



Healthy systems for healthy people

UNDP and Global Fund support to strengthen the national health management information system

Introduction

Zimbabwe has made important strides in the last two decades to combat HIV, tuberculosis (TB) and malaria. New infections have dropped by more than 50% among adults and 80% in children born from HIV positive mothers over the last decade, and AIDS-related deaths have decreased by 60%.¹ TB incidence declined by 67% between 2011 and 2019, from 633 to 210 cases per 100,000 people.² Malaria incidence fell by 24% between 2015 and 2019, from 29 to 22 per 1,000 population at risk, with an increase in districts reporting less than 1 per 1,000.³

Despite notable progress, significant challenges remain. Zimbabwe is among the WHO's list of 14 countries that are considered high-burden for TB, multi-drug resistant TB and TB/HIV coinfection. With a 13% HIV prevalence rate, it is home to an estimated 1.3 million people living with HIV. There are an estimated 39,000 new HIV infections each year,⁴ which disproportionately impact vulnerable and marginalized populations. Following a decade of high inflation, severe economic decline and rising poverty culminated in an acute shortage and mass exodus of skilled workforce from the public health sector, leading to a near collapse of the health system in 2008. The departure of skilled health staff and deterioration of infrastructure compromised efforts by the government and its international partners to provide universal access to basic health services and combat HIV, TB and malaria. The reduced fiscal space and human resource constraints undermined key health system processes, including the capacity to collect, transmit, and analyse health data to inform decision-making and planning for optimal services.

The government has prioritized strengthening the national health management information system (HMIS) as part of its strategic investments to bolster the essential building blocks for effective health service delivery and the achievement of universal health coverage (UHC). Through the financial support of the Global Fund, UNDP and other health and development partners, particularly the U.S. Government, the country has seen intensified efforts over the past decade to enhance the coverage, reliability, and effective collection and use of data through the HMIS.

This brief focuses on the impact and lessons learned from **UNDP and Global Fund support to the Ministry of Health and Child Care (MoHCC) since 2010 to implement several digital health information systems integral to HIV, TB, and malaria programming and decision-making across the health system**, including the District Health Information System, the electronic Patient Management System, and the Weekly Disease Surveillance System. UNDP has also supported ICT infrastructure enhancement to enable integration across systems and policy development to promote the sustainability and coherence of these investments.

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UNDP and the Global Fund in Zimbabwe

UNDP has supported the implementation of Global Fund HIV, TB and malaria grants in Zimbabwe for nearly two decades, starting with the management of an HIV grant which it transitioned to the National AIDS Council in 2006. Based on need, UNDP resumed the role of interim Principal Recipient (PR) for the three diseases in 2009. Following the outcome of a Global Fund assessment of the Additional Safeguard Policy, UNDP transitioned the PR-ship for TB and malaria programmes to the government in 2015, with an additional safeguard through UNDP's appointment as Fund Administrator. In this capacity, UNDP continues to provide support and technical assistance to the Ministry of Health and Child Care (MoHCC) as the national PR for TB and malaria programmes, including procurement services, whilst managing the HIV grant as interim PR. UNDP-managed Global Fund investments have played an instrumental role in progress towards combatting the three diseases, contributing to 1.2 million people living with HIV receiving treatment, more than 563,000 HIV-related deaths averted and 73,880 new TB cases detected between 2006 and 2018, and more than 463,000 cases of malaria treated between 2006 and 2017.

Beyond delivering life-saving support, UNDP plays a key role in assisting the government to strengthen systems for health, leveraging its vast country presence and broader development mandate to support country-led action on the 2030 Agenda for Sustainable Development. In Zimbabwe, its interventions to build resilient and sustainable systems for health focus on support to several interconnected building blocks of the health system, most notably: 1) procurement and supply chain management, 2) public financial management and risk management systems for health, including internal audit, and 3) health information management systems, with an emphasis on human resource development across each. This work is complemented by capacity development to promote sustainability and foster an enabling environment for equitable health service delivery, including support to civil society organizations and activities to reduce social and legal barriers that impede health access for adolescent girls, young women and key populations.



