

# Capacity Needs Assessment for Pharmaceutical Services for the ART Program in Lesotho

July 2013



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## Capacity Needs Assessment for Pharmaceutical Services for the ART Program in Lesotho

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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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## **Key Words**

capacity, pharmaceutical services, ART program, Lesotho

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## ACRONYMS AND ABBREVIATIONS

ADR	adverse drug reaction
AIDS	acquired immunodeficiency syndrome
ART	antiretroviral therapy
ARV	antiretroviral
CHAI	Clinton Health Access Initiative
CHAL	Christian Health Association of Lesotho
DCD	Disease Control Directorate
DDTS	daily dispensing tally sheet
DHMT	District Health Management Team
DPO	District Pharmaceutical Officer
DSM	drug supply management
EGPAF	Elizabeth Glaser Pediatric AIDS Foundation
FEFO	first-expiry, first-out
Global Fund	Global Fund to Fight AIDS, Tuberculosis and Malaria
HCW	health care worker
HF	health facility
HIV	human immunodeficiency virus
GOL	Government of Lesotho
MCA	Millennium Challenge Account
MOH	Ministry of Health
NDSO	National Drug Service Organization
OI	opportunistic infection
PD	Procurement Department
PMTCT	prevention mother-to-child transmission
PPR	provider-patient ratio
SIAPS	Systems for Improved Access to Pharmaceuticals and Services
USAID	US Agency for International Development

## EXECUTIVE SUMMARY

Lesotho is among the countries that have been devastated by the HIV and AIDS pandemic, with a prevalence rate at 23 percent and women's HIV and AIDS prevalence rate at 27 percent. To respond to the HIV pandemic, the government of Lesotho (GOL) initiated its comprehensive antiretroviral therapy (ART) program in 2004 and has scaled up the ART service since then. There were 190 accredited health facilities (HFs) for ART services in the country by the end of 2012.

The Health System Assessment conducted in 2010 found that pharmaceutical management in Lesotho has been affected by inadequate human resources, shortage of financial resources, and poor information regarding use of medicines. The HIV pandemic has increased the burden of the limited human resources. The Disease Control Directorate (DCD) of the Ministry of Health (MOH) of Lesotho identified the need to carry out an assessment of the numbers and skills of health workers involved in the provision of ART-related services in an attempt to maximize efficiency of ART service provision in the country. Therefore, the MOH requested the Systems for Improved Access to Pharmaceutical Services (SIAPS) Program to provide technical assistance to carry out a capacity needs assessment for pharmaceutical services for the ART program in Lesotho.

The objectives of the assessment were to identify the numbers and skills of the health care workers (HCWs) for the provision of ART pharmaceutical services; identify the gaps in the capacity of staff in the ART program in the country; recommend the required capacity of staff in the ART program to ensure good quality service provision; and make recommendations to policy makers on how to efficiently make use of available personnel to maximize their efficiency. The assessment was a descriptive cross-sectional study. Data were collected in August 2012 at 95 HFs in five districts. Five District Pharmaceutical Officers (DPOs), a DCD Pharmacy officer, and the procurement and logistics officers at the National Drug Service Organization (NDSO) also participated in the assessment. Six structured and semi-structured questionnaires were used for data collection, and Microsoft Excel was used for data analysis.

The main cadres for the provision of the ART pharmaceutical services were pharmacists, pharmacy technicians, nurses/midwives, and trained nursing assistants. Other cadres that assist in pharmaceutical services include physicians, counselors, lay HCWs, and nonprofessional staff. The estimated provider-patient ratio (PPR) for ART and general pharmaceutical services for pharmaceutical and nursing professionals indicates these HCWs are overloaded.

The following capacity gaps and possible causes were found—

- Delayed distribution from District Health Management Teams (DHMTs) to the HFs caused by lack of transport
- Poor pharmaceutical inventory management, in particular, at the private and primary health care facilities, because of insufficient storage space and knowledge, and high workload
- Poor data quality for antiretroviral (ARV) monthly requisitions and ART monthly morbidity reports caused by inadequate knowledge and high workload, including high volumes of paperwork

- Insufficient adverse drug reaction (ADR) information given to the patients and lack of confirmation of patient’s understanding of medicine use during medication counseling by taking for granted that patients were refill patients

Infrastructure and system constraints negatively affected the performance of drug supply management (DSM<sup>1</sup>). Storage space was insufficient or lacking at the NDSO, HFs, and DHMTs. Storage conditions were poor at the HFs’ stores and the DHMTs’ alternative stores. These factors affected storage and inventory management and consequently affect the data quality of inventory records and ARV requisitions and increase workload. The two-step pharmaceutical distribution system (NDSO to hospitals and DHMT, and DHMT to primary HFs) did not work well at the DHMT level because of lack of transport. It created the demand for storage space, increased DPOs’ workload, and delayed distribution of pharmaceuticals to the HFs. DPOs’ supportive supervision activities were also affected by lack of transport and the increased workload for handling pharmaceuticals.

Three-quarters of the surveyed HCWs received DSM and ART treatment trainings. In addition to the classroom in-service training, the three most useful learning methods, as indicated by the HCWs according to their experiences, were on-the-job training by supervisors or guidance by regular mentors, reading guidance materials, and attending technical meetings. Peer learning experiences were considered less useful than the preceding approaches. However, very few HCWs would initiate self-learning to improve their capacities. This information should help managers review and plan capacity-building approaches accordingly.

The HCWs deal with challenges on a daily basis. This assessment found more challenges in infrastructure, staffing levels, DSM capacity, and DSM and information management systems than those in ART treatment capacity. More efforts are made to address the infrastructure, staffing, and system issues than to address HCWs’ own capacity issues. The most common initiative is “communication,” that is, reporting problems to management or related authorities or colleagues, requesting more staff, or requesting trainings. The results showed that communication works best for DSM because most DSM issues are supply mistakes or late deliveries that can be resolved by quick responses. Task-shifting works well for storage and information management because these are labor intensive and can be done under supervision. Lay health workers are the main workforce for task-shifting, and they are in need of systematic and continuous capacity building.

Recommendations for capacity needs are as follows—

- Analytical skill and basic monitoring and evaluation for DCD pharmacy officers
- Advance logistics management for the NDSO Logistics Department
- Coaching, monitoring and evaluation, and managerial skills for DPOs
- DSM (including data management and quantification) and medication counseling, and basic managerial capacity for HCWs
- Basic storage management and medication counseling skills for lay health workers
- Hygienic medicine-handling skills for lay health workers and nonprofessional staff

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<sup>1</sup> “Drug supply management (DSM)” is more commonly used than “pharmaceutical supply management (PSM)” in Lesotho.



- Selection by DCD-Pharmacy Unit of a few HCWs from district and HF levels to participate in quantification activities to build capacity and improve data quality

Diversified training and learning methodologies are required for HCW capacity building. The classroom in-service training and on-the-job training should incorporate adult learning approaches with practical, hands-on, and problem-solving-oriented case studies and experience sharing and discussions. DCD or DPOs' supportive supervision can be conducted in a systematic manner. Periodic mentorship workshops with well-designed training series and posttraining supervision are useful for long-term capacity-building strategy.

In the self-learning experiences, peer learning approaches (new staff orientation and posttraining briefing) were not considered useful by most of the HCWs. Peer learning activities are basic and routine capacity-building activities at any organization. The managers and supervisors should review these activities and incorporate the most helpful learning approaches, such as providing guidance materials and assigning a mentor to new staff or having posttraining briefings in the staff or technical meetings. Training in team building could also be applied to strengthen teamwork and confidence in peer learning.

Recommendations for system strengthening are as follows—

- The MOH should continue or initiate more infrastructure renovation to improve the working and storage space and conditions at the HFs. Improving working conditions will enhance HCWs' morale and performance and thereby improve the quality of the services.
- Two options are proposed to address the challenges of the distribution system—
  - Option 1: Maintain the current distribution system by strengthening HFs' capacity in submission of timely requisitions to NDSO; plan NDSO distribution schedules for those who submit requisitions in time; and strengthen DHMTs' transportation capacity and plan distribution schedules according to NDSO's schedules.
  - Option 2: Implement direct distribution from NDSO to all HFs for ARVs and commercial orders. It will avoid delay of distribution and reduce DPOs' distribution burden, thus allowing them to provide better coaching and supervision to the HFs.
- To make efficient use of transport, DHMTs should consider joint supervision for several district supervisors or partners.
- DCD-Pharmacy and DPOs should use the logistics information processed by NDSO for monthly updates and necessary actions instead of requesting DPOs to compile and submit duplicate data to DCD.
- The MOH should review the accreditation criteria, and periodic review of the performance of the HFs for the renewal of accreditation would encourage the HFs to maintain the quality of ART services.
- To effectively project and plan the human resources for integrated health services, more information should be required with a holistic projection approach.

The capacity-building and system-strengthening strategy through the ART program will contribute to the improvement of the general system. Pharmaceutical supply management is a cross-cutting area; the supervisors should educate the HCWs to apply their DSM capacity

across all the programs and provide nonfinancial awards to those who perform well to recognize and appreciate their performance.

## INTRODUCTION

The Republic of Lesotho is a landlocked highland country in southern Africa with a population of about 1.9 million, of which almost 80 percent resides in rural areas. Life expectancy at birth is 48.2 years, which decreased by 5.6 years between 1980 and 2011 .

Lesotho is among the countries that have been devastated by the HIV and AIDS pandemic, with a prevalence rate at 23 percent and women's HIV/AIDS prevalence rate at 27 percent. To respond to the HIV pandemic, the GOL initiated its comprehensive ART program in 2004 and has scaled up the ART service since then. There are 190 accredited HFs for ART services in the country, which include those owned by the GOL, the Christian Health Association in Lesotho (CHAL), and private practitioners. Between 2008 and 2011, with the efforts of the government and the support of the partners, the incidence of new HIV infections declined by 16 percent from approximately 21,000 to 17,500. Over the same period, the number of AIDS-related deaths declined by 16 percent from approximately 12,000 in 2008 to 8,500 in 2011 . Lesotho has achieved these results despite its limited human resources. Only 31 percent of the filter clinics filled their full-time staff positions, and only 41 percent of the health centers met minimum staffing requirements of nursing staff. Moreover, Lesotho has 0.16 pharmacists and 0.32 pharmaceutical technicians per 10,000 population. Furthermore, with the GOL's target of reaching more people living with HIV and AIDS with ARVs, a strain is put on the already limited human resources and funding. The current financial meltdown and declining donor support further exacerbate the problem.

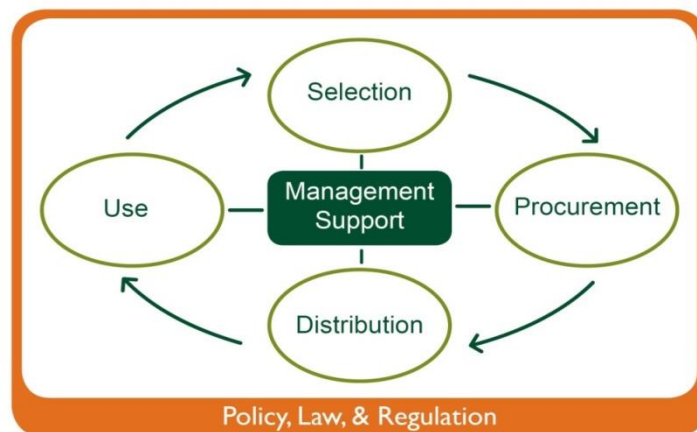
The National HIV/AIDS Strategic Plan highlights the need to put in place mechanisms for providing effective services for prevention, treatment, care, and support and impact mitigation. The supply and management of ARVs and the medication services are among the mechanisms to provide effective treatment for HIV/AIDS. The Health System Assessment conducted in 2010 found that pharmaceutical management in Lesotho has been affected by inadequate human resources and shortage of financial resources as well as poor information regarding use of medicines. Furthermore, the HIV pandemic has increased the burden on the limited human resources.

