



Swaziland Ministry of Health

## Quantification of HIV and AIDS Commodities for April 2014 through March 2016, Swaziland

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January 2014



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This report is made possible by the generous support of the American people through the US Agency for International Development (USAID), under the terms of cooperative agreement number AID-OAA-A-11-00021. The contents are the responsibility of Management Sciences for Health and do not necessarily reflect the views of USAID or the United States Government.

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Shiferaw, G., Sigudla, T., Mthimkhulu, W. 2014. *Quantification of HIV and AIDS Commodities for April 2014 through March 2016, Swaziland*. Submitted to the US Agency for International Development by the Systems for Improved Access to Pharmaceuticals and Services (SIAPS) Program. Arlington, VA: Management Sciences for Health.

## **Key Words**

quantification, HIV and AIDS, forecasting, supply planning, Swaziland

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## **ACKNOWLEDGMENTS**

We would like to express our appreciation to the management and staff of the Swaziland Central Medical Store (CMS), the National AIDS Program of the Ministry of Health (MoH), the Strategic Information Department (SID), the Health Management Information System (HMIS) unit, the Clinton Health Access Initiative (CHAI), and the USAID/SIAPS program implemented by Management Sciences for Health (MSH) for their wholehearted contributions, for making the program data available, and for their dedication to making the whole exercise a success. Special acknowledgment and gratitude go to all of the consultative quantification workshop participants for their unreserved participation and expert input during the workshop and after. Last but not least, we would like to recognize the financial support provided by the US President's Emergency Plan for AIDS Relief (PEPFAR) through USAID.

## ACRONYMS

|          |   |
|----------|---|
| 3TC      | lamivudine  |
| ABC      | abacavir  |
| AIDS     | acquired immunodeficiency syndrome                          |
| AMC      | average monthly consumption                                 |
| APMR     | ART Patients Monitoring and Reporting [system]              |
| ART      | antiretroviral therapy                                      |
| ARV      | antiretroviral  |
| ATV      | atazanavir  |
| AZT      | zidovudine  |
| CHAI     | Clinton Health Access Initiative                            |
| CMS      | Central Medical Stores                                      |
| D4T      | stavudine   |
| DDI      | didanosine  |
| DMU      | Data Management Unit [at CMS]                               |
| EFV      | efavirenz   |
| FY       | fiscal year   |
| GoS      | Government of Swaziland                                     |
| HIV      | human immunodeficiency virus                                |
| HMIS     | health management information systems                       |
| INH      | isoniazid   |
| IPT      | isoniazid preventive therapy                                |
| LMIS     | logistics management information systems                    |
| LPV/r    | lopinavir/ritonavir   |
| MoH      | Ministry of Health  |
| MSH      | Management Sciences for Health                              |
| NVP      | nevirapine  |
| PEPFAR   | US President's Emergency Plan for AIDS Relief               |
| PMTCT    | prevention of mother-to-child transmission                  |
| PO       | per os  |
| RPM Plus | Rational Pharmaceutical Management Plus                     |
| RTV      | ritonavir   |
| SIAPS    | Systems for Improved Access to Pharmaceuticals and Services |
| SID      | Strategic Information Department                            |
| SNAP     | Swaziland National ART Programme                            |
| SQL      | Structured Query Language                                   |
| SZL      | Swazi lilangeni   |
| TDF      | tenofovir   |
| TWG      | technical working group                                     |
| UNAIDS   | United Nations Joint Programme on HIV/AIDS                  |
| USAID    | United States Agency for International Development          |
| USD      | United States dollar  |
| WHO      | World Health Organization                                   |

## EXECUTIVE SUMMARY

Swaziland faces daunting health challenges. It has the highest HIV prevalence rate in the world, currently at 31% among 15- to 49-year-olds. HIV and AIDS remain the greatest public health and socioeconomic development challenges for Swaziland. The Government of Swaziland (GoS) has made significant progress in addressing the epidemic through a series of strategic plans and frameworks. A regular and systematic quantification of HIV and AIDS commodities is one of the interventions necessary to ensure that adequate resources are availed without interruption. The scope of the quantification was national, covering all HIV and AIDS commodities through government funding. The commodities to be quantified include antiretroviral medicines (ARVs) for antiretroviral therapy (ART), medicines for prevention of mother-to-child transmission (PMTCT), medicines for opportunistic infections (e.g., co-trimoxazole prophylaxis), medicines for isoniazid preventive therapy (IPT) such as isoniazid (INH), and medicines for Kaposi's sarcoma. In total, 35 line items were quantified covering the period April 2014 through March 2016. A detailed 24-month supply plan taking into consideration service capacity, current stock availability, and outstanding shipment was prepared for the fiscal years (FY) April 2014 through March 2016. Various quantification methodologies and tools have been employed based on the nature of the program and availability of required data.

Approximately SZL 386.3 million (approximately 36.8 million in United States dollars [USD]) is required for the period from April 2014 through March 2016 with SZL 171 million and 215.3 million attributed to year I and year II, respectively. For year I, out of all line items, the ARV requirement comprises the largest proportion at SZL 156.5 million (91.5% of the budget) for FY 2014–15. The other 8.5% accounts for co-trimoxazole, INH, and medicines for Kaposi's sarcoma. Of the ARV requirements, adult first-line ARVs account for over two-thirds (69.8%), and requirements for all pediatric and PMTCT medicines account for 8.2% and 11.7%, respectively. Comparison of procurement cost of products showed that TDF+3TC+EFV 300+300+600 of 30 tablets comprise almost 50% of the procurement budget followed by AZT+3TC+NVP 300+150+200 mg of 60 tablets at 11.8%. Budget requirement and patient utilization of these two products are increasing due to new WHO guideline recommendations and implementation.

The results of the quantification exercise have already been submitted to the Ministry of Finance and used for the FY 2014–15 tender.

The main challenges encountered during completion of the quantification exercise were the following:

- Inadequate human resources, especially the lack of pharmacy personnel at the facility level, and a relatively weak health system
- Relatively higher ART attrition rate compared to other African countries
- Patient data inaccuracy and incompleteness at ART sites
- Relatively poor inventory management at ART sites

- Longer lead time in allocating and releasing funds for procurement
- Inadequate funding and delayed disbursement process
- Delayed payment processes, which hinder on-time, regular delivery of HIV commodities
- Poor reporting and communication between ART-initiating clinics and refill clinics in terms of stock reporting and ordering
- Poor performance from some suppliers

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

- Strengthen in-country pharmacy personnel training
- Strengthen the ART patient-retention strategy
- 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 an improved process of payments of suppliers
- Build the capacity of regional clinical supervisors to bridge the communication between ART-initiating facilities and refill clinics on stock reporting and ordering
- Put a suppliers' performance management system in place and engage suppliers regularly.



# INTRODUCTION

## Country Profile

Swaziland faces daunting health challenges. It has the highest HIV prevalence rate in the world, currently at 31% among 15- to 49-year-olds.<sup>1</sup> In 2009, mortality from AIDS-related causes amounted to 0.6% of the population (about 7,000 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.<sup>2</sup>

## HIV/AIDS in Swaziland

HIV and AIDS remain the greatest public health and socioeconomic development challenges for Swaziland. The GoS has made significant progress in addressing the epidemic through a series of strategic plans and frameworks. Despite these efforts, Swaziland still bears a high HIV disease burden. As a result, the extended National Strategic Framework for HIV and AIDS was developed to shift the national response paradigm not only from focusing on results, but also to rethinking its investment for HIV and AIDS. The HIV/AIDS epidemic continues to pose a major threat to the nation, and its impact is already felt in all sectors. Epidemiological review indicates an increase in HIV prevalence among pregnant women, from 3.9% in 1992 to 41.1% in 2010. The 2010 prenatal care sentinel surveillance survey showed that prevalence has stabilized between 42% and 41% and that HIV prevalence is highest among those ages 30–34 years (53.8%) and lowest among those ages 15–19 years (20.4%).<sup>3</sup>

The Swaziland National ART Programme (SNAP) was established in 2003 as a unit of the Swaziland MoH. The priority intervention for the program is the provision of high-quality treatment, care, and support for all adults, adolescents, and children living with HIV/AIDS in the Kingdom of Swaziland through the provision of ART, PMTCT, and related services.

HIV and AIDS commodities are vital for the successful implementation of ART and PMTCT programs. Therefore, SNAP, in collaboration with CMS and partners such as the USAID/SIAPS Program and CHAI, conduct annual HIV and AIDS commodity demand planning and budgeting and submit financial requirement to GoS.

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<sup>1</sup>Government of Swaziland. 2012. *Swaziland HIV Incidence Measurement Survey (SHIMS)*. Mbabane: GoS.

<sup>2</sup>United Nations Joint Programme on HIV/AIDS. 2011. *UNAIDS World AIDS Day Report 2011*. Geneva: UNAIDS.

<sup>3</sup>United Nations Joint Programme on HIV/AIDS. 2012. *Swaziland Country Report on Monitoring the Political Declaration on HIV and AIDS*. Geneva: UNAIDS.

## **Supply Chain Management for HIV/AIDS Commodities**

### ***Selection***

HIV and AIDS commodities in Swaziland are selected based on the country's ART and PMTCT guidelines. The guidelines are systematically updated based on the new findings and recommendations provided by 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 of HIV and AIDS commodities are conducted through the ART Forecasting and Supply Planning Technical Working Group (TWG), which was established in 2011 with defined roles and responsibilities. The TWG is led by the CMS, and its membership is comprised of the Baylor Pediatrics Clinic, the Mbabane Government Hospital, and partners such as PEPFAR/US Centers for Disease Control and Prevention, USAID/SIAPS, CHAI, the University Research Co., Médecins Sans Frontières (Doctors Without Borders), the United Nations Children's Fund, the Elizabeth Glaser Pediatric AIDS Foundation, and the International Center for AIDS Care and Treatment Programs..

Annual forecasting of two years' demand and quarterly supply planning is conducted by the TWG. Once annual forecasting is done, 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 ARV requirements; however, the consumption method is used to quantify co-trimoxazole, INH, and medicines for Kaposi's sarcoma, based on the available data. During the quarterly supply planning exercise, stock on hand, consumption and losses/adjustments, and outstanding shipment data aggregated from central and facility level are used to determine which products are needed, in what quantities, and when the products should be brought into the country. The result from the supply planning exercise is used to generate a purchase request. The Procurement Unit prepares 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 tender or bid. Tender evaluation is then conducted through the National Drug Advisory Committee (an 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 condition of the tender.

### ***Warehouse and Distribution of HIV and AIDS Commodities***

CMS is responsible for receiving, storing, and distributing all HIV and AIDS commodities. The warehouse and distribution activity is integrated with other essential health commodities. HIV/AIDS commodities and essential medicines are distributed monthly to health facilities, based on orders from those facilities. In April 2011, the supply chain system for HIV and AIDS commodities was redesigned in such a way that facilities would maintain a maximum stock of three months and minimum of two months. The reporting and ordering period continued to be monthly. A logistics management information systems (LMIS) tool was designed. A two-day

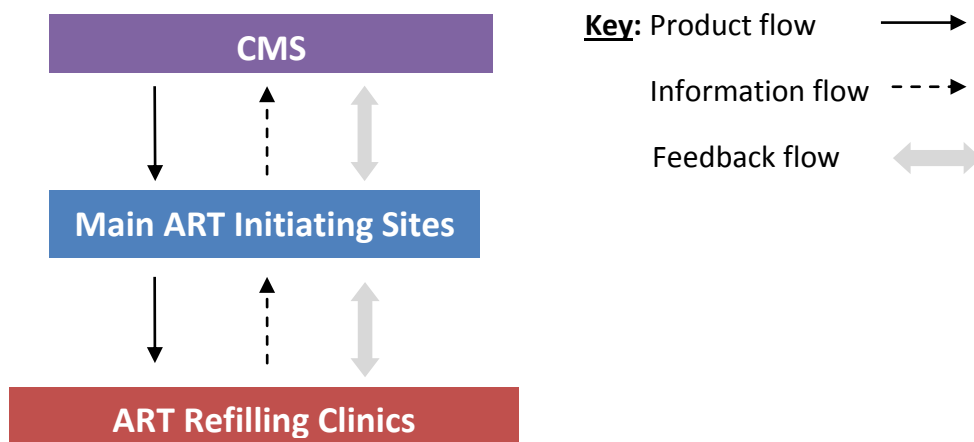
training on how to implement the newly designed LMIS was conducted and facilitated by USAID/Strengthening Pharmaceutical Systems and CHAI. To date, more than 200 health workers from 98 ART-initiating and refill facilities have been trained and have started implementing the system. At CMS, the Data Management Unit (DMU) was established to collect, collate, analyze, and generate stock and patient-related information for decision making.

The distribution of the commodities to facilities is staggered throughout the month according to the set schedule for the four administrative regions of the country as shown in table 1.