Quality information for quality health: the path to digital health information management

An effective response to HIV, malaria and TB relies on the collection and provision of complete, timely and accurate data to enable better identification of needs and the right activities to address them. Reliable and effective information systems not only ensure adequate monitoring and evaluation of programmes, but also drive early warning capabilities, inform national budget and policy formulation, and inform planning and decision-making processes to facilitate uninterrupted, quality health services based on patients' needs. As underlined by Zimbabwe's National Health Information Strategy 2018-2020, **the availability and use of robust health data for evidence-based programming provides the foundation for the MoHCC to achieve its vision of quality health for all.**

Digital solutions that allow for real-time data collection and visibility have the potential to enhance all aspects of health information management and the functioning of the overall health system. In Zimbabwe, the digitization process was prompted by the rapid growth in programmes for HIV and other epidemics in the early 2000s and the limited capacity of health workers to manually process large volumes of patient information. The transition away from paper-based reporting, and the genesis of the modern national health information and surveillance system, began in 2010 with the national roll-out of the **District Health Information System 1.4 (DHIS-1.4)**, an electronic platform for aggregate reporting of health data from the district level upwards.

¹ Extended ZNASP III (2015-2020)

² Global TB Control Report, 2011 & 2019

³ Zimbabwe HMIS data, 2019

⁴ UNAIDS 2018 HIV estimate

Additionally, recognizing the need for a tool to capture and monitor detailed patient-level data, the MoHCC resolved to establish an **electronic Patient Management System (ePMS)** in 2013, initially focused on the collection of HIV and TB treatment data at health facilities based on the urgent need. While the roll-out of the computerized system helped to enhance data collection and accuracy of reports under specific disease programmes, fragmentation and timeliness issues remained across the broader health information landscape.

To enhance the transmission of routine health information collected through DHIS-1.4, the MoHCC sought to upgrade to the **District Health Information System version 2 (DHIS-2)** starting in 2013. As an online system connected to a central server, DHIS-2 not only improved the timeliness of health information reporting, but also allowed for greater access to real-time data across all levels of the health system, from the national to health facility level. Most critically, the electronic system **introduced the potential for the gradual integration of all health information systems** into a single platform, reflecting a shift towards

more integrated programme management. Building on this progress, the MoHCC will work with partners to eventually bring DHIS-2 and the ePMS into an electronic health records (EHR) platform currently being rolled out.

The MoHCC has promoted the continued growth of the electronic information ecosystem to address information needs across the health system. Whereas the initial priority was to enhance information systems for high-level decision making, the MoHCC has increasingly invested in systems for data disaggregation and use at lower levels of service delivery, building on the systems and infrastructure already in place. This has been accompanied by a **focus on developing policy frameworks and human resource capacity** for the effective use of the data in the delivery of health services. Electronic systems now include those for rapid disease notification, laboratory services, and patient information, among many others. Efforts to build data skills among the health workforce along with investments in information and communications technology (ICT) infrastructure have helped to drive and reinforce the development of all systems.





UNDP and the Global Fund support to the national HMIS

Since the genesis of the modern national health information and surveillance system in Zimbabwe with the adoption of the ePMS and DHIS, UNDP, with Global Fund and U.S. government support, has provided critical funding and technical assistance that has helped the MoHCC to harness the potential of digital solutions to transform health information management. **Since 2010, UNDP has invested substantially in HMIS activities through Global Fund grants.**

In close coordination with other partners including, inter alia, the University of Oslo, the Center for Disease Control (CDC)-funded Research Triangle International (RTI), WHO, UNFPA, DFID, and USAID, UNDP and the Global Fund have continued to build on the MoHCC-driven investments to introduce systems and processes based on nationally-identified gaps and opportunities. Further to the piloting and scale up of new digitally-enabled platforms, much of this support has focused on **laying the groundwork for interoperability between systems**. As the data needs and ICT landscape in the country have continued to evolve, UNDP has helped the MoHCC to leverage the latest

technologies as well as infrastructure developed by other sectors to further improve the accuracy, timeliness, coverage, and effective use of data for patient management, disease surveillance, and reaching vulnerable populations with basic health services.