The MOH DCD in Lesotho identified the need to carry out an assessment of the numbers and skills of health workers involved in the provision of ART-related services in an attempt to maximize efficiency of ART service provision in the country. Therefore, the MOH requested the SIAPS Program to provide technical assistance to carry out a capacity needs assessment for pharmaceutical services for the ART program in Lesotho to identify what skills are required to provide good quality pharmaceutical services, what skills are available, and how the gaps identified can be addressed.

### **Overview of the Pharmaceutical Supply System for ARV Medicines**

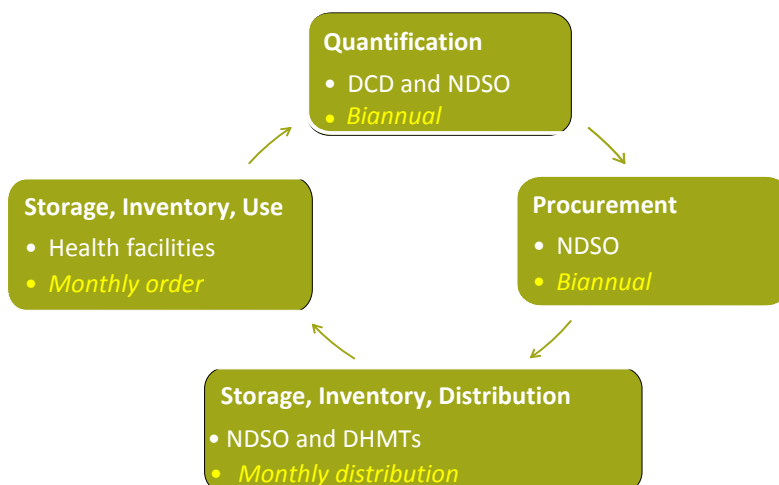
A well-established pharmaceutical supply system requires effective management with respect to selection, procurement, and subsequent distribution and use. This system is built in the context of a policy and legal framework with management support that includes human resources, financial, and information management. This pharmaceutical management framework is shown in figure 1. The pharmaceutical supply system, with the guidance of policy and regulation, includes selection of medicines based on an essential medicines list;

estimation of medicine needs for a defined period (quantification and budget estimation); procurement based on the selected items and estimated quantities and available budget; distribution of medicines according to inventory information; and use of medicines in accordance with standard treatment guidelines. This pharmaceutical management framework requires qualified or trained staff to operate the system, sound financial management for pharmaceutical funds, and reliable information systems for appropriate decision making.



**Figure 1. Pharmaceutical management framework**

The supply chain for Lesotho’s ART program is summarized by figure 2.



**Figure 2. Supply chain framework for the ART program in Lesotho**

As figure 2 depicts, the pharmaceutical supply for Lesotho’s ART program involves several players. The DCD forecasts annual needs of ARVs based on consumption and morbidity information and reviews the quantification biannually during the tendering process. The ARVs are then procured by and stored at the NDSO. The distribution of ARVs is done by the NDSO and DHMTs according to requisitions from HFs. The NDSO delivers ARVs to accredited hospitals and the DHMTs. The DHMTs further distribute them to the accredited

health centers and prevention mother-to-child transmission (PMTCT) of HIV sites in their districts. The HFs use ARVs according to ART treatment guidelines and document the inventory and patient information for further quantification and procurement; hence the ARV supply cycle continues.

## OBJECTIVES

The objectives of the assessment were to—

- Identify the numbers and skills of pharmaceutical personnel available for provision of ART-related services
- Identify the gaps in the capacity of staff in the ART program in the country
- Recommend the required capacity of staff in the ART program to ensure good quality service provision
- Make recommendations to policy makers on how to efficiently make use of available personnel to maximize their efficiency

## METHODOLOGY

This was a cross-sectional descriptive study. The assessment was conducted in—

- HFs, which offer ART services
- DCD, which performs quantification
- NDSO, which is responsible for procurement, storage, and distribution of ARVs and medicines for opportunistic infections (OIs)
- DHMTs, which are the transit points for the consignments from NDSO to the HFs

Six questionnaires were developed to collect the information from the sampled HFs, sampled DHMTs, the DCD and the NDSO.

A stratified sampling protocol was applied to the selection of the HFs based on the following categories—

- Ownership of the HFs: GOL, CHAL,<sup>2</sup> and private, for-profit HFs
- Geographical location: urban and rural
- Level of service: primary health care facilities<sup>3</sup> and secondary health care facilities

Because of limited budget and timeline for data collection, only half the 10 districts in the country were included in the sampling frame. The health facilities were randomly selected from 5 districts in three regions of the country based on the preceding sampling frame: Leribe, Thaba Tseka, Maseru, Mafeteng, and Maseru. The characteristics of the 5 districts are as follows—

- Leribe and Maseru: urban, lowlands and highlands, newly designated regional hospitals
- Thaba Tseka: rural, highlands
- Mafeteng: mixed urban and rural populations, lowlands
- Maseru: urban and capital city

At the time of the assessment, there were 190 accredited ART sites across the country, 125 of which are located in the 5 selected districts. A sample size of 95 HFs was selected for the assessment, which meets the desired 95 percent confidence level, with a confidence interval of 4.9 percent. The sample size in each district was calculated based on the total number of accredited ART sites in that district and was proportional to the total sample size. The profile of the HFs selected for the assessment is summarized in table 1.

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<sup>2</sup> Including private nonprofit health facilities

<sup>3</sup> Primary health care facilities include health centers, filter clinics, and clinics.

**Table 1: Health Facility Profile for the Assessment**

Districts	Ownership types			Geographic types		Level of services		Total HFs
	GOL	CHAL	Private	Rural	Urban	Primary	Secondary	
Leribe	8 (36%)	12 (55%)	2 (9%)	16 (73%)	6 (2%)	21 (95%)	1 (5%)	22
Mafeteng	6 (38%)	8 (50%)	2 (13%)	11 (69%)	5 (31%)	15 (94%)	1 (6%)	16
Maseru	8 (24%)	15 (45%)	10 (30%)*	13 (39%)	20 (61%)	30 (91%)	3 (9%)	33
Mohale's Hoek	7 (64%)	3 (27%)	1 (9%)	10 (91%)	1 (9%)	10 (91%)	1 (9%)	11
Thaba-Tseka	6 (46%)	7 (54%)	0 (0%)	12 (92%)	1 (8%)	11 (85%)	2 (15%)	13
Total HFs	35 (37%)	45 (47%)	15 (16%)	62 (65%)	33 (35%)	87 (92%)	8 (8%)	95

\* Most of the private health facilities are located in Maseru District, in particular, in Maseru city.

Twenty data collectors, comprising DCD pharmacy staff, district logistics officers, supportive supervision and mentoring coordinators, and newly graduated pharmacy students from the University of Lesotho, were selected. Each data collection team was composed of one senior (pharmaceutical professional) and one junior (newly graduated student) member to build the capacity of the junior members. Two data collection teams were assigned to one district. A data collection orientation workshop was conducted at the MOH on August 20 and 21, 2012, followed by data collection between August 22 and 24. Data were entered into Microsoft Excel spreadsheets and analyzed using Excel. Chi-square test was used to compare the differences between groups.

Limitations of the methodology were as follows—

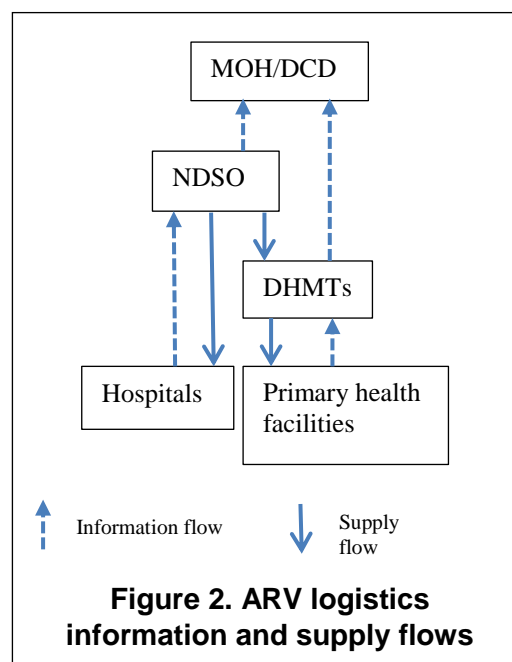
- The sample sizes in the DCD, NDSO, and DHMTs are low because the DCD and NDSO have only one respondent, respectively, for the quantification, procurement, and distribution of ARVs, and only five districts were selected for the assessment. The results are the findings from the interviews rather than statistics-based interpretations.
- Data were incomplete for the number of patients in pediatric ART and PMTCT in the ART register, for general health services, and for some of the cadres.
- On the day of the visit in some HFs, there were no ART services; therefore, some of the observations or interviews could not be conducted.
- The capacity of administering the semi-structured questions among data collectors varied despite the orientation and practice. These differing skill levels affected the data quality, requiring clarifications or discarding of some unusable data.



## FINDINGS

### Overview of the ARV Logistics Information and Supply Systems

The logistics information and supply flows for ARVs are shown in figure 3. The ARV logistics reporting system in place is that the data are collected at the HFs and submitted to the NDSO directly from the hospitals or through the DHMTs from the primary health facilities. However, the DCD-Pharmacy also requests the DHMTs to submit monthly consolidated reports for updating about the availability of the ARVs, to compare with the morbidity data, and to take necessary actions such as prioritized supervision or redistribution of overstocked ARVs. However, only 30 percent of the districts are able to submit the reports in a timely manner.



The monthly ARV logistics data are collected manually in a well-designed reporting form<sup>4</sup> in which the data for consumption, stock on hand, number of patients for each medicine, order quantity, stock-outs for 28 days, and expiry dates are required (figure 4). Upon receiving the reports from the health facilities, the DPOs then send them to the NDSO by fax according to the NDSO's schedule. The NDSO captures the monthly reports into RxSolution<sup>5</sup> and supplies the ARVs according to the requisitions or the stock levels at the NDSO.

**Figure 3. ART requisition form**

<sup>4</sup> The ART requisition form was introduced in 2011 to incorporate the information of number of patients and consumption of the medicines.

<sup>5</sup> RxSolution is a supply chain management software developed by Management Sciences for Health.

**GROUPS**

Group A (Highlands)	Group B (South)	Group C (North)	Group D (Central)
Health Services Tlokoeng Maseru Maseru Maseru Maseru Maseru Maseru	Phuthaditjhaba Teyateyaneng Teyateyaneng Teyateyaneng Teyateyaneng Teyateyaneng Teyateyaneng Teyateyaneng	Leha Hospital Teyateyaneng Hospital Maseru Hospital Maseru Hospital Maseru Hospital Maseru Hospital Maseru Hospital Maseru Hospital	St. Joseph's St. Joseph's St. Joseph's St. Joseph's St. Joseph's St. Joseph's St. Joseph's St. Joseph's

**NDSO DELIVERY SCHEDULE**

	Aug/Sept '12	Oct '12	Nov '12
Group A	27/08/12 - 31/08/12	08/10/12 - 12/10/12	08/11/12 - 08/11/12
Group B	12/08/12 - 16/08/12	19/10/12 - 23/10/12	19/11/12 - 19/11/12
Group C	17/08/12 - 21/08/12	22/10/12 - 26/10/12	18/11/12 - 22/11/12
Group D	24/08/12 - 28/08/12	29/10/12 - 02/11/12	18/11/12 - 22/11/12

	Dec '12	Jan/Feb '13	Feb/March '13
Group A	03/12/12 - 07/12/12	03/01/13 - 07/01/13	10/02/13 - 14/02/13
Group B	10/12/12 - 14/12/12	14/01/13 - 18/01/13	18/02/13 - 22/02/13
Group C	17/12/12 - 21/12/12	21/01/13 - 25/01/13	25/02/13 - 29/02/13
Group D	24/12/12 - 28/12/12	28/01/13 - 01/02/13	04/03/13 - 08/03/13

	Mar/Apr '13	Apr/May '13	May/June '13
Group A	11/03/13 - 15/03/13	18/04/13 - 22/04/13	19/05/13 - 23/05/13
Group B	18/03/13 - 22/03/13	25/04/13 - 29/04/13	25/05/13 - 29/05/13
Group C	25/03/13 - 29/03/13	30/04/13 - 03/05/13	27/05/13 - 31/05/13
Group D	01/04/13 - 05/04/13	06/05/13 - 10/05/13	08/06/13 - 12/06/13

	June '13	July '13	Aug '13
Group A	15/06/13 - 19/06/13	16/07/13 - 20/07/13	08/08/13 - 12/08/13
Group B	22/06/13 - 26/06/13	23/07/13 - 27/07/13	15/08/13 - 19/08/13
Group C	29/06/13 - 03/07/13	30/07/13 - 03/08/13	22/08/13 - 26/08/13
Group D	06/07/13 - 10/07/13	07/08/13 - 11/08/13	29/08/13 - 02/09/13

PLEASE NOTE THAT ORDERS FOR COMMERCIAL STOCK ARE EXPECTED TO REACH NDSO TWO (2) WEEKS PRIOR TO DELIVERY. ONE (1) WEEK BEFORE THE EXPECTED DATE OF DELIVERY, ALL END-USERS TO ADVISE TO THE DELIVERY MANAGER PLEASE.

