Quantification of HIV and AIDS Commodities for the Period April 2015 through March 2017, Swaziland

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CONTENTS

List of Figures

List of Tables

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ACRONYMS

3TC	lamivudine
ABC	abacavir
AMC	average monthly consumption
APMR	ART Patient Monitoring and Reporting System
ART	antiretroviral treatment
ARV	antiretroviral
AZT	zidovudine
CDC	Centers for Disease Control and Prevention
CHAI	Clinton Health Access Initiative
CMS	Central Medical Stores
D4T	stavudine
DMU	Data Management Unit
EFV	efavirenz
FY	fiscal year
GoS	Government of Swaziland
HMIS	Health Management Information System [Unit]
INH	isoniazid
IPT	isoniazid preventive therapy
LMIS	Logistics Management Information System
LPV/r	lopinavir/ritonavir
MoH	Ministry of Health
MSH	Management Sciences for Health
NNRTI	non-nucleoside reverse-transcriptase inhibitor
NVP	nevirapine
PEPFAR	US President's Emergency Plan for AIDS Relief
PMTCT	prevention of mother-to-child transmission
RPM Plus	Rational Pharmaceutical Management Plus
SIAPS	Systems for Improved Access to Pharmaceuticals and Services
SID	Strategic Information Department
SNAP	Swaziland National Antiretroviral Treatment Program
SOH	stock on hand
SPS	Strengthening Pharmaceutical Systems
SZL	Swaziland Lilangeni
TDF	tenofovir
TWG	Technical Working Group
USAID	US Agency for International Development
WHO	World Health Organization

EXECUTIVE SUMMARY

Swaziland faces daunting health challenges. It has the highest HIV prevalence rate in the world at 31% of people aged 15 to 49 years. HIV and AIDS are the greatest public health and socio-economic development challenges for the country. The Government of Swaziland (GOS) has made significant progress addressing the epidemic through the implementation of a series of strategic plans and frameworks. A regular and systematic quantification of HIV and AIDS commodities is one of the essential interventions to ensure that adequate resources are available without interruption. The scope of this quantification was national, covering all HIV and AIDS commodities procured with government funding. Commodities that were quantified included: antiretroviral (ARV) medicines for antiretroviral treatment (ART) and prevention of mother-to-child transmission (PMTCT); medicines for opportunistic infections, such as cotrimoxazole prophylaxis; medicines for isoniazid preventive therapy (IPT), such as isoniazid (INH); and medicines for Kaposi sarcoma. A total of 32 items were quantified to cover the period April 2015 to March 2016, and 34 items to cover the period April 2016 to March 2017. A detailed 24-month supply plan, which took into consideration the service delivery capacity, current stock availability, and outstanding shipments, was prepared for fiscal years (FY) April 2015 to March 2017. Various quantification methodologies and tools were used, informed by the nature of the ART program, which is scaling up, and the availability of required data.

A total of approximately Swaziland Lilangeni (SZL) 574.8 million (~US$ 52 million) are required for the period April 2015 to March 2017. Of all the line items in the commodity budget, ARV requirements comprise the largest proportion, at SZL 265,045,688.98 (93.25%) for FY2015/16. The other 6.75% accounts for cotrimoxazole, INH, and medicines for Kaposi Sarcoma. A comparison of the procurement costs of products shows that tenofovir+lamivudine+efavirenz (TDF+3TC+EFV) 300/300/600 mg of 30 tablets comprised almost 60.35% of the FY2015/16 commodity budget, followed by zidovudine+ lamivudine +nevirapine (AZT+3TC+NVP) 300/150/200 mg of 60 tablets at 10.29%. Budget requirements for and patient utilization of these two products are increasing due to the implementation of new World Health Organization (WHO) recommendations.

The results of the quantification exercise have already been submitted to the Ministry of Finance and used for the preparation of the FY2015/16 tender.

The main challenges encountered during the quantification exercise were:

- Inadequate human resources, especially a lack of pharmacy personnel at the facility level and a relatively weak health system.
- A relatively high ART attrition rate (14%) as compared to other African countries.
- Inaccuracy and incompleteness of patient data at ART sites.
- Longer lead times for allocating and releasing funds for procurement.

- Delayed payment processes that hinder on-time and regular delivery of HIV commodities.
- Poor performance by some suppliers.

The following recommendations are offered to improve the quantification, procurement, and supply chain management of HIV and AIDS commodities:

- Strengthen in-country training of pharmacy personnel to fill the gaps in human resources.
- Strengthen the strategy for retaining patients on ART.
- Strengthen continuous supportive supervision and mentorship to alleviate challenges related to poor data quality and inventory management.
- Advocate for the on-time release of adequate funding.
- Advocate for improved process of payments of suppliers.
- Build the capacity of regional clinical supervisors to bridge the communication gap between ART-initiating facilities and refill clinics on stock reporting and ordering.

INTRODUCTION

Country Profile

Swaziland faces daunting health challenges. It has the highest HIV prevalence rate in the world at 31% of people aged 15 to 49 years.[1] In 2009, the mortality rate from AIDS-related causes was 0.6% (about 7,000 people out of a total population of 1.185 million). Since 2004, when Swaziland first officially acknowledged the AIDS crisis, it has mounted an impressive response. According to the 2011 UNAIDS World AIDS Day Report, Swaziland is close to achieving universal access to HIV and AIDS treatment.[2]

HIV and AIDS in Swaziland

HIV and AIDS are the greatest public health and socio-economic development challenges for Swaziland. The Government of Swaziland (GOS) has made significant progress in addressing the epidemic through the implementation of a series of strategic plans and frameworks. Despite its efforts, Swaziland remains one of the countries with a high HIV disease burden. The extended National Strategic Framework for HIV and AIDS was developed to shift the paradigm of the national response to a focus on results and to rethink the country's investment for fighting HIV and AIDS. The epidemic continues to pose a major threat to the Swazi nation; its impact is felt by all sectors. An epidemiologic review indicates an increase in HIV prevalence among pregnant women, from 3.9% in 1992 to 41.1% in 2010. The 2010 antenatal sentinel surveillance survey showed that prevalence has stabilized between 41% and 42%, and that HIV prevalence is highest among people aged 30–34 years (53.8%) and lowest among those aged 15–19 years (20.4%).[3]

The Swaziland National Antiretroviral Treatment Program (SNAP) was established in 2003 as a unit within the Ministry of Health (MoH). SNAP's priority interventions are the delivery of high-quality treatment, care, and support for all adults, adolescents, and children living with HIV and AIDS in the Kingdom of Swaziland through the provision of antiretroviral treatment (ART), prevention of mother-to-child transmission (PMTCT) treatment, and related services.

HIV and AIDS commodities are vital for the successful implementation of ART and PMTCT programs. In collaboration with the Central Medical Stores (CMS) and partners, such as the Systems for Improved Access to Pharmaceuticals and Services (SIAPS) program funded by the US Agency for International Development (USAID), as well as the Clinton Health Access Initiative (CHAI), SNAP conducts annual HIV and AIDS commodity demand planning and budgeting and submits its financial requirements to the GOS.

[1] Ministry of Health. 2012. *Swaziland HIV Incidence Measurement Survey (SHIMS)*.
[2] United Nations Joint Programme on HIV/AIDS (UNAIDS). 2011. *UNAIDS World AIDS Day Report 2011*. Geneva: UNAIDS.
[3] UNAIDS. 2012. *Swaziland Country Report on Monitoring the Political Declaration on HIV and AIDS*. Geneva: UNAIDS.

Supply Chain Management for HIV and AIDS Commodities

Selection

Selection of HIV and AIDS commodities is guided by the country's ART and PMTCT guidelines. The guidelines are systematically updated based on new findings and recommendations provided by the World Health Organizations (WHO). All HIV and AIDS commodities are included in the National Standard Treatment Guidelines and Essential Medicines List.

