SIAPS Swaziland Final Report

February 2018
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About SIAPS

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

Recommended Citation

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Key Words

Antiretroviral Therapy, Regional Health Management Teams, Logistics Management Information System, Ministry of Health, National Strategic Plan, Supply Chain Management, Supportive Supervision and Mentoring, Standard Treatment Guidelines, Technical Working Group
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<th>DEFINITION</th>
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<tbody>
<tr>
<td>ADR</td>
<td>adverse drug reaction</td>
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<tr>
<td>AMR</td>
<td>antimicrobial resistance</td>
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<tr>
<td>ART</td>
<td>antiretroviral therapy</td>
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<td>ARV</td>
<td>antiretroviral</td>
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<tr>
<td>CMIS</td>
<td>client management information system</td>
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<td>CMS</td>
<td>Central Medical Stores</td>
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<tr>
<td>CTS</td>
<td>commodity tracking systems</td>
</tr>
<tr>
<td>EML</td>
<td>essential medicines list</td>
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<tr>
<td>LMIS</td>
<td>logistics management information system</td>
</tr>
<tr>
<td>MOH</td>
<td>Ministry of Health</td>
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<tr>
<td>MRA</td>
<td>Medicines Regulatory Authority</td>
</tr>
<tr>
<td>MSH</td>
<td>Management Sciences for Health</td>
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<tr>
<td>NERCHA</td>
<td>National Emergency Response Council to HIV/AIDS</td>
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<td>NTCP</td>
<td>National TB Control Program</td>
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<tr>
<td>PEPFAR</td>
<td>US President’s Emergency Plan For Aids Relief</td>
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<td>PViMS</td>
<td>Pharmacovigilance Information Management System</td>
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<tr>
<td>SANU</td>
<td>Southern Africa Nazarene University</td>
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<tr>
<td>SCTWG</td>
<td>Supply Chain Technical Working Group</td>
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<tr>
<td>SIAPS</td>
<td>Systems for Improved Access to Pharmaceuticals and Services</td>
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<tr>
<td>SNAP</td>
<td>Swaziland National AIDS Program</td>
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<tr>
<td>SOP</td>
<td>standard operating procedure</td>
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<tr>
<td>SPPRA</td>
<td>Swaziland Public Procurement Regulatory Authority</td>
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<tr>
<td>SPS</td>
<td>Strengthening Pharmaceutical Systems</td>
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<tr>
<td>SRH</td>
<td>sexual reproductive health</td>
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<td>SSM</td>
<td>supportive supervision and mentoring</td>
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<tr>
<td>STG</td>
<td>standard treatment guideline</td>
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<tr>
<td>TB</td>
<td>tuberculosis</td>
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<tr>
<td>UNFPA</td>
<td>United Nations Population Fund</td>
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<td>USAID</td>
<td>US Agency for International Development</td>
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<td>WHO</td>
<td>World Health Organization</td>
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EXECUTIVE SUMMARY

The Kingdom of Swaziland’s pharmaceutical services have limitations due to weak legislation and a shortage of pharmacy personnel at health facilities. Fewer than 10% of the country’s 287 health facilities have qualified pharmacy personnel. In addition, facilities in the country are often faced with a shortage of essential medicines. In the case of antiretrovirals (ARVs), this is due to a variety of factors, from the procurement system to the movement of medicines from the central warehouse to the service delivery points.

Responding to a request for support from the Kingdom of Swaziland Ministry of Health (MOH), the US Agency for International Development (USAID) Swaziland introduced the Strengthening Pharmaceuticals Systems (SPS) Program in 2007, followed by its successor, the Systems for Improved Access to Pharmaceuticals and Services (SIAPS), in 2011. The two programs aimed to address the gaps in the pharmaceutical and supply chain management system for HIV treatment and care services. SIAPS, initially a five-year program, was implemented by Management Sciences for Health (MSH) from September 22, 2011, to March 22, 2018. Since 2011, USAID Swaziland has supported the Government of the Kingdom of Swaziland MOH through this project, which has grown incrementally in response to the MOH’s identified priorities in the pharmaceutical sector. SIAPS Swaziland’s support to the MOH used a results-focused pharmaceutical systems strengthening approach to address gaps in the country’s health system with regard to addressing the HIV and tuberculosis (TB) pandemics.

The goal of SIAPS was to ensure the availability of quality pharmaceutical products and effective pharmaceutical services to achieve desired health outcomes. To achieve this wider goal, the program intended to strengthen the pharmaceutical sector by meeting the following four objectives:

- **Objective 1**: Pharmaceutical sector governance strengthened
- **Objective 2**: Capacity for pharmaceutical management and services increased and enhanced
- **Objective 3**: Information for decision making challenges in the pharmaceutical sector addressed
- **Objective 4**: Pharmaceutical products and services improved

SIAPS implementation in Swaziland was guided by national strategic policy documents, including the US Government and Government of the Kingdom of Swaziland Partnership Framework, National Multi-sectoral HIV and AIDS Response, National Health Sector Strategic Plan, and Pharmaceutical Sector Strategic Plan.

SIAPS contributed to the national goal of decentralizing HIV treatment services and to the scale up of HIV treatment to all people living with HIV. This was accomplished by improving ARV availability, strengthening pharmaceutical human resource capacity for HIV management, strengthening the laboratory supply chain for HIV diagnosis, improving pharmaceutical sector governance, improving patient safety, and supporting the logistics management information system. SIAPS also focused on improving metrics, monitoring and evaluation, capacitating local governments and organizations, and increasing country ownership in all its interventions.
BACKGROUND

Swaziland is a lower middle income country in Southern Africa. The country had an estimated population of 1,132,657 in 2016, with 37% under the age of 15.\(^1\) Approximately 77% of the population lives in rural areas. The country has experienced an upward movement of the health budget in the past few years, with approximately 13% of the national budget allocated to health in the 2013/14 fiscal year. The increase has also been due to the high commitment by government to address HIV and TB challenges. A large portion of this budget goes to the procurement of ARVs, TB medicines, and laboratory commodities.

HIV and AIDS remain one of the major public health and socio-economic challenges facing Swaziland. The HIV incidence among adults aged 15–49 years is estimated at 1.48%, with 0.99% among men and 1.99% among women in 2016.\(^2\) According to the Global TB Report of 2015, Swaziland has an estimated TB incidence of 9.3 (CI: 6.8–12.0) per 1,000 population, including HIV positive people, who face the double burden of HIV and TB co-infection. In 2015, the TB incidence among HIV patients was estimated to be 5.9 (CI: 4.2–7.9) per 1,000 people.\(^3\)

For the past six years, SIAPS has provided technical assistance to the MOH to intensify the responses in the fight against HIV/TB. The goal of the technical assistance has been to ensure the availability of quality pharmaceutical products and effective pharmaceutical services to achieve desired health outcomes. The Central Medical Stores (CMS) and the Swaziland Health Laboratory Service, which are the main entry points for all health products into the public health system, have received technical assistance in warehousing and distribution for HIV, TB, and family planning pharmaceutical products. The National TB Control Program (NTCP) and the Swaziland National AIDS Program (SNAP) have also been supported in annual quantification and quarterly supply planning to inform budget requirements for HIV/TB/sexual reproductive health (SRH) commodities. SIAPS worked directly with health facilities to promote good dispensing practice standards and patient safety. The MOH Procurement Unit has been supported in tendering, adjudication, and contract management. SIAPS worked with the Pharmacy Department in policy legislative reforms in the pharmaceutical sector. SIAPS also provided support to health facilities in medicines storage, dispensing, and reporting of adverse drug events. The Pharmacy Diploma and Certificate program was introduced at Southern Africa Nazarene University (SANU) with assistance from SIAPS, and 58 students were enrolled. Between 2014 and 2016, 50 students graduated with certificates and diplomas.

The country continues to face challenges of stock interruptions due to numerous factors. Swaziland relies on foreign suppliers for all its pharmaceutical products; any international market factor can quickly affect stock availability in the country.

The Government of Swaziland is working toward achieving the UNAIDS 90-90-90 goal by 2020.

\(^3\) Swaziland National TB Control Program. 2015. Annual Program Report
SIAPS was designed to reflect a dynamic relationship among the five health system strengthening building blocks with medical products overlaid, as shown below. The Swaziland program sought to address issues affecting medicines availability and rational use that may compromise the MOH’s plans to decentralize HIV and TB treatment and care programs.

**Figure 1. SIAPS pharmaceutical system strengthening framework**

The SIAPS technical approach emphasizes Global Health Initiative principles, particularly country ownership, health system strengthening, developing capacity of local governments and organizations, sustainability, and improving metrics and monitoring and evaluation. SIAPS worked to support the country’s interventions to improve access to and rational use of pharmaceuticals and laboratory commodities for HIV and TB by further strengthening the related health system building blocks. The interventions were guided by USAID/US President’s Emergency Plan for AIDS Relief (PEPFAR) strategy, which seeks to control the HIV and TB epidemics in the most efficient way; improve on current gains; scale up integrated clinical activities rapidly; and use evidence-based interventions, accountability, quality, and cost effectiveness. SIAPS worked with local partners to address site-level challenges to medicines availability and use. Direct technical assistance was provided at the national/central level and at selected high patient volume HIV treatment facilities.
The goal of the SIAPS Swaziland program was to ensure the availability of quality pharmaceutical products and effective pharmaceutical services to achieve desired health outcomes for HIV/TB care and treatment.

Figure 2. SIAPS Swaziland result framework
FUNDING

The SIAPS project in Swaziland was funded entirely by PEPFAR. Table 1 provides the funding levels for the six years of implementation.

Table 1. Funding Level by Program Year

<table>
<thead>
<tr>
<th>Fiscal year</th>
<th>Amount (USD)</th>
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<tbody>
<tr>
<td>PY 1</td>
<td>1,300,000</td>
</tr>
<tr>
<td>PY 2</td>
<td>1,518,100</td>
</tr>
<tr>
<td>PY 3</td>
<td>1,500,000</td>
</tr>
<tr>
<td>PY 4</td>
<td>1,181,134</td>
</tr>
<tr>
<td>FY 5</td>
<td>958,000</td>
</tr>
<tr>
<td>PY 6</td>
<td>1,800,000</td>
</tr>
<tr>
<td>TOTAL FUNDING</td>
<td>8,257,234</td>
</tr>
</tbody>
</table>
SIAPS provided technical assistance throughout its six years of project implementation to the MOH and to 144 ARV treatment sites, including all 8 hospitals, 5 health centers, and 15 laboratories in the country’s 4 regional administration areas, the CMS, and the National Laboratory Warehouse. SIAPS provided technical assistance by assigning pharmacy advisors to the regional health management teams in the Hhohho, Manzini, Lubombo, and Shiselweni regions. Technical assistance was provided to SANU for the implementation of the pharmacy training program.