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

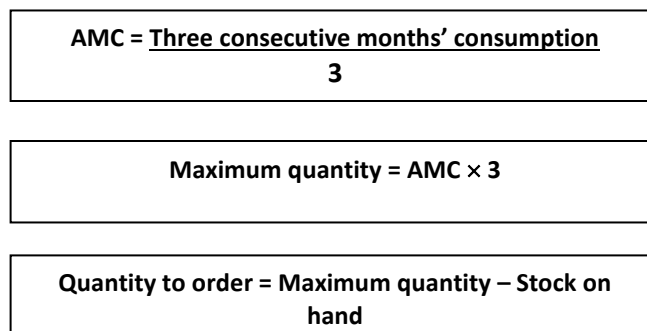
| Region     | When orders are received at CMS | When commodities are distributed to health facilities |
|------------|---------------------------------|---|
| Shiselweni | First week of the month         | First week of the month                               |
| Lubombo    |                                 | 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 ART LMIS report order form is sent from refill clinics to ART-initiating sites. ART-initiating sites will check the report and order coming from refill sites and resupply accordingly.



**Figure 1. Movement of HIV and AIDS commodities and information**

ART-initiating sites aggregate the data of stock they have issued to clinics and their own monthly dispensed-to-users quantities. The aggregated data are considered to be their monthly consumption. Facilities calculate their average monthly consumption (AMC) based on the average of the last two previous months' and the current month's consumption. The AMC is used to calculate their maximum stock quantity that, in turn, is used to estimate their order quantity, as shown in figure 2.



**Figure 2. Estimating order quantity**

The inventory management system for HIV and AIDS commodities in Swaziland is designed in such a way 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 levels at the central level (i.e., CMS) are seven and four months, respectively. The inventory control system and LMIS are supported by inventory control tools such as stock cards at the facility level and an electronic inventory and warehouse management system called RxSolution<sup>®</sup> at health facilities and at CMS. RxSolution is software developed by a USAID-funded project, Rational Pharmaceutical Management Plus (RPM Plus), which was implemented by MSH. It uses an SQL database. Currently RxSolution implementation is being supported by the USAID/SIAPS Program.

## **GOALS, OBJECTIVES, AND SCOPE OF QUANTIFICATION**

### **Goals**

- Complete the National HIV and AIDS Commodities Quantification for the FY April 2014 through March 2016
- Develop a two-year supply plan for the FY April 2014 through March 2016

### **Objectives**

- Update the national HIV and AIDS commodity quantification conducted in November 2012
- Review methodologies and tools; validate any assumptions made
- Discuss data sources and data gaps; determine how to address gaps
- Complete quantification of products
- Determine funding requirements and resources
- 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 through government funding. The commodities to be quantified include ARVs for HIV treatment, PMTCT medicines, medicines for opportunistic infections (e.g., co-trimoxazole prophylaxis), INH that is used in IPT, and medicines for Kaposi's sarcoma. The forecast covers the period from April 2014 through March 2016. A detailed 24-month supply plan taking into consideration service capacity, current stock availability, and outstanding shipment was prepared for FY April 2014 through March 2016.

## QUANTIFICATION METHODOLOGY AND PROCESSES

### Forecasting and Supply Planning TWG

The Forecasting and Supply Planning TWG met on October 18, 2013. The objective of the meeting was to discuss the steps in the quantification processes, new HIV guideline reviews and significant changes, data requirements and inputs, phase-out plans, and the next steps. The TWG discussed in depth and laid out the next steps, with shared roles and responsibilities of the TWG. The TWG also decided to have a National HIV and AIDS Commodity Quantification Consultative meeting with the bigger group of partners and stakeholders.

### Data Collection and Document Review

Available data were collected on each of the programs from the beginning of July 2012 through the end of June 2013. The main data types collected were the following:

- Number of patients on ART from July 2012 through June 2013 from HMIS/SID
- Number and percentage of patients between pediatrics and adults
- Number and percentage of patients (both pediatric and adult) by regimen both from SID and CMS/DMU

Data collected were then compiled, analyzed, and evaluated during consultative meeting. Discussions and revisions were made on the assumptions and data inputs for the forecast.

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

- Previous national quantification reports (2013 and 2014)
- National guidelines for ART and PMTCT
- Annual reports for ART and PMTCT
- Swaziland preliminary HIV estimates and projections (Spectrum software 2013)
- APMR ART reports—June 2012 through June 2013
- LMIS ART reports—June 2012 through June 2013

### Quantification Consultative Meeting

In addition to reviewing the documents and data sources listed above, CMS organized a half-day consultative meeting, held on November 5, 2013 at Mountain Inn. It was attended by 22 participants from different organizations. (See annexes 1 and 3 for the agenda of the quantification consultative meeting and the list of participants, respectively. Annex 2 contains the invitation letter.)

The objectives of the consultative meeting were to—

- Review and validate the available data, assumptions, and methodologies
- Build additional assumptions based on new guidelines and changes, trends and targets, and future programmatic goals
- Reach a consensus and draw agreed-upon assumptions, data, methodologies, scenarios, and recommendations for the current quantification exercise

The meeting was attended by various HIV care and treatment partners, program managers, and clinical experts to clarify questions on the data's completeness, quality, and sources. The available data and assumptions were then organized, analyzed, and triangulated for the quantification input.

CMS shared two presentations. The first, a one-year progress report of the CMS/DMU, included the consumption pattern of key HIV and AIDS commodities, patient proportions on different regimens (for both pediatrics and adults), health facility reporting rates, data quality improvements, and other achievements of the DMU. The second presentation focused on the available information that had been generated from different sources. The main sources were SID and DMU. Thereafter, CMS made presentations focusing on each of the program areas, namely ART and PMTCT, and presentations on the data to be used, forecasting assumptions, forecasting methodologies, and the process to be implemented.

In general, a consensus was reached on most of the data, assumptions, methodologies, and processes to be used for the quantification of each of the commodity groups. Further analysis of the data and follow-up discussions with program managers and SID were needed, however, especially for some of second-line ART data for existing patients.

## **Forecasting Methods and Tools**

Based on the feedback given during the consultative quantification meeting and further discussions, the morbidity method of forecasting was applied for ART and PMTCT programs; however, the consumption method of forecasting was applied for co-trimoxazole, medicines for Kaposi's sarcoma, and INH prophylaxis. Results were produced in terms of quantities and values.

The morbidity method was selected for ART and PMTCT programs because these programs are still in scale-up mode with specific targets set for the number of patients to be enrolled in the programs. In addition, since steady rate status in the program has not yet been attained and regimens could potentially be changed or switched, past consumption data do not provide a strong indicator of the future requirements. Furthermore, new WHO ART guidelines (2013), formulations, and regimens are being introduced to the programs. Commodity requirements for ART and PMTCT were determined using Quantimed<sup>®</sup>, a Microsoft Access<sup>®</sup>-based pharmaceutical cost-estimation tool developed by the RPM Plus Program, with funding from USAID. The use of Quantimed facilitates the creation of alternative scenarios that reflect the consideration of different values for certain variables such as the percentage of the population on

each regimen and the proportion on a different formulation within a particular regimen. The forecast in Quantimed is calculated on a month-by-month basis to reflect more accurately the changing numbers of patients on treatments and, hence, the change in forecasted consumption. The Quantimed month-by-month output quantities for each product have, therefore, been imported directly into the supply planning tool, PipeLine<sup>®</sup>, to derive a sound supply and procurement plan.

The consumption method was selected for co-trimoxazole, INH, and Kaposi's sarcoma medicines because the targets provided the previous years were not in line with the actual consumption on the ground and, hence, resulted in over-quantification. Microsoft Excel<sup>®</sup> was used to forecast requirement for co-trimoxazole, INH prophylaxis, and medicines for Kaposi's 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 the "Quantification Assumptions and Outputs" section of this report.

The prices used for valuation were derived from the current tender for HIV and AIDS commodities (2013 and 2014) and were assumed to remain constant during the forecast period. The tender price includes the price of the product plus freight and logistics costs. However, due to local currency high inflation rate, prices of commodities are expected to increase by 20-25%. When tender prices were not available, such as for the new formulations to be introduced starting July 2014, an estimated price for the Supply Chain Management Systems Quantimed database was used.

The forecasting results in this report are the forecasted consumptions and corresponding costs (morbidity requirements), however, the supply plan result reflects forecasted consumption and account for buffer stock, minimum and maximum inventory levels, stock on hand, and outstanding shipments.

Analysis was also done to show the implication of the results. The key lessons and opportunities, challenges, and recommendations were also drawn throughout the process and have been included in this report (see "Discussion and Analysis").

## **Dissemination Workshop**

The results of the forecasting exercise will be shared in a half-day, breakfast dissemination workshop (day and venue to be determined). The objectives of this workshop will be to—

- Share the results of the quantification exercise
- Review and validate the data and assumptions used for the quantification
- Define funding requirements
- Discuss and draw recommendations for regular forecasting and supply planning

Draft reports of the quantification results including the driving assumptions will be compiled and shared with the programs for review and comments before finalization of this report.



## QUANTIFICATION ASSUMPTIONS AND OUTPUTS

### ARVs for ART and PMTCT

The following assumptions were adopted for the forecast of adult first-line, adult second-line, and pediatric ARVs.

#### ***General ART Assumptions***

- The forecast period is April 2014 through March 2016.
- The morbidity method of forecasting was used for ARVs since the ART program is still in a scale-up mode and since new formulations and regimens are being introduced to the program.
- The following scale-up rates of net increases of new patients on ART per month were used for the forecast (*source*: SNAP).
  - The addition of 1,200 net new adult patients per month was used for the forecast period from April 1 through June 30, 2014.
  - The addition of 1,500 net new adult patients per month was used for the forecast period from July 1, 2014 through March 30, 2016.
  - A net addition of 133 new pediatric patients is expected during the forecast period.
- The total baseline number of adult ART patients was 88,638 as of end of June 2013. This number is the actual reported total from the *SID ART Quarterly Report* generated from the ART Patients Monitoring and Reporting (APMR) system. See table 2.
- The total baseline number of pediatric ART patients was 7,643 as of end of June 2013. The source of these data is the *SID ART Quarterly Report* generated from the APMR. See table 3.
- The annual attrition rate was considered to be 13%, which is monthly attrition of 1.08% from the previous month's total.
- The first- and second-line populations were 96% and 4%, respectively
- ARV regimens and doses were based on the current national ART guidelines to be in use through June 30, 2014. Starting July 1, 2014, the newly revised national ART guidelines will be used. Both treatment guidelines were assumed to be implemented effectively at all levels according to the timeline.
- New formulations such as ATV+RTV 300+100 mg 30 tablets and ABC+3TC 600+300 mg scored 30 tablets will be introduced as of July 2014.

- To calculate DDI 400 mg and 250 mg requirements, the weight proportions for adults >60 kg to those <60 kg was assumed to be 40% and 60%, respectively (*source: experts' opinions during the consultative meeting*).

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

| Month                                       | July 2013 | November 2013 | March 2014 | July 2014 | November 2014 | March 2015 | July 2015 | November 2015 | March 2016 |
|---|-----------|---------------|------------|-----------|---------------|------------|-----------|---------------|------------|
| Existing first-line, month start            | 85,092    | 81,465        | 77,991     | 74,666    | 71,483        | 68,435     | 75,495    | 72,276        | 69,195     |
| Existing first-line, month end              | 84,171    | 80,582        | 77,147     | 73,857    | 70,709        | 78,003     | 74,677    | 71,493        | 68,445     |
| New first-line, month end (cumulative)      | 2,160     | 10,698        | 19,077     | 27,603    | 36,883        | 46,023     | 55,488    | 64,804        | 73,979     |
| Existing second-line, month start           | 3,546     | 3,394         | 3,250      | 3,111     | 2,978         | 2,851      | 2,730     | 2,614         | 2,502      |
| New second-line, month start (cumulative)   | 0         | 357           | 708        | 1,053     | 1,441         | 1,823      | 2,630     | 3,002         | 3,368      |
| Total second-line, month start (cumulative) | 3,546     | 3,752         | 3,958      | 4,164     | 4,419         | 4,674      | 5,360     | 5,615         | 5,871      |

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

| Beginning Month                                      | July 2013 | November 2013 | March 2014 | July 2014 | November 2014 | March 2015 | July 2015 | November 2015 | March 2016 |
|--|-----------|---------------|------------|-----------|---------------|------------|-----------|---------------|------------|
| Total patients, month start                          | 7,643     | 7,317         | 7,005      | 6,707     | 6,421         | 6,147      | 5,885     | 5,634         | 5,394      |
| Attrition during the month                           | 83        | 79            | 76         | 73        | 70            | 67         | 64        | 61            | 58         |
| Total existing patients, month end (after attrition) | 7,560     | 7,238         | 6,929      | 6,634     | 6,351         | 6,080      | 5,821     | 5,573         | 5,335      |
| Total pediatric patients on ART                      | 7,643     | 8,175         | 8,707      | 9,239     | 9,771         | 10,303     | 10,835    | 11,367        | 11,899     |
| Total new beginning (cumulative)                     | 0         | 858           | 1,702      | 2,532     | 3,350         | 4,156      | 4,950     | 5,733         | 6,505      |

### **Adult ART Assumptions**

Based on the current ART guidelines for Swaziland, on the new ART guidelines for Swaziland (to be implemented starting July 2014), on APMR and LMIS data as of June 2013, and in some instances, on experts' opinions, the following adult ART assumptions were made:

- The first-line regimens shown in table 4 with the respective proportions were assumed to be used for existing patients during the forecast period.

