs (83%) operate an inpatient unit.
- All of the hospitals and 96% of the HCs have a pharmacy unit with a dispensary while only 36% of the hospitals and 35% of the HCs have a medicine counselling area for patients.
- The availability of storage space for medicines is limited both at the HCs (52%) and at the hospitals (59%).
- About 30% of the DHOs are located in the same compound as the HCs and 20% of the HCs share their store with DHOs. On the other hand, about three-quarters of the hospitals (73%) and 93% of the HCs have HIV, OI, malaria and TB drugs stored in the same store.

Malaria Diagnosis in Hospitals and HCs

The current (June 2004) *National Malaria Diagnosis and Treatment Guidelines* recommend that malaria treatments in all clinically suspected cases should be based on a laboratory diagnosis for the parasite species using a microscopic method at hospitals and HCs and rapid diagnostic test (RDT) diagnosis at the health-post level.

Thus, the assessment included questions about the percentage of suspected malaria cases the clinicians sent to the laboratory for microscopic confirmation. The findings included the following:

About 70% of prescribers at hospitals and more than 80% of prescribers at HCs always send clinically suspected malaria cases for testing. Only 17% of prescribers in hospitals and 11% in HCs stated that they asked for laboratory diagnosis for fewer than 75% of their patients. Although this appears to be a strong indication of adherence to the guidelines, the findings also show there are prescribers who need to show improvement with regard to sending all suspected cases for laboratory confirmation.

Table 5. Percentage of Prescribers Who Send Suspected Malaria Cases for Microscopy Testing

		Sent for Laboratory Confirmation			
		100% of the Time	75–99% of the Time	<75% of the Time	Total
Hospital	Count	16	3	4	23
	%	69.6%	13.0%	17.4%	100.0%
HC	Count	37	4	5	46
	%	80.4%	8.7%	10.9%	100.0%
Total	Count	53	7	9	69
	%	76.8%	10.1%	13.0%	100.0%

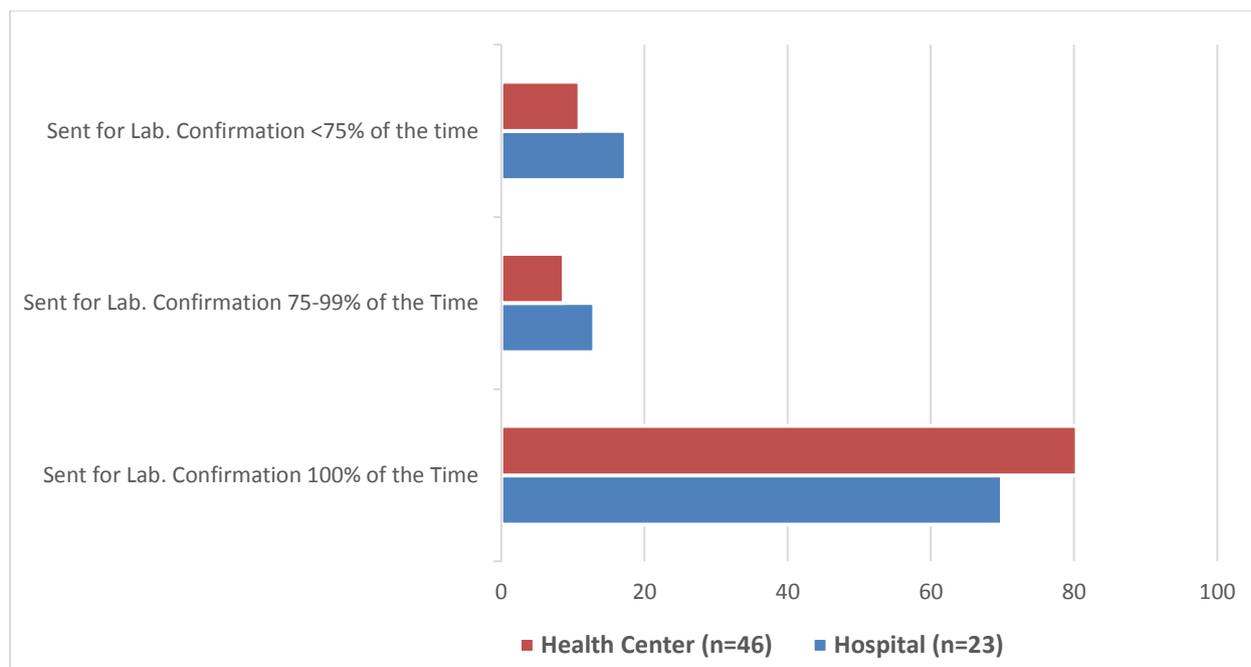


Figure 2. Percentage of prescribers who send suspected malaria cases for microscopy testing

Availability of the National Malaria Diagnosis and Treatment Strategy and National Malaria Diagnosis and Treatment Guidelines

The FMOH produced the National Malaria Diagnosis and Treatment Strategy (NMDTS) and the National Malaria Diagnosis and Treatment Guidelines (NMDTG), which are based on the national prevailing disease conditions and the malaria parasite susceptibility to existing drugs. For better adherence, health providers at the different levels should be trained to implement the current guidelines. In the assessment, we sought to determine the availability of the guidelines at the different service areas and categories (prescribers, dispensers, and program coordinators at zonal and district levels), and if trainings have been provided on malaria case managements based on the current guidelines. The results are shown in tables 6 and 7.