Quantification and Procurement of HIV and AIDS Commodities

In Swaziland, forecasting and supply planning for HIV and AIDS commodities are conducted by the ART Forecasting and Supply Planning Technical Working Group (TWG). The ART Forecasting and Supply Planning TWG was established in 2011, at which time its role and responsibilities were defined. The TWG is led by the CMS. Its members includes: Baylor Pediatrics Clinic; Mbabane Government Hospital; and partners, such as the US President's Emergency Plan for AIDS Relief/Centers for Disease Control and Prevention (PEPFAR/CDC), SIAPS, CHAI, University Research Co., Médecins Sans Frontières , United Nations Children's Fund, Elizabeth Glaser Pediatric AIDS Foundation, and ICAP at Columbia University.

Annual forecasting of two years' demand for commodities as well as quarterly supply planning are conducted by the TWG. Once annual forecasting is done, the estimated one-year quantities and budgets are submitted to the MoH Planning Unit and Procurement Unit. The morbidity method of forecasting is usually used to quantify antiretroviral (ARV) requirements; however, the consumption method is used to quantify cotrimoxazole, INH, and medicines for Kaposi sarcoma, based on available data. During the quarterly supply planning exercise, stock on hand (SOH), consumption, losses/adjustments, and outstanding shipment data are aggregated from the central and facility levels and used to determine which products to procure, the quantities needed, and when to bring them into the country. Results of the supply planning exercise are used to generate purchase requests. The Procurement Unit prepares the bid documents for HIV and AIDS commodities and floats open tenders every fiscal year. A pre-tender adjudication meeting is conducted with bidders to clarify any issues related to the tenders/bids. Tender evaluation is then conducted by the National Tender Evaluation Committee. Once the tender evaluation process has been finalized, the tenders are approved and then awarded to successful bidders by the National Tender Board. After successful bidders have been notified, they sign a contract agreement on the terms and conditions of the tender.

Warehousing and Distribution of HIV and AIDS Commodities

The CMS is responsible for receiving, storing, and distributing all HIV and AIDS commodities. Warehousing and distribution activities for HIV and AIDS commodities are integrated with other essential health commodities. Commodities are distributed monthly to health facilities based on orders from the facilities. In April 2011, the supply chain system for HIV and AIDS commodities was redesigned so that facilities would maintain a maximum stock of three months and minimum of two months. The reporting and ordering periods continued to be monthly. A

Logistics Management Information System (LMIS) tool was designed. A two-day training on how to use the new LMIS was conducted, facilitated by the USAID-funded Strengthening Pharmaceutical Systems (SPS) project (the predecessor project to the current SIAPS), and CHAI. To date, more than 200 health workers from 133 ART-initiating and refill facilities have been trained and have started to implement the system. At the CMS, a Data Management Unit (DMU) was established to collect, collate, analyze, and generate stock- and patient-related information for decision making. Distribution of commodities to facilities is staggered throughout the month according to a set schedule for the four administrative regions of the country (table 1).

Table 1. HIV and AIDS Commodity Distribution Schedule from CMS to Facilities

Region	When orders are received at CMS	When commodities are distributed to health facilities
Shiselweni	First week of the month	First week of the month
Lubombo		Second week of the month
Hhohho		Third week of the month
Manzini		Last week of the month

The flow diagram in figure 1 shows that the LMIS report and order form for ART commodities are sent from refill clinics to ART-initiating sites. ART-initiating sites check the report and order form and resupply accordingly.

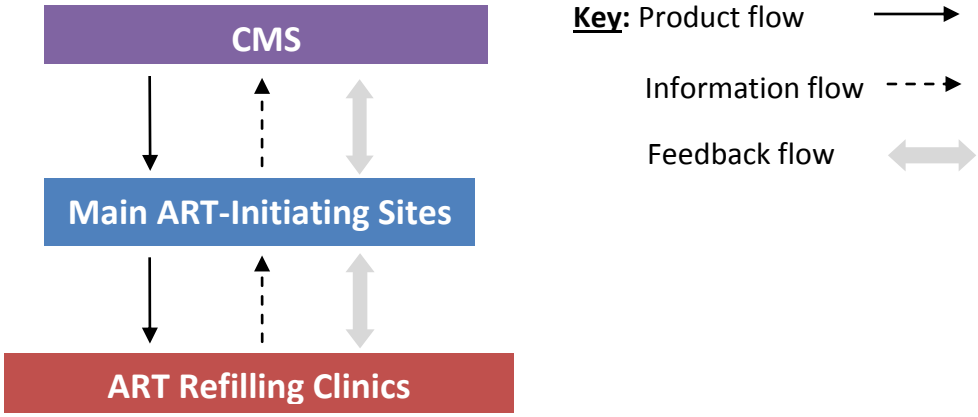

Figure 1. Movement of HIV and AIDS commodities and information

ART-initiating sites aggregate the data on the amount of stock they issue to clinics and their own monthly dispensing to users. The aggregated data are considered their monthly consumption. Facilities calculate their average monthly consumption (AMC) based on the average of the two previous months plus the current month's consumption. The AMC is used to calculate a facility's maximum stock quantity that is in turn used to estimate the order quantity, as follows:

$$\text{AMC} = \frac{\text{3 consecutive months' consumption}}{3}$$

$$\text{Maximum quantity} = \text{AMC} \times 3$$

$$\text{Quantity to order} = \text{Maximum quantity less SOH}$$

Figure 2. Estimating the order quantity

As noted above, the inventory management system for HIV and AIDS commodities in Swaziland is designed such that facilities are expected to maintain a maximum of three months of stock and a minimum of two months of stock. The maximum and minimum stock level at the CMS is seven and four months, respectively. The inventory control system and LMIS are supported by the use of inventory control tools, such as stock cards used at the facility level and an electronic inventory system, as well as a warehouse management system called RxSolution, which is used at health facilities and at the CMS. RxSolution is a software developed by the USAID-funded Rational Pharmaceutical Management Plus (RPM Plus) project, which was implemented by Management Sciences for Health (MSH). It uses a Structured Query Language (SQL) database. Implementation of RxSolution is currently supported by SIAPS.

GOALS, OBJECTIVES, AND SCOPE OF QUANTIFICATION

Goals

- Revise the national HIV and AIDS commodities quantification conducted in 2013, which covered the fiscal year (FY) periods April 2014 to March 2016.
- Develop a two-year forecast and supply plan covering the FY periods April 2015 to March 2017.

Objectives

- Update the November 2013 national HIV and AIDS commodity quantification that covered the FY2014/16 period.
- Review the methodologies and tools used, and validate any assumptions made.
- Discuss data sources and data gaps, and how to address the gaps.
- Complete the quantification of products for the FYs 2015 to 2017.
- Estimate the quantity and funding requirements and other resources needed.
- Develop a system for regular updates of quantifications and supply plans.

Scope of Quantification

The scope of the quantification was national, covering all HIV and AIDS commodities that are procured with government funding. The commodities quantified included: ARVs for ART and PMTCT (for Option B+); medicines for opportunistic infections, such as cotrimoxazole prophylaxis and isoniazid (INH) that is used in isoniazid preventive therapy (IPT); and medicines for Kaposi sarcoma. A detailed 24-month supply plan was prepared, taking into consideration service delivery capacity, current stock availability, and outstanding shipments, covering the FYs April 2015 to March 2017.

QUANTIFICATION METHODOLOGY AND PROCESSES

Forecasting and Supply Planning TWG

The Forecasting and Supply Planning TWG met on August 22, 2014. The meeting's objectives were to discuss in depth the steps in the quantification process, and to review the new HIV guidelines, any significant changes in them, as well as data requirements and inputs, phase-out plans, next steps, and shared roles and responsibilities of the TWG. The TWG decided to have a National HIV and AIDS Commodity Quantification Consultative Meeting with a bigger group of partners and stakeholders.

Data Collection and Document Review

Available data were collected on each of the HIV and AIDS programs for the period July 2013 to July 2014. The main types of data collected included:

- Total number of patients on ART from August 2013 to July 2014 recorded in the health management information system (HMIS) database of the Strategic Information Department (SID).

- Total number and percent of patients, both pediatric patients and adults.

- Total number and percent of patients, by regimen, from the SID and DMU of the CMS, for both pediatric patients and adults.

Collected data were then compiled, analyzed, and validated during the consultative meeting held on August 22, 2014. Discussions and revisions were made to the assumptions and data inputs for the forecast.