*Quantification Assumptions and Outputs*

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- The first-line regimens shown in table 5 with the respective proportions were assumed to be used for new patients during the forecast period.
- The second-line regimens shown in table 6 with the respective proportions were assumed to be used for existing second-line patients during the forecast period.
- The regimens shown in table 7 with the respective proportions were assumed to be used for new second-line patients (i.e., patients switched from first-line to second-line treatment) during the forecast period.

**Table 4. First-Line Regimens to be used by Existing Adult Patients**

| <b>Regimen description</b> | <b>Percentage of episodes</b> | <b>Note/source</b>                   |
|----------------------------|-------------------------------|--------------------------------------|
| TDF+3TC+EFV                | 44.60                         | LMIS end of June 2013                |
| AZT+3TC+NVP                | 31.39                         | Average of LMIS and APMR             |
| AZT+3TC+EFV                | 14.67                         | LMIS data                            |
| TDF+3TC+NVP                | 6.11                          | LMIS and was part of the new co-pack |
| D4T+3TC+NVP                | 1.00                          | APMR                                 |
| D4T+3TC+EFV                | 1.00                          | APMR                                 |
| ABC+3TC+EFV                | 0.85                          | Average of APMR and LMIS             |
| ABC+3TC+NVP                | 0.35                          | Average APMR and LMIS                |
| AZT+3TC+ABC                | 0.02                          | APMR                                 |
| TDF+3TC+ABC                | 0.01                          | APMR                                 |
| Total                      | 100.00%                       |                                      |

**Table 5. First-Line Regimens to be used by New Adult Patients during the Forecast Period**

| <b>Regimen description</b> | <b>Percentage of episodes</b> | <b>Note/source</b>   |
|----------------------------|-------------------------------|--|
| TDF+3TC+EFV                | 72.65                         | Last year's proportion from APMR was taken.  |
| AZT+3TC+EFV                | 15.15                         | This regimen is preferred over NVP for the new guideline, and data were swapped between EFV and NVP from APMR June 2013. |
| TDF+3TC+NVP                | 5.29                          | APMR data  |
| AZT+3TC+NVP                | 4.77                          | Swapped APMR 2013 data between AZT/3TC/NVP and EFV   |
| ABC+3TC+EFV                | 0.94                          | APMR data from the end of June   |
| D4T+3TC+EFV                | 0.41                          | APMR   |
| D4T+3TC+NVP                | 0.39                          | APMR   |
| ABC+3TC+NVP                | 0.37                          | APMR   |
| AZT+3TC+ABC                | 0.03                          | APMR   |
| Total                      | 100.00                        |  |

**Table 6. Second-Line Regimens to be used by Existing Adult Patients during the Forecast Period**

| Regimen description | Percentage of episodes | Note/source  |
|---------------------|------------------------|--|
| ABC+3TC+LPV/r       | 39.00                  | Source: APMR and LMIS  |
| TDF+3TC+LPV/r       | 23.58                  | Note: Distributed the TDF/3TC/EFV/AZT percentage differences between APMR and LMIS to the top three regimens |
| AZT+3TC+LPV/r       | 21.94                  |  |
| D4T+3TC+LPV/r       | 3.88                   | APMR   |
| TDF+3TC+EFV+AZT     | 3.55                   | LMIS   |
| ABC+DDI+LPV/r       | 2.62                   | APMR   |
| AZT+DDI+LPV/r       | 2.42                   | APMR   |
| AZT+3TC+TDF+LPV/r   | 1.45                   | APMR   |
| AZT+3TC+LPV/r+ABC   | 0.68                   | APMR   |
| AZT+3TC+SQV+RTV     | 0.68                   | APMR   |
| AZT+3TC+IDV+RTV     | 0.10                   | APMR   |
| TDF+ABC+LPV/r       | 0.10                   | APMR   |
| Total               | 100.00                 |  |

**Table 7. Second-Line Regimens to be used by New Adult Patients during the Forecast Period**

| Regimen description | Percentage of episodes | Note/source        |
|---------------------|------------------------|--------------------|
| TDF+3TC+ATV/r       | 50.00                  | New ART guidelines |
| AZT+3TC+ATV/r       | 50.00                  |                    |
| Total               | 100.00                 |                    |

### ***Pediatric ART Assumptions***

- The average weight proportions for both existing and new first- and second-line pediatric patients are shown in table 8.
- Based on the current ART guidelines for Swaziland, on the new ART guidelines (to be implemented in July 2014), on APMR and LMIS data as of June 2013, and in some instances on experts' opinions, the following pediatric ART assumptions were made:
  - The regimens shown in table 9 with the respective proportions were assumed to be used for existing first- and second-line pediatric patients in the 0–13.9 kg weight band during the forecast period.
  - The regimens shown in table 10 with the respective proportions were assumed to be used for existing first- and second-line pediatric patients in the 14–34.9 kg weight band during the forecast period.
  - The regimens shown in table 11 with the respective proportions were assumed to be used for existing first- and second-line pediatric patients in the  $\geq 35$  kg weight band during the forecast period.

- The regimens shown in table 12 with the respective proportions were assumed to be used for new pediatric first- and second-line patients in the 0–34.9 kg weight band during the forecast period.
- The regimens shown in table 13 with the respective proportions were assumed to be used for new pediatric first- and second-line patients in the ≥35 kg weight band during the forecast period.

**Table 8. Average Weight Proportion of the Pediatrics Population during the Forecast Period**

| Weight (kg) | Percentage of children | Weight (kg) | Percentage of children |
|-------------|------------------------|-------------|------------------------|
| 0–5.9       | 5.98                   | 20–24.9     | 12.71                  |
| 6–9.9       | 20.56                  | 25–34.9     | 13.83                  |
| 10–13.9     | 16.45                  | 35+         | 12.34                  |
| 14–19.9     | 18.13                  | Total       | 100.00                 |

**Table 9. Pediatric First- and Second-line Regimens for Existing Pediatric Patients in the 0–13.9 kg Weight Band**

| Regimen description | Percentage of episodes | Note/source |
|---------------------|------------------------|-------------|
| AZT+3TC+NVP         | 52.68                  |             |
| D4T+3TC+NVP         | 37.57                  |             |
| AZT+3TC+LPV/r       | 5.46                   | APMR        |
| D4T+3TC+LPV/r       | 4.15                   |             |
| D4T+3TC+ABC         | 0.11                   |             |
| AZT+3TC+ABC         | 0.03                   |             |
| Total               | 100.00                 |             |

**Table 10. Pediatric First- and Second-line Regimens for Existing Pediatric Patients in the 14–34.9 kg Weight Band**

| Regimen description | Percentage of episodes |
|---------------------|------------------------|
| AZT+3TC+NVP         | 46.14                  |
| D4T+3TC+NVP         | 32.90                  |
| AZT+3TC+EFV         | 7.88                   |
| AZT+3TC+LPV/r       | 4.78                   |
| D4T+3TC+EFV         | 4.55                   |
| D4T+3TC+LPV/r       | 3.63                   |
| D4T+3TC+ABC         | 0.09                   |
| AZT+3TC+ABC         | 0.03                   |
| <b>Total</b>        | <b>100.00</b>          |

**Table 11. Pediatric First- and Second-line Regimens for Existing Pediatric Patients in the ≥35 kg Weight Band**

| <b>Regimen description</b> | <b>Percentage of episodes</b> |
|----------------------------|-------------------------------|
| AZT+3TC+NVP                | 44.30                         |
| D4T+3TC+NVP                | 31.60                         |
| AZT+3TC+EFV                | 7.57                          |
| AZT+3TC+LPV/r              | 4.59                          |
| D4T+3TC+EFV                | 4.37                          |
| D4T+3TC+LPV/r              | 3.49                          |
| TDF+3TC+EFV                | 3.43                          |
| TDF+3TC+NVP                | 0.53                          |
| D4T+3TC+ABC                | 0.09                          |
| AZT+3TC+ABC                | 0.03                          |
| Total                      | 100.00                        |

**Table 12. Pediatric First- and Second-line Regimens for New Patients and Patients Switching to Second-line Regimens in the 0–34.9 kg Weight Band**

| <b>Regimen description</b> | <b>Percentage of episodes</b> |
|----------------------------|-------------------------------|
| ABC+3TC+LPV/r              | 90.00                         |
| D4T+3TC+NVP                | 6.00                          |
| AZT+3TC+NVP                | 4.00                          |
| Total                      | 100.00                        |

**Table 13. Pediatric First- and Second-line Regimens—New First-line Patients and Patients Switching to Second-line Regimen—in the ≥35 kg Weight Band**

| <b>Regimen description</b> | <b>Percentage of episodes</b> |
|----------------------------|-------------------------------|
| ABC+3TC+EFV                | 42.67                         |
| ABC+3TC+LPV/r              | 34.67                         |
| TDF+3TC+EFV                | 9.29                          |
| AZT+3TC+EFV                | 8.73                          |
| AZT+3TC+NVP                | 3.95                          |
| TDF+3TC+LPV/r              | 0.69                          |
| Total                      | 100.00                        |

### **General PMTCT Assumptions**

- The forecast period is April 2014 through March 2016.
- The morbidity method of forecasting was used to forecast for the ARVs since the PMTCT program is still in a scale-up mode and since new regimens and formulations are being introduced to 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 software

## *Quantification Assumptions and Outputs*

for Swaziland as provided by the program. Only 80% of all HIV-positive women were assumed to be in need of PMTCT.

- Option B+ will be implemented in July 2014.
- A net total of 692 new mother and baby PMTCT patients will be enrolled every month.
- The pediatric PMTCT dose of NVP syrup is, on average, 17.86 mg/day for 42 days.
- Target and scale-up were as shown in tables 14–16.

**Table 14. PMTCT Option B+ Target**

| Month                                  | July<br>2014 | November<br>2014 | March<br>2015 | July<br>2015 | November<br>2015 | March<br>2016 |
|--|--------------|------------------|---------------|--------------|------------------|---------------|
| Number of PMTCT Mothers Month starting | 0            | 4,776            | 9,552         | 14,328       | 19,104           | 23,880        |
| Number of PMTCT Mothers Month ending   | 1,194        | 5,970            | 10,746        | 15,522       | 20,298           | 25,074        |

**Table 15. PMTCT Target for Pediatric Patients**

| Date                                  | July<br>2014 | November<br>2014 | March<br>2015 | July<br>2015 | November<br>2015 | March<br>2016 |
|---------------------------------------|--------------|------------------|---------------|--------------|------------------|---------------|
| Number of PMTCT babies month starting | 0            | 2,768            | 5,536         | 8,304        | 11,072           | 13,840        |
| Number of PMTCT babies month ending   | 692          | 3,460            | 6,228         | 8,996        | 11,764           | 14,532        |

**Table 16. PMTCT for Option B+ and Pediatric Regimen to be used**

| Regimen description | Percentage of episodes | Note   |
|---------------------|------------------------|--|
| AZT+3TC+EFV         | 5.00                   | PMTCT experts' opinion 95% on TDF and 5% on AZT close monitoring on implementation |
| TDF/3TC/EFV         | 95.00                  |  |

### **Medicines for Opportunistic Infections and Prophylaxis**

#### ***General Opportunistic Infection and Prophylaxis Assumptions***

- The forecast period is April 2014 through March 2016.
- The consumption method of forecasting was used because the morbidity data and future target implementations are not reliable.

- The following assumptions and considerations were made:
  - One-year CMS issue data are considered, and adjusted AMC was calculated.
  - The annual average increase or decrease trend in consumption of each product over the forecast period was assumed to be constant based on the trend evidenced in issue data generated by RxSolution from April 2012 through March 2013.
  - Current stock on hand and shelf-life and outstanding shipments are taken into consideration to calculate shipment quantities.

## Quantification Results

### *ART and PMTCT Forecast Results*

Based on the consensus reached during the consultative quantification workshop and on follow-up discussions with program managers and using the morbidity method and Quantimed as a forecasting tool, the forecasts shown in table 17 were made for the April 2014 through March 2016 period. This result does not include available stock, lead time stock, buffer stock, and outstanding shipments.