Table 6. FMOH Malaria Diagnosis and Treatment Guidelines Availability and Training in Malaria Drugs Management (Dispensers)

Dispensers	Are the FMOH Malaria Diagnosis and Treatment Guidelines Available? (n=68)		Trained in Malaria Drugs Management? (n=69)	
	Yes	No	Yes	No
Hospital	1.5%	30.9%		33.3%
HC	7.4%	60.3%	1.4%	65.2%
Total	8.8%	91.2%	1.4%	98.6%

Table 7. FMOH Malaria Diagnosis and Treatment Guidelines Availability and Training in Malaria Drugs Management (at Prescribers' Level)

Prescribers	Are the FMOH Malaria Diagnosis and Treatment Guidelines Available? (n=67)		Received Refresher Training on Malaria Case Management? (n=69)	
	Yes	No	Yes	No
Hospital	9.0%	25.4%	4.3%	29.0%
HC	11.9%	53.7%	10.1%	56.5%
Total	20.9%	79.1%	14.5%	85.5%

Table 8. FMOH Malaria Prevention and Control Strategy Documents Availability and Refresher Training in Malaria Drugs Management

Organization	Are the FMOH Malaria Prevention and Control Strategy Documents Available?		Are the FMOH Malaria Diagnosis and Treatment Guidelines Available?		Received Refresher Training in Malaria Drugs Management?	
	Yes	No	Yes	No	Yes	No
Hospital (n=23)			1.5%	30.9%	0%	33.3%
HC (n=46)			7.4%	60.2%	1.4%	65.3%
DHO (n=52)	26.9%	73.1%	43.1%	56.9%	26%	74%
ZHD (n=19)	42.1%	57.9%	77.8%	22.2%	15.8%	84.2%

- The overall availability of the NMDTG is significantly lower—only 20.9% at the prescribers' level and 8.8% at the dispensers' level at hospitals and HCs.
- Although the availability of both the Malaria Control Strategy document and the NMDTG at ZHDs (42.1%) and DHOs (26.9%) is not satisfactory, they are higher percentages than those at the HFs. Similarly, the NMDTG is more available at the coordination offices—77.8% at ZHDs and 43.1% at the DHOs. In short, the NMDTG should have been the daily reference handbook for the staffs that are actually conducting the routine diagnosis, treatment, and dispensing practices.
- Concerning trainings conducted on the types of services provided, 85.5% of prescribers said they have not received trainings in malaria case management while 98.6% of the dispensers said they have not received trainings in the management of malaria drugs management. Further, 74% of respondents from DHOs and 84.2% from ZHDs also have not received trainings in malaria drugs management

Availability and Use of Standard Prescription Forms

Prescriptions are basic documents specifying the prescribers' intentions regarding the drug order for a patient that the dispenser should fill accordingly. In addition to being a means of clear communication between the prescriber and dispenser, they are also legal documents showing the type and quantity of drugs provided to the patient. The questionnaire also sought information on the availability of the prescription paper and its proper use both at the facility and region levels.

Table 9. Comparative Availability of Standard Prescriptions at HCs and Hospitals

		Type of HF		Total
		Hospital	HC	
Facilities Having a Standard prescription Paper	Yes	16 (69.6%)	12 (26%)	28
	No	7 (30.4%)	34 (74%)	41
Total		23	46	69

Table 10. Availability and Use of Standard Prescription Forms at HCs and Hospitals in Each Region

Region of the Health Facility		Have a Standard Prescription Paper?		Does the Prescriber Always Enter Full Information on the Prescription?	
		Yes	No	Yes	No
Tigray	Hospital	2	2	0	4
	HC	0	6	0	6
Harari	Hospital	1	-	-	1
	HC	1	-	-	1
Dire Dawa	Hospital	1	-	0	1
	HC	4	-	1	3
Afar	Hospital	1	1		2
	HC	0	2		2
Amhara	Hospital	4	1	1	3
	HC	5	11	3	12
Somali	Hospital	1	0		1
	HC	0	2		2
Benshangul-Gumuz	Hospital	-	2		2
	HC	-	5		5
SNNPR	Hospital	6	1	1	6
	HC	2	8	2	8
Total		28 (40.5%)	41 (59.4%)		

Below are some of the findings at the HFs and overall regional levels:

- While 69.6% of the hospitals responded that they have standard prescription papers, only 26% of HCs said they have standard prescription papers. Findings by region show that 59.4% of the health service facilities (both hospitals and HCs) do not have standard prescription papers. Almost all of the facilities in the different regions also responded that the prescribers do not always enter full information in their prescriptions.
- The absence of standard prescriptions containing all patient and drug use information will hinder the proper documentation of existing pharmaceutical management information system (PMIS) tools. This will also impact follow-up regarding rational use of medicines, especially with respect to prescribing and dispensing antimalaria drugs (AMDs) where only specific drugs are indicated for certain malaria species and contraindicated in certain age groups and presence of pregnancy.

Prevalence of Malaria Parasite Species

According to the data collected on the number of patients who were examined and tested positive for malaria at selected hospitals and HCs in 2002 and 2003 Ethiopian Calendar (E.C.), Amhara and SNNPR are the regions with the highest number of patients treated while Somali and Diredawa are the regions with the lowest. Amhara region treated 99,716 and 68,991 malaria patients in 2002 and 2003 E.C., respectively, while Somali region treated four and two malaria patients in those two years at the target facilities included in the data collection. The number of positive cases for adults and children under five years of age is significantly greatest in SNNPR and Amhara while Diredawa and Somali have the fewest.

Table 11: Number of Patients Who Were Examined and Tested Positive for Malaria at Selected Hospitals and HCs in 2002 and 2003 E.C. (Equivalent to 2010 and 2011)

Region of the HF	2002 E.C.			2003 E.C.		
	Total Treated	Adult (>5 Years)	<5 Years	Total Treated	Adult (>5 Years)	<5 Years
Tigray	45,012	27,392	5,572	42,007	29,352	6,267
Harari	730	.	.	332	27	1
Dire Dawa	6	.	.	15	.	.
Afar	13,002	10,006	2,764	17,318	12,254	3,405
Amhara	99,716	52,121	15,095	68,991	42,862	12,976
Somali	4	4	0	2	2	0
Benshangul-Gumuz	11,862	1,294	379	12,104	4,615	885
SNNPR	77,084	65,765	16,982	73,643	61,434	17,808
Grand Total	247,416	156,582	40,792	214,412	150,546	41,342

Prescribers (n=68) were asked to identify the types of prevalent malaria parasites they encounter in their clinical practice (table 12). These findings are not based on any document review.

Table 12. Prescribers' Responses on Types of Malaria Parasites Encountered

Type of Malaria Parasites	Frequency	%
Mixed	1	1.50%
PV	20	29.40%
PF	47	69.10%
Total	68	100.0%

The responses we received show that the highest prevalence of malaria parasites that the prescribers manage is PF (69.1%), followed by PV (29.4%) and mixed cases (just over 1%). The prevalence of *Plasmodium malariae* (PM) and *Plasmodium ovale* (PO) appears to be rare in the surveyed regions of the country.