Figure 4. NDSO delivery schedule for ARVs

The NDSO has a delivery schedule for four geographic groups—group A, highland; group B, south; group C, north; and group D, central—one week each month. A detailed schedule with the advice of timely submission of the requisition is provided to each health facility (figure 5).

The NDSO delivers the ARVs as scheduled to the hospitals and the DHMTs for the supplies for the primary HFs, except Maseru and Mafeteng because they are close to the NDSO; in those locations, the supplies are delivered directly to the HFs. Upon receiving the supplies, the DHMTs deliver them to the HFs as soon as possible. However, lack of transport at the DHMTs often delays the delivery of the supplies to the HFs.

Quantification of the ARVs is performed centrally. The DCD-Pharmacy, in collaboration with the NDSO, the Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund), the Clinton Health Access Initiative (CHAI), and other stakeholders, conducts the quantification of and forecasting for ARVs in November and December in preparation of the budget. It is reviewed after the budget is officially announced in February and in August during the tendering process. Consumption (data provided by NDSO) and morbidity methods are applied, and Microsoft Excel and customized software are used for quantification by DCD and CHAI, respectively. The ARVs are then procured by the NDSO through restrictive tender biannually in April and August, according to the results of the quantification.

The quantification of ARVs is meant to estimate the budget requirement for the same fiscal year and for procurement planning purposes. The budget seems to be sufficient because only limited stock-outs have been reported. One of the development partners involved in funding for ARVs is the Global Fund. However, sometimes the Global Fund funding arrives late, and the DCD has to seek emergency support from the MOH.

## ARV Logistics Information Management and Supply Systems

This section describes the findings about the ARV supply chain system from quantification at the central level to services at HF level. The human resources issues for DCD and the NDSO are included for better connection to the system. However, the human resources issues for the DHMTs and HFs are described in more detail in a later section. The statistical difference between categories or types of HFs is indicated as  $p < 0.05$ . Those without indication of statistical difference means there is no significant difference between groups or types of HFs.

### Quantification

Unreliable data quality of the ARV monthly requisitions and morbidity reports is the main concern of DCD-Pharmacy. They attributed the problem to the overloaded HCWs at the HFs. To support DCD to address this issue, SIAPS recruited three district logistics officers and two supportive supervision and mentoring coordinators to mentor the HCWs to improve data quality at health center level and hospital level, respectively. Additionally, a supply chain

management adviser has been seconded to the MOH central level to mentor staff at that level and support the supply chain and management information systems nationally.

Shortage of staff also affects DCD-Pharmacy's work in supervision and data processing. DCD relies on partners' assistance in supervision and mentorship, such as CHAI's support of four mentors and PMTCT coordinators, as well as coordinators from the Elizabeth Glaser Pediatric AIDS Foundation (EGPAF). The MOH is expected to absorb the four mentors, but it has no budget for them. The supervision and mentorship conducted by the PMTCT and EGPAF coordinators have limited results because they are nurses with priorities in clinical work, hence could not provide sufficient coaching in pharmaceutical supply management. DCD is expecting that SIAPS's support through the district logistics officers, supportive supervision and mentoring coordinators, and supply chain management adviser will strengthen the pharmaceutical supply and information management practices.

### ***Procurement***

The NDSO handles procurement of ARVs, which seems to be well organized. No emergency procurement was necessary for ARVs because the biannual quantification and tenders were well planned. Even for essential medicines, only one emergency order was needed for obsolete items or those not commonly stocked. The lead time for ARVs is about two months, and no delays have been experienced.

The main challenges that the Procurement Department (PD) is facing are, first, lack of proper quantification for OI medicines, and second, fluctuation of the exchange rate. The PD attributed the problem of quantification of medicines for OIs to the fact that OI medicines are used for treating multiple health conditions and are procured with other essential medicines, and the prescribers tend to have their preferences in using these medicines. Regarding the fluctuation of the exchange rate, the PD suggested using a buffer to protect the NDSO from fluctuations in the market as is implemented in the United Nations system.

### ***Distribution***

Distribution of ARVs by the NDSO is regarded as reliable. None of the DHMTs and only 2 percent of the HFs reported late delivery from the NDSO. However, delay in distribution from the DHMTs to the primary health care facilities has been a challenge because of lack of transport despite the fact that 40 percent of the DHMTs reported having distribution schedules. Of the primary health care facilities in Leribe, Thaba-Tseka, and Mohale's Hoek districts, 24 percent reported delayed deliveries from the DHMTs. However, only one DHMT reported delayed delivery for more than two days, and two reported delivery in two days if transport was available. Nevertheless, the data collection teams found that the medicines were kept in the DHMTs although they had been delivered by the NDSO one or two weeks previously.

Unlike the case for ARVs, the NDSO does not have regular schedule for the distribution of commercial orders.<sup>6</sup> Late submission of requisitions, mainly for commercial orders and a few for ARVs, and emergency commercial orders were factors that caused delay in distribution or

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<sup>6</sup> In the NDSO, requisitions for essential pharmaceuticals and other commodities are called "commercial orders."

increased workload at the NDSO. Route planning and distribution are not efficient unless a truck is loaded with a reasonable amount of goods.

The ARV requisitions were submitted directly from the DHMTs or hospitals to the NDSO. However, the NDSO was concerned that the purchase orders and payment for commercial orders took time to process. Nevertheless, the MOH procurement office clarified that the complaint was for the previous system in which the purchase orders and payments were managed at the district level, and some of the payments have not yet been completely processed. The new system, which just started, operates at the central level and takes only one week for approval of a purchase order;<sup>7</sup> it works better than the previous system.

### ***Storage and Inventory Management***

#### *NDSO*

ARV storage and inventory management is integrated into the general system. Standard operating procedures and monthly physical count are in place. There are stock cards and a computer inventory system, but because of bulky and high piles of products, the assessment team could not physically check whether the stock records were up to date or the first-expiry, first-out (FEFO) stock method was used. Regarding the storage space, although the World Bank donated a warehouse a few years ago, NDSO's growing business has overloaded its space. Shortage of space has caused difficult movement, hiring of additional space, engagement of more staff and security, and overtime work to organize stocks. Sometimes when the receiving area is full, the dispatch area is used for receiving, which then affects the operation flow and increases workload. A designated but limited storage space exists for ARVs. The preparation of the bulky mother-baby packs is done in the hallway beside the shelves, which further affects the movement in the store. The prepacking of mother-baby packs is done at the district hospital because the NDSO has no dispensing space, and it is done during weekends to avoid interrupting usual business both in the NDSO and the hospital.

#### *DHMTs*

All five assessed DHMTs lack designated stores for pharmaceuticals. One of them uses a boardroom, two of them use a multipurpose storeroom, one uses the stores at the district hospital, and one does not have any alternative space. Storage conditions in these alternative spaces are a major challenge because of lack of security measures, pallets or shelves, temperature control mechanisms, and cleanliness. Delivery notes are kept in the DPOs' offices for security reasons. The DPOs' workload is increased by offloading, storage, uploading, cross-checking, and getting delivery notes in and out.

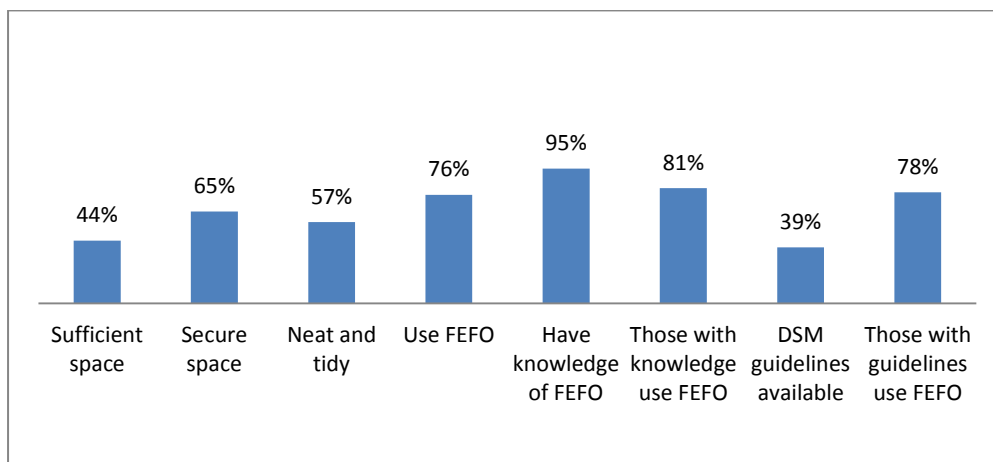
#### *Health Facilities*

The storage conditions were assessed through examination of space and security. Only 44 percent of the HFs had sufficient storage space, 65 percent had secure space, and only 27

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<sup>7</sup> The process for a commercial order is as follows: primary HFs submit commercial requisitions to the DHMT, then the DHMT submits them to the MOH procurement office. The procurement office captures the requisitions, checks the balance of the budget, and communicates with the DHMT if the budget is insufficient or proceeds to generate the purchase order for approval if the budget is sufficient. After delivering, the NDSO sends invoices to the procurement office for payment.

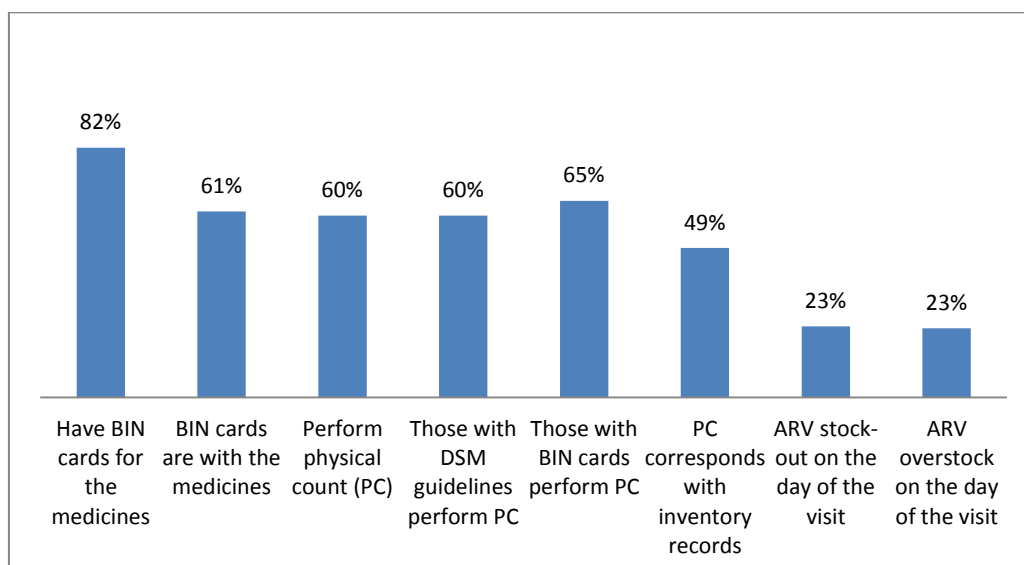
percent of the HFs had both sufficient and secure storage space. More private HFs have sufficient storage space than government and CHAL HFs (73 percent, 37 percent, and 40 percent, respectively;  $p < 0.05$ ). Regarding the performance of storage management, 57 percent of the HFs kept the stores neat and tidy, and 76 percent perform FEFO. Most (95 percent) of the respondents reported having knowledge about FEFO, and 81 percent used FEFO. The DSM guidelines (manual or job aids) were available in 39 percent of the HFs on the day of the visit, which included 23 percent of all HFs for the manual and 33 percent for job aids. Of those that had the DSM guidelines (manual and job aids), 78 percent use FEFO (see figure 6). Slightly more CHAL and GOL HFs (47 percent and 37 percent, respectively) than private HFs (27 percent) had DSM guidelines. However, no significant difference existed between different types of HFs regarding storage management and availability of DSM guidelines.