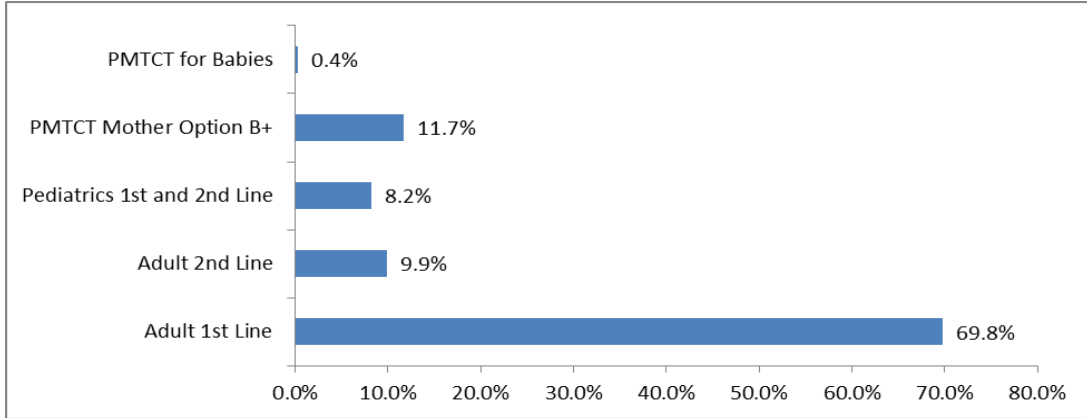
**Table 17. Summary of ARVs Requirement by Value (SZL, USD)**

| Category                        | Year I (2014-15) |               | Year II (2015-16) |               | Total          |               |
|---------------------------------|------------------|---------------|-------------------|---------------|----------------|---------------|
|                                 | SZL              | USD           | SZL               | USD           | SZL            | USD           |
| Adult first line                | 101,556,900.83   | 9,672,085.97  | 133,678,320.70    | 12,731,268.88 | 235,235,221.53 | 22,403,354.85 |
| Adult second line               | 15,105,958.74    | 1,438,662.76  | 18,361,075.16     | 1,748,673.86  | 33,467,033.90  | 3,187,336.62  |
| Pediatric first and second line | 12,112,115.25    | 1,153,534.81  | 15,661,771.25     | 1,491,597.29  | 27,773,886.50  | 2,645,132.10  |
| PMTCT mother option B+          | 10,251,710.82    | 976,353.43    | 29,177,893.99     | 2,778,847.10  | 39,429,604.81  | 3,755,200.53  |
| PMTCT for infants               | 599,237.48       | 57,070.24     | 599,237.48        | 57,070.24     | 1,198,474.96   | 114,140.48    |
| Grand total                     | 139,625,923.12   | 13,297,707.21 | 197,478,298.58    | 18,807,457.37 | 337,104,221.70 | 32,105,164.58 |

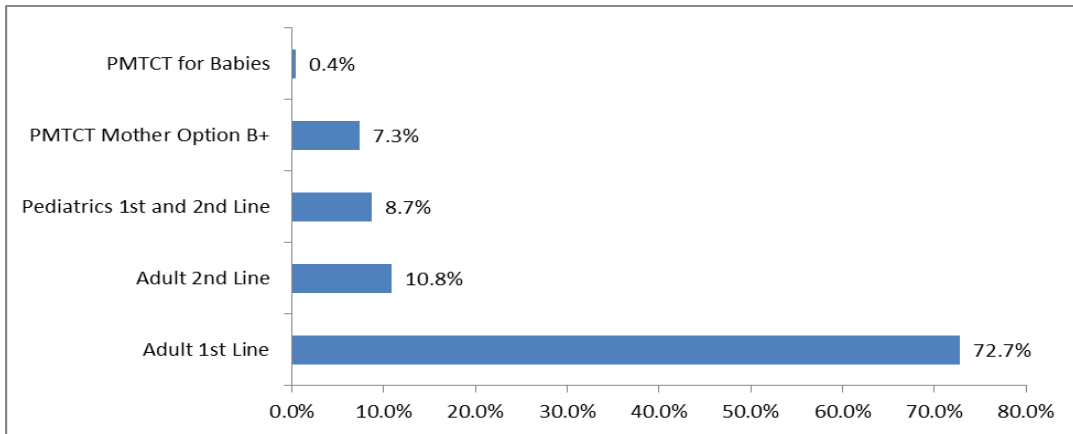
*Note:* USD 1 = SZL 10.50 was considered at the time of developing this report.

Of the total amount of approximately SZL 337.1 million (approximately USD 32.1 million) required for the period April 2014 through March 2016, the requirement for adult first-line ARVs accounts for over two-thirds (69.8%), and requirements for all pediatric and PMTCT medicines account for 8.2% and 11.7%, respectively. Figures 3–5 contain the details for the shares of requirements for each subcategory. Tables 18 and 19 list the total ARV requirements.

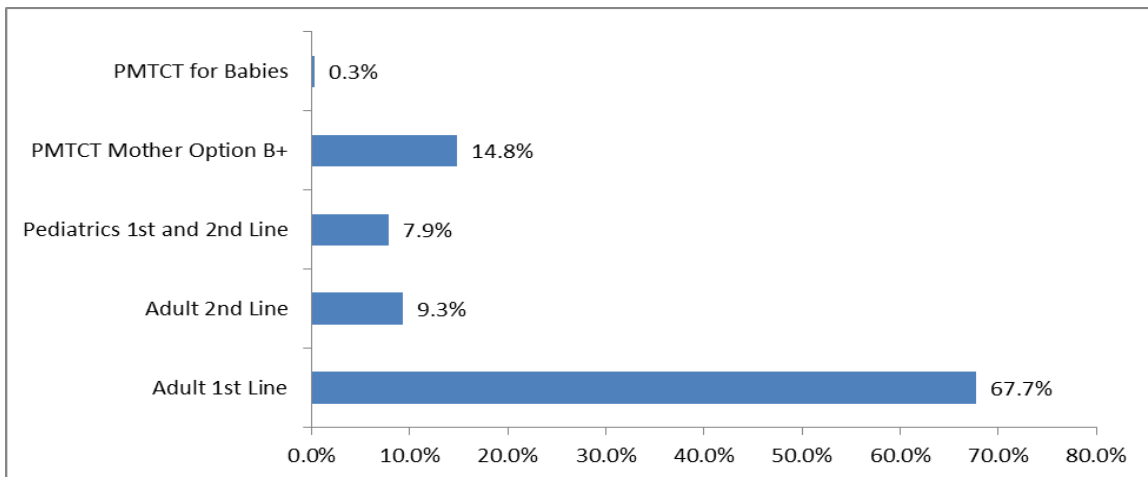




**Figure 3. Percentage requirement by value for each category of ARVs for two years**



**Figure 4. Percentage requirement by value for each category of ARVs (April 2014 through March 2015)**



**Figure 5. Percentage requirement by value for each category of ARVs (April 2015 through March 2016)**

**Table 18. Total ARV Requirements by Pack—Adult, Pediatric, and PMTCT ARVs**

| <b>Product description</b>  | <b>Units/pack</b> | <b>Cost/pack (SZL)</b> | <b>Total year I</b> | <b>Total year II</b> | <b>Grand total</b> |
|---|-------------------|------------------------|---------------------|----------------------|--------------------|
| Abacavir + lamivudine 600+300 mg/tablet                                 | 30                | 76.00                  | 37,967              | 47,098               | 85,065             |
| Didanosine EC 250 mg/capsule  | 30                | 130.60                 | 712                 | 624                  | 1,336              |
| Efavirenz 200 mg/tablet   | 90                | 91.20                  | 16,021              | 23,465               | 39,486             |
| Lamivudine + zidovudine 30 + 60 mg/tablet                               | 60                | 21.91                  | 10,968              | 9,621                | 20,589             |
| Atazanavir + ritonavir 300 + 100 mg/tablet                              | 30                | 200.00                 | 23,987              | 41,193               | 65,180             |
| Nevirapine 200 mg/tablet  | 60                | 23.58                  | 3,787               | 4,930                | 8,717              |
| Abacavir 60 mg/tablet   | 60                | 79.90                  | 2,672               | 4,208                | 6,880              |
| Saquinavir 200 mg/capsule   | 270               | 755.67                 | 267                 | 234                  | 501                |
| Lamivudine + zidovudine + nevirapine 30 + 60 + 50 mg/tablet             | 60                | 36.55                  | 60,103              | 54,844               | 114,947            |
| Lamivudine + stavudine 60+12 mg/tablet                                  | 60                | 25.00                  | 3,755               | 3,294                | 7,049              |
| Lamivudine + stavudine + nevirapine 60 + 12 + 100 mg/tablet             | 60                | 34.40                  | 22,560              | 21,381               | 43,941             |
| Lamivudine + zidovudine 150 + 300 mg/tablet                             | 60                | 61.51                  | 186,028             | 248,678              | 434,706            |
| Abacavir 300 mg/tablet  | 60                | 103.11                 | 1,206               | 1,058                | 2,264              |
| Abacavir-lamivudine 60 + 30 mg/tab                                      | 60                | 43.29                  | 62,073              | 100,332              | 162,405            |
| Lamivudine + zidovudine + nevirapine 150 + 300 + 200 mg/tablet          | 60                | 73.01                  | 297,016             | 302,263              | 599,279            |
| Stavudine 30 mg/capsule   | 60                | 19.50                  | 12,618              | 13,321               | 25,939             |
| Lamivudine + stavudine + nevirapine 150 + 30 + 200 mg/tablet            | 60                | 43.57                  | 16,413              | 16,864               | 33,277             |
| Efavirenz + lamivudine + tenofovir 600 + 300 + 300 mg/tablet            | 30                | 109.35                 | 620,271             | 1,018,041            | 1,638,312          |
| Didanosine enteric coated 400 mg/capsule                                | 30                | 181.92                 | 1,067               | 936                  | 2,003              |
| Efavirenz 600 mg/tablet   | 30                | 32.22                  | 181,691             | 241,104              | 422,795            |
| Indinavir 400 mg/capsule  | 180               | 610.50                 | 35                  | 31                   | 66                 |
| Lamivudine 150 mg/tablet  | 60                | 19.30                  | 12,600              | 13,305               | 25,905             |
| Lopinavir + ritonavir 80 + 20 mg/ml                                     | 60                | 45.94                  | 38,876              | 56,771               | 95,647             |
| Lopinavir + ritonavir 100 + 25 mg/tablet                                | 60                | 52.87                  | 1,626               | 1,426                | 3,052              |
| Lopinavir + ritonavir 200 + 50 mg/tablet                                | 120               | 179.96                 | 36,526              | 33,181               | 69,707             |
| Nevirapine 10 mg/ml suspension (PO)                                     | 25                | 24.05                  | 24,916              | 24,916               | 49,832             |
| Ritonavir 100 mg/capsule  | 84                | 62.19                  | 590                 | 518                  | 1,107              |
| Tenofovir disoproxil fumarate 300 mg/tablet                             | 30                | 38.85                  | 636                 | 566                  | 1,202              |
| Tenofovir + lamivudine 300+300 mg/tablet                                | 30                | 45.46                  | 21,213              | 29,113               | 50,326             |
| Zidovudine 300 mg/tablet  | 60                | 49.62                  | 2,339               | 2,177                | 4,516              |
| Tenofovir + lamivudine + nevirapine 300 + 300 + 200 mg/co-packed tablet | 30                | 83.60                  | 64,013              | 79,997               | 144,010            |

*Note:* USD 1 = SZL 10.50 was considered at the time of developing this report.