The following primary data sources and documents were reviewed as part of the data collection process:

- Previous national quantification report (FY2014/15)
- Revised national guidelines for ART and PMTCT
- Annual reports (ART and PMTCT)
- Swaziland HIV Estimates and Projections (Spectrum 2014)
- ART Patient Monitoring and Reporting System (APMR) reports: August 2013–July 2014
- LMIS ART reports: August 2013–July 2014

Quantification Consultative Meeting

In addition to reviewing these documents and data sources, a half-day consultative meeting was organized on October 3, 2014 by the CMS. The objectives of this consultative meeting were:

- To review and validate the available data, assumptions, and methodologies.
- To formulate additional assumptions based on the new HIV guidelines and changes, trends/targets, and future programmatic goals.
- To reach consensus on assumptions, data, methodologies, scenarios, and recommendations for the quantification exercise.

The meeting was attended by HIV care and treatment partners, program managers, and clinical experts. The available data and assumptions were organized, analyzed, and triangulated for the quantification inputs.

Forecasting Methods and Tools

Based on feedback obtained during the consultative quantification meeting and further discussions, the morbidity method of forecasting was used for the ART and PMTCT programs. The consumption method of forecasting was used for cotrimoxazole, medicines for Kaposi sarcoma, and INH prophylaxis.

The morbidity method was selected for the ART and PMTCT programs because they are still in scale-up mode, with specific targets set for the number of clients to be enrolled in the programs. In addition, since steady rate status has not yet been attained in these programs and there is the potential for changing or switching of regimens, past consumption data are not a strong indicator of future requirements. Moreover, new WHO ART guidelines (2013), formulations, and regimens are being introduced into the programs. Commodity requirements for ART and PMTCT were determined using Quantimed®, a Microsoft Access-based pharmaceutical cost estimation tool developed by the RPM Plus program implemented by MSH, with funding from USAID. Quantimed facilitates the creation of alternative scenarios that reflect the consideration of different values for certain variables, such as the percentage of a population on each regimen and the proportions of different formulations within a particular regimen. The forecast in Quantimed is calculated on a month-by-month basis to more accurately reflect the changing number of patients on treatment, and hence, changes in forecasted consumption. The Quantimed month-by-month output quantities for each product were imported directly into the supply planning tool, PipeLine®, to prepare a sound supply/procurement plan.

The consumption method was selected for cotrimoxazole, INH, and Kaposi sarcoma medicines because the targets provided in previous years were not in line with actual consumption on the ground, resulting in over quantification. Microsoft Excel was used to forecast the requirements for cotrimoxazole, INH prophylaxis, and medicines for Kaposi sarcoma.

The specific forecasting methodologies, key assumptions, and forecasting results by quantity and value for the forecast period for each commodity category are included in this report and are presented under the quantification outputs.

The prices used for valuation were taken from the most recent tender for HIV and AID commodities (2014/2015) and were assumed to increase by 25% over the forecast period. The tender price includes the price of the product plus freight and logistics costs. In cases where tender prices were not available, such as for the new formulations to be introduced, estimated prices from the Supply Chain Management System (SCMS) Quantimed database were used.

The quantification results in this report take into account the buffer stock, minimum-maximum inventory levels, SOH, and outstanding shipments.

QUANTIFICATION ASSUMPTIONS AND OUTPUTS

Antiretroviral Medicines for ART and PMTCT

The following assumptions were used for the forecasts for adult first-line, adult second-line, and pediatric ARVs:

General ART Assumptions

- The forecast period is April 2015 to March 2017.

- The morbidity method of forecasting was used for the ARVs because the ART program is still in scale-up mode, and new formulations and regimens are being introduced into the program.

- The following scale-up rates for the net increases in new patients on ART per month were used for the forecast (Source: Swaziland National AIDS Program and Swaziland HIV Estimate [SPECTRUM projection 2014]).

    - Additions of 1,600 net new adult patients per month were used for the forecast from April 1, 2015 to March 30, 2017.
    - Net new 130 pediatric ART patients will be added during the forecast period.

- The baseline number of adult ART patients is 103,751 as of the end of June 2014 (table 2.) This is the actual reported total number of adult patients from the MoH/SID ART Quarterly Report generated by the APMR System.

- The baseline number of pediatric patients on ART is 7,800 as of the end of June 2014 (table 3). The source of this data is HMIS/SID ART Quarterly Report generated by the APMR System.

- The annual ART attrition rate was assumed to be 13%, which is a monthly attrition rate of 1.08%.

- The first-line and second-line population was assumed to be 96% and 4%, respectively.

- ARV regimens and doses were based on the revised National ART Guidelines.

- New formulations, such as atazanavir/ritonavir 300/100 mg 30 tabs and abacavir (ABC)/lamivudine (3TC) 600/300 mg scored 30 tabs will be introduced.

Table 2. Adult First- and Second-Line ART Targets for Existing and New Clients

Month	Jul-14	Nov-14	Mar-15	Jul-15	Nov-15	Mar-16	Jul-16	Nov-16	Mar-17
Existing first-line adult month start	99,601	95,366	91,312	87,423	83,706	80,147	77,577	73,476	70,351
Existing first-line adult month end	98,523	94,336	90,325	86,478	82,802	79,281	75,910	72,682	69,591
New first-line adult month end (cumulative)	2,548	12,740	22,932	33,124	43,316	53,508	63,700	73,892	84,084
Existing second-line adult month start	4,150	3,972	3,802	3,678	3,481	3,331	3,188	3,050	2,919
Second-line NEW month start (cumulative)	0	424	848	1,272	1,696	2,120	2,544	2,968	3,392

Table 3. Pediatric First- and Second-Line ART Targets for Existing and New Clients

Beginning Month	Jul-14	Nov-14	Mar-15	Jul-15	Nov-15	Mar-16	Jul-16	Nov-16	Mar-17
Total patients at beginning of month	7,800	8,276	8,767	9,358	9,870	10,391	10,951	11,494	12,053
Total existing patients at end of month after attrition	7,712	7,372	7,111	6,820	6,515	6,247	5,967	5,707	5,452
Total new beginning (cumulative)	0	820	1,640	2,460	3,280	4,096	4,916	5,722	6,539

Adult ART Assumptions

Based on the revised ART Guidelines for Swaziland and APMR and LMIS data as of June 2014, the following adult first-line regimens, with the respective proportions, were assumed and applied for existing first line adult patients during the forecast period (table 4):

Table 4. First-Line Regimens to Be Used by Existing Adult Patients

Regimen description	% of episodes	Note/source
TDF+3TC+EFV	55.55%	LMIS end of June 2013
AZT+3TC+NVP	23.94%	Average of LMIS and APMR
AZT+3TC+EFV	11.40%	LMIS data
TDF+3TC+NVP	7.27%	LMIS and was part of the new co-pack
ABC+3TC+EFV	0.89%	Average of APMR and LMIS
D4T+3TC+NVP	0.42%	LMIS
ABC+3TC+NVP	0.33%	Average of APMR and LMIS
D4T+3TC+EFV	0.17%	LMIS
TDF+3TC+ABC	0.02%	LMIS
AZT+3TC+ABC	0.01%	LMIS
Total	**100.00%**	

Based on the revised ART Guidelines for Swaziland, APMR and LMIS data as of June 2014, and experts' opinions, the following adult first-line regimens, with the respective proportions were assumed and applied for new adult patients during the forecast period (table 5).

Table 5. First-Line Regimens to Be Used by New Adult Patients During the Forecast Period

Regimen description	% of episodes	Note/Source
TDF+3TC+EFV	84.23%	Took last year's proportion
AZT+3TC+EFV	8.38%	APMR
AZT+3TC+NVP	3.22%	APMR
TDF+3TC+NVP	1.76%	APMR data
ABC+3TC+EFV	0.94%	APMR data as of end of June
D4T+3TC+NVP	0.83%	APMR
D4T+3TC+EFV	0.30%	APMR
ABC+3TC+NVP	0.29%	APMR
TDF+3TC+ABC	0.03%	New initiation regimen noted in APMR data. It needs to be validated.
AZT+3TC+ABC	0.02%	APMR
Total	**100.00%**	

Based on the revised ART Guidelines for Swaziland and APMR and LMIS data as of June 2014, the following adult second-line regimens, with the respective proportions, were assumed and applied for existing second-line patients during the forecast period (table 6).