**Figure 5. Storage conditions and performance at HFs**

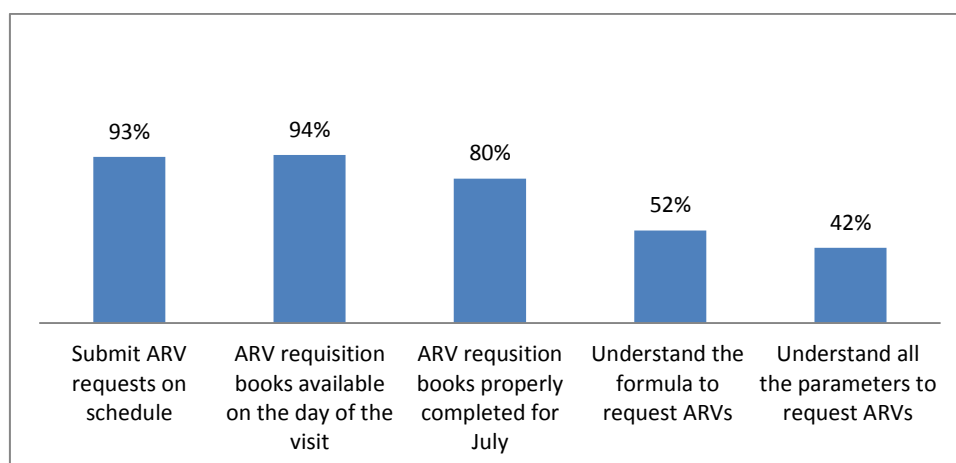
Inventory management was assessed through BIN cards and physical count (figure 7). Most HFs (82 percent) had BIN cards for ARVs, and the BIN cards were with the medicines in 61 percent of them. Only a few of the private HFs (36 percent) had BIN cards, compared to the GOL and CHAL HFs (89 percent and 93 percent, respectively) ( $p < 0.05$ ), and the BIN cards were with the medicines in only 20 percent of these private HFs, compared to GOL and CHAL HFs (63 percent and 65 percent) ( $p < 0.05$ ). Geographically, more rural HFs than urban HFs had BIN cards (93 percent vs. 63 percent,  $p < 0.05$ ) and kept BIN cards with the medicines (71 percent vs. 35 percent,  $p < 0.05$ ). Physical count was performed in 60 percent of the HFs. Of those HFs that had DSM guidelines, 60 percent performed physical count, and of those HFs that had BIN cards, 65 percent performed physical count. On the day of the visit, the data collection team did a random physical count in 97 percent of those HFs that had BIN cards and found that in only 49 percent of these HFs did stock on hand correspond to the balance on the BIN cards. This means that, in all 95 HFs visited, only 36 HFs (38 percent) could provide accurate inventory data for the ARV monthly report if the BIN cards were the sole inventory data source. More secondary than primary HFs performed physical count (86 percent vs. 58 percent) and had a better correspondence rate (71 percent vs. 47 percent). However, there was no statistical significance between groups and types of HFs regarding stock-on-hand correspondence rate. Availability of the ARVs was acceptable; 23 percent of the HFs had stock-outs of any ARVs, and the same percentage of HFs had any ARV overstock on the day of the visit. Among them, 24 percent of the primary and 13 percent of the secondary HFs had stock-outs. All the secondary HFs had no overstock while 25 percent

of the primary HFs had overstock. However, there was no significant difference between groups and types of HFs regarding stock-outs and overstock of ARVs.



**Figure 6. Inventory management and availability of ARVs at HFs**

Ordering ARVs was reported to be on schedule in 93 percent of the HFs. On the day of the visit, the ARV requisition book was found available in 94 percent of the HFs, and 80 percent of them had their ARV requisition book properly completed for July. Nevertheless, only 52 percent of the interviewees were able to respond correctly to the question on the formula for requisitioning, and only 42 percent understood the parameters for ordering ARVs. A significant difference existed between secondary and primary HFs regarding understanding the formula (100 percent vs. 48 percent,  $p < 0.05$ ) and the parameters (100 percent vs. 37 percent,  $p < 0.05$ ). Staff in the secondary HFs seemed to have better knowledge about how to order ARVs (figure 8).



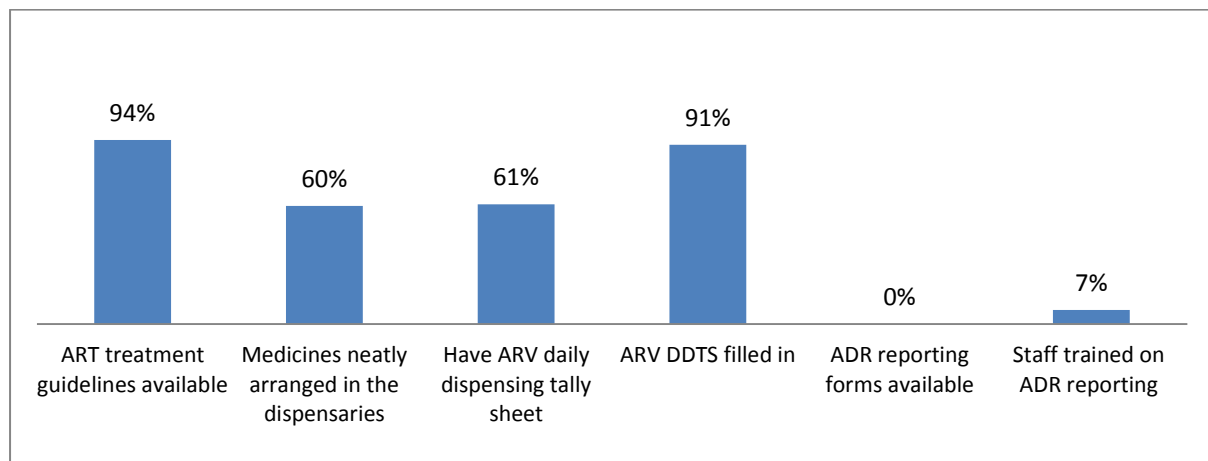
**Figure 7. Knowledge and practice for monthly ARV requisitions at HFs**

Only 18 percent of the HFs used computer systems for inventory information management, most of which were secondary HFs (75 percent of the secondary HFs vs. 13 percent of the primary HFs,  $p < 0.05$ ). Geographically, 34 percent of the urban HFs and 10 percent of the rural HFs had access to computers for inventory information management ( $p < 0.05$ ). Of these HFs, 29 percent used RxSolution software, followed by Microsoft Excel, Microsoft Access, BIPAI-EMR, and SAP (14 percent each), and ALAFA bookwise and Elixir (7 percent each). There was no significant difference between groups and type of HFs regarding using computerized inventory information management and stock-out of ARVs.

### Pharmaceutical Services

Pharmaceutical services were assessed through observation and interview, focusing on the practices of dispensing and medication counseling at the HFs. Because some of the HFs did not have ART clinics on the day or time of the visits, the denominators vary among the indicators.

Dispensing error was not assessed in this activity. However, the way the medicines were arranged was assessed because a well-organized dispensary is one of the measures to prevent or reduce dispensing errors. The finding was that 60 percent of the HFs neatly arranged the medicines<sup>8</sup> in the dispensaries regardless of whether it was time for dispensing or not. ART treatment guidelines were available in almost all (94 percent) the HFs, of which 91 percent had manuals and 77 percent had job aids. It was observed that only 61 percent of the HFs had ARV daily dispensing tally sheets (DDTSs), of which 91 percent were filled in. However, the DDTs used different formats or different materials (notebooks or paper sheets). In addition, the information in the DDTs was never reported to any authorities or used after it was collected. Only 7 percent of the HFs had staff trained in ADR reporting. However, none of the HFs had the ADR report forms (see figure 9).

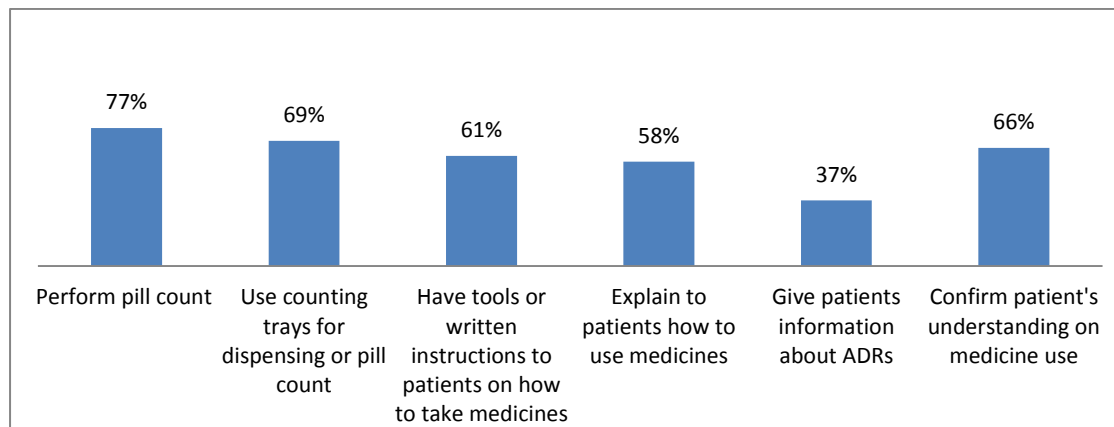


**Figure 8. Dispensing tools and management**

The dispensing and medication counseling were observed only at the time of the visit when the practice or services were available. Therefore, the dispensing practice was observed in 64 of 95 HFs, of which 77 percent performed pill counts. Of those that performed pill counts, 69 percent used counting trays. Through interview and observation in 72 HFs, 61 percent had

<sup>8</sup> Medicines were displayed by item name and could be clearly identified for dispensing.

tools or written instructions for the use of the medicines. The data for medication counseling were observed in only 50 HFs, of which 58 percent gave oral instructions on how to use the medicines, 37 percent provided ADR information, 66 percent confirmed patients' understanding of the instructions given (see figure 10).



**Figure 9. Dispensing and medication counseling**

The average time for dispensing and medication counseling was 5 minutes (minimum 24 seconds and maximum 31 minutes) for refill patients; 39 percent of the patients' dispensing and medication counseling time was less than 3 minutes. Patients' average waiting time for medication services was 79.9 minutes (minimum: 0, maximum: 360), and 43 percent of the patients' waiting time was less than 60 minutes. The wide variation for patients' waiting time was because, in many primary health facilities, the services for clinical consultation and dispensing and medication counseling were served by one HCW at the same time. It was not feasible to separate the waiting time for clinical and medication services.

## **Human Resources and Capacity Issues**

### ***DCD***

The DCD-Pharmacy was staffed with two pharmacy professionals. Their responsibilities include quantification for ARVs, monitoring the availability of ARVs, supervision on ARV supply management at the hospital and DHMT levels, and coordinating ART-related pharmaceutical issues. ART diagnostic supplies and laboratory affairs are not managed by the DCD-Pharmacy office but rather by the laboratory logistics coordinator in the Laboratory Service Directorate.