SIAPS worked closely with the government of the Kingdom of Swaziland, local counterparts, development partners, and training institutions to implement the pharmaceutical systems strengthening strategies.

The following are the main interventions implemented in the six years of the program.

**Figure 3. SIAPS-supported sites in Swaziland**

### Governance

The MOH Pharmaceutical Sector Strategic Plan was developed in the first year of SIAPS, and this plan served to guide the six years of activities SIAPS in Swaziland. In Swaziland, the Pharmacy Act of 1929 has been the only law that governs the practice of pharmacy and has few provisions on the control of medicines. This presented a gap that SIAPS worked to address in an effort to ensure improved medicine therapeutic effectiveness of ARVs and TB commodities. Throughout the program, SIAPS has advocated for and provided technical assistance to the MOH to facilitate enactment of two bills: the Medicines and Related Substances Control Bill no. 7 of 2014, enacted in November 2016, and the Pharmacy Bill no. 8 of 2014. The Pharmacy Bill contains sections that deal with the training and practice of pharmacy. The Medicines and Related Substances Control Bill established the Medicines Regulatory Authority (MRA) to
govern medicine production, availability, and use in Swaziland. SIAPS worked with a diverse mix of stakeholders, including community members, politicians, and health and legal professionals, in the drafting the Pharmacy Bill (which will repeal the Pharmacy Act of 1929), and the Medicines and Related Substances Control Bill. Inter-ministerial (MOH, Ministry of Justice, Ministry of Agriculture, and Ministry of Labor) engagements ensured that all government institutions affected by the bills had an opportunity to provide input.

The Government of Swaziland enacted the Public Procurement Act of 2011, which governs procurement activities in the public sector. The regulations of this Act were drafted in 2015 and published by the Swaziland Public Procurement Regulatory Agency (SPPRA), an independent agency established by the Act to govern procurement systems in the country. The Act and its regulations have yet to be customized for pharmaceuticals, which require different procurement options than do other health sector goods. SIAPS partnered with the SPPRA and developed a procurement procedure manual, which will be a guiding document for the procurement of pharmaceuticals in the health sector.

Pharmaceutical Preservice Training

With assistance from SIAPS, pharmaceutical human resource interventions were implemented to improve the availability and skills of health workers responsible for medicine management and pharmaceutical services. SIAPS supported the design of two preservice pharmacy training programs—a two-year certificate program in pharmacy and a three-year academic diploma program—that were developed in collaboration with local universities, the MOH, the Swaziland Pharmacy Association, and the Swaziland Medical and Dental Council. This was the first pharmacy training program to be offered in Swaziland and was seen as a long-term sustainable solution to increasing the number of pharmacy personnel in the country. The training program will ensure the availability of a continuous pool of certified pharmacy personnel to manage and dispense pharmaceuticals according to international standards.

Patient Safety

SIAPS interventions to improve patient safety were designed to address the challenges of adverse drug events and promote adherence to HIV/TB treatment. A framework to guide the implementation of active and passive surveillance was designed and approved by SNAPS, the NTCP, and the Office of the Chief Pharmacist (currently Office of the Deputy Director for Pharmaceutical Services). Adverse event reporting systems and an electronic database for tracking adverse events were designed and providers were trained. The data from adverse events are used to inform decision on treatment and policy decisions.
**Key Interventions**

### Product Availability and Logistics Management Information System

SIAPS supported the MOH to improve product availability at the central and facility levels. The intervention aimed at ensuring that appropriate information is available to inform the procurement and distribution of life-saving medicines to all facilities providing HIV treatment and care.

The program introduced a web-based logistics management information system (LMIS) that is used for reporting and ordering of HIV, TB, SRH, malaria, and laboratory commodities (Figure 4). Facilities were supplied with stock cards to record all transactions and stock movements. A job aid was developed to advise facilities on good storage practice of medicines and laboratory commodities. SIAPS assisted in the establishment of a supply chain technical working group and national quantification committee and trained pharmacists at central warehouses and selected hospitals on medicine quantification principles.

![Figure 4. Web-based LMIS dashboard](image)

The training included quantification processes, tools, data analysis, and quantification of health commodities. Data collected from the web-based LMIS and stock cards have been used to forecast commodity requirements for the national HIV and TB program.

### Supportive Supervision and Mentoring

A lack of qualified pharmaceutical professionals is a major challenge facing the health sector in Swaziland. The national strategy to achieve zero new HIV infection by 2022 requires the availability of skilled health personnel, including a pharmacy cadre, to ensure that products are available and used appropriately for those clients in need. The majority of health facilities have nursing assistants and other auxiliary health workers who are responsible for medicine management and dispensing. The officers have little or no background knowledge of pharmacy services or stock management practices. SIAPS championed the supportive supervision and mentorship activity at high patient volume antiretroviral therapy (ART) facilities throughout the country. The supportive supervision involved an assessment of the pharmacy personnel’s capacity to manage pharmaceuticals, identified areas for improvement, and developed interventions to strengthen the system and build capacity.
ACHIEVEMENTS

Table 2. Key Achievements by Result Area

<table>
<thead>
<tr>
<th>Governance</th>
<th></th>
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<tbody>
<tr>
<td>Enactment of Medicines and Related Substances Bill</td>
<td>Draft Pharmacy Bill in Parliament</td>
</tr>
<tr>
<td>Launch of the Supply Chain Technical Working Group (SCTWG)</td>
<td>Development and implementation of the five-year SPSP</td>
</tr>
<tr>
<td>Development of five-year antimicrobial resistance (AMR) containment strategy</td>
<td>Five coordination committees</td>
</tr>
<tr>
<td>Total of 16 guidelines, SOPs, and strategic documents</td>
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<table>
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<tr>
<th>Capacity building</th>
<th></th>
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<tbody>
<tr>
<td>Preservice training of 3,982 health workers</td>
<td>Curriculum developed for in-service training</td>
</tr>
<tr>
<td>74 pharmacy students enrolled (50 graduated)</td>
<td>Routine supportive supervision and mentorship institutionalize in MOH/CMS</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Information systems</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Data processed and tools standardized</td>
<td>LMIS for HIV, TB, SRH, lab, and malaria</td>
</tr>
<tr>
<td>Systematic data quality monitoring and audit</td>
<td>Data dissemination with facilities</td>
</tr>
<tr>
<td>Linking data to decisions</td>
<td>Innovation using web-based technologies and desktop applications</td>
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<table>
<thead>
<tr>
<th>Product availability</th>
<th></th>
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<tbody>
<tr>
<td>Integrating program commodities into one supply chain system</td>
<td>Establishing quantification systems and linking to procurement (annual long-term forecasting and regular supply planning)</td>
</tr>
<tr>
<td>Saving resources (approximately USD 6.2 million)</td>
<td>Avoiding eminent stock-outs</td>
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</table>

<table>
<thead>
<tr>
<th>Pharmaceutical services</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Rational medicine use through standard treatment guideline/essential medicines list (STG/EML) implementation</td>
<td>Establishment of PTCs</td>
</tr>
<tr>
<td>Medicines Safety Monitoring System</td>
<td>AMR containment five-year strategy</td>
</tr>
<tr>
<td>Launch of the NEMC (formal meeting conducted)</td>
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</tr>
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</table>

Governance

At the beginning of SIAPS Swaziland, a strategic plan was developed that formed the basis for implementation in the country. In developing the Pharmaceutical Sector Strategic Plan, SIAPS undertook a fully consultative process to ensure that input from all local stakeholders was sought and incorporated in the plan. The plan was led by the MOH, with technical assistance from SIAPS and the World Health Organization (WHO)-Afro Swaziland country office. The health sector stakeholders included other government ministries, the United Nations Population Fund (UNFPA), development and implementing partners, the private sector, civil society organizations, and members of the public. The plan was designed around the pharmaceutical systems strengthening framework and the SIAPS implementation strategy.

The Pharmacy and Medicines and Related Substances Control bills were finalized, published in the government gazette, and tabled before both Houses of Parliament in May 2014. Work on these two
bills included support to the office of the chief pharmacist in conducting stakeholder input hearings and workshops for parliamentary health portfolio committee members on the content and importance of these two bills. The bills incorporated and were designed to align with the New Partnership for Africa's Development Model Law. Consequently, the Medicines and Related Substances Control Act 9 of 2016 was enacted, and Pharmacy Bill no. 8 of 2014 was commissioned for a joint House sitting following non-concurrence between the two House of Parliament upon its approval.

**Pharmaceutical Preservice Training**

SIAPS collaborated with SANU to establish the first preservice training program for pharmacy personnel in Swaziland. The certificate in pharmacy and diploma in pharmacy curricula were developed with participation from local stakeholders, including government and the private pharmacy sector. The curricula were approved by the SANU council. SIAPS provided teaching material and reference books for the pharmacy program. An interim head of department and senior lecturer were engaged to run the program for the first two years. Fifteen students graduated from the preservice certificate in pharmacy program in October 2014. Cumulatively, 105 students have been enrolled in the pharmacy training program since its inception in 2012. From 2012 to September 2015, eight students (two males, six females) graduated with a diploma in pharmacy, while six students (two males, four females) graduated with a certificate in pharmacy. To date, 21 students have graduated with a certificate in pharmacy and eight have graduated with a diploma in pharmacy.

![Figure 5. Number of health workers trained in pharmaceutical management](image)

A milestone toward realizing ownership and sustainability of the pharmacy diploma program in 2014 was that students started receiving government scholarships and SANU recruited staff to replace the SIAPS-supported faculty. SIAPS also played a role in the on-boarding exercise for the new heads of departments and lectures for the program. Regular guidance was provided to the Swaziland Christian Medical University, the Good Shepard College of Nursing, and the University.
of Swaziland in their plans to offer a bachelor of pharmacy program in the near future. Through SIAPS, 50 pharmacy personnel graduated from the local university (Southern Africa Nazarene University) and are currently working in the public and private pharmaceutical sectors.

**Patient Safety**

SIAPS supported establishing active surveillance in seven facilities providing HIV/TB treatment and care services. Health care workers at these facilities were trained on the active surveillance system, and an electronic database was introduced to capture all surveillance system data. A passive adverse event monitoring system was implemented at 39 SIAPS-supported ART treatment sites to monitor and manage ADRs. The information from the patient safety monitoring system (passive and active) was used to guide the country’s decision to phase out stavudine-based regimens in 2012 and to review the HIV treatment guidelines in 2014 and 2017. A quarterly medicines safety watch newsletter is published and distributed to all health workers in both the public and private sectors. With support from SIAPS, Swaziland also became a member of the WHO Uppsala Monitoring Centre for Pharmacovigilance, providing the country with access to global pharmacovigilance updates and reports.
Along with patient safety interventions, SIAPS also supported activities that sought to promote rational medicine use. SIAPS assisted the MOH in monitoring the implementation of the standard treatment guidelines (STGs) for common public health conditions. At least 92% of health facilities in the country currently have a copy of the STGs. Improvements have also been noted in the prescribing patterns of clinicians. The STG post-implementation survey report reflected improvements on the proportion of encounters with an antibiotic prescribed (53% from a baseline of 59%) and the proportion of injections per prescription (16% from a baseline of 19%).