Table 6. Second-Line Regimens to Be Used by Existing Adult Patients During the Forecast Period

Regimen description	% of episodes	Note/source
TDF+3TC+LPV/r	32.51%	Average between APMR and LMIS data has been used
AZT+3TC+LPV/r	31.53%	
ABC+3TC+LPV/r	20.78%	
D4T+3TC+LPV/r	11.14%	
TDF+3TC+EFV+AZT	2.95%	
TDF+ABC+LPV/r	0.44%	
AZT+3TC+LPV/r+ABC	0.39%	
AZT+3TC+SQV	0.23%	
AZT+3TC+IDV+RTV	0.03%	
Total	**100.00%**	

Based on the revised ART Guidelines for Swaziland, and experts' opinions, the following regimens, with the respective proportions, were assumed and applied for new adult second-line patients (patients switched from first-line to second-line) during the forecast period (table 7).

Table 7. Second-Line Regimens to Be Used by New Adult Patients During the Forecast Period

Regimen description	% of episodes	Note
TDF+3TC+ATV/r	50.00%	New ART guidelines
AZT+3TC+ATV/r	50.00%	
Total	**100.00%**	

Pediatric Patients ART Assumptions

The average weight proportions of pediatric patients, both existing and new first- and second-line pediatric patients, are given in table 8.

Table 8. Average Weight Proportions of Pediatric Population During the Forecast Period

Weight (kg)	% of children
0-5.9	5.98%
6-9.9	20.56%
10-13.9	16.45%
14-19.9	18.13%
20-24.9	12.71%
25-39.9	13.83%
40+	12.34%
Total	**100.00%**

Based on the revised ART Guidelines for Swaziland and APMR and LMIS data as of June 2014, the following pediatric regimens, with the respective proportions, were assumed and applied for existing first- and second-line pediatric patients with weight band 0–19.9 kg during the forecast period (table 9).

Table 9. Pediatric First- and Second-Line Regimens for Existing Pediatric Patients with Weight Band 0–19.9 kg

Regimen description	% of episodes	Note/source
AZT+3TC+NVP	89.98%	APMR
AZT+3TC+LPV/r	9.57%	
ABC+3TC+LPV/r	0.32%	
ABC+3TC+NVP	0.10%	
AZT+3TC+ABC	0.03%	
Total	**100.00%**	

Based on the revised ART Guidelines for Swaziland and APMR and LMIS data as of June 2014, the following pediatric regimens, with the respective proportions, were assumed and applied for existing first- and second-line pediatric patients with weight band 20–39.9 kg during the forecast period (table 10).

Table 10. Pediatric First- and Second-Line Regimens for Existing Pediatric Patients with Weight Band 20–39.9 kg

Regimen description	% of episodes	Note/Source
AZT+3TC+NVP	77.39%	APMR
AZT+3TC+EFV	12.20%	
AZT+3TC+LPV/r	8.23%	
ABC+3TC+EFV	1.79%	
ABC+3TC+LPV/r	0.28%	
ABC+3TC+NVP	0.08%	
AZT+3TC+ABC	0.03%	
Total	**100.00%**	

Based on the revised ART Guidelines for Swaziland and APMR and LMIS data as of June 2014, the following pediatric regimens, with the respective proportions, were assumed and applied for existing first- and second-line pediatric patients with weight band 40+ kg during the forecast period (table 11).

Table 11. Pediatric First- and Second-Line Regimens for Existing Pediatric Patients with Weight Band 40+ kg

Regimen description	% of episodes	Note/source
AZT+3TC+NVP	74.31%	APMR
AZT+3TC+EFV	11.72%	
AZT+3TC+LPV/r	7.91%	
TDF+3TC+EFV	3.43%	
ABC+3TC+EFV	1.72%	
TDF+3TC+NVP	0.53%	
ABC+3TC+LPV/r	0.27%	
ABC+3TC+NVP	0.08%	
AZT+3TC+ABC	0.03%	
Total	**100.00%**	

Based on the revised ART Guidelines for Swaziland and experts' opinions, the following regimens, with the respective proportions, were assumed and applied for **new** pediatric first- and second-line patients with weight band 0–19.9 kg during the forecast period (table 12).

Table 12. Pediatric First- and Second-Line Regimens for New Patients and Those Switching to Second Line (0–19.9 kg)

Regimen description	% of episodes	Note/Source
ABC+3TC+LPV/r	95.00%	Estimated a 5% intolerance to ABC
AZT+3TC+LPV/r	5.00%	
Total	**100.00%**	

Based on the revised ART Guidelines for Swaziland and experts' opinions, the following regimens, with the respective proportions, were assumed and applied for new pediatric first- and second-line patients with weight band 20–24.9 kg during the forecast period (table 13).

Table 13. Pediatric First- and Second-Line Regimens for New Patients and Those Switching to Second-Line (20–24.9 kg)

Regimen description	% of episodes	Note/Source
ABC+3TC+LPV/r	93.10%	Estimated that 98% of pediatric cases are exposed to NVP, hence will be on LPV/r; 5% of pediatric cases will be ABC intolerant, hence they will be on AZT backbone.
AZT+3TC+LPV/r	4.90%	
ABC+3TC+EFV	1.90%	
AZT+3TC+NVP	0.10%	
Total	**100.00%**	

Based on the revised ART Guidelines for Swaziland and experts' opinions, the following regimens, with the respective proportions, were assumed and applied for new pediatric first- and second-line patients with weight band 25–39.9 kg during the forecast period (table 14).

Table 14. Pediatric First- and Second-Line Regimens for New Patients and Those Switching to Second-Line (25–39.9 kg)

Regimen description	% of episodes	Note/Source
ABC+3TC+EFV	93.00%	Expert opinion is also to consider that pediatric patients are co-infected with tuberculosis in this age group; hence EFV is preferred due to NVP interaction with rifampicin.
AZT+3TC+NVP	5.00%	
AZT+3TC+EFV	2.00%	
Total	**100.00%**	

Based on the revised ART Guidelines for Swaziland and experts' opinions, the following regimens, with the respective proportions, were assumed and applied for new pediatric first- and second-line patients with weight band 40+ kg during the forecast period (table 15).

Table 15. Pediatric First- and Second-Line Regimens for New Patients and Those Switching to Second-Line (40+ kg)

Regimen description	% of episodes	Note/Source
TDF+3TC+EFV	93.00%	Experts' opinion and assumptions are that most of the pediatric cases above 40+ kg will take the adult dosage.
AZT+3TC+NVP	5.00%	
AZT+3TC+EFV	2.00%	
Total	**100.00%**	

General PMTCT Assumptions

- The forecast period is April 2015 to March 2017.

- The morbidity method of forecasting was used to estimate the ARVs for the PMTCT program because the program is still in scale-up mode, and new regimens and formulations are being introduced into the program.

- The number of HIV-positive pregnant women, including those currently on ART (for their own health) and those in need of PMTCT, was obtained from the Spectrum Model for Swaziland, as provided by the program, and added to the total number of new adult ART patients.

- Option B+ has already been implemented in Swaziland. Women who previously started this regimen will continue to be considered as existing adult first-line clients.

- The pediatric PMTCT dose of NVP syrup is 17.86 mg per day for 42 days, on average.

- A total of 1,000 pediatric PMTCT clients are expected to be enrolled each year.

General Assumptions regarding Opportunistic Infections and Prophylaxis

- The forecast period is April 2015 to March 2017.

- The consumption method of forecasting was used because there are no reliable morbidity data and future target implementations are not realistic.

- The following assumptions and considerations were taken into account:

    - One-year CMS issue data were considered and an adjusted AMC was calculated.

    - The average annual increase or decrease in consumption of each product over the forecast period was assumed to be constant, based on trends seen in issue data generated by RxSolution for the period April 2013 to March 2014.

    - Current SOH, shelf-life, and outstanding shipments were considered to calculate shipment quantities.