There were no quantification guidelines for DCD-Pharmacy, but the staff received training in quantification methodologies and use of the Excel spreadsheet for quantification. Their other useful learning experiences include learning from colleagues while being assisted, attending monthly meetings or technical seminars, and participating in quantification activities.



## **NDSO**

A Procurement Department staffed with nine personnel at the NDSO was responsible for the procurement of both essential and ARV pharmaceuticals. The officers within this unit had various backgrounds in business or general administration, as pharmacists, pharmacy technicians, and as laboratory technicians. They were trained in procurement practice as well as government and Global Fund procurement rules and regulations. Apart from trainings, other useful learning experiences included on-the-job training provided by supervisors, attending technical meetings, private part-time learning, learning from colleagues while being assisted, and reading guidance materials.

The NDSO Logistics Department is responsible for receiving, storage, inventory management, and distribution. The department was staffed with 42 workers, with pharmaceutical and nontechnical backgrounds, of whom 25 were tasked with managing essential pharmaceuticals and 17 were responsible for ART commodities. However, all staff were working in a harmonized manner to tackle the heavy workload (three trucks of consignments received per day in the previous week, 140 picking lists per day for essential pharmaceuticals, and 233 picking lists per month for ARVs, in addition to other tasks). There were guidelines for storage, inventory, and distribution for essential pharmaceuticals. The same guidelines were applied to the management of ARVs. The pharmacist interviewed received in-service warehouse management training. She also indicated that new staff orientation, colleagues' briefings from training, and attending technical meetings were the most useful self-learning experiences. A capacity-building system for nontechnical staff included orientation, annual training needs assessment, outsourced training (previously), and correspondence training.

One staff member under the Customer Services Department was designated to manage the ARV requisitions from HFs and to process consumption information using RxSolution software. The information for ARV quantification was generated from this office too. Collaboration among the Customer Services Department, the Logistics Department, and DCD-Pharmacy for quantification and distribution seemed satisfactory.

### ***District Pharmaceutical Officers***

The DPOs, with pharmacist or pharmacy technician backgrounds, were responsible for pharmaceutical affairs in the districts. These include information management (receiving and sending requisitions, providing consumption data to DCD), distribution, and supportive supervision to the primary health care facilities. Each DHMT is staffed with one DPO. No clear understanding existed about the established posts for pharmaceutical staff at the DHMTs. However, of the five DHMTs, one had one more full-time staff, and another had three part-time staff on loan from other hospitals to assist the DPOs.

All the DPOs received in-service classroom training for pharmaceutical management, but only 40 percent had received training in the last two years. Other useful learning experiences included on-the-job training provided by their supervisors (80 percent), attending technical meetings (60 percent), and reading guidance materials (60 percent).

Problem-solving capacity of the DPOs was assessed based on the challenges they are facing. Table 2 summarizes the challenges facing DPOs, initiatives they took, and the results. Issues related to supply management, storage, and transport were at the top of the challenges, followed by shortage of staff. DPOs were also challenged by factors affecting availability of

transport, such as lack of vehicles, insufficient drivers, poor vehicle maintenance, and poor transport management. Communication was the approach most used to address the problems, and it was said to work well only for submitting monthly requisitions and resolving discrepancies between delivery notes and consignments. Some of the issues, such as space, transport, and staffing, were out of DPOs' control; therefore, their initiatives could not achieve satisfactory results.

**Table 2. Challenges, Initiatives, and Results at the DPO Level**

<b>Types of challenges</b>	<b>Challenges</b>	<b>Initiatives</b>	<b>Improved</b>	<b>Descriptions of initiatives</b>
Discrepancies between delivery notes and products or quantity received at HFs	2 (50%)	2 (100%)	2 (100%)	Communication with NDSO/HFs
Lack of storage space for pharmaceuticals	5 (100%)	2 (40%)	1 (50%)	Communication (report to authorities) Alternative stores
Poor storage conditions	4 (100%)*	1 (25%)	0 (0%)	Deliver pharmaceuticals to HFs as soon as possible
Shortage of transport	5 (100%)	3 (60%)	1 (33%)	Communication (report to authorities) Assisted by partners
Late submission of the monthly orders from HFs	3 (60%)	3 (100%)	3 (100%)	Communication with HFs
Overload of paperwork or reports	1 (25%)	1 (100%)	1 (100%)	Time management
Shortage of staff	4 (80%)	4 (100%)	1 (25%)	Communication (report to authorities)
Low capacity of staff	2 (40%)	1 (50%)	1 (100%)	Partners conducted trainings and supervisions
Others (have no authority over nurses)	1 (20%)	1 (100%)	0 (0%)	Communication with focal person

\* One DHMT does not have alternative storage space.

The DPOs also attributed the difficulty in conducting supportive supervision to the lack of transport and shortage of staff. The DHMTs had different transport strategies for supervision: some conducted integrated supervision where several supervisors arrange schedules to share one vehicle to the same HFs; some schedule supervision for one supervisor, and take turns for different supervisors. However, because of high workload in the office and lack of vehicles, the DPOs found going out for supervision a major challenge.

Regarding the issue of capacity, none of the DPOs had concern about their own capacity, but two (40 percent) indicated a concern about the low capacity of the staff in the HFs in pharmaceutical management and general management skills. One DPO was assisted by partners for training and supervision. Therefore, the DPO would like to join them in supervision to overcome the transport issue at the DHMT.

## Health Facilities

### Workforce for Provision of ART Pharmaceutical Services

Several cadres work for ART and general pharmaceutical services in the HFs. Table 3 shows the distribution of the various cadres in the three HF categories. Most pharmacists and pharmacy technicians were working in the urban or secondary HFs, whereas more trained nursing assistants served in the rural and primary than in urban and secondary HFs. Nearly half the HFs used lay health workers<sup>9</sup> to assist in pharmaceutical services. They were seen more in the rural HFs than in the urban ones. Table 4 indicates the distribution of various cadres for ART and general pharmaceutical services, and the total number of these cadres in these HFs. It shows that nursing staff were the main workforce for pharmaceutical services in most of the HFs. All the pharmacy professionals (pharmacists and pharmacy technicians) and almost all the nursing professionals performed both ART and general pharmaceutical services. Lay health workers served more on ART than general pharmaceutical services. Table 5 shows types of pharmaceutical services the various cadres performed. The pharmacy and nursing professionals performed all types of pharmaceutical services, whereas the counselors and lay health workers performed mainly pill counts and medication counseling. Nonprofessional<sup>10</sup> staff were used in a few health facilities to assist in repackaging and other pharmaceutical activities.

**Table 3. Number and Percentage of HFs by Facility Types with Various Cadres Performing ART Pharmaceutical Services**

Health worker	Average	Ownership types			Geographic types		Level of services	
		GOL	CHAL	Private	Rural	Urban	Primary	Secondary
Pharmacists	13 (14%)	5 (14%)	7 (16%)	1 (7%)	3 (5%)*	10 (30%)*	6 (7%)*	7 (88%)*
Pharmacy technicians	19 (20%)	11 (31%)	8 (18%)	0 (0%)	7 (11%)*	12 (36%)*	11 (13%)*	8 (100%)*
Nurses/ midwives	85 (89%)	30 (86%)	44 (98%)	11 (73%)	58 (94%)	27 (82%)	79 (91%)	6 (75%)
Trained nursing assistants	69 (73%)	24 (69%)	37 (82%)	8 (53%)	53 (85%)*	16 (48%)*	66 (76%)*	3 (38%)*
Counselors	12 (13%)	4 (11%)	5 (12%)	3 (20%)	9 (15%)	3 (9%)	10 (11%)	2 (29%)
Lay health workers	46 (48%)	24 (65%)*	21 (49%)*	1 (7%)*	35 (56%)*	11 (33%)*	41 (47%)	5 (71%)
Nonprofessionals	14 (48%)	4 (11%)	6 (14%)	4 (27%)	7 (11%)	7 (21%)	14 (16%)	0 (0%)

\* Significant difference (p<0.05)

<sup>9</sup> Lay health workers: the nonhealth professional workers that received short-term informal basic training and orientation or on-the-job training specifically for the work they are assigned to. They work under the supervision of the in-charge of the related units in the HFs. In this assessment, lay health workers included lay counselors, lay assistants serving in the pharmacies, store keepers, community/village health workers, expert patients, and mother-to-mother (M2M) volunteers.

<sup>10</sup> Nonprofessional staff: the staff that did not receive health related formal education, including cleaners, gardeners, book keepers, support staff, ward attendants, soldiers, and unspecified staff.

**Table 4. Number and Percentage of HFs with Various Cadres for Pharmaceutical Services and Total Numbers of the Cadres in the Surveyed HFs**

Cadres	ART	General	ART + General	Total number of cadres for pharmaceutical services in the surveyed HFs
Pharmacists	13 (14%)	13 (14%)	13 (14%)	17
Pharmacy technicians	19 (20%)	19 (20%)	19 (20%)	32
Physicians	3 (3%)	2 (2%)	2 (2%)	5
Nurses and midwives	85 (89%)	71 (75%)	72 (76%)	171
Trained nursing assistants	69 (73%)	66 (69%)	67 (71%)	111
Counselors	12 (13%)	3 (3%)	3 (3%)	29 (incomplete data)
Lay health workers	46 (48%)	18 (19%)	10 (11%)	113 (incomplete data)
Data clerks	8 (8%)	3 (3%)	2 (2%)	7 (incomplete data)
Nonprofessional staff	14 (15%)	8 (8%)	3 (3%)	15 (incomplete data)

**Table 5. Percentage of the HFs in Which Cadres Performed Specific ART Pharmaceutical Services**

Cadres	Ordering	Storage	Dispensing	Pill count	Medication counseling	Monthly reporting
Pharmacists	14	14	14	12	14	9
Pharmacy technicians	19	20	19	16	19	11
Physicians	2	1	1	0	3	1
Nurses/midwives	71	68	73	69	73	62
Trained nursing assistants	53	61	67	61	62	43
Counselors	1	1	2	9	12	1
Lay health workers	5	9	11	38	48	5
Data clerks	1	0	2	7	2	26
Nonprofessional staff	1	4	6	18*	4	3

\*Including prepacking for general pharmaceutical services

Hirschhorn et al. (2006) suggested that, overall, the number of HCWs required to provide ART to 1,000 patients included one or two physicians, two to seven nurses, and one to three pharmacy staff, and a much wider range of counselors and treatment supporters. Therefore, the provider per 1,000 patients ratio for key professional cadres is adopted as the indicator of their workload for pharmaceutical services. The patient load shared by pharmaceutical professionals (pharmacists and pharmacy technicians) and nursing professionals (nurses/midwives and trained nursing assistants), respectively, was also presented as reflecting an overall workload shared by the same category of cadres (see table 6). Because of incomplete data on the number of patients for ART and general patients in some HFs, the data can only represent minimum workload. The results show that the pharmacists and pharmacy technicians have higher patient loads than the nursing staff. It reflects the geographic differences because most pharmaceutical professionals work in the urban and secondary health facilities. However, the pharmaceutical professionals' work is more focused in pharmacy stores and dispensaries, while the nursing staff have more diversified work in clinical, nursing, and pharmaceutical services, particularly in the primary health care facilities. Because both pharmacy and nursing cadres also provide general pharmaceutical

services, table 6 presents the workload for both types of services and showed higher patient load for both cadres for the combined services.