SIAPS also supported the MOH through intersectorial collaboration to develop an antimicrobial resistance (AMR) containment five-year strategic plan (2017–2022). The national AMR containment strategic plan embraces the vision and mission of the country’s commitment to curb AMR. The strategic plan outlines five strategic objectives with priority actions and activities: 1) Improve awareness and understanding of AMR through effective communication, education, and training; 2) Strengthen the knowledge and evidence base for AMR containment through surveillance and research; 3) Reduce the incidence of infection across human and animal communities, the environment, and health care through individual and environmental sanitation, hygiene, and infection prevention measures; 4) Optimize the use of antimicrobial medicines in human and animal health through AMR stewardship; and 5) Enhance leadership, governance, coordination, and investment in containing AMR.

**Product Availability and Logistics Management Information System**

With support from SIAPS, the country has been able to access stock status at the facility and central levels. The data collected and stored on the electronic LMIS system have been used to inform quantification and demand planning. The web-based electronic LMIS has been used at the central level to quantify health commodities. The laboratory warehouse has continuously maintained a 100% reporting rate of logistics commodities using the electronic LMIS.
A National Quantification Committee was established to coordinate the national quantification of health commodities and advise the government on issues of and threats to product availability. This committee meets quarterly to discuss supply chain issues, and the national medicines quantification for all health programs is done annually for a three-year period. Quarterly supply plans are updated to inform orders to be placed with suppliers. The MOH officers leading these processes have demonstrated required skills to carry out this important function with minimal support from SIAPS.

**Supportive Supervision and Mentorship**

Regional pharmacy advisors were assigned to each of the four regions in the country. The pharmacy-trained advisors were placed at the regional health management team to provide technical support to clinic supervisors on pharmacy issues at clinics and to pharmacy personnel at health centers and hospitals. A total of 288 facility visits were conducted for mentorship and supportive supervision throughout SIAPS. A marked improvement in stock card updates was observed from health facilities in the four regions visited (Figure 9).

There has been a steady improvement in facilities implementing good storage practices for medicines and related commodities. Over the three-year period of implementing supportive supervision and mentoring, there has been an increase from 50% to 89% in facilities storing commodities according to the good storage practice guidance. Storage space continues to be a challenge in most facilities, making it difficult to adhere to the good storage practice guidelines.
Figure 9. Percent of facilities with stock-outs of a preselected group of medicines for three days or more
CONTRIBUTION TO US GOVERNMENT GOALS

SIAPS focused on investments aligned to the PEPFAR Blueprint: Creating an AIDS-free Generation. PEPFAR introduced its 3.0 policy document in 2014, which stipulates an impact-driven agenda: efficiency, sustainability, partnership, and human rights. SIAPS has ensured that its interventions are aligned with strategies outlined in these documents.

SIAPS contributed to the various PEPFAR strategies by advocating for uninterrupted availability and rational use of safe, effective, and quality health products for HIV and TB diagnosis, treatment, and care services. SIAPS focused on improving the procurement systems for medicines and laboratory products.

SIAPS’ work in ensuring the availability of prevention of mother-to-child transmission commodities aligned with the call for Ending Preventable Maternal and Childhood Illnesses. Furthermore, SIAPS’ work on strengthening financing mechanisms aligned with the universal health coverage strategy with a goal to reduce out-of-pocket payments for medicines and ensure adequate allocation and efficient use of financial resources for medicines.
LESSONS LEARNED

Governance

Lobbying was a crucial step in advocating for the Medicines and Related Substances Bill and the Pharmacy Bill. A lot of ground work needed to be done for the politicians in Parliament to see the value of the bills proposed and prioritize them through the legislative process. The change of Parliament in 2013 during the activity implementation meant that SIAPS had to start the process from the beginning with the new Parliament, although a lot of ground was covered with the previous Parliament. Getting consensus on various aspects of the bill proved to be a challenge because the different legislators had varying interest in the bills, especially the component of pharmacy ownership.

SIAPS worked very closely with officials from the Ministry of Justice, Ministry of Agriculture, and MOH to push the bills through the parliamentary processes. Creating and maintaining relationships with all key stakeholders was crucial to get the bills prioritized for deliberation in Parliament.

Knowing that the House of Assembly’s members have diverse backgrounds and education levels, it was crucial to understand the target audience and pitch the message in a less technical manner. Understanding legislative procedures and issues of protocol was key to getting the bills considered by the two houses of Parliament.

Pharmacy Preservice Training

The enthusiasm and leadership of the SANU vice chancellor was key in pushing for the establishment of the pharmacy training program. Working as a development partner is often difficult when navigating complex government structures, especially in education and other ministries. The vice chancellor was very helpful in facilitating all of the policy issues and getting the senate of the university to approve the curriculum within one year.

Patient Safety

The introduction of the active surveillance program was viewed as a research activity, and many were not interested in participating or contributing. During the design of the intervention, the team at the National AIDS program was fully in support of and committed to seeing the activity through and ensuring its sustainability. However, staffing changes within the MOH meant that the new team was not fully aware of the activity and it was not fully implemented. SIAPS re-engaged the new team and pushed for a focal person within the MOH to lead this activity. This intervention also meant that a pharmacovigilance unit could be established under the pharmaceutical services department.
Product Availability and Logistics Management Information System

Fiscal constraints have continued to pose a serious risk to achieving uninterrupted product availability. The Government continues to prioritize ARVs, TB medicines, and condoms; however, the external factors tend to put pressure on Government’s ability to deliver on this commitment. In addition, losses of foreign currency due to fluctuations pose problems for the MOH, which relies on international suppliers for medicines. The networking infrastructure for a wide area network has yet to be rolled out to all facilities. This is limitation to the full roll out of the electronic LMIS/web-based LMIS.

Supportive Supervision and Mentoring

Staff rotation and inadequate storage space at facilities are the main constraints to capacity building in pharmaceutical and inventory management. Often nurses placed at health clinic dispensaries are rotated to another section of the clinic. This means the skills gained from the SIAPS mentorship have to be reintroduced to the new officer, who will likely move as well. The facilities do not have adequate storage space, and majority tend to use rooms that are not structurally appropriate for medicines but are the only available space within the health facilities.
SUSTAINABILITY

The advocacy work on the legislation, regulation of medicine, and pharmaceutical strategic plan implementation is already being transitioned in phases to the Pharmaceutical Services Department. Discussions are under way for the WHO Swaziland office to continue providing technical assistance in this area, especially post-SIAPS. The governance interventions will endure after SIAPS because there was strong country ownership and all activities were done with the chief pharmacist, who is currently leading this activity within the MOH. The Pharmacy Council and Medicines Regulatory Authority, once established, will need to be capacitated to perform their functions. Support will also be required in the development of standard operating procedures (SOPs) and guidelines for the functioning of the Pharmacy Council and Medicines Regulatory Authority. The WHO Swaziland office could provide this support to some extent.

The certificate and diploma in pharmacy program has successfully been transitioned to SANU, which now employs its own staff. SIAPS provided technical assistance to the newly recruited head of the pharmacy department, and lecturers were recruited to deliver the program. Support is still required to ensure the quality of the program. There is no local capacity to provide technical assistance in this area.

Patient safety is fairly new and requires a lot of support, particularly for active surveillance. Passive surveillance, however, is in the process of being included in clinical care activities and supported by PEPFAR partners working on HIV/TB treatment programs.
FUTURE OF PHARMACEUTICAL SYSTEM STRENGTHENING IN SWAZILAND

- Once enacted, the Pharmacy Bill will lead to the establishment of a Pharmacy Council, which will be responsible for developing and promoting pharmacy practice standards to ensure that only appropriately qualified pharmaceutical personnel perform duties within their scope of practice. The bill will also establish standards for quality pharmaceutical service provision in line with international best practices and enable effective use of medicines, information, human resources, and finances to ensure higher pharmaceutical service performance and improved availability and safety of medicines.

- Regulation of the Swaziland pharmaceutical sector will be strengthened after the enactment of the Pharmacy Bill and the Medicines and Related Substances Bill by:
  - Capacitating the Pharmacy Council and Medicines Regulatory Authority to perform their functions (once the bodies have been established)
  - Supporting the finalization, adoption, and implementation of the regulations for the Pharmacy Bill when enacted and the Medicines and Related Substances Control Act
  - Supporting the development of SOPs and guidelines for the functioning of the Pharmacy Council and Medicines Regulatory Authority
  - Establishing a monitoring mechanism for pharmacy training institutions in Swaziland by developing a framework for quality assurance and a monitoring mechanism for pharmacy training programs. This would be an activity done in collaboration with the Pharmacy Council
  - Implementing a web-based data collation and analysis tool system for ADR monitoring that would be piloted in targeted health facilities and deployed in selected facilities

- Synchronize RxSolution, CTS, and pharmacovigilance information management system (PViMS) with the client management information system for inventory and patient management (systems interoperability)

- Roll out a CTS to selected health facilities

- Establish a medicines waste management system to:
  - Finalize waste management guidelines
  - Update waste management SOPs at facilities (expired and damaged medicines are taking up a lot of storage space and there is poor handling)
  - Collaborate with the Government and Swaziland Environmental Authority to identify facilities for destruction of damaged and obsolete medicines

- Support the use of pharmacovigilance data for decision making at the facility and national levels to improve patient management and treatment outcomes

- Support the review of the STGs that were implemented under SIAPS
## Annex A. Stakeholders

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Strategic benefit from SIAPS technical assistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government of Swaziland</td>
<td>Desired health outcomes, client satisfaction</td>
</tr>
<tr>
<td>Ministry of Finance</td>
<td>Improved and efficient use of resources in pharmaceutical procurement</td>
</tr>
<tr>
<td>Procurement Unit</td>
<td>Processes and procedures established to ensure accountability</td>
</tr>
<tr>
<td>Ministry of Health (Directorate of Health Services, Pharmacy Department, Central Medical Stores, National Laboratory Warehouse, National AIDS Program, National TB Control Program, Sexual Reproductive Health Unit)</td>
<td>Improved pharmaceutical sector management; increased skills of supply chain personnel; monitoring and evaluation of treatment programs; successful implementation of treatment programs for TB, HIV, and family planning; improved supply chain of laboratory commodities for HIV and TB; improved health information management for HIV/TB programs</td>
</tr>
<tr>
<td>Ministry of Education and Training</td>
<td>Training of preservice health workers within local institutions (a cost saving from the previous system of funding students' training outside Swaziland)</td>
</tr>
<tr>
<td>Ministry of Justice/Parliament</td>
<td>Technical assistance in the development of the Pharmacy and Medicines and Related Substances legislation</td>
</tr>
<tr>
<td>United Nations Population Fund (UNFPA)</td>
<td>Reproductive health commodity security</td>
</tr>
<tr>
<td>USAID/PEPFAR</td>
<td>Implementing mechanism, leading the supply chain portfolio; pharmaceutical component of the HIV treatment program</td>
</tr>
<tr>
<td>World Health Organization (WHO)</td>
<td>Collaborate in efforts to strengthen governance in the pharmaceutical sector</td>
</tr>
</tbody>
</table>
## Annex B. Implementing Partners