The responses we received from the prescribers (table 12) do not support the findings from a records review we conducted (table 13), where about 38,874 malaria-confirmed persons treated in 15 HFs (5 hospitals and 10 HCs) showed an average of 60.4% PF, 38.4% PV, and

1.3% mixed in 2002. In 2003 E.C., on the other hand, 24,954 malaria-confirmed persons were treated and 49.5%, 49.8%, and 0.7% were PF, PV, and mixed, respectively. The data in 2002 is approximately consistent with the national PF/PV ratio, which is reported to be 60% for PF and 40% for PV. However, in 2003 an almost equal number of PF and PV cases were treated at these HFs, indicating an instability of the proportion, which may have an impact on the type of medicines supplied to treat patients.

As shown in tables 13 and 14 below, the total number of cases treated (94,229 in 2002 and 64,255 in 2003 E.C.) is greater than the total number of confirmed cases (38,874 in 2002 and 24,954 in 2003 E.C.). This may be attributable to either poor record keeping or treatment of patients without laboratory confirmation (59% in 2002 and 61% in 2003 E.C.). The large gaps in the findings indicate a need to improve data quality and look at the capacity of laboratories to make species differentiation accurately and consistently, as well as ensure that all patients are diagnosed before they receive treatment for malaria.

Table 13. Malaria Prevalence Findings from Records Review at Targeted HFs in 2002 E.C.

Name of HF	Total Treated	PF Total	PV Total	Mixed Total
Adare Hospital	5,760	2,260	2,917	74
Addis Zemen Health Center	18,219	5,965	1,455	141
Aleta Wondo Town Health Center	674	366	581	11
Assosa Hospital	1,673	197	852	2
Bati Health Center	326	121	41	1
Dangila Health Center	1,235	336	874	5
Dil Chora Hospital	6	5	1	0
Harbu Health Center	5,460	2,206	3,254	0
Jijiga Health Center	4	4	0	0
Koladiba Health Center	25,940	4,078	1,167	89
Kombolcha Health Center	600	475	95	30
National Hospital	2,402	345	10	7
Wolkite Health Center	2,775	1,731	1,023	21
Woreta Health Center	26,647	5,362	2,252	108
Yergalem Hospital	2,508	20	392	0
Grand Total	94,229	23,471	14,914	489

Table 14. Malaria Prevalence Findings From Records Review at Targeted HFs in 2003 E.C.

Name of HF	Total Treated	PF Total	PV Total	Mixed Total
Adare Hospital	2,364	666	1,575	43
Aleta Wondo Town Health Center	1,092	237	1,222	4
Assosa Health Center	1,315	152	724	0
Bati Health Center	1,748	464	198	4
Dangila Health Center	1,275	210	1,064	1
Dil Chora Hospital	6	2	4	0
Dilla Town Health Center	7,797	1,776	1,401	5
Haike Health Center	1,950	48	86	0
Harbu Health Center	1,485	154	1,331	0
Jijiga Health Center	2	1	1	0
Koladiba Health Center	11,686	1,155	1,230	24
Legehare Health Center	9	4	5	0

Name of HF	Total Treated	PF Total	PV Total	Mixed Total
Melkawerer Health Center	11,982	3,435	1,514	2
Metema Hospital	14,890	2,186	464	13
National Hospital	1,396	403	7	5
Wolkite Health Center	2,775	1,424	1,292	59
Yergalem Hospital	2,483	38	312	9
Grand Total	64,255	12,355	12,430	169

Table 15 shows the regional malaria parasites prevalence and proportion of clinical malaria treatment based on data collected from targeted HFs. Somali (100%), Diredawa (83%), and Amhara (70%) are the regions where the PF malaria species is the most prevalent, while Benishangul-Gumuz (81%) and Harari (72%) are the regions where PV malaria exists more. Although there are no cases of PO malaria in other regions, a few cases (0.12%) have been reported in Amhara. According to the report, the proportion of mixed malaria cases is very low in all regions except Tigray, where a significant number of cases (63%) were reported.

On the other hand, Benshangul-Gumuz (91%), Tigray (86%), Amhara (67%), and Afar (50%) contain a substantially higher number of malaria patients treated without laboratory confirmation while Somali (0%), Diredawa (0%) and Harari (1%) contain the fewest. SNNPR treated 23% of those with malaria without laboratory confirmation. This practice of treating malaria patients without laboratory confirmation will have a negative impact both on the quality of treatment and availability of specific antimalarial drugs.

Table 15. Regional Malaria Parasites Prevalence and Proportion of Clinical Malaria Treatment Findings From Records Review at Targeted HFs in 2002 E.C.

Region of HF	Total Treated	PF Total	PV Total	PM Total	Mixed Total	Clinically Treated
Tigray						
Sum	45,012	2,239	150	0	4,020	38,603
N	4	3	2	0	1	
%		35%	2%	0%	63%	86%
Harari						
Sum	730	205	518	0	0	7
N	2	1	1	0	0	
%		28%	72%	0%	0%	1%
Dire Dawa						
Sum	6	5	1	0	0	0
N	1	1	1	1	1	
%		83%	17%	0%	0%	0%
Afar						
Sum	13,002	4,944	1,513	0	7	6,538
N	4	4	4	0	1	
%		76%	23%	0%	0%	50%
Amhara						
Sum	99,716	23,229	9,505	39	393	66,550
N	10	11	9	2	8	
%		70%	29%	0%	1%	67%
Somali						
Sum	4	4	0	0	0	0
N	1	1	1	1	1	
%		100%	0%	0%	0%	0%

Region of HF	Total Treated	PF Total	PV Total	PM Total	Mixed Total	Clinically Treated
Benshangul-Gumuz						
Sum	11,862	197	852	0	2	10,811
N	2	1	1	0	1	
%		19%	81%	0%	0%	91%
SNNPR						
Sum	77,084	25,419	33,675	0	106	17,884
N	13	11	11	3	4	
%		43%	57%	0%	0%	23%
Grand Total						
Sum	247,416	56,242	46,214	39	4,528	140,393
N	37	33	30	7	17	
%		53%	43%	0%	4%	57%

Knowledge of Providers

The assessment was also designed to determine the level of knowledge of the key technical personnel (i.e., prescribers, pharmacy staff, and laboratory staff) at HF's regarding malaria treatment and prevention.