**Table 6. Provider-Patient Ratio for ART and General Pharmaceutical Services at HFs**

Providers per 1,000 patients	Pharmacists (HFs)	Pharmacy technicians (HFs)	Pharmacists and pharmacy technicians (HFs)	Nurses/midwives (HFs)	Trained nursing assistants (HFs)	Nurses/midwives and trained nursing assistants (HFs)
ART <sup>a</sup> pharmaceutical services	0.89 (12)	1.12 (17)	1.75 (18)	3.93 (81)	3.27 (68)	6.24 (90)
ART and general pharmaceutical services	0.18 (6)	0.32 (9)	0.50 (9)	1.67 (49)	1.33 (51)	1.94 (63)

*Note:* Data in parentheses indicate number of HFs where data were available for the indicated cadre.

a. ART patients: data in July 2012 for adults, pediatrics, and PMTCT

### *Training and Learning Experiences of Health Workers*

HCWs at HFs who responded to the assessment team were also interviewed about their training and learning experiences in DSM or ART treatment and medication counseling. They were professional staff (pharmacists, pharmacy technicians, nurses, or trained nursing assistants) in charge or working in the pharmacies or the ART clinics. Table 7 indicates the percentage of HCWs interviewed who received in-service training (conventional classroom training) in DSM and ART-related treatments. Over half received DSM training for ARVs or general pharmaceuticals. Most received training in ART treatment guidelines. However, less than half received medication counseling training. No statistical difference exists between HFs in ownership, geographical sites, and facility types in receiving DSM training and ART treatment training.

**Table 7. Training Received by HCWs**

Percentage of HCWs interviewed who received in-service training in general DSM	68
Percentage of HCWs interviewed who received in-service training in ARV supply management	54
Percentage of HCWs interviewed who received in-service training in any of the preceding two types of supply management	74
Percentage of HCWs interviewed who received in-service training in ART counseling and treatment	81
• Received training on HIV testing and counseling	34
• Received training on ART treatment guidelines	74
• Received training on tuberculosis treatment guidelines	51
• Received training on medication counseling	43

The statistics test between those who received in-service training and those who did not showed no significant difference in their knowledge in FEFO (94 percent vs. 95 percent, respectively). It indicates that the in-service training was not the only means of learning. The HCWs might have other learning approaches.

The same interviewees were asked to share their preservice training and other learning experiences, as well as to indicate which were most useful. Table 8, figure 11, and figure 12 show the results for DSM and ART treatment and medication counseling (ART treatment). In both DSM and ART treatment learning experiences, peer or team learning (new staff orientation, colleagues' briefing from trainings, observing how colleagues work, and asking for assistance from colleagues), on-the-job training by a supervisory team, and reading guidelines or job aids were used most. Among these learning experiences, on-the-job training by the supervisory team was considered most useful by more than half the respondents for both DSM and ART treatment. Reading guidelines or job aids was also considered most useful by about half the respondents. The experience of attending technical meetings was lower than half, but 50 percent of those attending found it useful. In DSM learning experiences, sixty percent (60 percent) of those guided by a regular mentor reported themselves as most satisfied. Less than half the respondents learned both DSM and ART treatment in their preservice training, and only one-fifth found it most useful. Although most respondents learned from peer or team interactions (new staff orientation, colleagues' briefing from trainings, observing how colleagues work, and asking for assistance from colleagues), less than half considered these learning experiences most useful.

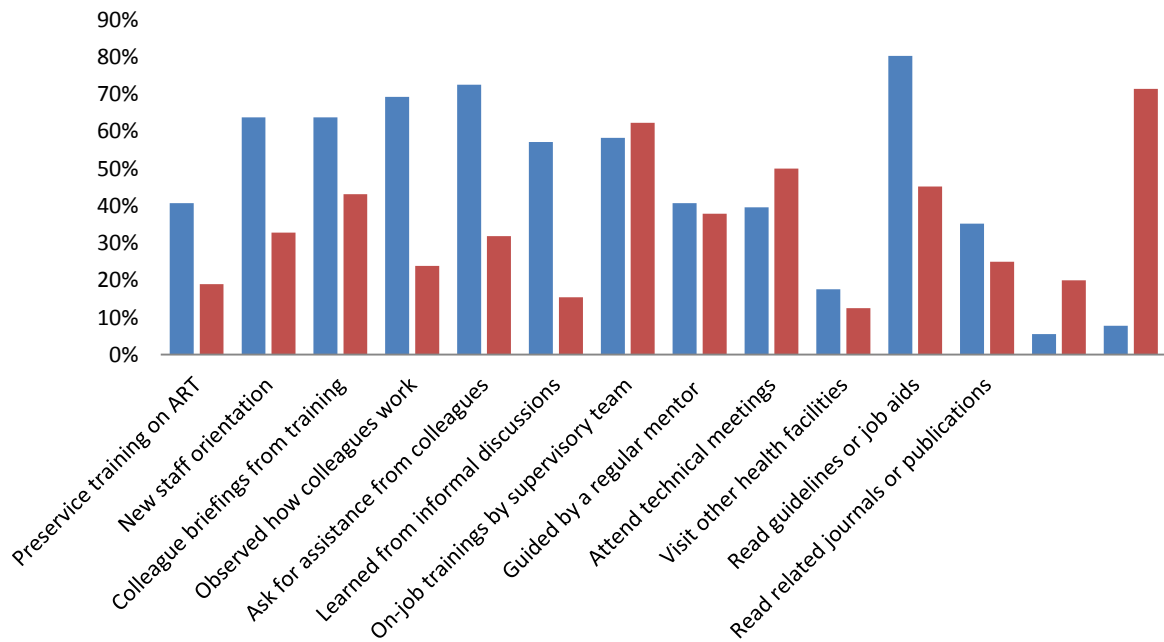
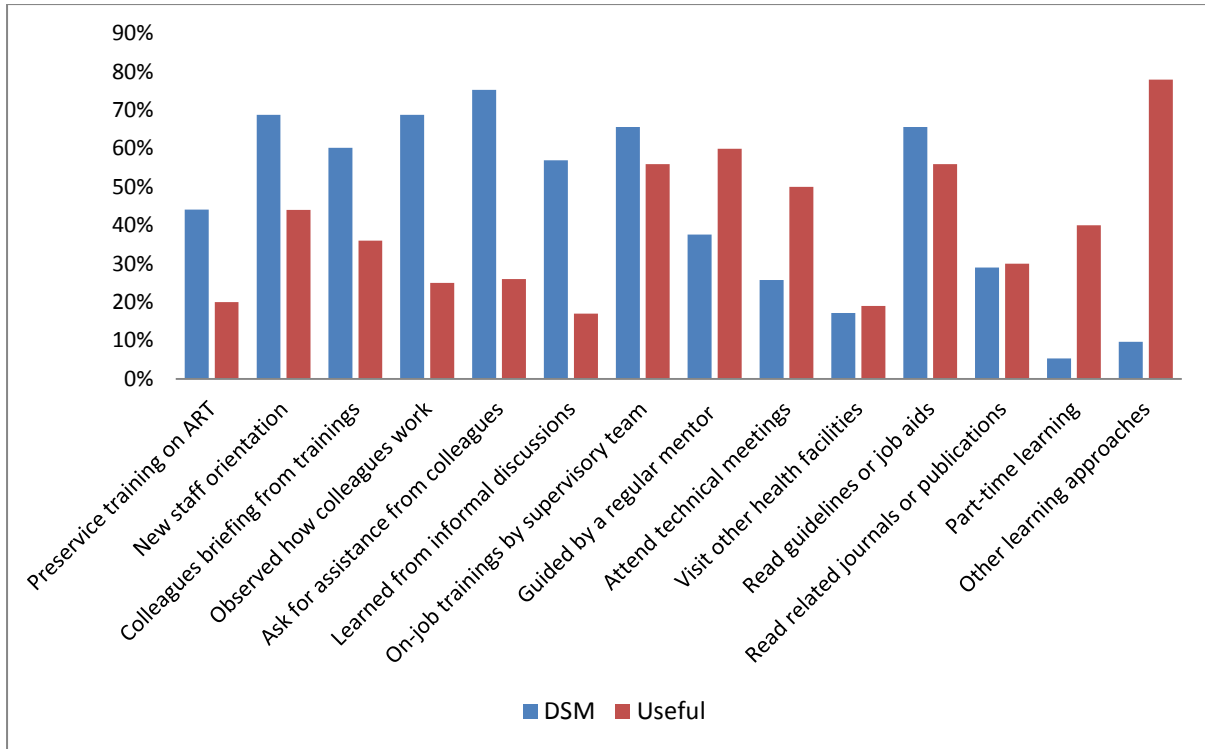
The distributions of the respondents that found on-the-job training by supervisory team, guidance by a regular mentor, attending technical meetings, and reading guidelines most useful for DSM and ART treatment are indicated in table 9 and table 10. There is no significant difference between different types of health facilities.

**Table 8. HCWs' Learning Experiences in DSM and ART Treatment and Medication Counseling**

Learning experiences	DSM	Most useful	ART treatment	Most useful
Preservice training on ART	44%	20%	41%	19%
<i>New staff orientation</i>	<b>69%</b>	44%	<b>64%</b>	33%
<i>Colleagues briefing from trainings</i>	<b>60%</b>	36%	<b>64%</b>	<b>43%</b>
<i>Observing how colleagues work</i>	<b>69%</b>	25%	<b>69%</b>	24%
<i>Asking for assistance from colleagues</i>	<b>75%</b>	26%	<b>73%</b>	32%
Learning from informal discussions	57%	17%	57%	15%
On-the-job training by supervisory team	<b>66%</b>	<b>56%</b>	58%	<b>62%</b>
Guided by a regular mentor	38%	<b>60%</b>	41%	38%
Attending technical meetings	26%	<b>50%</b>	40%	<b>50%</b>
Visiting other health facilities	17%	19%	18%	13%
Reading guidelines or job aides	<b>66%</b>	<b>56%</b>	<b>80%</b>	<b>45%</b>
Reading related journals or publications	29%	30%	35%	25%
Part-time learning	5%	40%	5%	20%
Other learning approaches	10%	78%	8%	71%

Note: Key findings in boldface.

*Findings*



**Table 9. Distribution of Respondents for Most Useful DSM Learning Experiences**

Learning experiences	Overall	GOL	CHAL	Private	Rural	Urban	Primary	Secondary
On-the-job training by supervisory team	56%	52%	53%	70%	55%	57%	56%	50%
Guided by a regular mentor	60%	64%	50%	71%	52%	71%	61%	50%
Attending technical meetings	50%	45%	50%	100%*	56%	38%	47%	60%
Reading guidelines or job aids	56%	58%	53%	60%	50%	67%	57%	50%

\*Only one respondent

**Table 10. Distribution of Respondents for Most Useful ART Treatment and Medication Counseling Learning Experiences**

Learning experiences	Overall	GOL	CHAL	Private	Rural	Urban	Primary	Secondary
On-the-job training by supervisory team	62%	50%	68%	75%	64%	59%	62%	67%
Attending technical meetings	50%	53%	53%	25%	56%	36%	48%	60%
Reading guidelines or job aids	45%	41%	49%	44%	43%	50%	43%	63%

### *Problem-Solving Capacity of HCWs at HF Level*

The HCWs face many challenges in their daily work that could affect their productivity or increase their workload. Those in remote areas may not have immediate support from the district or higher-level authorities. How they respond to the challenges and how successful their initiatives are, were assessed. The challenges included the areas of infrastructure and space, supply and inventory management, logistics and supply chain information system, and staffing levels and capacities in DSM and ART treatment.

Table 11 shows the challenges faced by the HCWs and their initiatives to address the challenges, as well as the results. The infrastructure or space and staffing levels were the top-most challenges facing the HCWs, and they had the lowest improved results at the time of the assessment visits. The ARV supply management system–related challenges were at the mid-level. Receiving over half the HCWs’ efforts, supply conditions and information management were improved. Over half the HCWs reported having DSM capacity constraints, and about half reported having ART treatment capacity constraints, but less than one-third reported taking initiatives to address the constraints. Of those who took initiatives, at least 59 percent reported improved conditions.