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Strategic benefit from SIAPS technical assistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Médecins Sans Frontières (MSF)</td>
<td>Supply chain systems strengthening for TB (incl. DR-TB) and HIV program at MSF supported facilities in Shiselweni and Manzini regions</td>
</tr>
<tr>
<td>Clinton Health Access Initiative (CHAI)</td>
<td>Collaborate in providing technical assistance to MOH on pharmaceutical supply chain (Access to Medicines Program)</td>
</tr>
<tr>
<td>Elizabeth Glazer PAF (EGPAF)</td>
<td>Supply chain strengthening and commodity security for PMTCT and MNCH</td>
</tr>
<tr>
<td>University Research Co. (URC)</td>
<td>Supply chain systems; pharmaceuticals for TB/DR-TB and TB/HIV co-infection</td>
</tr>
<tr>
<td>Family Life Association of Swaziland (FLAS)</td>
<td>Supply chain of family planning commodities and ARV medicines</td>
</tr>
<tr>
<td>Royal Swaziland Sugar Corporation (RSSC)</td>
<td>Program implementation of HIV through supply chain management technical assistance, pharmaceutical management, and deployment of electronic patient MIS</td>
</tr>
<tr>
<td>Salvation Army</td>
<td>Program implementation of HIV through supply chain management technical assistance, pharmaceutical management, and deployment of electronic patient MIS</td>
</tr>
<tr>
<td>Institute for Health Management (IHM)</td>
<td>Partner on interventions to strengthen MOH capacity in information systems</td>
</tr>
<tr>
<td>Usuthu – Sappi Clinic</td>
<td>Program implementation of HIV through supply chain management technical assistance, pharmaceutical management, and deployment of electronic patient MIS</td>
</tr>
<tr>
<td>Southern African Nazarene University (SANU)</td>
<td>Partner in the provision of preservice training program for pharmacy mid-level workers</td>
</tr>
</tbody>
</table>
### Annex C. SIAPS Swaziland Results by Number

#### IR 1: Pharmaceutical Sector Governance Strengthened

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Baseline Value</th>
<th>Year</th>
<th>End of PY1</th>
<th>PY2</th>
<th>PY3</th>
<th>PY4</th>
<th>PY5</th>
<th>End of Project Targets</th>
</tr>
</thead>
<tbody>
<tr>
<td># of civil society organizations that participated in and/or monitored pharmaceutical management operations in the past year (include the names of the organizations and whether each is local, national, or international)</td>
<td>5</td>
<td>Dec 2011</td>
<td>7</td>
<td>13</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td># of pharmaceutical sector laws and regulations developed or updated and submitted for adoption (please include the names in the comments section)</td>
<td>0</td>
<td>Dec 2011</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td># of pharmaceutical management guidelines, lists, and SOPs developed (or updated) and submitted for adoption (please include the names of the documents in the comments section)</td>
<td>0</td>
<td>Dec 2011</td>
<td>2</td>
<td>8</td>
<td>14</td>
<td>18</td>
<td>19</td>
<td>19</td>
</tr>
<tr>
<td># of functioning committees, structures, or related bodies with measures in place to provide oversight and promote accountability in the pharmaceutical sector</td>
<td>0</td>
<td>Dec 2011</td>
<td>7</td>
<td>13</td>
<td>15</td>
<td>19</td>
<td>21</td>
<td>21</td>
</tr>
<tr>
<td># of national pharmaceutical sector strategic plans developed (or updated) (please include the names of the plans)</td>
<td>0</td>
<td>Dec 2011</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td># of national pharmaceutical sector strategic plans approved (of those reported in Indicator 1d.1)</td>
<td>0</td>
<td>Dec 2011</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td># of SCTWG meetings for HIV, TB, RH, and lab commodities supply chain coordination held</td>
<td>3</td>
<td>Dec 2011</td>
<td>6</td>
<td>9</td>
<td>12</td>
<td>14</td>
<td>17</td>
<td>17</td>
</tr>
</tbody>
</table>

#### IR 2: Capacity for pharmaceutical supply management and services increased and enhanced

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Baseline Value</th>
<th>Year</th>
<th>End of PY1</th>
<th>PY2</th>
<th>PY3</th>
<th>PY4</th>
<th>PY5</th>
<th>End of Project Targets</th>
</tr>
</thead>
<tbody>
<tr>
<td># of persons trained in pharmaceutical management (F-M)</td>
<td>0</td>
<td>Dec 2011</td>
<td>354</td>
<td>556</td>
<td>728</td>
<td>1092</td>
<td>1148</td>
<td>1,148</td>
</tr>
<tr>
<td># of pharmaceutical management training programs accredited by a relevant governing body</td>
<td>0</td>
<td>Dec 2011</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td># of pre-service health professional training curricula developed or reformed to address pharmaceutical management topics</td>
<td>0</td>
<td>Dec 2011</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td># of SIAPS-supported local institutions or organizations providing training or technical assistance in pharmaceutical management</td>
<td>0</td>
<td>Dec 2011</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>% of facilities mentored on pharmaceutical services</td>
<td>0</td>
<td>Dec 2011</td>
<td>20</td>
<td>100</td>
<td>90</td>
<td>63.1</td>
<td>88.3</td>
<td>88.3</td>
</tr>
<tr>
<td># of students registered for mid-level pharmacy training program (F-M)</td>
<td>0</td>
<td>Dec 2011</td>
<td>22</td>
<td>43</td>
<td>44</td>
<td>74</td>
<td>74</td>
<td>74</td>
</tr>
</tbody>
</table>

#### IR 3: Utilization of information for decision making improved.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Baseline Value</th>
<th>Year</th>
<th>End of PY1</th>
<th>PY2</th>
<th>PY3</th>
<th>PY4</th>
<th>PY5</th>
<th>End of Project Targets</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of health facilities that received feedback on previously submitted report or data</td>
<td>0</td>
<td>Dec 2011</td>
<td>0</td>
<td>97.3</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Baseline % of health facilities that keep complete patient information (as per national standards)</td>
<td>94.7</td>
<td>Dec 2011</td>
<td>94.7</td>
<td>92.3</td>
<td>94.9</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Baseline % of health facilities that completed and submitted an LMIS report for the most recent reporting period</td>
<td>53.9</td>
<td>Dec 2011</td>
<td>61.5</td>
<td>92.3</td>
<td>89.5</td>
<td>75.1</td>
<td>83.7</td>
<td>83.7</td>
</tr>
<tr>
<td>Baseline % of HF that used consumption data to inform ordering at last assessment</td>
<td>35.9</td>
<td>Dec 2011</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Baseline # of HFs that have implemented electronic or mobile technology systems to document and report on specific component(s) of the pharmaceutical system</td>
<td>17</td>
<td>Dec 2011</td>
<td>32</td>
<td>38</td>
<td>39</td>
<td>39</td>
<td>39</td>
<td>39</td>
</tr>
<tr>
<td>Baseline % of health facilities that are using country-appropriate tools to report logistic and patient data</td>
<td>97</td>
<td>Dec 2011</td>
<td>106</td>
<td>110</td>
<td>133</td>
<td>133</td>
<td>133</td>
<td>133</td>
</tr>
<tr>
<td>Baseline % of facilities maintaining acceptable min-max stock levels of tracer commodities</td>
<td>77.2</td>
<td>Dec 2011</td>
<td>72.7</td>
<td>90</td>
<td>85.5</td>
<td>34.6</td>
<td>80.9</td>
<td>80.9</td>
</tr>
<tr>
<td>Baseline % of stock records that correspond with physical counts for a set of indicator drugs in MOH storage and health facilities</td>
<td>46.3</td>
<td>Dec 2011</td>
<td>46.3</td>
<td>46.3</td>
<td>60.3</td>
<td>65.4</td>
<td>77.1</td>
<td>77.1</td>
</tr>
<tr>
<td>Baseline % of health facilities implementing a fully functional RxSolution</td>
<td>53.1</td>
<td>Dec 2011</td>
<td>53.1</td>
<td>97.4</td>
<td>87.2</td>
<td>89.7</td>
<td>89.7</td>
<td>89.7</td>
</tr>
<tr>
<td>Baseline % of ART facilities submitting their monthly reports on time</td>
<td>41</td>
<td>Dec 2011</td>
<td>41</td>
<td>48.7</td>
<td>61.5</td>
<td>51.3</td>
<td>80.9</td>
<td>90.3</td>
</tr>
</tbody>
</table>

**IR 4: Financing strategies and mechanisms to improve access to medicines strengthened.**

| # of GFATM proposals/grants developed and submitted with technical assistance from SIAPS | 0 | Dec 2011 | 1 | 1 | 2 | 3 | 3 | 3 |
| % of average international price paid for last regular procurement of a set of indicator drugs **Must submit updated Excel spreadsheet with this indicator** | 105 | Dec 2011 | 65.3 | 50 | 62.8 | 62.8 |