*Quantification Assumptions and Outputs*

**Table 19. Total ARV Requirements by Value (SZL)–Adult, Pediatric, and PMTCT ARVs**

| Product description  | Units/<br>pack | Cost/<br>pack<br>(SZL) | Total year I<br>(SZL) | Total year II<br>(SZL) | Grand<br>total (SZL) |
|--|----------------|------------------------|-----------------------|------------------------|----------------------|
| Abacavir + lamivudine 600+300 mg/tablet                    | 30             | 76.00                  | 2,885,504.63          | 3,579,460.62           | 6,464,965.25         |
| Didanosine enteric coated 250 mg/capsule BP                | 30             | 130.60                 | 92,934.96             | 81,542.29              | 174,477.25           |
| Efavirenz 200 mg/tablet                                    | 90             | 91.20                  | 1,461,084.78          | 2,139,995.81           | 3,601,080.59         |
| Lamivudine + zidovudine 30+60 mg/tablet                    | 60             | 21.91                  | 240,306.32            | 210,788.44             | 451,094.76           |
| Atazanavir + ritonavir 300+100 mg/tablet                   | 30             | 200.00                 | 4,797,353.22          | 8,238,686.47           | 13,036,039.69        |
| Nevirapine 200 mg/tablet                                   | 60             | 23.58                  | 89,295.50             | 116,257.26             | 205,552.76           |
| Abacavir 60 mg/tablet                                      | 60             | 79.90                  | 213,474.16            | 336,233.86             | 549,708.02           |
| Saquinavir 200 mg/capsule                                  | 270            | 755.67                 | 201,498.01            | 176,793.20             | 378,291.21           |
| Lamivudine + zidovudine + nevirapine 30+60+50 mg/tablet    | 60             | 36.55                  | 2,196,758.00          | 2,004,536.07           | 4,201,294.07         |
| Lamivudine + stavudine 60+12 mg/tablet                     | 60             | 25.00                  | 93,870.83             | 82,340.41              | 176,211.24           |
| Lamivudine + stavudine + nevirapine 60+12+100 mg/tablet    | 60             | 34.40                  | 776,048.01            | 735,489.84             | 1,511,537.85         |
| Lamivudine + zidovudine 150+300 mg/tablet                  | 60             | 61.51                  | 11,442,555.22         | 15,296,160.69          | 26,738,715.91        |
| Abacavir 300 mg/tablet                                     | 60             | 103.11                 | 124,338.63            | 109,097.26             | 233,435.89           |
| Abacavir + lamivudine 60+30 mg/tablet                      | 60             | 43.29                  | 2,687,136.71          | 4,343,361.69           | 7,030,498.40         |
| Lamivudine + zidovudine + nevirapine 150+300+200 mg/tablet | 60             | 73.01                  | 21,685,145.81         | 22,068,211.04          | 43,753,356.85        |
| Stavudine 30 mg/capsule                                    | 60             | 19.50                  | 246,058.14            | 259,762.42             | 505,820.56           |
| Lamivudine + stavudine + nevirapine 150+30+200 mg/tablet   | 60             | 43.57                  | 715,103.52            | 734,779.00             | 1,449,882.52         |
| Efavirenz + lamivudine + tenofovir 600+300+300 mg/tablet   | 30             | 109.35                 | 67,826,800.00         | 111,322,936.56         | 179,149,736.56       |
| Didanosine enteric coated 400 mg/capsule                   | 30             | 181.92                 | 194,169.28            | 170,362.02             | 364,531.30           |
| Efavirenz 600 mg/tablet                                    | 30             | 32.22                  | 5,854,081.88          | 7,768,371.96           | 13,622,453.84        |
| Indinavir 400 mg/capsule                                   | 180            | 610.50                 | 21,564.22             | 18,918.72              | 40,482.94            |
| Lamivudine 150 mg/tablet                                   | 60             | 19.30                  | 243,188.68            | 256,794.86             | 499,983.54           |
| Lopinavir + ritonavir 80+20 mg/ml                          | 60             | 45.94                  | 1,785,946.59          | 2,608,049.01           | 4,393,995.60         |
| Lopinavir + ritonavir 100+25 mg/tablet                     | 60             | 52.87                  | 85,975.43             | 75,416.41              | 161,391.84           |
| Lopinavir + ritonavir 200+50 mg/tablet                     | 120            | 179.96                 | 6,573,193.57          | 5,971,290.35           | 12,544,483.92        |
| Nevirapine 10 mg/ml suspension                             | 25             | 24.05                  | 599,237.47            | 599,237.47             | 1,198,474.94         |
| Ritonavir 100 mg/capsule                                   | 84             | 62.19                  | 36,686.18             | 32,188.51              | 68,874.69            |
| Tenofovir 300 mg/tablet                                    | 30             | 38.85                  | 24,708.60             | 21,978.74              | 46,687.34            |
| Tenofovir + lamivudine 300+300 mg/tablet                   | 30             | 45.46                  | 964,359.62            | 1,323,469.37           | 2,287,828.99         |
| Zidovudine 300 mg/tablet                                   | 60             | 49.62                  | 116,083.50            | 108,002.89             | 224,086.39           |
| Tenofovir + lamivudine + nevirapine 300+300+200 mg/tablet  | 30             | 83.60                  | 5,351,461.65          | 6,687,785.34           | 12,039,246.99        |
| Grand total (SZL)  |                |                        | 139,625,923.12        | 197,478,298.58         | 337,104,221.70       |

*Note:* USD 1 = SZL 10.50 was considered at the time of developing this report.

**Co-Trimoxazole, INH Prophylaxis, and Medicines for Kaposi's Sarcoma Forecast**

The TWG has adopted the consumption method of forecasting for co-trimoxazole, INH, and Kaposi's sarcoma medicines since the morbidity method wasn't practically implemented and resulted in overstocks, particularly of co-trimoxazole and INH medicines during the FY 2012–13. Based on the consensus reached during meetings and follow-up discussions, the forecasts shown in tables 20 and 21 were made for the forecast period from April 2014 through March 2016. This result does not include available stock, lead time stock, buffer stock, or outstanding shipments.

**Table 20. Total Co-Trimoxazole, INH, and Kaposi's Sarcoma Medicine Requirements by Pack**

| Product description                               | Unit price (SZL) | Total year I quantity |
|---|------------------|-----------------------|
| Bleomycin injection 15 units vial                 | 292.00           | 2,472                 |
| Co-trimoxazole 120 mg, 100 tablets                | 8.40             | 62,364                |
| Co-trimoxazole 480 mg, 1,000 tablets              | 56.07            | 5,052                 |
| Co-trimoxazole 960 mg, 1,000 tablets              | 199.00           | 56,484                |
| Dapsone tablets 100 mg, 100 tablets               | 150.00           | 5,364                 |
| Doxorubicin (premixed) injection 50 mg/ml, 2.5 ml | 325.00           | 1,704                 |
| INH 300 mg of 100                                 | 32.90            | 22,404                |
| Vinblastine injection mg/ml, 10 ml vial           | 240.00           | 336                   |
| Vincristine Injection 2 mg/2 ml, 2 ml vial        | 80.50            | 1,884                 |

Note: USD 1 = SZL 10.50 was considered at the time of developing this report.

**Table 21. Total Co-Trimoxazole, INH, and Kaposi's Sarcoma Medicine Requirements by Value**

| Product description                               | Unit price (SZL) | Total year I quantity | Total year I cost (SZL) |
|---|------------------|-----------------------|-------------------------|
| Bleomycin injection 15 units vial                 | 292.00           | 2,472                 | 721,824.00              |
| Co-trimoxazole 120 mg, 100 tablets                | 8.40             | 62,364                | 523,857.60              |
| Co-trimoxazole 480 mg, 1000 tablets               | 56.07            | 5,052                 | 283,265.64              |
| Co-trimoxazole 960 mg, 1000 tablets               | 199.00           | 56,484                | 11,240,316.00           |
| Dapsone tablets 100 mg, 100 tablets               | 150.00           | 5,364                 | 804,600.00              |
| Doxorubicin (premixed) injection 50 mg/ml, 2.5 ml | 325.00           | 1,704                 | 553,800.00              |
| INH 300 mg of 100                                 | 32.90            | 22,404                | 737,091.60              |
| Vinblastine injection mg/ml, 10 ml vial           | 240.00           | 336                   | 80,640.00               |
| Vincristine Injection 2 mg/2 ml, 2 ml vial        | 80.50            | 1,884                 | 151,662.00              |
|   |                  | Total                 | 15,097,056.84           |

Note: USD 1 = SZL 10.50 was considered at the time of developing this report.

### **HIV and AIDS Commodity Supply Plan Result**

Supply planning is the process of estimating quantities required to fill the supply pipeline and of determining the total costs, lead times, and arrival dates of shipments to ensure optimal procurement and delivery schedules. In conducting regular supply planning, critical data such as the following should be available:

- Forecasted consumption
- Current available usable stock
- Any losses or adjustments, including anticipated ones, due to expiry or damage
- Outstanding shipments with their expected delivery dates

#### *Supply Plan Assumptions*

Table 22 shows the minimum, maximum, and desired stock levels at the health facilities and the CMS level used to calculate the quantities of each product that should be procured every procurement period.

**Table 22. Minimum, Maximum, and Desired Stock Levels at CMS and Health Facilities**

| <b>Levels</b>                   | <b>Minimum stock level</b> | <b>Maximum stock level</b> |
|---------------------------------|----------------------------|----------------------------|
| CMS                             | 4                          | 7                          |
| Facilities                      | 2                          | 3                          |
| Program                         | 6                          | 10                         |
| <b>Shipment interval to CMS</b> | <b>3 months</b>            |                            |
| <b>Desired stock level</b>      | <b>10 months of stock</b>  |                            |

Table 23 shows the estimated lead times for the different phases of quantification and procurement processes, which will be taken to make products available in Swaziland. The lead times are divided into thirds based on important milestones: from planning to ordering, from ordering to shipping, and from shipping to receiving. The lead times to reach each milestone have a critical impact on the procurement processes and the availability sufficient quantities of health products at the right time.

- *Planning*: Finalizing the forecast and supply plan of all the commodities to be procured and having the required approvals and budgets
- *Ordering*: Placing the orders of commodities with specific quantities and dates of delivery based on the supply plan
- *Shipping*: Sending of the commodities from the source or from the vendor to the recipient or to CMS
- *Receiving*: Getting the commodities in CMS and ready for distribution and use

**Table 23. Lead Times**

| <b>Parameters/processes</b> | <b>Lead time</b> |
|-----------------------------|------------------|
| Planning to ordering        | 2 months         |
| Ordering to shipping        | 1 month          |
| Shipping to receiving       | 1 month          |

Based on the forecast consumption, available usable stock, outstanding shipments, and other supply plan parameters (e.g., lead time stock level and buffer stock), the quantities and costs shown in table 24 were calculated. Table 24 shows detailed HIV and AIDS commodity procurement requirements by quantity, value, and delivery date for year I (April 2014 through March 2015). In summary, the total HIV and AIDS commodity procurement requirements for year I was estimated to be SZL 171,029,283 (approximately USD 16,304,030). However, an increase in ART commodity prices of 20-25% is expected due to high inflation in the local currency.

*Quantification Assumptions and Outputs*

**Table 24. HIV and AIDS Commodity Supply and Procurement Requirements Plan by Quantity, Date of Delivery, and Value for Year I (April 2014 through March 2015)**

| Product description   | Unit price (SZL) | Q1 Delivery: End of June 2014 |               | Q2 Delivery: End of September 2014 |                | Q3 Delivery: End of December 2014 |                | Q4 Delivery: End of March 2015 |                |
|---|------------------|-------------------------------|---------------|------------------------------------|----------------|-----------------------------------|----------------|--------------------------------|----------------|
|   |                  | Qty                           | Cost          | Qty                                | Cost           | Qty                               | Cost           | Qty                            | Cost           |
| Abacavir 60 mg scored 60 tablets  | 79.90            | 432                           | SZL 34,517    | 648                                | SZL 51,775     | 864                               | SZL 69,034     | 1,080                          | SZL 86,292     |
| Abacavir + lamivudine 60+30 mg 60 tablets                               | 41.25            | 7,937                         | SZL 327,401   | 30,438                             | SZL 1,255,568  | 22,455                            | SZL 926,269    | 24,792                         | SZL 1,022,670  |
| Abacavir + lamivudine 600+300 mg scored 30 tablets                      | 13.52            | 25,830                        | SZL 349,222   | 6,660                              | SZL 90,043     | 10,440                            | SZL 141,149    | 11,970                         | SZL 161,834    |
| Atazanavir + ritonavir 300+100 mg 30 tablets                            | 25.00            | 12,646                        | SZL 316,150   | 4,499                              | SZL 112,475    | 7,467                             | SZL 186,675    | 12,220                         | SZL 305,500    |
| Bleomycin injection 15 units vial                                       | 292.00           | 618                           | SZL 180,456   | 618                                | SZL 180,456    | 618                               | SZL 180,456    | 618                            | SZL 180,456    |
| Co-trimoxazole 120 mg, 100 tablets                                      | 8.40             | 15,591                        | SZL 130,964   | 15,591                             | SZL 130,964    | 15,591                            | SZL 130,964    | 15,591                         | SZL 130,964    |
| Co-trimoxazole 480 mg, 1,000 tablets                                    | 56.07            | 1,253                         | SZL 70,256    | 1,263                              | SZL 70,816     | 1,263                             | SZL 70,816     | 1,263                          | SZL 70,816     |
| Co-trimoxazole 960 mg, 1,000 tablets                                    | 199.00           | 14,141                        | SZL 2,814,059 | 14,121                             | SZL 2,810,079  | 14,121                            | SZL 2,810,079  | 14,121                         | SZL 2,810,079  |
| Dapsone tablets 100 mg, 100 tablets                                     | 150.00           | 1,341                         | SZL 201,150   | 1,341                              | SZL 201,150    | 1,341                             | SZL 201,150    | 1,341                          | SZL 201,150    |
| Didanosine 400 mg, 30 capsules  | 181.92           | 0                             | SZL 0         | 0                                  | SZL 0          | 0                                 | SZL 0          | 0                              | SZL 0          |
| Doxorubicin (premixed) injection 50 mg/ml, 2.5 ml                       | 325.00           | 0                             | SZL 0         | 852                                | SZL 276,900    | 0                                 | SZL 0          | 852                            | SZL 276,900    |
| Efavirenz 200 mg 90 capsules  | 75.25            | 3,040                         | SZL 228,760   | 6,280                              | SZL 472,570    | 5,360                             | SZL 403,340    | 5,800                          | SZL 436,450    |
| Efavirenz 600 mg 30 tablets   | 32.22            | 35,424                        | SZL 1,141,361 | 59,232                             | SZL 1,908,455  | 51,792                            | SZL 1,668,738  | 73,632                         | SZL 2,372,423  |
| Efavirenz + lamivudine + tenofovir 600+300+300 mg 30 tablets            | 109.35           | 77,489                        | SZL 8,473,422 | 200,070                            | SZL 21,877,655 | 214,020                           | SZL 23,403,087 | 287,776                        | SZL 31,468,306 |
| Indinavir 400 mg 180 capsules   | 610.50           | 0                             | SZL 0         | 0                                  | SZL 0          | 0                                 | SZL 0          | 24                             | SZL 14,652     |
| Isoniazid 300 mg, 100 tablets   | 32.90            | 0                             | SZL 0         | 0                                  | SZL 0          | 0                                 | SZL 0          | 5,373                          | SZL 176,772    |
| Lamivudine + stavudine 60+12 mg dispersible 60 tablets                  | 23.10            | 0                             | SZL 0         | 0                                  | SZL 0          | 5,505                             | SZL 127,166    | 2,541                          | SZL 58,697     |
| Lamivudine + stavudine + nevirapine 150+30+200 mg 60 tablets            | 43.57            | 0                             | SZL 0         | 0                                  | SZL 0          | 2,250                             | SZL 98,033     | 5,040                          | SZL 219,593    |
| Lamivudine + stavudine + nevirapine 60+12+100 mg dispersible 60 tablets | 61.40            | 6,681                         | SZL 410,213   | 6,798                              | SZL 417,397    | 6,965                             | SZL 427,651    | 6,774                          | SZL 415,924    |
| Lamivudine + zidovudine 150+300 mg 60 tablets                           | 61.51            | 35,940                        | SZL 2,210,669 | 61,620                             | SZL 3,790,246  | 53,340                            | SZL 3,280,943  | 75,660                         | SZL 4,653,847  |
| Lamivudine + zidovudine 30+60 mg 60 tablets                             | 19.69            | 7,276                         | SZL 143,264   | 7,487                              | SZL 147,419    | 7,738                             | SZL 152,361    | 7,440                          | SZL 146,494    |
| Lamivudine + zidovudine + nevirapine 150+300+200 mg 60 tablets          | 73.01            | 34,080                        | SZL 2,488,181 | 72,240                             | SZL 5,274,242  | 67,440                            | SZL 4,923,794  | 102,192                        | SZL 7,461,038  |