**Table 11. Challenges, initiatives to address challenges, and results**

Challenge areas	Have challenges	Took Initiatives	Results reported	Conditions Improved
Infrastructure and space	78 (84%)	55 (71%)*	49 (89%)	10 (20%)
ARV supply management	56 (60%)	33 (59%)	28 (85%)	20 (71%)
ARV pharmaceutical information management	56 (60%)	38 (68%)	37 (97%)	18 (49%)
ART human resource or staffing level	79 (84%)	49 (62%)	49 (100%)	12 (24%)
DSM capacity	64 (69%)	19 (30%)	17 (89%)	10 (59%)
ART treatment capacity	42 (45%)	8 (19%)	8 (100%)	5 (63%)

\* Including those with construction/renovations in progress

The challenges regarding infrastructure and space that affected the HCWs' productivity include insufficiencies of space (83 percent), shelves and pallets (60 percent), lighting (22 percent), and cold room (24 percent); lack of privacy at the counseling area (29 percent); and a few others, such as poor layout or fragmented space, unsecured storage area for medicines and documents, lack of electricity and water supply, and water leakage. The initiatives the HCWs and management had taken are shown in table 12. Most HCWs reported the issues to management; some others tried to add space or reorganize the space. All had low improvement results. Millennium Challenge Account (MCA) renovations or construction were going on in 22 health facilities in which the HCWs were expecting to solve all the infrastructure and space issues.

**Table 12. Initiatives and Results for Infrastructure and Space Challenges\***

Responses to space challenges	Initiatives taken	Improved results
Report to management	22 (40%)	5 (23%)
Add space and shelves/pallets	10 (18%)	4 (40%)
Reorganize stores/alternatives	14 (25%)	3 (21%)
Construction in progress**	22 (40%)	--

\* Multiple initiatives and results

\*\* MCA renovations

The challenges in ARV supply management that affected the HCWs' productivity included stock-outs (32 percent); delayed delivery or no regular delivery schedule from the DHMT (18 percent); short supply by NDSO (11 percent); and a few others, such as unmatched quantities against delivery notes, overstocking, NDSO/hospital supply stocks with short shelf life, short supply by the supporting hospital, uninformed about pharmaceutical budget, and frequent orders. The initiatives the HCWs and management took are shown in table 13. Most of the HFs reported the supply management issues to management, the DHMT, or the NDSO, and over half the issues were responded to, resulting in improved supply conditions afterward. A few HCWs managed to borrow medicines from other HFs or switch staff to manage stores, which resulted in temporarily relieving stock conditions.

**Table 13. Initiatives and Results for DSM Challenges\***

<b>Responses to DSM challenges</b>	<b>Initiatives taken</b>	<b>Improved results</b>
Reported to the management, DHMT, or NDSO	21 (64%)	13 (62%)
Borrowed medicines from other HFs	8 (24%)	4 (50%)
Switched staff to manage stores	2 (6%)	2 (100%)
Received transport assistance to deliver medicines	1 (3%)	1 (100%)
Requested to be informed about budget	1 (3%)	1 (100%)
Tried to decrease daily ordering	1 (3%)	0 (0%)

\* Multiple initiatives and results

The challenges regarding pharmaceutical supply information management included high volumes of paperwork (91 percent); multiple reporting requirements for vertical programs (38 percent); submitting the monthly reports or requisitions late (21 percent); unfriendly computer system (16 percent); and others, such as lack of computer/software, shortage of data clerks, poor data management, lack of DDTS, no guidance on how to use tally sheet, and lack of or inconsistent transport for report submission. Initiatives to address these challenges and the results are shown in table 14. Reporting to management and requesting data clerks were at the top of the list. However, only about one-third of HCWs saw improved conditions. A few others managed to improve the conditions by shifting tasks or were assisted by colleagues, learned to use the system, redesigned the work, and even worked overtime.

**Table 14. Initiatives and Results for Pharmaceutical Supply Information Management Challenges\***

<b>Responses to pharmaceutical supply information management challenges</b>	<b>Initiatives taken</b>	<b>Improved results</b>
Report to management	22 (58%)	7 (32%)
Request data clerk/more staff	13 (34%)	5 (38%)
Task-shifting/assisted by colleagues	11 (29%)	9 (82%)
Trained how to use the system	1 (3%)	1 (100%)
Redesigned the work	1 (3%)	1 (100%)
Cross-check data by working beyond normal working hours	2 (5%)	2 (100%)

\* Multiple initiatives and results

The challenges regarding ART human resource issues included insufficient number of posts (78 percent); shortage of professional staff (20 percent); high turnover rate (18 percent); frequent absence of colleagues (13 percent); and others, such as unfilled posts, increased workload, lack of accommodation, request to assist neighboring clinic. Initiatives to address these challenges and the results are shown in table 15. The majority of the HFs reported the human resource issues to management. However, only one-fifth had their condition improved. A few of the HFs recruited or loaned staff, and half of them showed improved conditions.

**Table 15. Initiatives and Results for ART Human Resource Challenges\***

<b>Responses to ART human resource challenges</b>	<b>Initiatives taken</b>	<b>Improved results</b>
Report to management	40 (82%)	8 (20%)
Recruit/loan staff	6 (12%)	3 (50%)
Use nonprofessional staff	2 (4%)	1 (50%)
Consult pharmacist in the supporting hospital	3 (6%)	1 (33%)
Availability of trained nurses in the neighboring clinic	1 (2%)	1 (100%)

\* Multiple initiatives and results

The challenges regarding DSM capacity included lack of training in DSM since 2010 (72 percent); untrained colleagues (42 percent); lack of guidelines (11 percent); and others, such as having skill gaps in DSM, needing computer training for DSM, and lacking proper handover for new staff. Initiatives taken were mostly reporting to management or requesting training (74 percent). Half improved. A few opted for self-education (32 percent) with two-thirds of them improving their capacity (see table 16).

**Table 16. Initiatives and Results for DSM Capacity Challenges\***

<b>Responses to DSM capacity challenges</b>	<b>Initiatives taken</b>	<b>Improved results</b>
Report to the management/request for training	14 (74%)	7 (50%)
Self-education	6 (32%)	4 (67%)

\* Multiple initiatives and results

The challenges in ART treatment capacity included lack of training in treatment guidelines since 2010 (69 percent), having colleagues untrained in ART treatment guidelines (29 percent), sometimes struggling to answer patients' questions or to convince patients on adherence (21 percent), and unavailability of ART treatment guidelines (7 percent). Compared to other challenges, relatively fewer HCWs would take actions or initiatives to improve their ART treatment capacity (see table 11 and table 17).

**Table 17. Initiatives and Results for ART Treatment Capacity Challenges**

<b>Responses to ART treatment capacity challenges</b>	<b>Initiatives taken</b>	<b>Improved results</b>
Request training	5 (63%)	2 (40%)
Self-education	1 (13%)	1 (100%)
Assisted by other colleagues	1 (13%)	1 (100%)
Conducted adherence health talk	1 (13%)	1 (100%)

## DISCUSSION

### ARV Supply Chain Management and Performance

ARV supply chain management was regarded as satisfactory in the following areas: funding, quantification, procurement, distribution from the NDSO, and availability of ARVs. The areas of concern are data quality for the ART monthly summary (requisitions and morbidity) reports, distribution from the DHMTs to health facilities, storage conditions at all levels, and inventory management at the HF level. These results confirm the success at the central and NDSO levels while highlighting the challenges at the DHMT and HF levels.

Factors accounting for success at the central and NDSO levels were the availability of financial resources and commitment in implementation. Despite the late arrival of the Global Fund funding, the MOH used its limited supplementary funding and mechanism to fill the gaps. Channeling of the funding for procurement and distribution was effective to ensure the availability of ARVs. Centralized quantification was done in collaboration with partners and stakeholders, and both consumption and morbidity information were used to maximize the effectiveness of the information and the use of the funds.

Storage conditions were the most challenging area at all levels. Insufficient storage space or poor storage conditions often increase HCWs' workload and stress in keeping pharmaceuticals in secure and good condition. However, the results are often unsatisfactory. The NDSO is facing growing business for which it must stretch to the limit the available space for storage of pharmaceuticals and prepacking of mother-baby packs, and more staff time is needed for moving and managing pharmaceuticals. The DHMTs are expected to play the role of distributing—rather than storing—the pharmaceuticals to the HFs. Hence, the DHMTs have no transitional stores. However, the DHMTs have insufficient capacity to distribute pharmaceuticals in a timely manner because of insufficient transport. A lot of effort was spent in offloading the consignments, looking for a temporary store, worrying about the storage condition and security of the consignment, keeping the delivery notes and invoices in secure files, pushing management to provide transport or looking for assistance from partners, uploading the consignments, and pulling delivery notes from the files for distribution. DPOs' energy and time are spent unnecessarily in efforts between offloading the consignments from NDSO's trucks and uploading them into the DHMTs' or partners' vehicles. In addition, the irregular distribution schedule for general pharmaceuticals from the NDSO affects DPOs' planning for supervision schedules.

The challenges of storage and dispensing space in the HFs were not only insufficient space but also storage condition issues. Even if the HCWs tried to find additional space, that sometimes results in fragmented space and poor storage conditions. Insufficient storage space could also affect the practice of inventory management. For example, crowded or high-piled stores may discourage physical count and use of FEFO; unsecure stores may discourage keeping BIN cards with the products and frustrate updating records for each transaction, and so on. All these challenges may result in poor quality of the inventory data or risk of product expiry. Fortunately, MCA construction took place in some HFs. Although the assessment teams were unable to physically check the sizes of the stores, the HCWs interviewed had high expectations of the new stores.

The data quality issues for the monthly requisitions and morbidity reports were related to inventory practice and capacity, HCWs' workload, and their understanding of the reports. This assessment found that private HFs and primary HFs had low performance in inventory management and low knowledge in ART monthly reports; in only half the HFs did their inventory data correspond with physical stock, and more than half the HCWs interviewed reported they had capacity challenges in DSM. Regarding workload, most of the HCWs complained about high volumes of paperwork. Because HCWs' priority is serving the patients, while patient load is high, paperwork could be compromised. For example, the recording and reporting may be shifted to other staff; some of HCWs filled or checked the data after working hours. In terms of understanding of the reports, about half the HCWs interviewed did not understand the formula and parameters for filling the monthly requisition forms; more than half the HFs did not even have DDTs to fill out. All these factors affected data quality. Some can be addressed by capacity building of the HCWs, such as training in storage and inventory management as well as data management; some rely on improving storage space and conditions and reducing paperwork.

Another challenge in data management was that most of the DPOs submit their aggregated logistics reports to DCD-Pharmacy late. In fact, all the monthly requisitions are processed at the NDSO in the computer. The NDSO should be able to provide information to the DCD on a regular basis, in addition to providing the data for annual quantification.

The performance in dispensing and medication counseling was moderately satisfactory except that giving ADR information to patients was relatively low. Because the patients observed were refill patients, the HCWs explained that all the required information was given at patients' first visits. This is a limitation to this assessment because there was no opportunity to assess whether the new patients' medication counseling was sufficient. In addition, room for improvement was identified, in particular, for confirming patients' understanding of medicine use because it is the last opportunity to have patients' feedback and check what information may be needed regarding the use of the medicines.

Regarding capacity in ART treatment, nearly half the HCWs interviewed reported having challenges in ART treatment capacity. It was relatively lower than other challenges partially because most of the HCWs interviewed were nursing professionals. They were more confident in clinical work and medication counseling. However, about one-fifth of the HCWs struggled to answer patients' questions, indicating that the HCWs require practical training with case study and experience sharing and discussion.

## **Human Resources and Capacity (Training and Problem Solving)**

### ***Human Resources Requirement and Workload***

Hirschhorn et al. (2006) reviewed literature and concluded that factors influencing health workforce needs include task assignments, delivery models, other staff responsibilities, and program size. They suggested that, overall, the number of HCWs required to provide ART to 1,000 patients included one or two physicians, two to seven nurses, one to three pharmacy staff, and a much wider range of counselors and treatment supporters. This assessment found that the provider-patient ratios for ART pharmaceutical services for pharmaceutical and nursing professionals are at the lower margin of Hirschhorn's estimates. However, these HCWs work for not only the ART program but also the general services and other programs.

Combining the workload of ART and general pharmaceutical services for more realistic estimates, this assessment found that these HCWs were indeed overloaded.