Quantification Results

Supply Plan Result

Supply planning is the process of estimating quantities required to fill the supply pipeline and determining the total costs, lead times, and arrival dates of shipments to ensure optimal procurement and delivery schedules. To conduct regular supply planning, critical data must be available, such as forecasted consumption, currently available usable stock, losses/adjustments, including those anticipated due to expiry or damage, and outstanding shipments with their expected delivery dates.

Supply Plan Assumptions

Table 16 provides the minimum, maximum, and desired stock levels at health facility and CMS levels used to calculate the quantities of each product that should be procured every procurement period.

Table 16. Minimum, Maximum, and Desired Stock Levels at the CMS and Health Facility Levels

Levels	Minimum stock level (months)	Maximum stock level (months)
CMS	4	7
Facilities	2	3
Program	6	10
Shipment interval to CMS	3 months	
Desired stock level	10 months of stock	

Table 17 shows the estimated lead times for the different steps in the quantification and procurement processes that were taken into account. The lead times are divided into three steps based on important milestones. The milestones are: from planning to ordering; from ordering to shipping; and from shipping to receiving. The lead times for each milestone have a critical impact on the procurement process and the availability of sufficient quantities of health products at the right time.

- Planning: finalizing the forecast and supply plan for all the commodities to be procured and obtaining the required approvals and budgets.
- Ordering: placing orders for commodities, with specific quantities and delivery dates based on the supply plan.
- Shipping: transporting the commodities from the source/vendor to the recipient/CMS.
- Receiving: Storing the commodities at the CMS and getting them ready for distribution and use.

Table 17. Lead Times

Parameters/processes	Lead time
Planning to ordering	2 months
Ordering to shipping	1 month
Shipping to receiving	1 month

Based on the forecasted consumption, available usable stock, outstanding shipments, and other supply plan parameters (lead time stock level and buffer stock), the quantities and costs of HIV and AIDS-related commodities were calculated. Tables 18 and 19 present the detailed HIV

commodity requirements by quarter, by quantity and value, for years I (April 2015–March 2016) and II (April 2016–March 2017). The total HIV and AIDS commodity procurement requirements for Years I and II were estimated to be **SZL 284,242,549.73 (≈USD 25,723,307.67),** and **SZL 290,585,222.28** (**≈USD 26,297,305.18)**, respectively (1 USD = SZL 11.0).

Table 18. HIV and AIDS Commodity Supply/Procurement Requirements Plan by Quarter, by Quantity and Value for Year I (Apr-15 to Mar-16)

	Q1		Q2		Q3		Q4		Total	
Product Description	**Quantity**	**Cost (SZL)**	**Quantity**	**Cost (SZL)**	**Quantity**	**Cost (SZL)**	**Quantity**	**Cost (SZL)**	**Quantity**	**Cost (SZL)**
Abacavir 60mg Scored 60 Tabs	250	19,969.00	250	19,969.00	250	19,969.00	250	19,969.00	1,000	79,876.00
Abacavir/Lamivudine 60/30mg 60 Tabs	13,652	569,697.96	15,567	649,610.91	17,425	727,145.25	19,387	809,019.51	66,031	2,755,473.63
Abacavir/Lamivudine 600/300mg Scored 30 Tabs	9,678	1,583,514.36	10,170	1,664,015.40	10,609	1,735,844.58	11,133	1,821,581.46	41,590	6,804,955.80
Atazanavir/Ritonavir 300/100mg 30 Tabs	9,997	2,058,982.12	7,734	1,592,894.64	8,701	1,792,057.96	9,678	1,993,280.88	36,110	7,437,215.60
Bleomycin injection 15 units vial	618	228,598.20	618	228,598.20	618	228,598.20	618	228,598.20	2,472	914,392.80
Cotrimoxazole 120mg, 100 tabs	15,591	145,931.76	15,591	145,931.76	15,591	145,931.76	15,591	145,931.76	62,364	583,727.04
Cotrimoxazole 480mg, 1000 tabs	1,287	177,606.00	1,263	174,294.00	1,263	174,294.00	1,263	174,294.00	5,076	700,488.00
Cotrimoxazole 960mg, 1000 tabs	14,300	3,432,000.00	14,200	3,408,000.00	14,042	3,370,080.00	14,200	3,408,000.00	56,742	13,618,080.00
Dapsone tablets 100mg, 100 tabs	1,333	226,156.78	1,341	227,514.06	1,341	227,514.06	1,341	227,514.06	5,356	908,698.96
Doxorubicin (Pre-mixed) injection 50mg/ml, 2.5ml	426	185,310.00	426	185,310.00	426	185,310.00	426	185,310.00	1,704	741,240.00
Efavirenz 200mg 90 Caps	-	-	-	-	1,567	117,916.75	3,697	278,199.25	5,264	396,116.00
Efavirenz 50mg, 30 caps	-	-	-	-	2,805	50,910.75	645	11,706.75	3,450	62,617.50
Efavirenz 600mg 30 Tabs	45,650	1,470,843.00	46,961	1,513,083.42	48,265	1,555,098.30	49,612	1,598,498.64	190,488	6,137,523.36
Efavirenz/Lamivudine/TDF 600/300/300mg 30 Tabs	349,413	48,278,394.21	271,814	37,556,540.38	302,288	41,767,132.96	318,022	43,941,099.74	1,241,537	171,543,167.29
Indinavir 400mg 180 Caps	12	23,825.00	25	23,825.00	25	23,825.00	25	23,825.00	87	95,300.00
Isoniazid 300mg, 100 tabs	8,367	275,274.30	5,601	184,272.90	5,601	184,272.90	5,601	184,272.90	25,170	828,093.00
Izoniazid 100mg, 100 tablets	182	5,987.80	192	6,316.80	192	6,316.80	192	6,316.80	758	24,938.20
Lamivudine 150mg 60 Tabs	1,980	38,214.00	1,971	38,040.30	2,049	39,545.70	2,078	40,105.40	8,078	155,905.40
Lamivudine/Stavudine/Nevi 150/30/200mg 60 Tabs	2,357	102,694.49	2,513	109,491.41	2,682	116,854.74	2,850	124,174.50	10,402	453,215.14
Lamivudine/Zidovudine 150/300mg 60 Tabs	48,224	2,966,258.24	49,674	3,055,447.74	51,149	3,146,174.99	52,650	3,238,501.50	201,697	12,406,382.47
Lamivudine/Zidovudine 30/60mg 60 Tabs	4,265	97,071.40	4,221	96,069.96	4,211	95,842.36	4,260	96,957.60	16,957	385,941.32
Lamivudine/Zidovudine/Nevi 150/300/200mg 60 Tabs	135,449	12,025,162.22	65,790	5,840,836.20	64,632	5,738,028.96	63,607	5,647,029.46	329,478	29,251,056.84
Lamivudine/Zidovudine/Nevi 30/60/50mg disp 60 Tabs	25,151	967,810.48	24,175	930,254.00	23,378	899,585.44	22,920	881,961.60	95,624	3,679,611.52
Lopi/Rito 80/20mg/ml [Kaletra] OS cool BTL 60ml	14,380	516,817.20	19,721	708,772.74	21,849	785,253.06	24,858	893,396.52	80,808	2,904,239.52
Lopinavir/Ritonavir 100/25mg 120 Tabs	4,580	242,144.60	2,520	133,232.40	2,727	144,176.49	2,946	155,755.02	12,773	675,308.51
Lopinavir/Ritonavir 200/50mg 120 Tabs	9,737	2,236,491.53	9,422	2,164,139.18	9,117	2,094,083.73	8,825	2,027,014.25	37,101	8,521,728.69
Pyridoxine 25mg, 1000 tabs	1,176	62,974.80	588	31,487.40	588	31,487.40	588	31,487.40	2,940	157,437.00
Tenofovir 300mg 30 Tabs	273	10,606.05	142	5,516.70	156	6,060.60	150	5,827.50	721	28,010.85
Tenofovir/Lami+Nevi 300/300+200mg BL 30+60 Tabs	42,736	4,141,545.76	20,154	1,953,124.14	20,016	1,939,750.56	19,908	1,929,284.28	102,814	9,963,704.74
Tenofovir/Lamivudine 300/300mg 30 Tabs	6,620	300,945.20	7,006	318,492.76	7,385	335,722.10	7,769	353,178.74	28,780	1,308,338.80
Vinblastine injection mg/ml, 10ml vial	252	72,261.00	84	24,087.00	84	24,087.00	84	24,087.00	504	144,522.00
Vincristine Injection 2mg/2ml, 2ml vial	1,556	301,475.00	471	91,256.25	471	91,256.25	471	91,256.25	2,969	575,243.75
Total Costs		**74,136,796.28**		**54,784,286.68**		**67,800,127.65**		**70,597,434.97**		**284,242,549.73**