The responses to the questions posed will aid in planning further training and development of learning aids to improve rational prescribing, rational dispensing, and proper counseling—all of which play a key role in achieving treatment goals and promoting better response to treatment. Responses considered correct are based on the *Malaria Diagnosis and Treatment Guideline for Health Workers in Ethiopia* (2nd edition, July 2004).

As shown in Table 16, the overall percentage of prescribers who replied correctly regarding the appropriate antimalarial drugs to recommend for different patients based on the specific malaria parasite and age/pregnancy condition is greater than that of dispensers both at hospitals and HCs. More than 98% and 81% of the prescribers and dispensers, respectively, knew the first line drugs recommended to treat malaria (PF, PV, and severe malaria). However, the percentages of prescribers and dispensers who correctly chose the right antimalarial drug for pregnant women and children <5 kg fell to 79% and 68%, respectively. These findings demonstrate a need to provide training and guidelines to ensure they possess this knowledge.

Table 16: Knowledge of Providers

Type of HF		First-line Drug for Uncomplicated <i>P. Falciparum</i>		First-line Drug for PV		First-line Drug for Severe Malaria		Drug for Pregnant Woman and Children <5 kg		Drugs Recommended for Malaria Prophylaxis in Pregnant Women	
		HL	HC	HL	HC	HL	HC	HL	HC	HL	HC
Prescribers	Count	22	46	23	45	22	44	19	34	3	3
	%	95.7%	100%	100%	98%	95.7%	95.6%	82.7%	75.5%	14.3%	7.1%
Dispensers	Count	18	37	15	34	20	37	13	35	1	3
	%	81.8%	84.1%	68.2%	77.3%	90.9%	82.2%	59.1%	76.1%	5.3%	6.8%

Staffing Status

We obtained information on the staff categories and the extent of their qualifications in the pharmacy and laboratory units to determine staffing patterns and their adequacy to conduct and support the proper diagnosis, pharmaceutical supply and dispensing, and counseling services at their facilities.

Table 17: Pharmacy Staff at Hospital and HC

Type of HF	Region of the HF	Pharmacist	Druggist	Pharmacy technician	Pharmacy clerk
Hospital	Tigray (n=3)	13	4	11	0
	Harari (n=1)	4	12	.	2
	Dire Dawa (n=1)	9	4	.	2
	Afar (n=1)	1	3	.	.
	Amhara (n=5)	26	38	5	6
	Somali (n=1)	2	7	.	.
	Benshangul-Gumuz (n=2)	4	10	2	2
	SNNPR (n=7)	24	53	8	12
	Sum	83	131	26	24
HC	Tigray (n=6)	0	9	13	0
	Harari (n=1)	0	2	0	0
	Dire Dawa (n=4)	1	9	.	0
	Afar (n=2)	1	5	.	1
	Amhara (n=16)	10	37	8	10
	Somali (n=2)	1	3	.	.
	Benshangul-Gumuz (n=5)	.	7	5	.
	SNNPR (n=10)	4	25	7	0
	Sum	17	97	33	11
Grand Total		100	228	59	35

In general, the assessment team found there were 83 pharmacists, and 157 druggists and pharmacy technicians in the 21 assessed hospitals (Table 17). On the other hand, we found 100 pharmacists, 287 druggists and pharmacy technicians, and 35 data clerks in the assessed 46 HCs.

Product Availability

A total of 31 key tracer medicines and other products (of which approximately 29% are laboratory products) used in malaria, TB, and HIV/OI management were selected for assessing availability and expiry.

The assessment revealed that the overall availability of AMDs is 83% at hospitals and 74% at HCs. The availability of an AMD (chloroquine) for treating PV malaria is better than that for PF malaria (artemether-lumefantrine, or AL) both at hospitals and HCs. The availability of chloroquine is 78% and 72%, at hospitals and HCs, respectively, while the availability of AL is 91% and 83%, respectively.

Quinine tablets, which are recommended for treatment of uncomplicated PF malaria in pregnant women during the first trimester and in children under 5kg, are not available at 13%

of the hospitals and 35% of the HCs, which requires improvement. Although the reason why HFs are stocking sulfadoxine-pyrimethamine (SP) was not included in the questionnaire, it was available at more than 21% of the hospitals and 245 of the HCs (Table 18). Due to resistance to malaria parasites, SP is not recommended for treatment of malaria in Ethiopia.

Table 18. Availability of Antimalaria Product at the Time of Visit

HF	SP	AL 6	AL 12	AL 18	AL 24	Chloroqu Tab	Chloroqu Syr	Quinine Tab	Quinine Inj
Hospital									
N	5	20	19	18	19	21	17	20	22
%	21.7%	87.0%	74.0%	78.3%	74.0%	91.3%	74.0%	87.0%	95.6%
HC									
N	11	31	35	31	36	38	37	30	35
%	24.0%	67.4%	76.1%	67.4%	78.3%	82.6%	80.4%	65.2%	76.1%

Stock-Out Days for AMDs

The number of stock-out days for products used to treat malaria is higher at hospitals than at HCs. The average number of stock-out days for chloroquine syrup (>191) is highest at hospitals while that of quinine tablets (>203) is highest at HCs. RDTs are not expected to be available at hospitals since they are not recommended at HCs and hospitals (Table 19).

However, since HCs are the source of supply of RDTs and other medicines for health posts, they should not have experienced stock-outs of RDTs. This situation requires attention and improvement.

Table 19. Stock-Out Days for AMDs at HFs

HF		SP	AL				Chloroqu		Quinine		RDT
			6	12	18	24	Tab	Syr	Tab	Inj	
Hospital	Sum	730		730		730		730		730	365
	Avg	182.5		182.5		182.5		182.5		182.5	365
	N	4	1539	4	1539	4	1539	4	1539	4	1
HC	Sum	760		760		760		760		760	820
	Avg	126.67		126.67		126.67		126.67		126.67	273.33
	N	6	1084	6	1084	6	1084	6	1084	6	3

Expiry of Malaria Medicines in Assessed HFs

Overall the availability of expired AMDs at the HFs assessed is very low. Other than a few hospitals and HCs in Amhara and a limited number of HCs in Diredawa, other regions have experienced a very low expiry of AMDs. However, the quantities of AL and quinine tablets that expired at HFs are more than the others and are significant. With weak record keeping and stock status tracking, and congested storage, the presence of expired products that have not been disposed of alongside active products gives an incorrect impression of having stock. Active inventory management and disposal of unusable products are key interventions that lay the foundation for ensuring reliable information for forecasting need and efficient management of space.