**IR 5: Pharmaceutical services to achieve desired health outcomes improved.**

<p>| % of warehouses with stock-outs of a preselected group of medicines for three days or more in the last three months | 100 | Dec 2011 | 0 | 0 | 0 | 100 | 100 | 100 |
| % of health facilities using a standardized checklist to monitor storage conditions | 0 | Dec 2011 | 54.6 | 68.2 | 58.2 | 70.0 | 71.8 | 71.8 |
| % of SIAPS-assisted structures (MTCs or alternative structures) that have documented evidence-based improvement in medicine use | 0 | Dec 2011 | 66.7 | 100 | 100 | 63.6 | 75.0 | 75 |
| % of facilities with available copy of STGs | 73.3 | Dec 2011 | 73.3 | 73.3 | 92.5 | 92.5 | 92.5 | 92.5 |
| % of health facilities with stock-outs of a preselected group of medicines for three days or more in the last three months | 0 | Dec 2011 | 15.5 | 20.9 | 0.0 | 0.0 | 0.0 | 0.0 |
| % of medicines procured in the public sector that are listed on the National EML | 64.3 | Dec 2011 | 64.3 | 73.7 | 73.7 | 73.7 | 100 | 100 |
| % of SIAPS-assisted structures (ICs, MTCs, or alternative structures) that have implemented AMR advocacy or containment-related activities | 6/6 | Dec 2011 | 6/6 | 6/7 | 9/9 | 9/12 | 9/14 | 9/14 |</p>
<table>
<thead>
<tr>
<th>Indicator Description</th>
<th>Baseline Value</th>
<th>Year</th>
<th>End of PY Indicator Values</th>
<th>End of Project Targets</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of prescriptions in compliance with STG</td>
<td>89.1</td>
<td>Sep 2012</td>
<td>PY1 89.1 PY2 89.1 PY3 84.8 PY4 84.8 PY5 84.8</td>
<td>End of Project Targets</td>
</tr>
<tr>
<td>% of encounters with an antibiotic prescribed</td>
<td>59.1</td>
<td>Sep 2012</td>
<td>PY1 59.1 PY2 59.1 PY3 52.2 PY4 52.2 PY5 52.2</td>
<td>End of Project Targets</td>
</tr>
<tr>
<td>% of PEPFAR-supported districts with documented routine supportive supervision visits to 75% of ART sites in that district</td>
<td>25</td>
<td>Dec 2014</td>
<td>PY1 75 PY2 100 PY5 100</td>
<td>End of Project Targets</td>
</tr>
</tbody>
</table>

**OTHER: Indicators mandated by PEPFAR and/or used to track progress for the HIV/AIDS portfolio.**

<table>
<thead>
<tr>
<th>Indicator Description</th>
<th>Baseline Value</th>
<th>Year</th>
<th>End of PY Indicator Values</th>
<th>End of Project Targets</th>
</tr>
</thead>
<tbody>
<tr>
<td># of health care workers who graduated from a preservice training institution or program as a results of PEPFAR-supported strengthening efforts (F-M)</td>
<td>Dec 2014</td>
<td>15</td>
<td>29</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9</td>
<td>6</td>
<td>19 10</td>
</tr>
<tr>
<td># of SIAPS-supported sites providing ART (REQUIRED)</td>
<td>110</td>
<td>Dec 2011</td>
<td>110 133 133 133 43 43</td>
<td>End of Project Targets</td>
</tr>
<tr>
<td># of adults and children receiving ARV at SIAPS-supported sites</td>
<td>72,402</td>
<td>Dec 2011</td>
<td>85,520 97,833 122,221 144,408 162,098 174,103</td>
<td>End of Project Targets</td>
</tr>
</tbody>
</table>
Annex D. List of Abstract Publications

*Coordinated Quantification of Health Commodities Helps Increase Availability of medicines in Swaziland*

**COORDINATED QUANTIFICATION OF HEALTH COMMODITIES HELPS INCREASE AVAILABILITY OF MEDICINES IN SWAZILAND**

**CHALLENGE**

Inconsistent supply of health commodities inhibits progress against HIV and TB

Swaziland, working to combat two concurrent epidemics of HIV and tuberculosis (TB), has recently intensified nationwide HIV testing and TB case finding campaigns. However, these efforts have been hampered by routine stock-outs of key TB, laboratory, HIV and AIDS, and other health commodities. In December 2011, 50% of tracer products were stocked out at the central level, while 23% of tracer products were stocked out at health facility warehouses. The challenge of maintaining a consistent supply of commodities threatens not only current efforts to help curb the HIV and TB epidemics, but may also erode the progress made to date toward advancing prevention, diagnosis, and treatment services. The rapid scale-up of these programs as well as fiscal challenges in the health sector, have exposed weaknesses related to procurement and supply chain systems.

**SIAPS ACTIVITIES**

Regular quantification exercises help plan the supply of commodities

Working closely with the Ministry of Health (MOH) and other relevant partners, SIAPS helped to establish an effective system for conducting regular quantification exercises for several essential health commodities. As part of this effort, SIAPS worked to establish the multidisciplinary Forecasting and Supply Planning Technical Working Groups, which comprise staff from the MOH, health programs, and partner organizations, and are designed to allow stakeholders to use logistics and supply chain information more effectively.

By using information from its logistics management information system (LMIS), the working groups help facilitate proper planning, procurement, and distribution schedules to avoid both over- and under-stocking of commodities. Members of the TWGs and technical officers in the MOH were trained on quantification principles, processes, methodologies, and on the use of key quantification tools (Quantimed®, Reality® and PipeLine®). SIAPS also provided on-the-job mentoring and support during actual quantification exercises to further build the capacity of local stakeholders to conduct these exercises.

Number of annual forecast and quarterly supply plan exercises conducted, 2012-2014

<table>
<thead>
<tr>
<th>Commodity</th>
<th># of annual forecast exercises conducted</th>
<th># of quarterly supply plan exercises conducted</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIV/AIDS</td>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td>Laboratory</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>TB</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>Family planning</td>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>11</strong></td>
<td><strong>40</strong></td>
</tr>
</tbody>
</table>
RESULTS

Effective quantification systems improve availability of commodities

The regular annual forecasting and quarterly supply planning activities have helped the MOH to better plan procurements from different funding sources (e.g. UNFPA, the Global Fund, and others), and to advocate for and mobilize resources. As a result, Swaziland’s Ministry of Finance was able to prepare financial plans and allocate about USD 30 million for procurement of TB, HIV/AIDS, family planning, and laboratory commodities in fiscal year 2013-2014. UNFPA also allocated a budget of about USD 1.03 million for family planning commodities.

Better quantification systems and processes have helped to improve the availability of tracer commodities. The stock-out rate for tracer commodities was reduced from 50% in December 2011 to 0% in September 2014 at the central warehouse, and from 23% to 0% at health facilities during the same time period. Additionally, the forecasting and supply planning exercises were able to act as an early warning system as they helped to indicate imminent stockouts, shortages, and expiries.

Conducting regular quantification and planning exercises also enabled a rapid emergency procurement of condoms in August 2014, when an imminent stock-out had been identified. Conversely, the development of forecasts and supply plans also helped to inform UNFPA that a planned order of contraceptive implants would result in an overstock scenario. UNFPA cancelled the order, resulting in a cost savings of USD 102,000. Additionally, due to quarterly supply planning revisions and adjustments, the financial requirements for procurement during fiscal year 2013-2014 were reduced by 6.4% and 69.2% for HIV/AIDS and reproductive health commodities respectively compared to the estimates at the beginning of the period.

The stock-out rate for tracer commodities was reduced from 50% in December 2011 to 0% in September 2014 at the central warehouse, and from 23% to 0% at health facilities during the same time period.

NEXT STEPS

Focusing on country ownership and data quality

Through trainings and on-the-job mentorship, SIAPS has strengthened local capacity to conduct quantification exercises and use forecasting and supply planning tools such as Quantmed, Realityl and Pipleine. In a step toward sustainability, staff from MOH and CMS now lead the quantification exercises and supply plan revisions with support from SIAPS provided on an as needed basis. Additionally, the technical working group model for quantification has been adopted by other SIAPS countries as well, including Angola, Mali and Cameroon.

SIAPS continues to collaborate with the MOH and other key stakeholders through the National Supply Chain technical working group, and is also working with MOH to establish a similar system for supply chain management of other essential medicines. Lastly, to help improve overall quality of data used for decision making, SIAPS is working on quality improvement projects that involve continuous supportive supervision and mentorship throughout the supply chain, from the health facility level to the central warehouse level.
Modernizing Legislation in Swaziland to Improve the Control of Medicines

Challenge

The weak regulatory system in Swaziland has posed a threat to public health and safety and has been an obstacle in the country’s effort to improve access to quality essential medicines and services for managing HIV, controlling tuberculosis, and delivering other priority public health interventions. The legislation governing the regulation of medicines, pharmaceutical establishments, and the pharmacy profession in Swaziland dated back to 1929 and no longer served as an effective or relevant legal framework for the pharmaceutical sector. Specifically, the absence of a legal mandate for a national medicines regulatory authority made it difficult for the government to assure the quality, safety, and efficacy of medicines used in the country.

For patients, this means that their health may be compromised if they cannot obtain the medicines they need or if they receive ineffective, inappropriate, or low-quality medicines that increase their risk for adverse reactions, drug resistance, and poor treatment outcomes. The availability of unregistered products in the market and the escalating numbers of pharmacies operated by unqualified people underscore the need for better regulation of the pharmaceutical sector as a whole.

SIAPS Technical Approach

The SIAPS predecessor program, Strengthening Pharmaceutical Systems (SPS), assisted the Ministry of Health (MOH) in developing two bills through an extensive stakeholder consultative process: the Medicines and Related Substances Control Bill and the Pharmacy Bill provide for the establishment of the first ever Medicines Regulatory Authority (MRA) and a Pharmacy Council to regulate the pharmaceutical sector, respectively. However, the enactment of these important bills has been held up since 2012 by lengthy legislative processes in the country, as well as by the competing responsibilities of the newly elected parliamentarians following the 2013 elections.

Building on the work of SPS, SIAPS supported the MOH in Swaziland to present the bills for legal drafting and legislative approval, to resubmit them to the new Parliament and Cabinet following the 2013 election, and to advocate for their finalization and enactment. To build political will and expedite an otherwise lengthy parliamentary process, SIAPS assisted the MOH to conduct seminars and develop briefs to educate legislators on the importance of the new legislation and the content of the draft bills. Following stakeholder consultations, SIAPS helped revise the bills to gain additional political buy-in and local ownership.

To expedite the implementation of the Medicines and Related Substances Control Bill once passed, SIAPS also worked in partnership with the MOH to draft a set of accompanying regulations and develop an implementation plan for establishing the MRA. In addition, SIAPS helped the Chief Pharmacist’s Office to develop guidelines and procedures for registering importers and created a database for cataloguing importers and the medicines they import.
Results

SIAPS assistance in strengthening governance and medicines regulation in Swaziland has contributed to the finalization of two bills—the Medicines and Related Substances Control Bill and the Pharmacy Bill—and the drafting of regulations that will be published to accompany the Medicines and Related Substances Control Bill once enacted. Following two SIAPS-supported seminars to 31 newly elected members of the House of Assembly and the Senate and intensive advocacy, the Medicines and Related Substances Control Bill has since been enacted as the Medicines and Related Substances Control Act, 9 of 2016. The Pharmacy Bill was also approved by both Houses of Parliament, save for one clause and His Majesty the King has since called for a Joint House sitting to deliberate on the specific clause. In the photo to the right, the Hon. Sibongile Ndlela-Simelane, Minister of Health, is delivering her opening remarks to members of parliament.

The strategic plan for establishing the MRA was approved by the MOH principal secretary. The MOH is now using the plan and the interim organizational structure proposed therein to establish new positions for the MRA and inform its staffing budget. In 2013, the MOH implemented the first step set out in the MRA plan for initiating the inspectorate function which called for partnering with the health inspectors and the police to conduct the first round of inspections. The MOH invited SIAPS to participate in a joint Royal Swaziland Police and Interpol operation to inspect establishments that function as de facto pharmacies in four regions and assess their compliance with good pharmacy practices and existing local laws.