Table 19. HIV and AIDS Commodity Supply/Procurement Requirements Plan by Quarter, by Quantity and Value for Year II (Apr-16 to Mar-17)

Product Description	Q1		Q2		Q3		Q4		Total	
	Quantity	Cost (SZL)	Quantity	Cost (SZL)	Quantity	Cost (SZL)	Quantity	Cost (SZL)	Quantity	Cost (SZL)
Abacavir 300mg 60 Tabs	90	9,279.90	39	4,021.29	68	7,011.48	75	7,733.25	272	28,045.92
Abacavir 60mg Scored 60 Tabs	18	1,438.20	9	719.10	9	719.10	9	719.10	45	3,595.50
Abacavir/Lamivudine 60/30mg 60 Tabs	21,212	885,176.76	23,130	965,214.90	25,028	1,044,418.44	24,818	1,035,655.14	94,188	3,930,465.24
Abacavir/Lamivudine 600/300mg Scored 30 Tabs	11,610	1,899,628.20	12,101	1,979,965.62	12,598	2,061,284.76	12,569	2,056,539.78	48,878	7,997,418.36
Atazanavir/Ritonavir 300/100mg 30 Tabs	10,635	2,190,384.60	11,613	2,391,813.48	12,570	2,588,917.20	12,478	2,569,968.88	47,296	9,741,084.16
Bleomycin injection 15 units vial	618	228,598.20	618	228,598.20	618	228,598.20	618	228,598.20	2,472	914,392.80
Dapsone tablets 100mg, 100 tabs	1,341	227,514.06	1,341	227,514.06	1,341	227,514.06	1,341	227,514.06	5,364	910,056.24
Doxorubicin (Pre-mixed) injection 50mg/ml, 2.5ml	426	185,310.00	426	185,310.00	426	185,310.00	426	185,310.00	1,704	741,240.00
Efavirenz 200mg 90 Caps	3,606	271,351.50	2,616	196,854.00	2,616	196,854.00	2,616	196,854.00	11,454	861,913.50
Efavirenz 50mg, 30 caps	651	11,815.65	711	12,904.65	711	12,904.65	711	12,904.65	2,784	50,529.60
Efavirenz 600mg 30 Tabs	50,974	1,642,382.28	52,375	1,687,522.50	53,788	1,733,049.36	53,698	1,730,149.56	210,835	6,793,103.70
Efavirenz/Lamivudine/TDF 600/300/300mg 30 Tabs	333,803	46,121,560.51	349,711	48,319,568.87	365,810	50,543,967.70	364,327	50,339,061.59	1,413,651	195,324,158.67
Indinavir 400mg 180 Caps	3	2,859.81	3	2,859.81	3	2,859.81	3	2,859.81	12	11,439.24
Isoniazid 300mg, 100 tabs	5,601	184,272.90	5,601	184,272.90	5,601	184,272.90	5,601	184,272.90	22,404	737,091.60
Izoniazid 100mg, 100 tablets	192	6,316.80	192	6,316.80	192	6,316.80	192	6,316.80	768	25,267.20
Lamivudine 150mg 60 Tabs	2,088	40,298.40	2,130	41,109.00	2,152	41,533.60	2,157	41,630.10	8,527	164,571.10
Lamivudine/Stavudine/Nevi 150/30/200mg 60 Tabs	3,001	130,753.57	3,171	138,160.47	3,333	145,218.81	3,328	145,000.96	12,833	559,133.81
Lamivudine/Zidovudine 150/300mg 60 Tabs	54,185	3,332,919.35	55,752	3,429,305.52	57,341	3,527,044.91	57,240	3,520,832.40	224,518	13,810,102.18
Lamivudine/Zidovudine 30/60mg 60 Tabs	4,199	95,569.24	4,199	95,569.24	4,196	95,500.96	4,215	95,933.40	16,809	382,572.84
Lamivudine/Zidovudine/Nevi 150/300/200mg 60 Tabs	62,542	5,552,478.76	61,596	5,468,492.88	60,674	5,386,637.72	60,919	5,408,388.82	245,731	21,815,998.18
Lamivudine/Zidovudine/Nevi 30/60/50mg 60 Tabs	21,923	843,597.04	21,212	816,237.76	20,466	787,531.68	20,630	793,842.40	84,231	3,241,208.88
Lopi/Rito 80/20mg/ml [Kaletra] OS cool BTL 60ml	25,313	909,749.22	28,275	1,016,203.50	30,414	1,093,079.16	27,781	998,449.14	111,783	4,017,481.02
Lopinavir/Ritonavir 100/25mg 120 Tabs	3,157	166,910.59	3,366	177,960.42	3,588	189,697.56	3,559	188,164.33	13,670	722,732.90
Lopinavir/Ritonavir 200/50mg 120 Tabs	8,534	1,960,174.46	8,251	1,895,172.19	7,990	1,835,223.10	8,039	1,846,477.91	32,814	7,537,047.66
Nevirapine 200mg 60 Tabs	2,608	61,496.64	1,486	35,039.88	1,529	36,053.82	1,532	36,124.56	7,155	168,714.90
Pyridoxine 25mg, 1000 tabs	588	31,487.40	588	31,487.40	588	31,487.40	588	31,487.40	2,352	125,949.60
Ritonavir 100mg [Norvir] Cool 84 Caps	0	-	107	6,654.33	0	-	90	5,597.10	197	12,251.43
Saquinavir 200mg [Invirase] 270 Caps	60	45,340.20	0	-	0	-	61	46,095.87	121	91,436.07
Stavudine 30mg 60 Caps	3,965	77,317.50	0	-	4,282	83,499.00	0	-	8,247	160,816.50
Tenofovir 300mg 30 Tabs	154	5,982.90	168	6,526.80	162	6,293.70	177	6,876.45	661	25,679.85
Tenofovir/Lami+Nevi 300/300+200mg BL 30+60 Tabs	19,809	1,919,690.19	19,728	1,911,840.48	19,654	1,904,669.14	19,718	1,910,871.38	78,909	7,647,071.19
Tenofovir/Lamivudine 300/300mg 30 Tabs	8,154	370,680.84	8,555	388,910.30	8,949	406,821.54	8,906	404,866.76	34,564	1,571,279.44
Vinblastine injection mg/ml, 10ml vial	84	24,087.00	84	24,087.00	84	24,087.00	84	24,087.00	336	96,348.00
Vincristine Injection 2mg/2ml, 2ml vial	471	91,256.25	471	91,256.25	471	91,256.25	471	91,256.25	1,884	365,025.00
		69,527,678.92		**71,967,469.60**		**74,709,633.81**		**74,380,439.95**		**290,585,222.28**

DISCUSSION AND ANALYSIS

A comparison of procurement costs for the different products for FY2016/17 shows that TDF+3TC+EFV 600+300+300 mg (30 tablets) accounts for almost 67.22% of the procurement budget, followed by AZT+3TC+NVP 300+150+200mg (60 tablets) at 7.51% (figure 4). Budget requirements and patient utilization rates for these two products are increasing due to the implementation of the revised ART Guidelines for Swaziland.

Figures 3 and 4 show the top 11 products that make up a high proportion (95.88%) of the FY2015/16 and FY 2016/17 budgets.