*Quantification of HIV and AIDS Commodities for April 2014 through March 2016*

| Product description   | Unit price (SZL) | Q1 Delivery: End of June 2014 |                | Q2 Delivery: End of September 2014 |                | Q3 Delivery: End of December 2014 |                | Q4 Delivery: End of March 2015 |                |
|---|------------------|-------------------------------|----------------|------------------------------------|----------------|-----------------------------------|----------------|--------------------------------|----------------|
|   |                  | Qty                           | Cost           | Qty                                | Cost           | Qty                               | Cost           | Qty                            | Cost           |
| Lamivudine + zidovudine + nevirapine 30+60+50 mg dispersible 60 tablets                 | 36.55            | 24,460                        | SZL 894,013    | 24,600                             | SZL 899,130    | 24,881                            | SZL 909,401    | 24,543                         | SZL 897,047    |
| Lopinavir + ritonavir 80+20 mg/ml [Kaletra] oral suspension cool bottle 60 ml           | 35.94            | 12,970                        | SZL 466,142    | 15,630                             | SZL 561,742    | 12,970                            | SZL 466,142    | 14,030                         | SZL 504,238    |
| Lopinavir + ritonavir 100+25mg 120 tablets  | 52.87            | 0                             | SZL 0          | 1,933                              | SZL 102,198    | 2,031                             | SZL 107,379    | 1,921                          | SZL 101,563    |
| Lopinavir + ritonavir 200+50 mg 120 tablets   | 206.25           | 10,795                        | SZL 2,226,469  | 10,933                             | SZL 2,254,931  | 11,119                            | SZL 2,293,294  | 10,931                         | SZL 2,254,519  |
| Nevirapine 10 mg/ml oral suspension, 25 ml  | 22.00            | 0                             | SZL 0          | 0                                  | SZL 0          | 0                                 | SZL 0          | 4,200                          | SZL 92,400     |
| Ritonavir 100 mg [Norvir] Cool 84 capsules  | 62.19            | 40                            | SZL 2,488      | 200                                | SZL 12,438     | 120                               | SZL 7,463      | 120                            | SZL 7,463      |
| Saquinavir 200 mg [Invirase] 270 capsules   | 755.67           | 112                           | SZL 84,635     | 140                                | SZL 105,794    | 56                                | SZL 42,318     | 56                             | SZL 42,318     |
| Stavudine 30 mg 60 capsules   | 19.50            | 2,458                         | SZL 47,931     | 2,146                              | SZL 41,847     | 1,818                             | SZL 35,451     | 2,174                          | SZL 42,393     |
| Tenofovir 300 mg 30 tablets   | 39.68            | 3,913                         | SZL 155,268    | 4,193                              | SZL 166,378    | 4,511                             | SZL 178,996    | 4,126                          | SZL 163,720    |
| Tenofovir + lamivudine + nevirapine 300+300 + 200 mg blister co-pack of 30 + 60 tablets | 83.60            | 0                             | SZL 0          | 0                                  | SZL 0          | 11,045                            | SZL 923,362    | 25,004                         | SZL 2,090,334  |
| Tenofovir + lamivudine 300 + 300 mg 30 tablets  | 45.46            | 3,840                         | SZL 174,566    | 6,432                              | SZL 292,399    | 6,192                             | SZL 281,488    | 8,928                          | SZL 405,867    |
| Vinblastine injection mg/ml, 10 ml vial   | 240.00           | 0                             | SZL 0          | 168                                | SZL 40,320     | 84                                | SZL 20,160     | 34                             | SZL 8,160      |
| Vincristine injection 2 mg/2 ml, 2 ml vial  | 80.50            | 628                           | SZL 50,554     | 0                                  | SZL 0          | 942                               | SZL 75,831     | 471                            | SZL 37,916     |
| Subtotal by quarter for year I  |                  |                               | SZL 23,622,111 |                                    | SZL 43,545,387 |                                   | SZL 44,542,990 |                                | SZL 59,318,795 |

Note: USD 1 = SZL 10.50 was considered at the time of developing this report.

Table 25 shows detailed HIV and AIDS commodity procurement requirements by quantity, value, and delivery date for year II (April 2015 through March 2016). In summary, the total HIV and AIDS commodity procurement requirements for year II was estimated to be SZL 215,290,298 (approximately USD 20,523,384).



*Quantification Assumptions and Outputs*

**Table 25. HIV and AIDS Commodity Supply and Procurement Requirements Plan by Quantity, Date of Delivery, and Value for Year II (April 2015 through March 2016)**

| Product Description   | Unit Price (SZL) | Q1<br>June 2015 |                | Q2<br>September 2015 |                | Q3<br>December 2015 |                | Q4<br>March 2016 |                |
|---|------------------|-----------------|----------------|----------------------|----------------|---------------------|----------------|------------------|----------------|
|   |                  | Qty             | Cost           | Qty                  | Cost           | Qty                 | Cost           | Qty              | Cost           |
| Abacavir 60 mg scored 60 tablets  | 79.90            | 1,080           | SZL 86,292     | 1,296                | SZL 103,550    | 1,296               | SZL 103,550    | 1,296            | SZL 103,550    |
| Abacavir + lamivudine 60+30 mg 60 tablets                               | 41.25            | 27,088          | SZL 1,117,380  | 29,410               | SZL 1,213,163  | 31,675              | SZL 1,306,594  | 31,371           | SZL 1,294,054  |
| Abacavir + lamivudine 600+300 mg scored 30 tablets                      | 13.52            | 11,970          | SZL 161,834    | 12,330               | SZL 166,702    | 12,870              | SZL 174,002    | 12,960           | SZL 175,219    |
| Atazanavir + ritonavir 300+100 mg 30 tablets                            | 25.00            | 10,458          | SZL 261,450    | 11,278               | SZL 281,950    | 12,099              | SZL 302,475    | 12,181           | SZL 304,525    |
| Bleomycin injection 15 units vial                                       | 292.00           | 618             | SZL 180,456    | 618                  | SZL 180,456    | 618                 | SZL 180,456    | 618              | SZL 180,456    |
| Co-trimoxazole 120 mg, 100 tablets                                      | 8.40             | 15,591          | SZL 130,964    | 15,591               | SZL 130,964    | 15,591              | SZL 130,964    | 15,591           | SZL 130,964    |
| Co-trimoxazole 480 mg, 1,000 tablets                                    | 56.07            | 1,263           | SZL 70,816     | 1,263                | SZL 70,816     | 1,263               | SZL 70,816     | 1,263            | SZL 70,816     |
| Co-trimoxazole 960 mg, 1,000 tablets                                    | 199.00           | 14,121          | SZL 2,810,079  | 14,121               | SZL 2,810,079  | 14,121              | SZL 2,810,079  | 14,121           | SZL 2,810,079  |
| Dapsone tablets 100 mg, 100 tablets                                     | 150.00           | 0               | SZL 0          | 0                    | SZL 0          | 0                   | SZL 0          | 0                | SZL 0          |
| Didanosine 400 mg, 30 capsules  | 181.92           | 93              | SZL 16,919     | 216                  | SZL 39,295     | 207                 | SZL 37,657     | 221              | SZL 40,204     |
| Doxorubicin (premixed) injection 50 mg/ml, 2.5 ml                       | 325.00           | 426             | SZL 138,450    | 426                  | SZL 138,450    | 426                 | SZL 138,450    | 852              | SZL 276,900    |
| Efavirenz 200 mg 90 capsules  | 75.25            | 6,280           | SZL 472,570    | 6,680                | SZL 502,670    | 7,160               | SZL 538,790    | 7,080            | SZL 532,770    |
| Efavirenz 600 mg 30 tablets   | 32.22            | 62,640          | SZL 2,018,261  | 65,520               | SZL 2,111,054  | 68,352              | SZL 2,202,301  | 68,064           | SZL 2,193,022  |
| Efavirenz + lamivudine + tenofovir 600+300+300 mg 30 tablets            | 109.35           | 273,600         | SZL 29,918,160 | 296,010              | SZL 32,368,694 | 318,240             | SZL 34,799,544 | 315,540          | SZL 34,504,299 |
| Indinavir 400 mg 180 capsules   | 610.50           | 0               | SZL 0          | 24                   | SZL 14,652     | 0                   | SZL 0          | 0                | SZL 0          |
| Isoniazid 300 mg, 100 tablets   | 32.90            | 0               | SZL 0          | 0                    | SZL 0          | 7,440               | SZL 244,776    | 5,601            | SZL 184,273    |
| Lamivudine + stavudine 60/12 mg dispersible 60 tablets                  | 23.10            | 0               | SZL 0          | 0                    | SZL 0          | 0                   | SZL 0          | 0                | SZL 0          |
| Lamivudine + stavudine + nevirapine 150/30/200 mg 60 tablets            | 43.57            | 4,140           | SZL 180,380    | 4,230                | SZL 184,301    | 4,140               | SZL 180,380    | 4,140            | SZL 180,380    |
| Lamivudine + stavudine + nevirapine 60+12+100 mg dispersible 60 tablets | 61.40            | 0               | SZL 0          | 3,975                | SZL 244,065    | 5,156               | SZL 316,578    | 5,170            | SZL 317,438    |
| Lamivudine + zidovudine 150+300 mg 60 tablets                           | 61.51            | 64,740          | SZL 3,982,157  | 67,740               | SZL 4,166,687  | 70,740              | SZL 4,351,217  | 70,440           | SZL 4,332,764  |
| Lamivudine + zidovudine 30+60 mg 60 tablets                             | 19.69            | 0               | SZL 0          | 0                    | SZL 0          | 0                   | SZL 0          | 0                | SZL 0          |
| Lamivudine + zidovudine + nevirapine 150+300+200 mg 60 tablets          | 73.01            | 74,208          | SZL 5,417,926  | 73,104               | SZL 5,337,323  | 72,000              | SZL 5,256,720  | 72,240           | SZL 5,274,242  |
| Lamivudine + zidovudine + nevirapine 30+60+50 mg dispersible 60 tablets | 36.55            | 0               | SZL 0          | 0                    | SZL 0          | 0                   | SZL 0          | 0                | SZL 0          |