Table 20. Expired Quantities of AMDs

HF	Region	SP	AL 6	AL 12	AL 18	AL 24	Chloroqu Tab	Chloroqu Syr	Quinine Tab	Quinine Inj
Hospital	Dire Dawa	0	0	0	0	576	0	0	0	0
	N	0	0	0	0	1	0	0	0	0
	Afar	0	0	0	60		0	0	1500	0
	N	0	0	0	1		0	0	1	0
	Amhara	0	1980	1800	7650	9360	0	0	0	0
	N	0	1	1	2	1	0	0	0	0
	Benshangul-Gumuz	0	0	0	0	120	0	0	0	0
	N	0	0	0	0	1	0	0	0	0
	SNNPR	0	0	0	0	0	0	0	19600	0
	N	0	0	0	0	0	0	0	1	0
	Tigray	0	120	0	720	0	0	0	0	0
	N	0	1	0	1	0	0	0	0	0
HC	Dire Dawa	0	450	540	60	0	0	0	0	0
	N	0	1	1	1	0	0	0	0	0
	Afar	0	0	0	0	0	0	0	15	0
	N	0	0	0	0	0	0	0	1	0
	Amhara	0	60	338	406	777	0	60	2700	100
	N	0	2	3	2	3	0	1	1	1
	SNNPR	0	60	0	0	0	0	0	0	200
	N	0	1	0	0	0	0	0	0	1

TB Medicines Availability

The overall availability of TB medicines at the surveyed HFs is at least 75%. Further, 71% of hospitals and 58% of HCs stated that they have TB drugs while the other facilities reported stock-outs. However, compared to other TB drugs, availability of the four-drug combination rifampicin, isoniazid, pyrazinamide, and ethambutol (RHZE) is the highest both at hospitals and HCs. (table 21). These findings illustrate the need for increased TB drugs availability at HFs in these regions.

Table 21. Availability of TB Medicines at the Time of Visit

Type of HF		RHZE 150/75/400/27 5 mg	RH 150/75 mg	Ethambutol 400 mg	INH 100 mg and 300 mg	Streptomycin 1 g	Determine/ KHB
Hospital	N	21	20	13	15	13	16
	%	91.3%	87%	56.5%	65.2%	56.5%	69.5%
HC	N	33	33	13	28	21	31
	%	71.7%	71.7%	28.3%	60.8%	45.6%	67.4%

Availability of HIV/OI Medicines: Stock-Out Days for Antiretroviral Drugs at HFs

Overall, stock-outs of antiretroviral (ARV)/OI medicines are higher at HCs than hospitals. Stock-out of stavudine is greater at both HCs and hospitals than it is for other ARV medicines, and stock-out of fluconazole is greater than it is for other OI medicines.

Table 22. Stock-Out Days for ARV Drugs at HF's

HF		Lamivudine 30 mg/ Zidovudine 60 mg Tab	Lamivudine 150 mg Tab	Stavudine 15 mg Caps	Efavirenz 15 mg Caps	Nevirapine 10 mg/ml Sus	Fluconazole Tab	Co-trimoxazole Tab	Ciprofloxacin Tab
Hospital	Sum	34	597	730	627	6	1727	0	141
	Avg.	11.3	149.25	365	125.4	6	215.8	0	47
	N	3	4	2	5	1	8	0	3
HC	Sum	485	877	1670	1343	121	1240	62	1480
	Avg.	161.67	219.25	278.3	223.8	40.3	310	31	164.4
	N	3	4	6	6	3	4	2	9

Table 23. Availability of Laboratory Reagent and Tools at the Time of Visit

Facility	RDT	Geimsa stain	Methanol	Acetone	Glycerin	Denatured Oil	Immersion Oil	Binocular Microscope	Microscope Objective (x100)	
Hospital	N	1	17	11	13	10	18	19	15	9
	%	4.3%	74%	48%	56.5%	43.5%	78.3%	82.6%	65.2%	39%
HC	N	16	30	26	19	15	30	39	32	17
	%	35%	65.2%	56.5%	41.3%	32.6%	65.2%	85%	69.5%	37%

Laboratory Commodities Availability

To assess the availability of laboratory-related products, the team used nine tracer products including microscopes. The findings indicate that availability of key laboratory-related products and supplies for microscopic malaria diagnosis is low both at hospitals and HCs. For example, Geimsa stain was available at 74% of the hospitals and only 65% of the HCs, demonstrating an inadequate supply of this reagent to diagnose malaria patients. Similarly, not all hospitals (65%) and HCs (69%) have binocular microscopes. Only 39% of the hospitals have microscope objectives suitable for differentiating species (x100 objective), and just over 82% have immersion oil (Table 23).

Storage and Store Accessories

Key indicators considered in assessing storage and handling of medicines include availability of shelves, pallets, refrigerators, organized storage, segregation and disposal of expired or obsolete products, and incidence of theft or loss. Medicines must be handled properly and stored under the right conditions, expired medicines must be disposed of properly, and security must be maintained. Medicines that are not properly handled will be adversely affected, and their effectiveness and safety will be compromised to a degree that they either will not help the patient or may bring harm to the patient. Because medicines are extremely sensitive products that can easily be affected and lose their medical properties, findings of improper store management practices and lack of concern or required attention by management in the assessment is quite troubling.

The assessment in general showed that the storage conditions at all levels are inadequate and do not meet professional standards. Many expired products congest the space, which could otherwise be used for storing useable products. About 38% of assessed HCs and 30% of the hospitals do not have good storage conditions. Only 54% of the hospitals and 30% of the HCs have adequate storage spaces for medicines, indicating that storage space improvement is needed. The overall segregation of expired drugs from active ones is very low in all regions but better at hospitals than at the HCs.