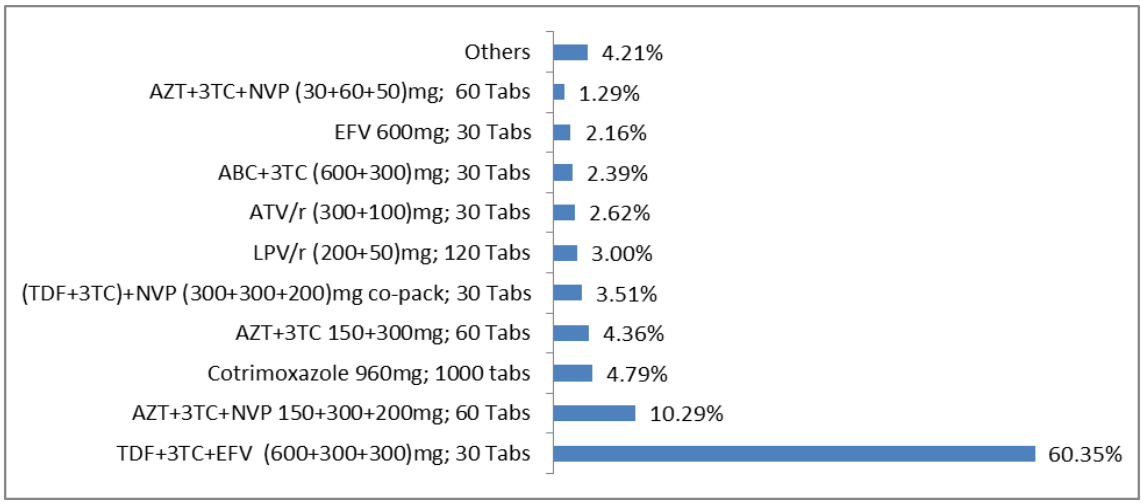

Figure 3. Procurement cost proportions for top eleven HIV and AIDS commodities for FY 2015/16

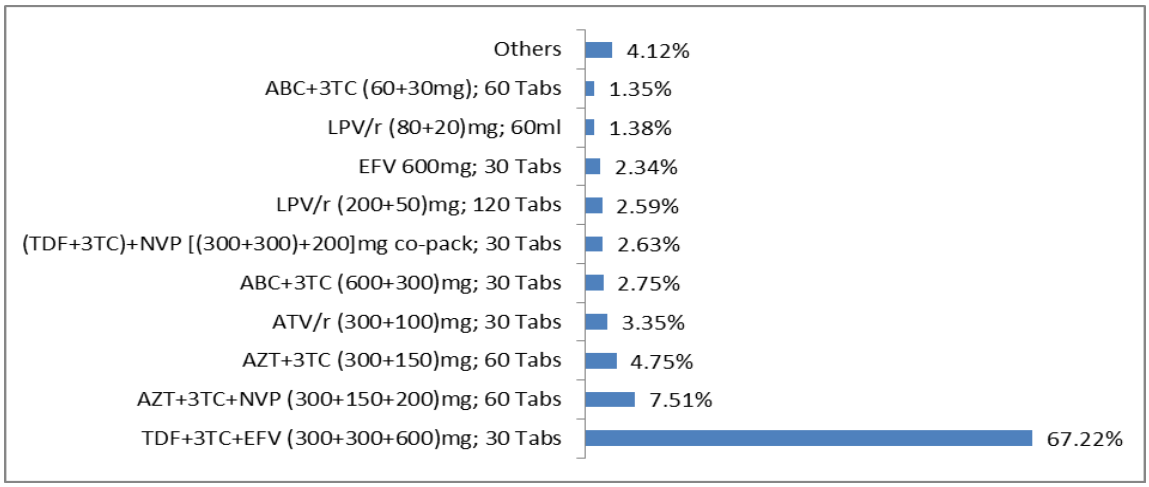

Figure 4. Procurement cost proportions for top 11 HIV and AIDS commodities for FY 2016/17

Adult ARVs

TDF+3TC+EFV is currently being used by 55.55% of existing and 84.23% of newly-initiated adult clients. The new preferred first-line regimen used for the forecast shows a shift to more patients on TDF and fewer on AZT. Similarly, a shift is expected for the non-nucleoside reverse-transcriptase inhibitors (NNRTI) for the forecast period, from NVP to EFV, due to issues relating to effectiveness, adherence, and adverse effects.

Figure 5 illustrates the trends for the top four adult first-line regimen proportions for FY2014/15 for existing patients and for FY2015/16 for new patients. These data indicate that the country is moving aggressively to implement WHO recommendations by initiating new patients on a TDF-based regimen and phasing out stavudine (D4T)-based regimens.

Good management of selected regimens and their respective formulations from the supplier to the facility level is critical to ensure the continuous availability of ARVs and the successful implementation of the ART program.

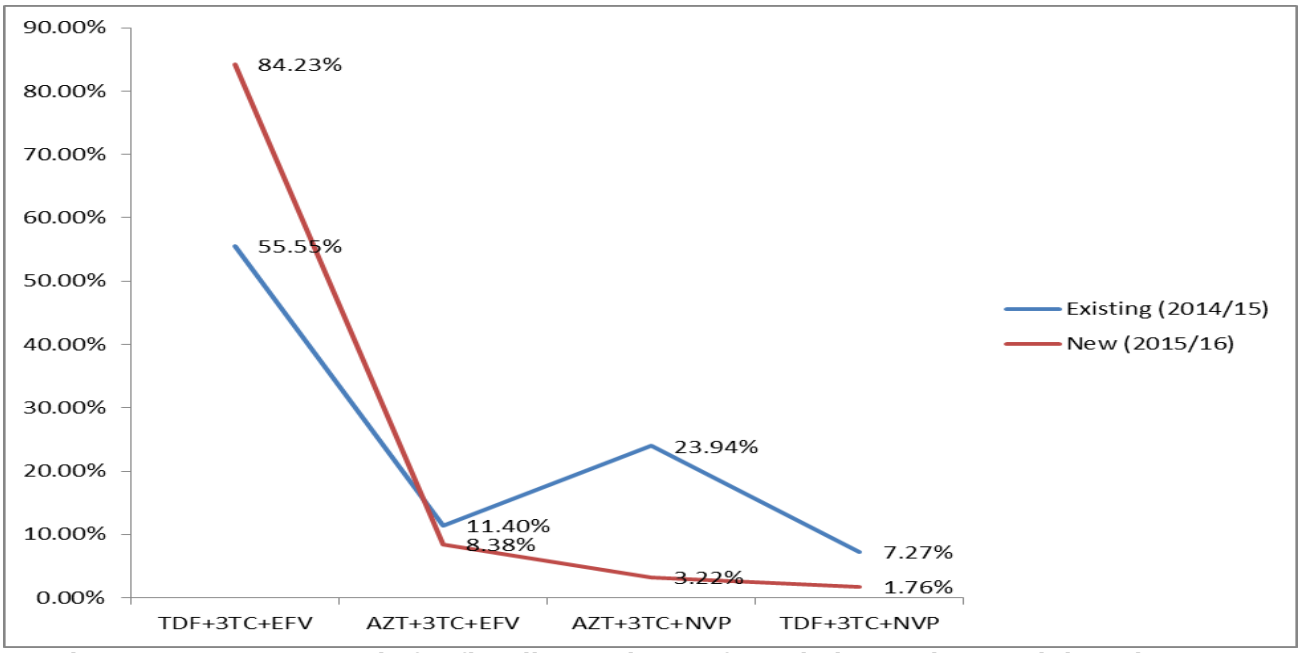

Figure 5. Forecast trends for first-line regimens for existing and new adult patients

In addition to their clinical advantages (effectiveness, minimal adverse effects, and adherence), use of TDF-based regimens, especially the fixed-dose combination of TDF+3TC+EFV, has logistics and cost advantages because it is a one tablet formulation. It is currently cheaper to buy compared to AZT and ABC-based regimens (see figure 6 for cost comparisons of regimens and formulations) and it requires less storage space. Figure 6 provides a cost comparison of the most common first- and second- line regimens per patient per year.