Swaziland has also developed a database of importers of medicines, which contains information on 12 importers and over 6,000 products that they import. The registered importers have been issued with importer registration certificates that are recognized by the Ministry of Finance-based import committee and that will also be recognized by the Swaziland Revenue Authority as pre-requisite for medicines importation.

In addition to providing for the establishment of the MRA and the Pharmacy Council, the two bills have updated and clarified policies related to medicines registration, quality assurance, importation, and wholesale distribution of medicine. While legislative processes take time, through advocacy and technical support SIAPS has helped Swaziland to advance legislation that will facilitate access to safe, effective, and quality medicines for the people of Swaziland.

Next Steps/ Remaining Gaps

There is a need for continued support to the MOH in the implementation of the two Acts. This includes developing information, education, and communication materials on the legislation for a wider scope of stakeholders, including the public, to ensure a widespread awareness of the bills and facilitate their introduction. Further support includes the finalization of regulations to facilitate the implementation of the Acts.
Cost-Effective Phasing out of Stavudine for ART Patients in Swaziland
Authors: Sigudla Tibuyile, Shongwe Nomsa, Mabuza Sibongile, Vilane Mavis, Azih Charles, Shiferaw Gashaw, Mthimkhulu Wenzile, Young Garrett, Fakudze Fortunate, Shongwe Velephi

Background/Issues:
Stavudine, a highly effective Antiretroviral, is associated with cumulative and irreversible peripheral neuropathy that are particularly present in long-term users. Thirty percent (16,225) of all adult ART patients in Swaziland were receiving Stavudine in their treatment regimen prior to 2010.

The Ministry of Health (MOH) actively needed to switch patients from Stavudine to less-toxic ARVs. The process needed to ensure that the existing 95,000 packs of D4T (valued at E2.6 million) were not wasted and that new products would be available to prevent shortages.

Methodology (Design and Implementation):
A committee led by SNAP and the Central Medical Stores (CMS) including SIAPS and CHAI was established to ensure a cost-effective transition. The committee determined stock of Stavudine available in the pipeline, identified number of patients receiving Stavudine based regimen, stratified patients by years on treatment and presence of Stavudine-specific toxicity. It also implemented switching rate per month with user friendly flow chart.

Results
By June 2011, 12,425 (76.6%) adult patients had been successfully transitioned from Stavudine to a less toxic Tenofovir and Zidovudine, and preventing E2.3 million emalangeni worth of Stavudine from expiry.

Lessons Learned
Policy change could affect supply chain and when policy changes are planned, supply chain issues should always considered. Swaziland’s well planned and coordinated action with quality information on products and patients makes it possible to effectively transitioned treatment changes without losing already procured Stavudine.

Recommendations
- Engaging programs and policy makers with supply chain is critical to make products available and save costs that may occur due to expiry
- Improve sensitization of clinicians in health facilities to ensure success in future transitions.
- Actively following up with health facilities to minimize deviations from transition plan.
- Switching patients off a product should be systematic and across different sites, not pushed on one facility.

Key words: Stavudine transition, supply chain and regimen change
From Data to Decision-Making: Swaziland’s Implementation of an ART Logistics Management Information System
Gashaw Shiferaw, Tibuyile Sigudla, Garrett Young, Mavis Vilane, Kidwell Matshotyana

Background

Swaziland has the highest HIV prevalence in the world (25.9 percent). Currently 80 percent of eligible patients are on treatment. The Kingdom of Swaziland’s supply of life-saving antiretroviral medicines (ARVs) has historically been characterized by long lead times for orders, expiry of medicines due to inappropriate stock management practices, and the lack of a reliable logistics management information system (LMIS). To ensure an uninterrupted supply of ARVs, particularly for children and mothers, and to increase treatment as a means of prevention, the Ministry of Health worked with partners to implement an LMIS for all levels of the health care system, with priority given to HIV commodities.

Methods

The Central Medical Store’s (CMS) Data Management Unit was established to collect, collate, analyze, and present information for supply chain decision making. The LMIS was revised in April 2011 to link facilities with the CMS through a maximum-minimum inventory control system. Standardized tools for reporting and requisition were designed, printed, and distributed to more than 100 antiretroviral therapy (ART) facilities across the country. Over 200 staff members at all ART initiating and refill sites trained on use of the LMIS tools, and continuous supportive supervision was provided.

Results

Reporting rates using the revised tools increased from 60 percent to 95 percent, and the order fill rate reached 100 percent for key ARVs. Since the LMIS introduction, 100 percent stock availability has been reported for key ARVs at facilities. Health workers are now better equipped to assess their stock levels and make appropriate orders to ensure continuous product availability. Information coming to the CMS through the LMIS has been used for resupply, to develop the national forecast and supply plan, and supply monitoring. The Ministry of Health has used the information for making decisions that has resulted in a savings of $6.25 million from unnecessary procurement.

Conclusion

Information from the new LMIS has allowed the CMS’s Drug Management Unit to make decisions that have both improved ARV availability and saved money. The LMIS should be expanded to include more products, including those for tuberculosis, malaria, and essential medicines.

Background

Swaziland remains one of the countries with the highest TB burden in the world. It is estimated that annually there are around 1,380 per 100,000 incident TB cases. Exacerbating this challenge is the TB/HIV co-infection rate that remains high at around 80%. TB is estimated to kill 2,780 people a year in Swaziland and the prevalence of MDR-TB is 7.7% among new cases and 33% among previously treated cases.

Description

Information on adherence levels is one of the markers that indicate program success in ensuring safe and effective use of first line medicines as well as second line thus avoiding amplified resistance and further development of drug resistant TB. The adherence level among TB patients in Swaziland was measured using a Multi-Method Adherence Assessment Tool (MMAT), which was developed with technical assistance from SIAPS/Swaziland. This tool was developed to strengthen the adherence level measurement gaps that cannot be addressed through the pill-count method on its own. The tool includes components of self-reporting, visual analogue scale, pill identification tests and pill count to facilitate the calculation of a more robust patient adherence score.

Results
Lessons Learned

1. The number of submitted reports varied widely from month to month and appeared to be decreasing. A re-sensitization of the Adherence Officers and Treatment Supporters could be conducted to strengthen the reporting rates and the data quality.

2. The adherence levels according to pill count could only be performed in 47% of the reports. Patients should be encouraged to bring their pill along when they present for refills and the capturing and calculation of this component emphasised among the Adherence Officers and Treatment Supporters.

Conclusion/Recommendations

Adherence to TB treatment is crucial in increasing treatment success rates, reducing antimicrobial resistance and eliminating emerging resistant strains of TB that are difficult and expensive to treat. Strengthening adherence monitoring is an important intervention that can be optimized by the MOH and repeated in other priority diseases such as HIV/AIDS.
Supporting Pre- and In-Service Training Programs to Expand and Strengthen the Pharmaceutical Workforce

Challenge

Swaziland, similar to a number of low resource countries was facing a severe and prolonged shortage of health workers, particularly in the pharmaceutical sector where pharmacists, pharmacy assistants, and technicians are becoming especially scarce. With treatment programs, such as those for HIV/AIDS and TB, expanding, more pharmacists, pharmacy technicians and assistants are required to provide effective services. Additionally, overstretched pharmacists and other healthcare workers are often unable to provide effective patient-centered pharmaceutical care, which is a recognized critical opportunity to prevent drug resistance, reduce irrational medicines use, eliminate wasteful spending, and most importantly, improve patient health outcomes.

Until recently, Swaziland, like many developing countries, did not have an established training program for pharmaceutical health workers, instead relying on programs mainly in South Africa to train their students. However, these students frequently found work elsewhere, deciding to practice in the private sector or not to practice in their home country, which further exacerbated shortages in the pharmaceutical workforce. In 2011, Swaziland’s 287 government facilities shared a total of 20 pharmacists and 34 pharmacy technicians.

SIAPS Technical Approach

Given the scarcity of pharmacy workers, coupled with provisions in the Pharmacy Bill that specified the specialized training required for pharmaceutical personnel, the Ministry of Health (MOH) set out to establish the first-ever pharmacy training program in Swaziland with support from SIAPS. After conducting a feasibility study, the MOH decided that the training program would support two types of pharmacy personnel (pharmacy assistants and pharmacy technicians). In a widely consultative process, the training curricula were developed with inputs from tertiary educational institutions, private sector pharmacists, MOH stakeholders, the Pharmacy Association, local pharmaceutical companies, and non-governmental institutions. SIAPS worked with local stakeholders to identify training needs, create the curriculum content and outline job descriptions for the new functions. With PEPFAR support, the Southern Africa Nazarene University (SANU) established the Department of Pharmacy at its Faculty of Health Sciences in 2012 and with technical support and guidance from SIAPS began offering a two-year certificate and a three-year diploma in pharmacy services.

Results

Since the inception of the program in 2012, there have been 145 students enrolled onto the program, the first of whom graduated with a Certificate of Pharmacy in July 2014. The Diploma in Pharmacy program (three year program) was also launched in 2014.
Twenty-two students have graduated with a Certificate in Pharmacy and another 22 with a Diploma in Pharmacy. Eight of the first cohort of students went onto to complete the Diploma and are also part of the 22 Diploma graduates.

Of the first cohort of graduates (August 2012 intake), nine work in the MOH and of the second intake (August 2013 intake), where there were 15 graduates (one with a Certificate and 14 with Diplomas), all 14 Diploma graduates expressed interest to join the MOH and have since been interviewed by the MOH in preparation for employment by the Civil Service Commission.

Conclusion

With this new cadre of pharmacy workers entering workforce, Swaziland has taken an important step forward in meeting its human resources needs to deliver high-quality pharmaceutical care and services.


Strengthening Pharmacovigilance Systems in Swaziland to Improve Patient Safety and Treatment Outcomes

Background

Along with passive surveillance, sentinel site-based active surveillance is a key approach to strengthening a country’s pharmacovigilance (PV) and medicine safety system. As new essential medicines for HIV/AIDS and drug-resistant tuberculosis (TB) are being introduced and scaled up in resource-limited countries, monitoring adverse drug reactions (aDRs) and therapeutic effectiveness associated with these medicines is increasingly important. A well-integrated, comprehensive pharmacovigilance system is necessary for improving patient management, making evidence-based treatment decisions, and promoting rational medicine use.