Table 24. Storage Condition and Availability of Store Accessories

Region of the HF		Adequate Storage Space?		Ceiling Intact?		Carton/Box Packed Drugs Kept on Pallets?		Away From Walls?		Loose Packs Shelved?		Expired Drugs Separated?		% Good Storage Condition
		Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
Tigray	Hospital	2	2	4	0	3	1	3	1	4	0	3	1	79%
		50%	50%	100%	0%	75%	25%	75%	25%	100%	0%	75%	25%	
	HC	3	3	6	0	3	3	3	3	4	1	6	0	69%
		50%	50%	100%	0%	50%	50%	50%	50%	67%	17%	100%	0%	
DHO	0	1	1	0	0	1			0	1	0	1	17%	
	0%	100%	100%	0%	0%	100%	0%	0%	0%	100%	0%	100%		
Harari	Hospital	0	1	1	0	0	1	0	1	1	0	1	0	50%
		0%	100%	100%	0%	0%	100%	0%	100%	100%	0%	100%	0%	
	HC	0	1	1	0	0	1	0	1	1	0	0	1	33%
0%		100%	100%	0%	0%	100%	0%	100%	100%	0%	0%	100%		
Dire Dawa	Hospital	1	0	1	0	1	0	1	0	1	0	1	0	100%
		100%	0%	100%	0%	100%	0%	100%	0%	100%	0%	100%	0%	100%
	HC	2	2	3	1	1	3	1	3	4	0	4	0	63%
50%		50%	75%	25%	25%	75%	25%	75%	100%	0%	100%	0%		
Afar	Hospital	0	2	1	1	1	1	1	1	2	0	2	0	58%
		0%	100%	50%	50%	50%	50%	50%	50%	100%	0%	100%	0%	
	HC	0	2	2	0	1	1	2	0	1	1	2	0	67%
		0%	100%	100%	0%	50%	50%	100%	0%	50%	50%	100%	0%	
DHO	0	1	1	0	0	1			0	0	0	1	17%	
Amhara	Hospital	2	3	4	1	4	1	3	2	4	1	5	0	73%
		40%	60%	80%	20%	80%	20%	60%	40%	80%	20%	100%	0%	
	HC	4	12	15	1	6	10	9	7	12	4	16	0	65%
		25%	75%	94%	6%	38%	63%	56%	44%	75%	25%	100%	0%	
DHO	11	12	15	8	6	17			13	8	12	11	42%	
	48%													
Somali	Hospital	1	0	1		1		0	1	1		1		83%
		100%	0%	100%	0%	100%	0%	0%	100%	100%	0%	100%	0%	
	HC	0	1	1		1		1	0	1		1		83%
		0%	100%	100%	0%	100%	0%	100%	0%	100%	0%	100%	0%	
DHO	1	0	1	0	0	1			1	0	1	0	67%	
	100%	0%	100%	0%	0%	100%	0%	0%	100%	0%	100%	0%		

Survey Findings and Analysis

Region of the HF		Adequate Storage Space?		Ceiling Intact?		Carton/Box Packed Drugs Kept on Pallets?		Away From Walls?		Loose Packs Shelved?		Expired Drugs Separated?		% Good Storage Condition
		Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
Benshangul-Gumuz	Hospital	1	1	1	1	1	1	0	2	1	1	2		50%
		100%	100%	100%	100%	100%	100%	0%	200%	100%	100%	200%	0%	
	HC	3	1	3	1	0	4	1	3	2	2	4		54%
		75%	25%	75%	25%	0%	100%	25%	75%	50%	50%	100%	0%	
	DHO	2	2	1	3	0	4			1	3	1	3	21%
		50%	50%	25%	75%	0%	100%	0%	0%	25%	75%	25%	75%	
SNNPR	Hospital	3	4	4	3	6	1	2	5	6	1	6	1	64%
		43%	57%	57%	43%	86%	14%	29%	71%	86%	14%	86%	14%	
	HC	4	6	7	3	3	7	4	6	9	1	9	0	60%
		40%	60%	70%	30%	30%	70%	40%	60%	90%	10%	90%	0%	
	DHO	1	9	5	5	0	10			3	7	5	2	23%
		10%	90%	50%	50%	0%	100%	0%	0%	30%	70%	50%	20%	

Table 25: Region of the Health Facility * Expired Drugs Separated? Cross-tabulation

	Expired drugs separated?			Total
	Yes	No	Unknown	
Tigray	0	1	0	1
	.0%	100.0%	.0%	100.0%
Afar	0	1	0	1
	.0%	100.0%	.0%	100.0%
Amhara	12	11	0	23
	52.2%	47.8%	.0%	100.0%
Somali	1	0	0	1
	100.0%	.0%	.0%	100.0%
Benshangul-Gumuz	1	3	0	4
	25.0%	75.0%	.0%	100.0%
SNNPR	5	2	3	10
	50.0%	20.0%	30.0%	100.0%
Total	19	18	3	40
	47.5%	45.0%	7.5%	100.0%

Table 26: HFs that Conducted Disposal of Obsolete/Unusable Malarial Drugs

Region of the HF		Obsolete/Unusable Malarial Drugs Disposed?	
		Yes	No
Tigray	Hospital	2 50%	2
	HC	6 100%	0
Harari	Hospital	1 100%	
	HC	1 100%	
Dire Dawa	Hospital	0 0%	1
	HC	2 50%	2
Afar	Hospital	2 100%	
	HC	2 100%	
Amhara	Hospital	4 80%	1
	HC	14 88%	2
Somali	Hospital	1 100%	0
	HC	0 0%	1
Benshangul-Gumuz	Hospital	1 50%	1
	HC	4 100%	0
SNNPR	Hospital	6 86%	1
	HC	7 78%	2

Table 26 shows the degree of disposal of obsolete/unusable malarial or drugs at the targeted HFs in the regions surveyed. The disposal of obsolete/unusable malarial or drugs occurred in most of the facilities—88% of HCs and 81% of hospitals. However, the accumulation of unusable stocks of malaria commodities at the remaining facilities will present a challenge regarding storage space and a risk of being mistakenly dispensed to patients. This calls for immediate resolution.

Table 27. Type of HF * RDT Stored at the Right Temperature? * Region of the HF Cross-Tabulation

Region of the HF		RDT Stored at the Right Temperature?		
		Yes	No	Not Applicable
Tigray	Hospital	4		
	HC	6		
Harari	Hospital	1		
	HC	1		
Dire Dawa	Hospital	1		
	HC	4		
Afar	Hospital	0	0	2
	HC	1	1	0
Amhara	Hospital	2	1	2
	HC	13	3	0
Somali	Hospital	1		
	HC	1		
Benshangul-Gumuz	Hospital	0	1	1
	HC	3	0	1
SNNPR	Hospital	1	2	4
	HC	3	4	3

As shown in Table 27 above, HFs in some regions are not storing RDTs in accordance with the required storage condition (temperature), which will affect the quality of the RDT and its results. These regions include Afar, Amhara, Benshangul-Gumuz, and SNNPR. Therefore, the storage condition of RDTs in HFs in these regions needs to be improved.