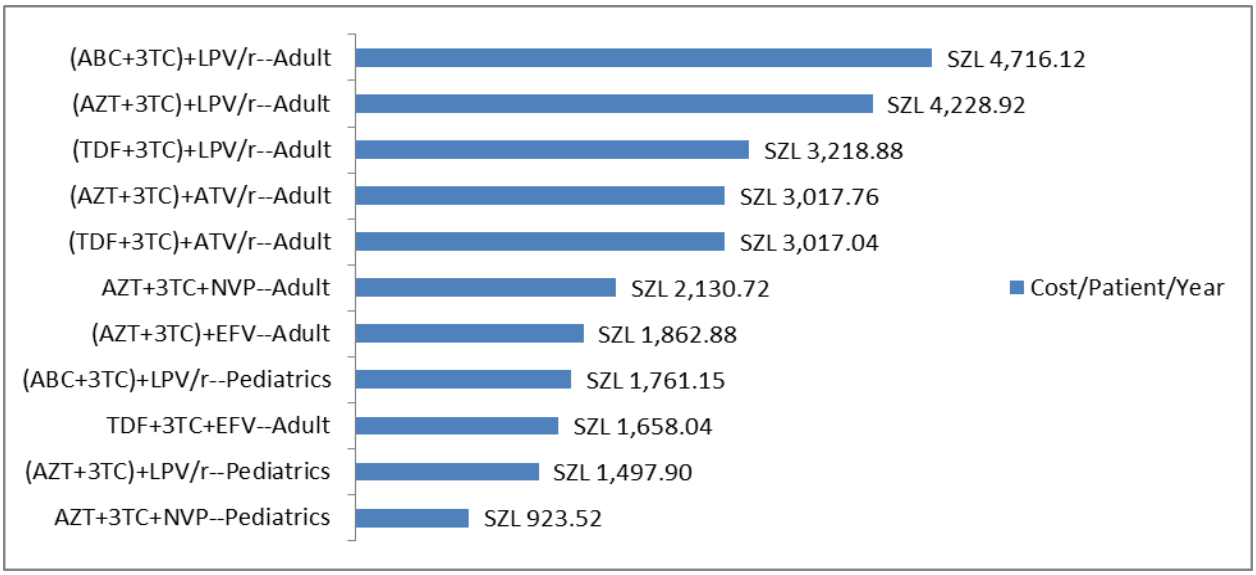

Figure 6. Comparison of costs per regimen per patient per year

(ABC+3TC)+LPV/r (lopinavir/ritonavir) is the most expensive regimen. It is second-line adult regimen, with which 20.78% of existing second-line adult patients are being treated, followed by (AZT+3TC)+LPV/r (31.53% of second-line adult patients), and (TDF+3TC)+LPV/r (32.51% of second-line adult patients). The least expensive, most commonly prescribed regimen is AZT+3CT+NVP, which is first-line regimen for pediatric patients and comprises more than 80% of existing pediatric patients. The difference in the costs per year per patient between the most and least expensive regimen is SZL 3792.60.

However, a comparison of costs among the first-line regimens shows that the most preferred regimen, TDF/3TC/EFV, with which 55.55% of existing and 84.23% of newly-initiated clients are being treated, costs SZL 1,658.04 per patient per year, which is relatively cheaper. In general terms, each of the second-line regimens per patient per year is more expensive than any of the first-line regimens per patient per year. Therefore, from both a patient care and cost perspective, it is important to strengthen adherence of patients to their ARV regimens to minimize treatment failure and the need to shift to second-line regimens.

Pediatric ARVs

Pediatrics regimens, formulations, and dosing are usually related to the distribution of weight and body surface area because of pharmacokinetic considerations of different ARVs. Therefore, for this forecasting exercise, the team used the weight distribution for regimen, formulation, and dosing selection. Figure 7 illustrates the proportion of pediatrics weight distribution used for the forecast.

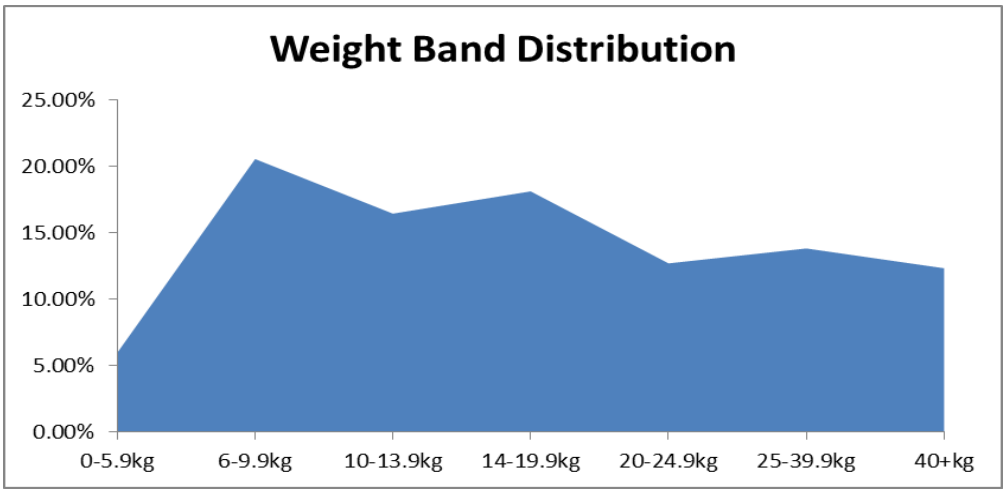

Figure 7. Weight band distribution for pediatric patients in Swaziland

According to the revised ART guidelines of Swaziland and WHO recommendations, an LPV/r-based regimen should be used as the first-line ART for all children infected with HIV younger than three years (36 months) of age, regardless of NNRTI exposure. If LPV/r is not feasible, treatment should be initiated with an NVP-based regimen (strong recommendation, moderate-quality evidence). Therefore, based on the revised guidelines, new pediatric ART-initiating patients will be put on ABC+3TC+LPV/r (95%), and (AZT+3TC)+LPV/r (5%). Figure 8 illustrates the proportions of pediatric regimens for FY2014/15 to FY2015/16.

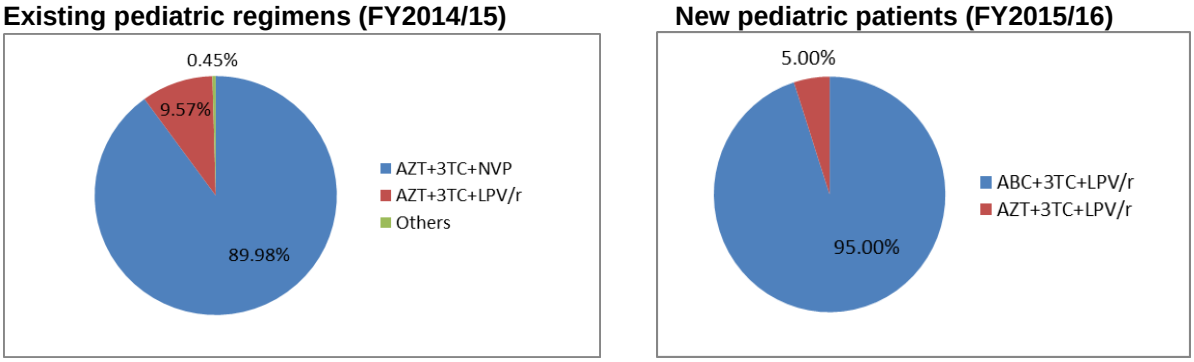

Figure 8. Most commonly prescribed regimens for existing and new pediatric patients

For adolescents infected with HIV (10 to 19 years old) weighing 40 kg or more, the NRTI backbone for an ART regimen was aligned with that of an adult's regimen.

CHALLENGES AND RECOMMENDATIONS

Challenges

- Inadequate human resources, especially a lack of pharmacy personnel at the facility level and a relatively weak health system.
- A relatively high ART attrition rate (14%) as compared to other African countries.
- Inaccuracy and incompleteness of patient data at ART sites.
- Longer lead times for allocating and releasing funds for procurement.
- Delayed payment processes that hinder on-time, regular delivery of HIV commodities.
- Poor performance by some suppliers.

Recommendations

- Strengthen in-country training for pharmacy personnel to fill the gaps in human resources.
- Strengthen the strategy for retaining patients on ART.
- Strengthen continuous supportive supervision and mentorship to alleviate challenges related to poor data quality and inventory management.
- Advocate for on-time release of adequate funding.
- Advocate for improved processes for the payment of suppliers.
- Build the capacity of regional clinical supervisors to bridge the communication gap between ART-initiating facilities and refill clinics on stock reporting and ordering.