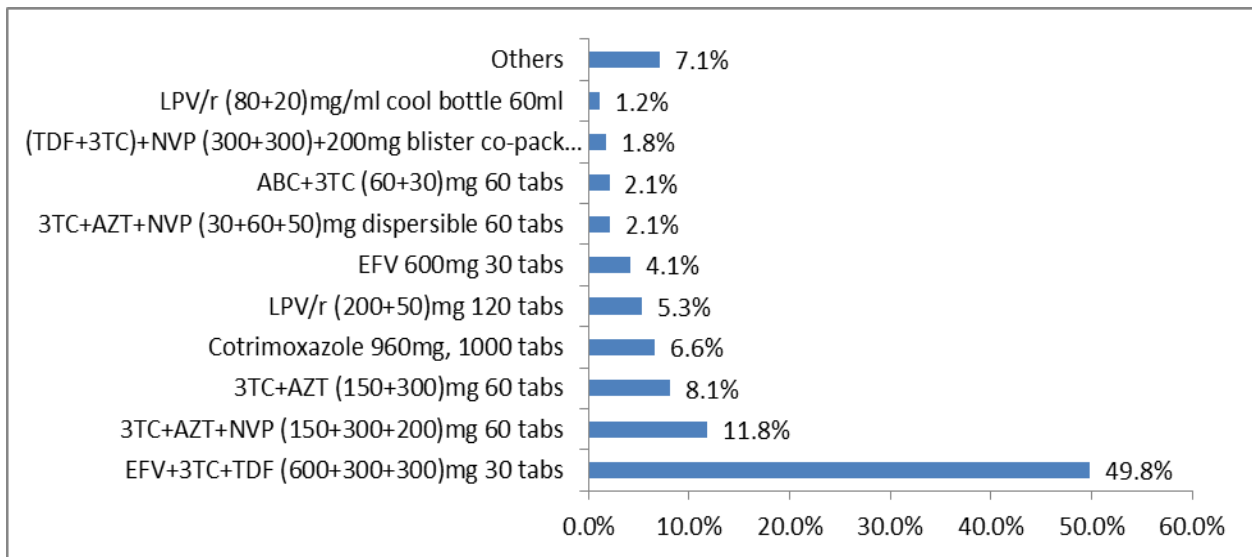
*Quantification of HIV and AIDS Commodities for April 2014 through March 2016*

| Product Description   | Unit Price (SZL) | Q1<br>June 2015 |                | Q2<br>September 2015 |                | Q3<br>December 2015 |                | Q4<br>March 2016 |                |
|---|------------------|-----------------|----------------|----------------------|----------------|---------------------|----------------|------------------|----------------|
|   |                  | Qty             | Cost           | Qty                  | Cost           | Qty                 | Cost           | Qty              | Cost           |
| Lopinavir + ritonavir 80+20 mg/ml [Kaletra] oral suspension cool bottle 60 ml         | 35.94            | 15,130          | SZL 543,772    | 16,210               | SZL 582,587    | 17,280              | SZL 621,043    | 17,150           | SZL 616,371    |
| Lopinavir + ritonavir 100+25 mg 120 tablets   | 52.87            | 0               | SZL 0          | 0                    | SZL 0          | 0                   | SZL 0          | 0                | SZL 0          |
| Lopinavir + ritonavir 200+50 mg 120 tablets   | 206.25           | 0               | SZL 0          | 0                    | SZL 0          | 0                   | SZL 0          | 0                | SZL 0          |
| Nevirapine 10 mg/ml oral suspension, 25 ml  | 22.00            | 6,230           | SZL 137,060    | 6,230                | SZL 137,060    | 6,230               | SZL 137,060    | 6,230            | SZL 137,060    |
| Ritonavir 100 mg [Norvir] cool 84 capsules  | 62.19            | 120             | SZL 7,463      | 160                  | SZL 9,950      | 80                  | SZL 4,975      | 160              | SZL 9,950      |
| Saquinavir 200 mg [Invirase] 270 capsules   | 755.67           | 56              | SZL 42,318     | 56                   | SZL 42,318     | 56                  | SZL 42,318     | 56               | SZL 42,318     |
| Stavudine 30 mg 60 capsules   | 19.50            | 3,168           | SZL 61,776     | 3,312                | SZL 64,584     | 3,312               | SZL 64,584     | 3,312            | SZL 64,584     |
| Tenofovir 300 mg 30 tablets   | 39.68            | 0               | SZL 0          | 0                    | SZL 0          | 0                   | SZL 0          | 0                | SZL 0          |
| Tenofovir + lamivudine + nevirapine 300+300+200 mg blister co-pack of 30 + 60 tablets | 83.60            | 20,561          | SZL 1,718,900  | 21,250               | SZL 1,776,500  | 21,931              | SZL 1,833,432  | 21,863           | SZL 1,827,747  |
| Tenofovir + lamivudine 300+300 mg 30 tablets  | 45.46            | 7,632           | SZL 346,951    | 7,968                | SZL 362,225    | 8,304               | SZL 377,500    | 8,304            | SZL 377,500    |
| Vinblastine injection mg/ml, 10 ml vial   | 240.00           | 124             | SZL 29,760     | 84                   | SZL 20,160     | 84                  | SZL 20,160     | 168              | SZL 40,320     |
| Vincristine injection 2 mg/2 ml, 2 ml vial  | 80.50            | 0               | SZL 0          | 421                  | SZL 33,891     | 471                 | SZL 37,916     | 471              | SZL 37,916     |
| Subtotal by quarter for year II   |                  |                 | SZL 49,852,094 |                      | SZL 53,094,146 |                     | SZL 56,284,337 |                  | SZL 56,059,721 |

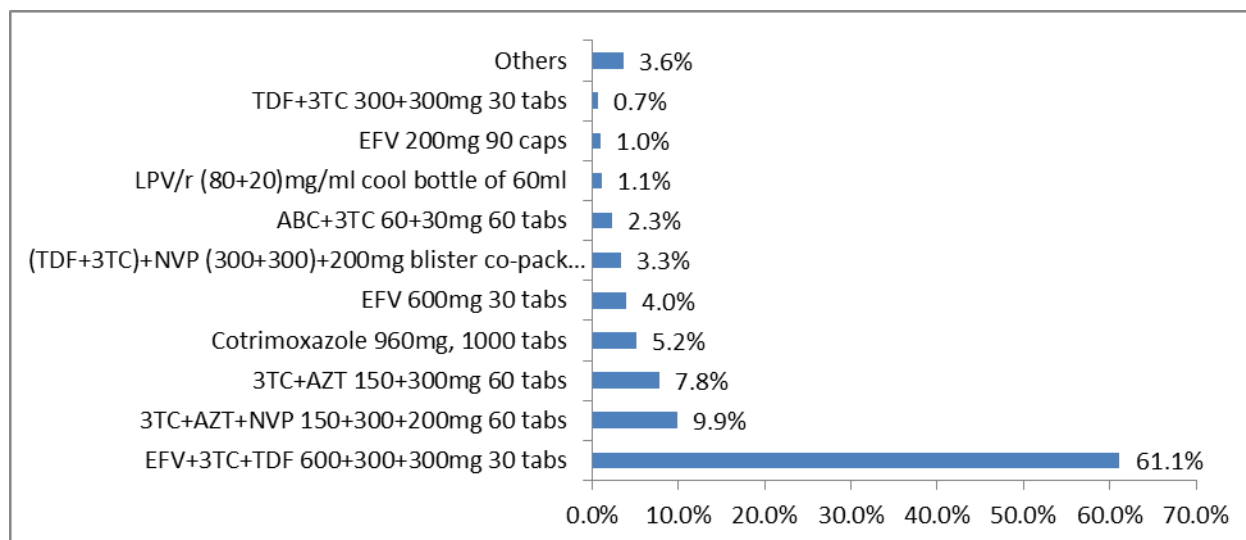
Note: USD 1 = SZL 10.50 was considered at the time of developing this report.

## DISCUSSION AND ANALYSIS

Of the total forecast amount of approximately SZL 386.3 million (approximately USD 36.8 million) required for the period from April 2014 through March 2016, the requirement for adult first-line ARVs accounts for over two-thirds (69.8%), and the requirements for all pediatric and for PMTCT medicines account for 8.2% and 11.7%, respectively. A comparison of procurement cost of the different products showed that TDF+3TC+EFV 300+300+600 mg (30 tablets) accounts for almost 50% of the procurement budget followed by AZT+3TC+NVP 300+150+200 mg (60 tablets) at 11.8%. Budget requirements and the patient utilization rate for these two products are on the rise due to the new WHO guideline implementation. Figures 6 and 7 show the top 10 products consist of high proportion of budgets for years I and II.



**Figure 6. Procurement cost proportion for top 10 HIV and AIDS commodities in year I (April 2014 through March 2015)**

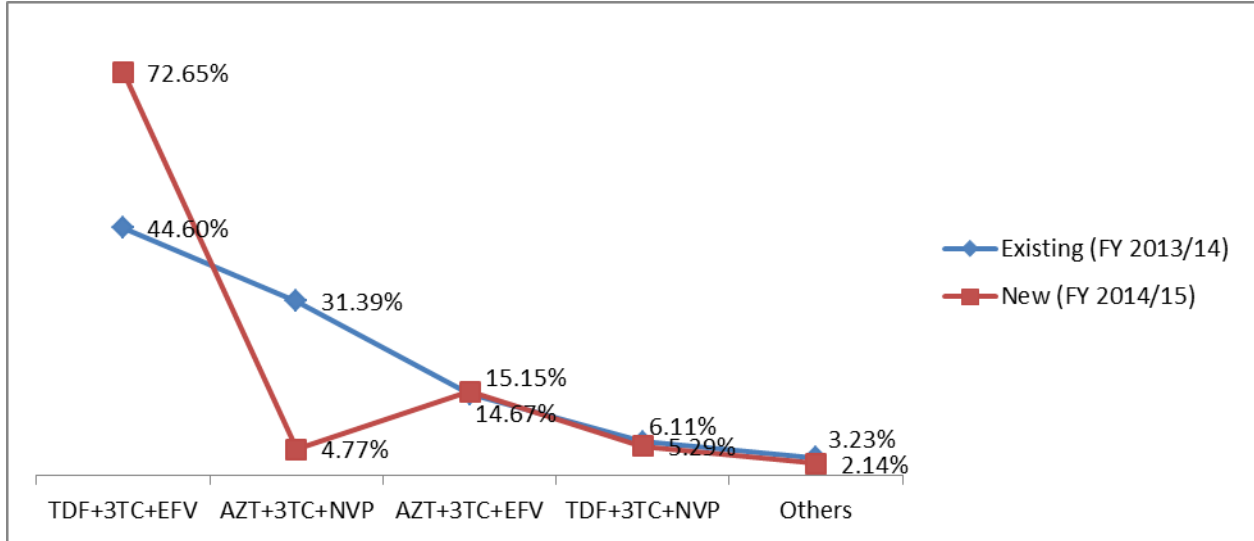


**Figure 7. Procurement cost proportion for top 10 HIV and AIDS commodities in year II (April 2015 through March 2016)**

### **Adult ARVs**

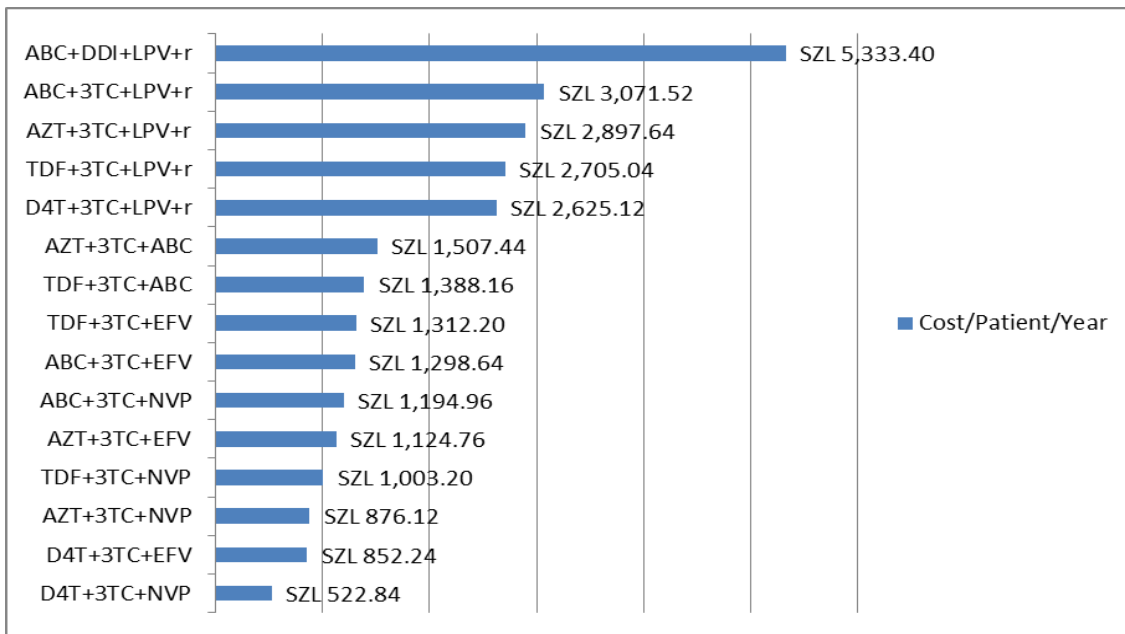
TDF+3TC+EFV is currently being used by 44.60% of existing and 72.65% of newly initiating patients. The new preferred first-line regimen that was used for the forecast showed a shift toward more patients on TDF and fewer on AZT. Similarly, a shift is also expected for the non-nucleoside reverse transcriptase inhibitor for the forecast period from NVP to EFV due to issues relating to effectiveness, adherence, and adverse effects.

Figure 8 illustrates the trend of the top four adult first-line regimens proportions between FY 2013–14 and FY 2014–15. This trend also indicates that the country is moving toward implementing the WHO guideline by initiating new patients on a TDF-based regimen. Therefore, good management of selected regimens and their respective formulations from supplier to facility level is critical to ensuring continuous availability and successful ART program implementation.



**Figure 8. Forecast trend in first-line regimens for existing and new adult patients**

In addition to the clinical advantages (i.e., effectiveness, minimal adverse effects, and adherence) use of TDF-based regimens, especially the fixed-dose combination TDF+3TC+EFV, has logistical and cost advantages because it is a single-tablet formulation. It is currently cheaper to buy compared to AZT- and ABC-based regimens (see below for cost comparison of regimens and formulations), and it requires less storage space. Figure 9 illustrates cost comparison of most common first- and second-line regimens per patient per year.