Table 28. Availability of Storage Equipment

Region of the Health Facility		Are Shelves Available?		Is Wooden Pallet Available?		Is Filling Cabinet Available?		Is Computer Available?		Is Refrigerator Available?		Secure Door / Window Available?		Overall % of Availability of Storage Equipment
		Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
Tigray	Hospital	4		3	1	1	3	4		4		3	1	83%
	HC	6		6	0	2	4	6		6		5	1	
% (Tigray)		100%		90%		30%		100%		100%		80%		
Harari	Hospital	1		1	0		1	1	0	1	0		1	42%
	HC	1		0	1		1	0	1	0	1		1	
% (Harari)		100%		50%		0%		50%		50%		0%		
Dire Dawa	Hospital	1	0	1	0		1	1	0	1		1	0	60%
	HC	3	1	1	3		4	2	2	4		3	1	
% (Dire Dawa)		80%		40%		0%		60%		100%		80%		
Afar	Hospital	0	2		2	1	1	0	2	1	1	1	1	34%
	HC	0	2		2	0	2	2	0	1	1	2	0	
% (Afar)		0%		0%		25%		50%		50%		80%		
Amhara	Hospital	5	0	5	0	3	2	5	0	5	0	5		71%
	HC	14	2	7	9	3	12	11	5	10	6	16		
% (Amhara)		90%		57%		30%		76%		71%		100%		
Somali	Hospital	1		1		1	0	1	0	1	0	1		67%
	HC	2		1		0	2	0	2	0	2	2		
% (Somali)		100%		100%		33%		33%		33%		100%		
Benshangul-Gumuz	Hospital	2		2	0	2	0	2	0	2	0	2	0	43%
	HC	5		0	5	0	5	0	5	1	4	0	5	
% (Benshangul-Gumuz)		100%		29%		29%		29%		43%		29%		
SNNPR	Hospital	7		7	0	4	3	7	0	7	0	7	0	73%
	HC	10		5	5	3	7	5	5	7	3	7	3	
% (SNNPR)		100%		63%		41%		71%		82%		82%		

Proper store organization involving the appropriate storage equipment influences medicine quality, proper inventory management, and ease of moving around in the store. As shown in Table 28, 68% of the facilities have all the required storage equipment. Tigray facilities have the best (83%) storage equipment and Afar has the fewest HFs (34%) with the required storage equipment. Other regions need to improve the availability of storage equipment required for high-quality storage of medicines.

Pharmaceutical Management Information System (PMIS)

Availability of proper stock recording and inventory control tools and accurate and appropriate pharmaceutical management information are important prerequisites for a proper pharmaceutical supply management system (PSMS). All transactions should be properly recorded, processed, and reported to the next higher coordinating body for good planning in the supply management process. Stock cards, dispensing registers, and stock status monitoring forms are some of the essential tools required for maintaining proper stock control, tracking expired medicines, monitoring rational medicine use, ensuring adherence, and providing medicine consumption trends.

The default inventory control (issuing and receiving) document present at all levels is the model — an official government form that is used by all public sector institutions as a transaction document for commodities ranging from medicines to furniture to food items to stationery. However, the model template does not provide for the technical information required to manage pharmaceuticals. Use of the model has literally replaced the effective use of standard pharmaceutical forms such as stock cards as inventory control tools. To make the information system work, the appropriate technical forms must be available, correctly and promptly filled out, and aggregated for reporting.

The assessment showed that inventory management tools are inadequate at all levels. For example, 62% of the hospitals and only 24% of the HCs have treatment/dispensing registers. However, all of the hospitals (100%) and 96% of the HCs have bin cards.

According to Table 29 below, an average of 71% of the HCs and 55% of the hospitals have updated their bin cards in all regions. This gap in malpractice requires intervention to improve current practice.

Table 29: Availability of PMIS Tools

Region of the HF		Are Treatment/Dispensing Registers Available?		Is Ordering/ Requisition Form Available?		Is Stock Card Available?		Is Bin Card Available?		Is Expiry/ Loss/Damage Report Form Available?	
		Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Tigray	Hospital	3	1	4	0	3	1	4	0	2	2
		75%		100%		75%		100%		50%	
Tigray	HC	4	2	5	1	4	2	5	1	2	4
		67%		83%		67%		83%		33%	
Harari	Hospital	1	0	1			1	1		1	
		100%		100%		0%		100%		100%	
Harari	HC	0	1	1			1	1		1	
		0%		100%		0%		100%		100%	
Dire Dawa	Hospital		1	1	0		1	1			1
		0%		100%		0%		100%		0%	
Dire Dawa	HC		4	3	1		4	4			4
		0%		75%		0%		100%		0%	
Afar	Hospital		2		2		2	2			2
		0%		0%		0%		100%		0%	
Afar	HC		2		2		2	2			2
		0%		0%		0%		100%		0%	
Amhara	Hospital	3	2	5		5	0	5	0	2	3
		60%		100%		100%		100%		40%	
Amhara	HC	1	15	16		4	11	15	1	3	13
		6%		100%		27%		94%		19%	
Somali	Hospital	1	0	1	0	1	0	1			1
		100%		100%		100%		100%		0%	
Somali	HC	0	2	0	2	0	1	1			1

Survey Findings and Analysis

Region of the HF	Are Treatment/Dispensing Registers Available?		Is Ordering/ Requisition Form Available?		Is Stock Card Available?		Is Bin Card Available?		Is Expiry/ Loss/Damage Report Form Available?		
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
		0%		0%		0%		100%		0%	
Beneshangul-Gumuz	Hospital	2	0	2	0	2	0	2		1	1
		100%		100%		100%		100%		50%	
SNNPR	HC	2	3	3	2	2	2	4		0	5
		40%		60%		50%		100%		0%	
SNNPR	Hospital	4	3	6	1	4	3	7	0	4	3
		57%		86%		57%		100%		57%	
SNNPR	HC	8	2			2	8	9	1	3	7
		80%		0		20%		90%		30%	

On average more than 63% of the hospitals and 94% of the HCs are updating their use of treatment registers. Overall, although the availability of PMIS tools such as bin cards and treatment registers are better at the hospitals, their use or updating is poor at hospitals compared to HCs.