Challenge

Swaziland has a high burden of both HIV/AIDS and TB, and the nation’s pharmacovigilance system has traditionally relied on passive surveillance mechanisms based on spontaneous reporting. In a passive surveillance system, health professionals and others are encouraged to report adverse events, but no other active measures are used. Thus, relying on passive surveillance alone can lead to under-detection and underreporting of adverse drug events. In Swaziland, the Ministry of Health (MOH) had only been receiving about 30 adverse reaction reports per year since the passive surveillance system was implemented in 2010. This low level of reporting spurred the introduction of an active surveillance system to complement the passive system.

SIAPS Approach

SIAPS mobilized stakeholders from the Swaziland National AIDS Program (SNAP) and the National Tuberculosis Control Program (NTCP) to introduce and implement the Sentinel Site-based Active Surveillance System for Antiretroviral and Anti-TB (SSASSA) active surveillance system. SIAPS partnered with the Pharmacovigilance Unit (PVU) of the MOH to create the protocol and tools for the electronic SSASSA system, and developed a patient recruitment system at HIV and TB sites.

The new system documents and quantifies incidence rates of adverse drug events (ADEs) associated with antiretrovirals (ARVs) and anti-TB medicines and determines risk factors at selected sentinel sites. In addition to collecting and compiling the type and rate of adverse events, the SSASSA system tracks and reports data on adherence, severity of adverse events, patient demographics, and reasons for switching regimens.

The active surveillance system was officially launched in 2013, and subsequently installed at five hospitals and one clinic. SIAPS continues to support the implementation of the active surveillance system through mentoring and supervisory visits to facilities. SIAPS also continues to support the PVU to conduct data collation, causality assessments, and other patient analyses as well as the dissemination of pharmacovigilance data to all stakeholders.
Annexes

Results

Based on the active surveillance data analysis of data recorded from June 2013 to September 2016, 4210 patients have been enrolled on the active surveillance system since May 2013 to September 2016 and there have been 1224 ADEs have been reported. Figure 10 depicts the top 15 most commonly reported ADEs, the most common of which is gastrointestinal disturbances and peripheral neuropathy (17% each of all events).

![Graph](image)

**Figure 10.** Adverse events reported across six sites, June 2013-September 2016 (n=1224)

Figure 11 illustrates adherence levels among 572 patients, as measured by timing of follow-up and medicine use. As indicated in the graph, nearly 90% of patients had a follow-up visit that was on time or early, and remembered to use their medicine.

![Graph](image)

**Figure 11.** Patients seen for follow up and reported adherence levels across eight sites, June 2013 – September 2016 (n=572)
SIAPS continues to support the MOH in developing *Medicine Safety Watch*, a quarterly newsletter designed to disseminate information on medicines safety.Copies are printed and distributed to all health facilities, and electronic copies are mailed to stakeholders.

**Active Surveillance Information Use**

i) The evidence generated led to an expansion of the active surveillance system to three more health facilities in 2015.

ii) The existence of an active surveillance system also facilitated Swaziland being prioritized as one of the countries to benefit from the USAID and Janssen Pharmaceuticals donation program of bedaquiline, a new TB medicine used to treat drug-resistant TB.

iii) The data were used to quantify raltegravir for those patients who are also taking bedaquiline (i.e., co-infected patients on treatment for both HIV and drug-resistant TB) to avoid undesired interactions between efavirenz and bedaquiline.

iv) The data are being used to inform the revision of national programmatic management of drug-resistant TB guidelines.

v) The data are being used to formulate clinical guidance on the adoption and implementation of a shortened multi-drug resistant TB (MDR-TB) treatment regimen.

vi) The findings have been used to revise treatment guidelines and develop job aids for health professionals and patients to facilitate the early identification and management of ADEs to promote patient safety and adherence.

vii) The strength of the data generated also supported the establishment of a National Patient Safety Monitoring Committee.

viii) The challenges faced in implementing the electronic pharmacovigilance tools informed the development of a new system, the pharmacovigilance information management system (PViMS), which is a web-based tool developed by SIAPS that facilitates more streamlined data collection and analysis. This tool will be rolled out in Swaziland in 2017.

**Conclusion**

The use of SSASSA in Swaziland demonstrates that active surveillance programs, which have mostly been implemented almost exclusively in industrialized countries, can be initiated successfully in resource-limited settings if system-based support and local collaboration are in place. Such an active surveillance system creates an enabling environment for regulatory decision-making and risk management planning. National bodies have provided overall leadership and governance for the implementation of these activities, and have identified and engaged other key stakeholders to contribute. Human resource capacity has also been strengthened, as evidenced by the extensive training that health care workers have received on capturing data and reporting ADRs.
Enhancing supply chain data availability, visibility, and access in Swaziland through innovation for better, bigger, and faster decision making

Swaziland’s eLMIS (electronic Logistics Management Information System) is a web-based commodity tracking system that tracks patient and stock information at the health facility and central levels for priority health programs, such as HIV, TB, malaria, family planning and laboratory reagents to support evidence-based decision making. It has three important features—data entry, reporting, and the dashboard. The system generates critical supply-chain information, such as stock status at all levels of the health system, which will assist with quantification, timely procurement, and distribution to service delivery sites. The system will also serve as an early warning system that will contribute to averting stock-outs, avoiding emergency procurements, and ensuring an uninterrupted supply of all key products.

Figure 12. Swaziland eLMIS Dashboard displaying stock status of tracer ARV by chart, table, and flash map
Figure 13. Swaziland eLMIS schematic (CTS, Commodity Tracking System)

Figure 14. Examples of eLMIS reports
The eLMIS

The SIAPS Program, with funding from USAID, proposed automating the LMIS to foster better and faster supply-chain information processing, increased supply-chain data visibility, improved accessibility, and reduced workload. The eLMIS has been implemented and is being used to capture data generated since January 2013 on laboratory, TB, HIV, malaria, family planning, and narcotic products.

Benefits

- Reduced data burden through auto-calculation and pre-population during data entry
- Enhanced data analysis and reporting—automatic reports by level and by programs/products
- Simpler usability—emulates current manual system
- Enhanced data availability, visibility, and accessibility through interactive maps, charts, and tables
- Enhanced coordination among key players through interoperability and supply chain data visibility
- Enhanced accountability and performance indicators
- More streamlined supply chain decisions for quantification, procurement, and distribution
- Improved data quality, uniformity and integrity for validation, security, and approval processes
- Early warning system for wastage reduction, stock-out prevention, and redistribution planning

Impact

- Reporting rate for ARVS has increased from 56% in 2010 to 93.2%
- Information coming to the Central Medical Stores through eLMIS has been used for resupply, developing the national forecast and supply plan, and supply monitoring. The Ministry of Health has used the information for making decisions that has resulted in a savings of $6.25 million by avoiding unnecessary procurement
- For tracer ARVs, the order fill rate reached 100% and, since the introduction of the eLMIS, 100% stock availability has been reported at facilities.

Background

Logistics Management Information Systems (LMIS) play an increasingly critical role in the ability of Ministries of Health increase responsiveness of their supply chain, reduce costs and fulfill people’s demand for a better quality health services and improved health outcomes through informed decision making and actions. During design of overall supply chain systems, considerable attention should always be given to information needs that supports each supply chain functions to work properly. However, more often than not, this is not the case particularly in low resource settings. Public health supply chain managers in developing countries do not have regular access to reliable real time information for procurement and supply management decision making. Typically these managers rely on subjective knowledge (past experience), guess work and very poor information systems, usually paper-based, without data visibility beyond current transactions. In order to address this problem, reliable procurement and supply management information systems should be implemented.

Adequate LMIS and user requirement assessments, including gap analysis, have rarely been conducted. Sometimes unnecessary data items are being collected and vice versa, adding work burden at the point of data capture. On the other side, relevant pieces of supply chain information are missed which leads to guess work and blind insight for supply chain decisions; hence frequent stock outs and/or over stock that leads to wastage of resources. The main LMIS challenges Ministries of Health in low resource settings facing are:

- inadequate technical knowledge and skill sets, on how to approach the design and implementation of LMIS that fits supply chain requirements, and

- inadequate resources for structural, resource and organizational support such as workforce and budget\(^4\).

This brief describes SIAPS Program’s experience in assessing, strengthening, redesigning and implementing LMIS in developing countries.

Purpose

This technical brief is prepared to demonstrate best practices in assessing, designing and implementing LMIS based on SIAPS Program’s experience using system strengthening approach. The experiences are supported by case studies of LMIS implementation in different countries.

The system strengthening approach implemented by SIAPS

The SIAPS approach for LMIS design and implementation is centered around the pharmaceutical system strengthening approach which is based on the evidence-based and time-tested problem-

solving logic of “diagnosis, option analysis, intervention design, implementation and management, performance monitoring and outcome measurement”, considering overall health system strengthening, capacity building and sustainability\textsuperscript{5,6}.

**Best Practices: LMIS Diagnosis, Intervention Design, and Implementation**

The Swaziland LMIS was originally designed in such a way that facilities will send their stock reports and requisitions without the knowledge on how and when to send. There wasn’t particular structure that receives reports, analyzes and presents for decision making. In addition, ad hoc stock information coming from facilities was not being used for procurement decisions. After a thorough assessment and desk review of the Swaziland supply chain system including LMIS, findings and recommendations informed the redesign of the LMIS at all levels of the health system that links all supply chain decision making such distribution decision being made through RxSolution (warehouse management software being used at CMS), supply plan decision that links to procurement and performance monitoring indicators that links to government decision makers and donor partners like The Global Fund. One big component identified as gap was the absence of organizational structure and workforce which are responsible for LMIS implementation, data analysis, validation, information sharing and use; and its performance management. One of the options forwarded to decision makers was the establishment of central LMIS office/Data Management Unit (DMU) which is responsible for the overall LMIS implementation in the country. The recommendation was endorsed by the MOH officials, government public services which are responsible for human resource establishment. The setup of the DMU helped successful implementation of LMIS, increased data analysis and use for supply chain decisions.

While the country is with the highest HIV prevalence in the world (31%) and 55% of women above 15 years of age are living with HIV, availability of life saving ARVs have been fully secured through the SIAPS supported intervention in designing and implementing LMIS across all ART facilities through training, supportive supervision and mentorship. The intervention has increased LMIS reporting rate from 56% in 2012 to 97% in 2014. Using information for resupply of ARVs, 100% of ARV orders from facilities have been fulfilled; stock out of highly consumed ARVs (more than 85% of patients are using) were avoided; all patients including women were able to get 3 month refill of ARVs according to the countries dispensing protocol (used to get 2-weeks refill during shortages); and the government was able to save close to 6.25 million dollars from unnecessary procurement. Furthermore, the Central Medical Store in collaboration with USAID | SIAPS and other partners facilitated supportive supervision and mentorship visits, focusing on inventory management and LMIS at 66 facilities and 2 warehouses. Given this intervention, in one of the four regions, health facilities showed an improvement in stock card updates from 56% in 2014 to 74% in 2015. In addition, LMIS reporting rates have increased to 92% in the reporting quarter, from 87% previous quarter in 2015.