The findings show an imbalance in distribution of pharmaceutical professionals between urban and rural areas, as well as between secondary and primary health facilities because health centers are strategically staffed by clinicians that are able to diagnose and prescribe, or by nurses or nursing assistants, not pharmaceutical professionals .

### ***Training and Learning Experiences***

Most of the HCWs received in-service training for general pharmaceutical or ARV supply management and ART treatment guidelines. However, less than half the HCWs reported that they received training for medication counseling. In fact, the medication counseling training is part of the adherence counseling contents in the treatment guidelines, thus reflecting unsatisfactory learning results for medication counseling for these HCWs. Medication counseling is interactive and case specific. It therefore requires very practical training approaches to ensure trainees' learning results.

The HCWs' learning experiences indicate that on-the-job training, regular mentorship, reading guidelines, and attending technical meetings were the most useful educational approaches. This result indicates that basic knowledge from guidelines and practical skills through interactions with supervisors, mentors, and colleagues are required for the HCWs to gain their capacity apart from the classroom in-service trainings. Peer learning approaches (new staff orientation, colleagues' briefing from trainings, learning from observing colleagues work, and asking for assistance from colleagues) received lower votes than the preceding approaches. This could be because the orientation and briefing were not well organized, orientation or briefing skills were lacking, staff was overwhelmed by too much information at once, or they were not confident in colleagues' capacity. These training approaches need to be reviewed and possibly incorporated with other training approaches.

### ***Problem-Solving Capacities***

Working in the real world, the HCWs are dealing with challenges on a daily basis and work conscientiously despite the difficulties. Their problem-solving initiatives reflect their managerial skills and their desire to improve working conditions or services. Some challenges, such as infrastructure, systems, and staffing level, require authorities to solve them; some challenges regarding practices or capacities require the HCWs' own motivation and innovation to address. However, all will need support from the authorities. This assessment found more challenges in infrastructure, staffing levels, DSM capacity, and DSM and information management systems than in ART treatment capacity. More efforts have been made to address the infrastructure, staffing, and system issues than to address capacity issues. The initiatives vary depending on the challenges. The most common initiative was "communication," which included reporting to management or related authorities and colleagues. The results showed that communication worked best for DSM challenges because most of the DSM issues were supply mistakes or late deliveries that could be solved by quick responses. Task-shifting worked well for storage and information management because they are labor intensive and can be done under supervision. Some other interim approaches, such as adding space or shelves/pallets, reorganizing the stores, and borrowing medicines to fill the gaps of late distribution or stock-outs, present the admirable commitment of the HCWs.

The HCWs' problem-solving experiences indicate the need for basic managerial skills and better support from management. As the frontline employees, HCWs are well positioned to improve the organization's outcomes by discovering challenges and suggesting changes based on their knowledge and experiences. Managers have supportive roles, such as assisting with problem-solving efforts; providing support for workers who attempt to improve their work systems, including building their capacities; and valuing them as proactive, motivated employees .

Task-shifting is regarded as an effective strategy for addressing shortages of human resources in HIV treatment and care in many countries. It offers cost-effective care to more patients than a physician-centered model. This assessment found that lay health workers were the main workforce for task-shifting. Some HFs also used nonprofessional staff to assist their work. This assessment did not interview these staff about their training. However, a research carried out in Lesotho found that lay counselors have often been insufficiently trained, and the quality of counseling and testing has sometimes been poor. Supervision and quality control mechanisms are absent. Coordination between counselors and ART treatment providers has been poor. Another report indicated that some lay health workers received short-term training, depending on their expected roles and responsibilities, and work under the supervision of the in-charge of the health facilities (15). These reports highlight the need for systematic and continuous capacity building for lay health workers.

## **RECOMMENDATIONS**

### **Capacity Needs**

Based on the findings from this assessment, the capacity needs for each level are associated with the roles of the HCWs and the level of the HFs. The DCD-Pharmacy officer requires capacity building in analytical skills; the NDSO logistics department requires advanced logistics management skills; the DPOs should enhance their management capacity; and the frontline HCWs need practical DSM, ART treatment and counseling, and basic management skills, which include time and teamwork management. The private and primary health care facilities require more attention in DSM and information management. Some of the officers and senior staff, including DCD-Pharmacy officers, NDSO logistics officers, DPOs, and senior HCWs, also play supervisory and mentorship roles. These officers and staff require capacities in supervision, coaching, and team building, as well as basic knowledge in monitoring and evaluation. Lay health workers need basic and practical training in storage management and medication and adherence counseling. Nonprofessional staff need very simple skills in hygienic handling of medicines, such as using clean counting trays or equipment to prepack medicines. Ensuring availability of the DSM and treatment guidelines for professional staff and providing reader-friendly job aids for lay health workers and nonprofessional staff would be very helpful.

### **Information Management and Quantification**

Many HCWs struggle to understand the relationship between services and information, yet they are the frontline data collectors. It is critical to help them understand the significance of the information to themselves. HCWs as data collectors are the starting point of the decision-making chain; the information reflects their workload and demand, and it will be transformed to funding, staffing, and supplies. In any DSM or ART training, the significance of information management to the system and to their services should be made clear to the trainees in addition to teaching them how to fill in the forms. Training in using the logistics and morbidity information for quantification should be incorporated in the DSM trainings. The DCD-Pharmacy should select a few HCWs from district and HF levels to participate in quantification activities each year as a capacity-building strategy for both data management and quantification. The supervisors should be equipped with basic monitoring and evaluation knowledge to provide continuous coaching to the HCWs and monitor data quality.

DCD should review the necessity of filling in the ARV DDTs because the information was not verified, the format was not standardized, and many HFs do not use them. Standardization of the ARV DDTs and their provision by DCD or DHMTs, as well as consideration of how the information should be verified and used, should be considered if the system is to be maintained.

### **Capacity-Building Methodologies**

Diversified training and learning methodologies are required for HCW capacity building. The classroom in-service training and on-the-job training should incorporate adult learning approaches with practical, hands-on, and problem-solving-oriented case studies, experience



sharing, and discussions. The skills for root cause analysis, intervention planning, and monitoring for problem solving or quality improvement training are required for trainers and managers, such as DCD-Pharmacy officers, NDSO departmental managers, DPOs, and senior staff at the health facilities.

DCD or DPOs' supportive supervision can be conducted in a systematic manner. Periodic mentorship workshops with well-designed training series with an adult learning approach and posttraining supervision are useful for a long-term capacity-building strategy in a district. The HCWs will be able to share their experiences and discuss how to improve their work in the mentorship workshops and to implement their action plans back in their HFs. The supervisors should apply key indicators in their supervision to monitor improvements and document challenging areas to allow DPOs or mentors to build HCWs' capacity systematically and to monitor their performance accordingly.

In the self-learning experiences, peer learning approaches were not considered useful by most of the HCWs. Peer learning activities are basic and routine capacity-building activities at any organization. The managers and supervisors should review these activities and incorporate the most helpful learning approaches, such as providing guidance materials and assigning a mentor to the new staff or having posttraining briefings in the staff or technical meetings. Team building training could also be applied to strengthen teamwork and confidence in peer learning.

### **Capacity-Building-Related System Strengthening**

Capacity-building-related system strengthening can be considered a mid- or long-term intervention. Regarding infrastructure and space, the MOH should continue or initiate more infrastructure renovation to improve the working and storage space conditions. Improving working conditions will enhance HCWs' morale and performance and consequently improve the quality of the services.

The current distribution system for commercial orders presents gaps at HF, DHMT, and NDSO levels. The following two options could be considered to improve the distribution system as mid- or long-term strategies—

*Option 1: Maintain the current distribution system by strengthening HFs' capacity in submitting timely requisitions to the NDSO; having the NDSO plan distribution schedules for those who submit requisitions in time; and strengthening the DHMTs transportation capacity and planning distribution schedules according to the NDSO's schedules.*

The ART distribution system proved that committing to scheduled reporting and delivery are doable. Therefore, the NDSO could follow the same ART delivery schedules or establish similar delivery schedules to distribute general pharmaceuticals, and the DPOs should strengthen the timely reporting capacity of the HCWs. The DHMTs should strengthen transportation capacity by increasing the numbers of vehicles and drivers and by improving route planning and transport management. Such strengthening could be carried out by DHMTs or contracted out. This option requires good collaboration of all levels (HFs, DHMTs, and NDSO, in addition to the financial department for processing purchase orders) and potential high investments at the DHMTs. The advantage of this option is that it would

not change the current system but aims at strengthening it. On the downside, delays by any party would affect the whole chain.

*Option 2: Implement direct distribution from the NDSO to all HFs for ARVs and commercial orders.*

As the findings from the assessment show, supervisors' on-the-job training and mentorship were very helpful to the HCWs—in particular, to those in the primary health care facilities. DPOs are the key supervisors for pharmaceutical management for those HCWs. Since the DHMTs lack capacity in pharmaceutical distribution, the current system burdens DPOs and DHMTs in transportation, storage, and other labor-intensive work and delays pharmaceutical distribution between the DHMTs and HFs. As a result, DPOs' time and energy are used for the inefficient pharmaceutical distribution instead of in assisting HCWs to improve their capacity or performance; and the HFs do not receive pharmaceuticals in a timely manner. A direct distribution system could be carried out by the NDSO or through contracting out. The former requires strengthening the NDSO's warehouse and transportation capacity, which includes increasing warehouse space, increasing numbers of vehicles and drivers, and establishing a well-functioning transport management department. The latter would engage the private sector or partners. The DHMTs would then play their roles in strengthening HCWs' capacity, data quality, and enforcing timely reporting from the HFs. This option ensures the distribution to the "last mile" without interruptions. It would minimize stock-outs and have fewer operational costs than option 1.

The DPOs could not conduct supervision and mentorship without support for transport from the DHMTs. To make use of the limited transport efficiently, the DHMTs should consider joint supervision with several district supervisors or partners. If the direct distribution of pharmaceuticals from the NDSO to HFs could be implemented, the DHMTs would have better transport capacity to support supervision activities.

Regarding logistics information sharing among the DPOs, DCD-Pharmacy, and the NDSO, a delay occurs between the DPOs and the DCD. However, an opportunity exists for improvement. Currently, very few DPOs are able to submit monthly logistics reports on time to DCD-Pharmacy per its request. However, all the monthly requisitions are processed by software at the NDSO, and the information is used for monthly supply and annual quantification. The DPOs are, in fact, repeating the task in an inefficient manner, and it could potentially cause data discrepancies. DCD-Pharmacy and the DPOs should obtain the monthly logistics information from the NDSO, which includes supply information, and if necessary, discuss any concerns or actions needed with the DPOs based on the same information. Therefore, this would be an easier option to obtain timely information for decision making and redistribution, and it would release DPOs for supportive supervision and to provide on-the-job training to the HCWs. This approach would require only sending information by e-mails; hence it would not significantly increase the NDSO's workload.

To motivate the HFs to strengthen and maintain their capacity to provide quality ART services, the MOH should review the accreditation criteria, take into consideration the DSM and data management capacity of the HCWs, and the cadres and their numbers in the HFs. Periodic review of the HFs' performance for renewal of accreditation would encourage the HFs to maintain the quality of ART services.

## **Human Resources Planning**

Effective pharmaceutical human resources planning requires an evidence-based approach that is needs based and informed by reliable information. The needs will be determined by the human resources strategies or the service targets. The MOH of Lesotho strategically uses nursing staff at the primary HFs to maximize their efficiency for all health care services. The pharmacy professionals also serve not only ART but also other programs and general pharmaceutical services. By using the criteria suggested by Hirschhorn et al. (9), the human resources for ART service alone would be marginally sufficient. However, adding general pharmaceutical services, HFs are clearly understaffed. The information in this assessment is insufficient to project the human resources needs for integrated health services. Therefore, to effectively project and plan the human resources, more information is needed with a holistic projection approach.

In summary, the capacity-building and system-strengthening strategy through the ART program will contribute to the improvement of the general system. DSM is a cross-cutting area, and the MOH supervisors should educate the HCWs to apply their DSM capacity across programs and provide nonfinancial awards to those performing well to recognize and appreciate their efforts.

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