Table 30: Regular Use of PMIS

Region of the HF		Is Bin Card Updated?		Is Stock Card Updated?		Are Treatment/Dispensing Registers Updated?		Is Monthly Reporting Form Updated?	
		Yes	No	Yes	No	Yes	No	Yes	No
Tigray	Hospital	1 25%	3	0 0%	3	3 100%		4 100%	
	HC	3 60%	2	1 25%	3	4 100%		5 100%	
Harari	Hospital		1				1		
	HC		1					1 100%	
Dire Dawa	Hospital	1 100%	0						
	HC	3 75%	1						
Afar	Hospital	1 50%	1					1 100%	
	HC	2 100%	0						
Amhara	Hospital	4 80%	1	2 40%	3	3 100%		4 100%	0
	HC	10 91%	1	3 75%	1	1 100%		7 88%	1
Somali	Hospital	0 0%	1		1				
	HC	1 100%	0						
Benshangul-Gumuz	Hospital	2 100%	0	1 50%	1	2 100%		1 100%	
	HC	2 50%	2	0 0%	2	2 100%		1 100%	
SNNPR	Hospital	6 86%	1	3 75%	1	3 75%	1	2 100%	
	HC	8 89%	1	1 50%	1	6 75%	2	4 100%	

CONCLUSION AND RECOMMENDATIONS

Availability and Expiry Management

The assessment revealed that overall availability of AMDs is 83% at hospitals and 74% at HCs. However, some facilities reported stock-outs and shortages of the AMDs, including quinine tablets, for treatment of uncomplicated PF malaria in pregnant women during the first trimester and children under 5 kg. The shortages and stock-outs of medicines could arise as a result of several factors in the supply chain system. These include the use of a push system of distribution or improper quantification practices, which fail to address the HFs' need for the medicines. A push system not only affects the availability of medicines but discourages the development of an active system of record-keeping, medication use monitoring, consumption-based ordering, and other more precise stock management procedures.

The overall availability of expired AMDs at the HFs assessed was found to be very low except at a few hospitals and HCs. However, the quantities of AL and quinine tablets that expired at HFs are greater than the others, which is significant. Proper quantification and active inventory management at all levels of the supply chain system will help increase availability of medicines and reduce risk of expiry at the HFs. Therefore, it is advisable to establish and strengthen a system of good record keeping on the transactions made regarding medicines, including those dispensed to patients, to obtain reliable consumption data for resupply and quantification. In line with strengthening the supply chain system at all levels, regular stock rotation and the establishment of a uniform system for redistribution of excess and near expiry products will support efforts to reduce expiry and can contribute to improving availability at HFs. Finally, timely and safe disposal of unusable products will help to reduce risks to patients and free limited space occupied by these unusable products.

Storage, Inventory Control, and Pharmaceutical Management Information System

The assessment also determined that most of the HFs have shortages of basic storage equipment, such as pallets and shelves, as well as a limited amount of adequate storage space. This will negatively impact medicine quality, proper inventory management, and ease of moving around in the store. To solve these challenges, making available adequate pallets and shelves in addition to proper reorganization of the products within the available space will improve the storage conditions at the facilities and program level (Woreda and Zonal Health Office) medicine stores. Separation of non-drug items (such as office furniture, bicycles, and cement) from medicines and storing them in separate rooms will also free up space for medicine storage and contribute to maintaining the quality of medicines and avoiding damages.

Proper inventory management tools at all levels will improve the accuracy and availability of appropriate pharmaceutical management information systems. The majority of the facilities assessed did not have a suitable tool such as dispensing registers for monitoring rational prescribing and dispensing practices at facilities. In addition, although the availability of stock transaction cards was encouraging, most of the HFs did not regularly update them. Without proper inventory and a patient and medication management system, ensuring uninterrupted supply; controlling pilferage and loss; monitoring expiry, medicine use, adverse

drug events, and resistance; reporting on uptake and scale-up; and obtaining reliable data for forecasting and budgeting will be extremely difficult.

Strategies and interventions should be in place to ensure that stock movements at all storage levels are recorded in bin cards or stock cards and regularly updated. In addition, patient treatment and dispensing registers should be institutionalized at the HFs to monitor the rational use of medicines and obtain reliable consumption data for re-supply or quantification exercises. The introduction of periodic monitoring checklists is also helpful in monitoring regular progress in planned activities.

Human Capacity and Knowledge

The assessment was also designed to reveal the level of knowledge of the key technical personnel (i.e., prescribers, pharmacy staff, and laboratory staff) at HFs regarding malaria treatment and prevention.

Although the overall percentage of prescribers with proper knowledge of the appropriate antimalarial drugs recommended for treatment of malaria patients was greater than that of dispensers, both groups of providers require training and encouragement to adhere to malaria treatment guidelines to ensure full knowledge. Without proper knowledge on the selection of the right drug for specific malaria parasite and patient groups, rational prescribing and dispensing practices cannot be ensured—which will eventually affect the quality and compliance of malaria treatment of patients. Therefore, in addition to assigning an appropriate level of pharmacy staffs and prescribers across the board, it is advisable to provide pre- and in-service training to all sectors that manage malaria cases and products.

Other Issues

- The current (June 2004) *National Malaria Diagnosis and Treatment Guidelines* recommend that malaria treatment of all clinically suspected cases be based on laboratory diagnosis of the parasite species using microscopic methods at hospitals and HCs and RDT diagnosis at health posts. Nonetheless, since the percentage of prescribers whose patients receive prompt laboratory diagnosis is not appreciable, this practice needs to be improved both at hospitals and HCs in all regions.
- We observed the co-location of district health stores with HC stores in many places. Although this arrangement can be beneficial due to its use of the same personnel for management, it is likely to create congestion of space, constraining staff and compromising equity. The two services must be separated and each must have its own building and staffing for efficiency, equity, and accountability.
- HFs should work hard to establish and strengthen drug and therapeutic committees as a mechanism for ensuring transparent and planned procurement, promoting rational medicine use, supporting accountability, and contributing to the sustainability and institutionalization of initiatives and policies.