In Mali, in 2012, SIAPS undertook an assessment of the LMIS and found a lack of strategic information for decision making which includes poor LMIS data quality, poor reporting system,
lack of visibility as well as poor capacity for pharmaceutical management at the operational level. These issues constituted major obstacles to the effective functioning of Mali’s pharmaceutical supply and services. To address these obstacles, SIAPS collaborated with the key supply chain stakeholders and other implementing partners in the redesign and implementation of the LMIS, focusing on improving data quality, better reporting system that links to supply chain decision such as reducing reporting frequency from every month to every quarter which in turn reduces the data burden at facility level, and increase data visibility and information sharing through a web-based dashboard, for informed supply chain decisions. Currently, 51 out of 60 districts are using a web-based LMIS in generating stock information for decision making.

In Lesotho, SIAPS provided support for the monitoring of LMIS routine reporting and data quality assessments after problems related to data quality were raised in 2012. The result of the assessment helped to identify routine data quality assurance intervention and resulted in reporting rate Improving from 44% to 76% in one quarter. The quality of the data submitted also improved significantly, with timeliness, accuracy, and completeness of reporting improving by 41%, 12%, and 29% respectively. In addition, from January to March 2015, the central medical store in Lesotho, in collaboration with partners, conducted 77 supportive supervision and mentoring (SSM) visits to health facilities in all 10 districts of Lesotho. Additionally, 150 health care workers were mentored in inventory management and LMIS using health facility visit approaches. In 4 districts the SSM was incorporated into the Supply Chain Management Leadership Development Program (SCMLDP) to ensure ownership, sustainability, and continuous supply of medicines at service delivery points. The participants form clusters made of two to four facilities that work together to complete the action plans that developed during the visits. The overall support to these districts surpasses the national target of keeping complete information 90% to 93% and the percentage of facilities using country-appropriate LMIS tools for logistics and patient data surpassed the target set, 90%.

In South Africa, Lesotho and Swaziland RxSolution (an automated information system characterized by its inventory, warehouse and information management features) is being used widely both at central, provincial and health facility level. In South Africa, it is being used in 280 facilities across the country. Use of RxSolution continues to contribute to significant improvements data availability, quality and transmission to decision makers that resulted in improved inventory management, medicines availability, and better patient care. For example, in Free State Province, SIAPS supported the introduction of the remote demander module (serving as LMIS) interfacing with RxSolution to facilitate the automated generation of reports and orders based on consumption data. In Limpopo Province, SIAPS customized RxSolution to help manage direct deliveries for ARVs and oncology agents to over 40 hospitals. The system enables the procurement unit to routinely monitor supplier performance.

In Bangladesh, Swaziland and West Africa region the manual LMIS system was designed and implemented with the support from USAID | SIAPS. However, there was huge workload particularly at central level to conduct thorough data analysis and generate reports for decision making, poor data quality and, minimal report visibility (only occurs when reports are sent through email to decision makers and stakeholders. Due to the above challenges, there was strong desire to design and implement innovative technologies that enhances information accessibility and visibility for managers to make faster and better supply chain decisions. A thorough assessment of LMIS users and systems requirements were conducted to identify best
possible options to address requirements. One of the options recommended based on the assessment and analysis was the introduction of a web-based LMIS that tracks stock information to make it available and visible through the Internet. Through USAID fund SIAPS helped to identify best options, develop and implement the system that enhances better and faster supply chain decisions (see case studies below).

In 2013/14, in Angola to increase the use of actual consumption data in determining health facility needs, SIAPS supported the CMS in the revision of monthly LMIS reporting and requisition forms. The CMS took ownership of the new system, providing final inputs to the forms and organizing internal training for staff. Information contained in the revised forms is being incorporated into the CMS electronic patient management system. Currently, the new reporting forms are being implemented in 6 of 18 provinces. SIAPS also collaborated with CMS and Hospital Esperança in an analysis of the hospital’s routinely collected patient management data for the previous 12 months, providing the hospital team with a mechanism to effectively utilize that data for decision making, especially aiming to minimize the risk of ARV stock-outs and increased drug resistance. SIAPS also supported the implementation of tools to monitor procurement and stock levels of antimalarial and HIV and AIDS products, and findings from the end use verification surveys were used to advocate for improved availability and use of essential medicines.

In Burundi, SIAPS supports the development and implementation of LMIS for the analysis of data so that health professionals can effectively plan and monitor service delivery. Burundi has been able to analyze monthly requisitions from all 45 districts and provide feedback. As a result of supervisory and coaching visits in 2013, through the support of SIAPS, reporting timeliness has been maintained at over 90% during this project year; as a result facilities were able to receive their orders on time.

Since the launch of Guinea’s new electronic malaria reporting system, through the support of SIAPS, significant improvement has been recorded in the transmission of timely reports. As of July 2014, districts were consistently reporting data for more than 90% of facilities in PMI zones, from a baseline of 30% in 2012. The Guinea CMS and SIAPS continue to review reports and provide detailed feedback. Additionally, supervisions have been initiated in collaboration with Stop Palu and CMS to check the validity of data per the source documents. This work-intensive tracking mechanism is critical for improving the quality of reporting over time. Detailed country case studies for Bangladesh, Swaziland and Western Africa regions are presented below.
Case Studies

Case study I: Bangladesh Supply Chain Information Portal Design and Implementation

Bangladesh required the presence of an efficient logistics management information system that provides real-time information on availability of commodities that allows managers to react quickly and efficiently to avoid stock-outs of family planning products and increase the contraceptive prevalence rate. After a thorough assessment of users and systems requirements, Bangladesh through the support of USAID funded Strengthening Pharmaceutical Systems (SPS) program, implemented by Management Sciences for Health (MSH), has designed and implemented a web-based logistics management information system that includes electronic tools at the Upazila (sub-district) level (the Upazila Inventory Management System [UIMS]) and also at the central level (the web-based Supply Chain Information Portal [SCIP]). Central, regional, and Upazila-level managers of the Directorate General of Family Planning (DGFP) enter logistics data, such as consumption and stock on hand, into the UIMS. This information is then consolidated and uploaded to the web-based portal. A key feature of the portal is an interactive dashboard which presents easy-to-understand charts, alerts, maps, and tables on stock levels throughout the country to foster effective and efficient decision-making. The portal, which became operational in 2011, is the first of its kind for information management in the public sector.

Analysis showed that implementing the electronic LMIS tools had two major positive effects: data is used to make more informed decisions and stock-outs have been reduced. For example, potential stock-out was reduced by more than 85 percent at both Upazila stores and service delivery points, while under-stock of the same commodities was also reduced by 60 percent at both levels. Any type of stock-out (stock-out, potential stock-out and under-stock) of injectables and IUDs has gone down significantly in 2013 in comparison with 2009. The availability of logistics data has improved decision making at several levels of the system. At the national level, the SCIP data have allowed the Directorate General of Family Planning to adopt a more scientific approach to quantification that considers different policy scenarios to produce a more accurate forecast of needs. The SCIP provides logistics information that gives a clear picture on
actual consumption and whether commodities are available at satisfactory levels. DGFP now organizes quarterly logistics coordination forum meeting and yearly forecasting working group meeting, where all relevant stakeholders, including donors, are present. Data from the SCIP allows in-depth, interactive discussion among partners to prepare, review, revise, and update the national needs for contraceptives to revise forecasting, fund-gap analysis, and supply planning.

**Case study II: Swaziland LMIS and Commodity Tracking System Design and Implementation**

Swaziland has the highest HIV prevalence in the world (25.9 percent). Currently more than 80 percent of eligible ART patients are on treatment. Swaziland’s supply of life-saving antiretroviral medicines (ARVs) has historically been characterized by long lead times for orders, expiry of medicines due to inappropriate stock management practices, and the lack of a reliable logistics management information system (LMIS). To ensure an uninterrupted supply of ARVs, particularly for children and mothers, and to increase treatment as a means of prevention, the Ministry of Health through USAID funded SPS program, implemented by MSH assessed the existing supply chain system. Recommendation from the assessment informed the redesign and implementation of an LMIS at all levels of the health care system, with priority given to HIV, Laboratory, TB and Family Planning commodities. The Central Medical Store’s (CMS) Data Management Unit was established being responsible for the implementation. The LMIS was revised in April 2011 to link facilities with the CMS through a maximum-minimum inventory control system. Standardized tools for reporting and requisition were designed, printed, and distributed to more than 180 ART, TB, and Laboratory monitoring facilities across the country. Over 200 staff trained on use of the LMIS tools, and continuous supportive supervision was provided. At the same time, a system and user requirement assessment for the design and implementation of a web based commodity tracking system (CTS/eLMIS) was conducted. After the assessment, the CTS was designed, tested and users have been trained.

![Swaziland Commodity Tracking System Schematic Diagram](image)

**Figure 16. Swaziland Commodity Tracking System Schematic Diagram**
Reporting rates using the revised tools increased from 56 percent to 97 percent, and the order fill rate reached 100 percent for tracer ARVs. Since the LMIS introduction, 100 percent stock availability has been reported for tracer ARVs at facilities. Information coming to the CMS through LMIS has been used for resupply, to develop the national forecast and supply plan, and supply monitoring. The Ministry of Health has used the information for making decisions that has resulted in a savings of $6.25 million from averting unnecessary procurement. CTS have been used to capture data since January 2013; and currently it accommodates Laboratory, TB, HIV and Family Planning products.

Figure 17. Swaziland Commodity Tracking System Dashboard

Figure 18. Swaziland LMIS reporting Rate Trend

**Case study III: West Africa: a web based Dashboard for Early Warning System**

In West Africa SIAPS developed and introduced a web-based LMIS with a feature for early warning system (EWS) to collect, aggregate and track information on HIV and AIDS commodities across the six focus countries. The dashboard allows the spectrum of
stakeholders—from program managers to Ministry of Health officials to donor agencies—to monitor commodity stock status, anticipates future funding gaps, respond to projected medicine shortages and expiries, and make decisions based on accurate information. The HIV regional dashboard has already been deployed in Benin, Burkina Faso, Cameroon, Niger, and Togo.

Analysis through the EWS showed that, in Togo, at the end of February 2014, there was a risk of stock-out of 11.1 percent of ARV products that would have affected 5.9 percent of patients currently on ART. The Togo team has used the information for decision making to speed up request for procurement.

In Niger, the dashboard showed that 26.1 percent of ARV products are in risk of expiry (products with more than 24 months of stock). Reports from the software showed that particular products will be available for at least 100 months based on Average Monthly Consumptions (see image above). This has prompted the program managers to seeking ways to transfer the product to another country.
Further Reading

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Measurement. 6 Nickerson Street, Suite 300, Seattle, WA 98109-1618. Phone 206-616-8410 •
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Annexes