**Figure 9. Comparison of costs per regimen per patient per year**

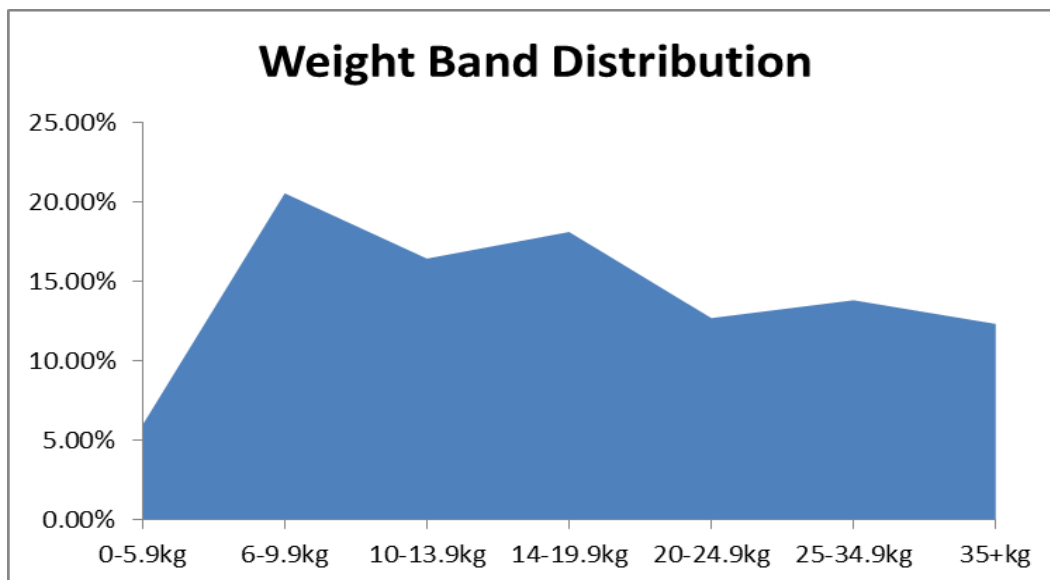
ABC+DDI+LPV/r is the most expensive second-line regimen, and only 2.62% of existing second-line adult patients are on it. The most prescribed second-line regimen, however, ABC+3TC+LPV/r, which comprises 39.00% of existing adult second-line patients, stands to be the second most expensive regimen per patient per year.

The least expensive is a first-line regimen D4T+3TC+NVP, which is being phased out because of D4T toxicity and comprises only 1% of existing adult first-line patients. The difference between the most expensive and least expensive regimen is SZL 4,810.56 per patient per year, but the comparison of cost within first-line regimens shows that the most preferred regimen, TDF+3TC+EFV, which 44.60% of existing and 72.65% of newly initiated patients take, stands second next to AZT+3TC+ABC, which comprises only 0.02% of existing and 0.03% of new adult first-line patients. The second most consumed regimen, AZT+3TC+NVP costs SZL 876.12 per patient per year, which is relatively cheaper.

Generally, 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 patient care and cost points of view, it is important to strengthen adherence of patients to ARV medication to minimize treatment failure and shifts to second-line regimens.

### **Pediatric ARVs**

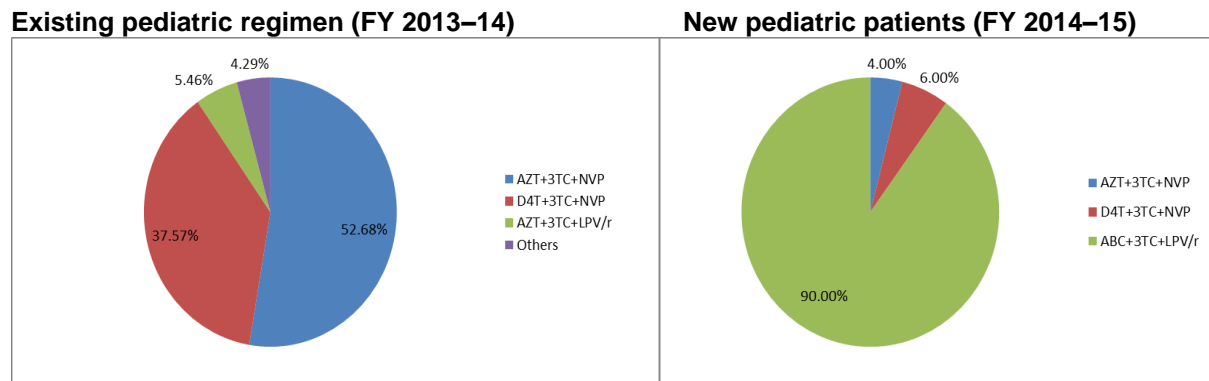
Pediatric regimens, formulations, and dosing are usually related to the weight distribution and body surface area due to issues related to the pharmacokinetic considerations of different ARVs. Therefore, for this forecasting exercise, the team has used the weight distribution for regimen, formulation, and dosing selection. Figure 10 illustrates the proportion of pediatric weight distribution used for the forecast.



**Figure 10. Weight band distribution of pediatric patients in Swaziland**

The current Swaziland ART guideline (2010) recommends AZT+3TC+NVP and D4T+3TC+NVP as the preferred regimens for initiating pediatric patients, so 52.68%, 37.57%, and 5.46% existing pediatric patients are on AZT+3TC+NVP, D4T+3TC+NVP, and AZT+3TC+LPV/r, respectively, in weight band 0–13.9 kg. These guidelines will be followed until June 2014 and will be replaced, in July 2014, by the new ART guideline.

According to the new, revised ART guideline of Swaziland and WHO recommendation, an LPV/r-based regimen should be used as first-line ART for all HIV-infected children younger than three years (36 months) of age, regardless of non-nucleoside reverse transcriptase inhibitor 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 new guideline starting in July 2014, new pediatric ART-initiating patients will be put on ABC+3TC+LPV/r (90%), D4T+3TC+NVP (6%), and AZT+3TC+NVP (4%). Figure 11 illustrates the proportion of pediatric regimen from FY 2013–14 to FY 2014–15.



**Figure 11. Most commonly prescribed regimens for existing and new pediatric patients**

For adolescents infected with HIV (10 to 19 years old) weighing 35 kg or more the nucleoside reverse transcriptase inhibitor backbone for an ART regimen was aligned with that of adult’s regimen.

## CHALLENGES AND RECOMMENDATIONS

### Challenges

- Inadequate human resources, especially the lack of pharmacy personnel at the facility level, and a relatively weak health system
- Relatively higher ART attrition rate compared to other African countries
- Patient data inaccuracy and incompleteness at ART sites
- Relatively poor inventory management at ART sites
- Longer lead time in allocating and releasing funds for procurement
- Inadequate funding and delayed disbursement
- Delayed payment processes, which hinder on-time, regular delivery of HIV commodities
- Poor reporting and communication between ART-initiating and refill clinics in terms of stock reporting and ordering
- Poor performance from some suppliers

### Recommendations

- Strengthen in-country pharmacy personnel training to fill gaps
- Strengthen ART patient-retention strategy
- 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 an improved process of payments of suppliers
- Build the capacity of regional clinical supervisors to bridge the communication between ART-initiating facilities and refill clinics on stock reporting and ordering
- Put a suppliers' performance management system in place and engage suppliers regularly.



## ANNEX 1. AGENDA FOR QUANTIFICATION CONSULTATIVE MEETING



Swaziland Ministry of Health National HIV Commodity Quantification

Consultative Meeting

November 5, 2013 Mountain Inn

### Objectives

- To review and validate the available data, assumptions, and methodologies
- To build additional assumptions based on—
  - New guidelines and changes
  - Trends and targets
  - Future programmatic goals
- To reach a consensus and draw agreed-upon assumptions, data, methodologies, and scenarios for the current quantification
- To draw up recommendations

| Time                    | Session   | Facilitators              |
|-------------------------|---|---------------------------|
| 8:30 a.m. – 8:45 a.m.   | Registration and self-introductions   | All                       |
| 8:45 a.m. – 9:00 a.m.   | Welcome and objectives of the meeting   | Tibuyile, S               |
| 9:00 a.m. – 10:00 a.m.  | National ART LMIS snapshot  | Mavis, M.                 |
| 10:00 a.m. – 10:20 a.m. | <b>Coffee Break</b>   |                           |
| 10:20 a.m. – 11:20 a.m. | Data presentation on ART, PMTCT, opportunistic infections, and IPT  | Tibuyile, S.              |
| 11:20 a.m. – 12:45 p.m. | Discussion on data presentations, assumptions and decision making   | Gashaw, S.<br>Wenzile, M. |
| 12:45 p.m. – 1:00 p.m.  | Next steps and end of workshop <ul style="list-style-type: none"> <li>• Forecasting exercise</li> <li>• Submission of budget</li> <li>• Dissemination</li> <li>• Tender advertisement and adjudication</li> </ul> | Tibuyile, S.              |
| 1:00 p.m.               | <b>Lunch and departure</b>  |                           |

## ANNEX 2. INVITATION LETTER QUANTIFICATION CONSULTATIVE MEETING

**Telegrams:**  
**Telex:**  
**Telephone: (+268 404 2431)**  
**Fax: (+268 404 2092)**



MINISTRY OF HEALTH  
P.O. BOX 5  
MBABANE  
SWAZILAND

### THE KINGDOM OF SWAZILAND

24 October, 2013

To: See Distribution List

#### RE: HIV COMMODITIES QUANTIFICATION CONSULTATIVE WORKSHOP

Dear Madam/Sir,

The National ART Program and the Central Medical Store are coordinating the National Annual HIV Commodities Forecasting Exercise with the support and technical input of partners. The Ministry of Health views such a coordinated and integrated exercise as the most appropriate response to the scaling-up of ART and PMTCT service delivery in line with the planned implementation of the recent changes in guidelines recommended by World Health Organization (WHO) and adopted/adopted by the country.

The period of the forecast is 2 years, from April 1 2014 to March 30, 2016 with 1 year supply plan (from April 1, 2014 to March 30, 2015). The scope of the forecast includes ARV medicines for ART and PMTCT, medicines for Opportunistic Infections (Cotrimoxazole, medicines for Kaposi Sarcoma), and INH for IPT. The result from the exercise will inform annual budgeting, tendering and procurement of HIV-care commodities.

The objective of the consultative workshop is to present relevant data for quantification, evaluate and validate them, entertain expert opinions, come up with probable assumptions, and agree on relevant data. Discussions will culminate in a summary of agreed and validated data, assumptions and recommendations for executing the forecast.

This consultative workshop will be held at **Mountain Inn on the 5<sup>th</sup> of November 2013 starting 8:30am** and will consist of a series of in-depth discussions among technical experts and working groups.

Considering the importance of this consultative workshop as a stepping stone for national quantification and supply planning for HIV programming, SNAP cordially requests your attendance to participate in the workshop and contribute to this important exercise.

Best Regards,

PP:

**Dr Velephi Okello**  
Senior Medical Officer  
ART Program



**ANNEX 3. LIST OF PARTICIPANTS FOR THE QUANTIFICATION CONSULTATIVE MEETING**

**MEETING ATTENDANCE FORM**

| #  | Name and Surname    | Organization | Cell number | Email address                           |
|----|---------------------|--------------|-------------|---|
| 1  | Wanzile Nkhimkhulu  | CHAI         | 76159247    | wmthimkhulu@clintonhealthaccess.org     |
| 2  | Tibuyile Sigudla    | CMS          | 76152843    | teeboo dee@yahoo.com                    |
| 3  | Mazmus Benews       | Baylor       | 78314177    | benews@bcm.edu                          |
| 4  | Mavis Magaya        | CMS          | 76852949    | mavisvilane@gmail.com                   |
| 5  | Duncan Kochelani    | Baylor       | 76029620    | dkochelani@baylorsternland.org.za       |
| 6  | Eric Muzany         | Baylor       | 76321741    | muzanyeric@yahoofr                      |
| 7  | NANATO YANO         | CHAI         | 78231497    | nanatoyano@clintonhealthaccess.org      |
| 8  | SIFISO SLAMINI      | MSH/SIAPS    | 76770075    | sdlamin@msl.org                         |
| 9  | CAROLINE MIDDLECOTE | CHAI         | 7800599     | cmiddlecote@clintonhealthaccess.org     |
| 10 | Bernhold Henschel   | RSF          | 076146678   | RSFCH-SWAZILAND-DIRECTOR@GENEVA.RSF.ORG |
| 11 | Lelia Dawson        | MSH AT7      | 76767857    | ledawson@yahoo.com                      |
| 12 | Graham Steffen      | MSH          | 76600835    | gshiffen@msl.org                        |
| 13 | AZIH Charles        | SNAP         | 7678171     | Fwonders.ciazih@gmail.com               |
| 14 | Thamba Manku        | EGPAF        | 76075932    | tmanku@pedaids.org                      |
| 15 | Ulric GC            | ICAP         | 7682855     | ulric@colimbi.edu                       |
| 16 | Kimberly Larkins    | MSF          | 7611849     | MSFCH-Nhlangu-pharmacy@geneva.msf.org   |
| 17 |                     |              |             |   |
| 18 |                     |              |             |   |
| 19 |                     |              |             |   |
| 20 |                     |              |             |   |