Critical to this process has been UNDP's **support to the MoHCC at the policy level to enhance the enabling environment** for investments in health sector ICT, monitoring and evaluation (M&E), and health management information systems. This includes support to develop key policy frameworks, such as the national Health Sector Performance M&E Policy Guidelines and Strategy, which lays the foundation for a results-oriented approach to performance measurement in the sector, a new health information strategy and costed implementation action plan, an ICT Policy, and ongoing work to develop an e-Health Policy. This dual focus has helped to ensure that efforts to strengthen data systems and ICT infrastructure are complemented by enhancements to processes and capacities for the effective use of data in the management of health services.

Pillars of UNDP's support

In line with the areas emphasized by national ICT and M&E policy guidelines, UNDP has supported the national HMIS through the following interconnected outcomes:

1. Governance

- Policies and strategic documents developed, including through UNDP's support to the ICT policy (2018), national M&E Policy Guidelines and Strategy (2018), and e-Health Policy (2018), which guide the rollout of ICT innovations to accelerate progress towards UHC. UNDP also supported the end-term evaluation of the 2010-2015 National Health Information Strategy (NHIS) and the development of the 2020-2025 NHIS, with ongoing work to identify a consultant.
- Assessments conducted to guide investments in health information systems and capacities, including: 1) in collaboration with the Global Fund, WHO, and University of Oslo, a one-week data analysis for the MoHCC in 2015 to assess the quality of data generated by the health information system and train health information officers at all levels for increased data analysis and usage; and 2) comprehensive assessments in May-June 2018 to inform national roadmaps for the implementation of new systems and enhancements to existing ICT infrastructure.

- Finalization of three-year plans (2014-2016 and 2017-2019) to guide the direction of the national health information department in the implementation of identified priorities.
- National coordination bodies strengthened through financial and technical support from partners, including the establishment of working groups to coordinate the development of new information systems and reduce fragmentation across systems.

2. Systems and infrastructure

- DHIS-2 rolled out in all health facilities as a web-based national system to collect, extract, and disseminate aggregated district-level health data for weekly and monthly reporting.
- ePMS installed at more than 620 sites, enabling the collection of patient-level data for HIV and other services, with the development of a Macro Database allowing for data synchronization across all ePMS sites and analysis at the central level.
- Weekly disease surveillance enhanced through introduction of Frontline SMS, a mobile phone-enabled tool to collect and transmit surveillance data in real-time to districts and centrally for rapid response.
- Major developments undertaken towards a unified national health information system, with 13 systems integrated into DHIS-2, including ePMS and the Weekly Disease Surveillance System.
- ICT infrastructure and connectivity improved countrywide for the effective functioning of electronic data systems and central storage of databases, including the development of a state-of-the-art data center and server in the MoHCC, provision of laptops at all levels, payment of internet and phone subscriptions, and installation of solar energy at health facilities through the Solar for Health initiative.

3. Human resources

- Coherent strategies for ICT-skills building operationalized, including through support to develop a comprehensive ICT capacity development plan (2017-18).
- Over 6,000 healthcare practitioners, data clerks, and policy-makers trained in various HMIS systems at the facility, district, provincial and central levels, contributing to improvements in basic data literacy as well as the accuracy and completeness of reporting.
- Sustainability in the implementation and use of data systems enhanced through capacity building and skills transfer activities provided through UNDP-managed projects.

“In working with UNDP, we were taught monitoring, follow-up, and accountability. The knowledge transfer and formalization of internal structures for continued management is key.” – MoHCC staff



The building blocks of a robust national health management information system in Zimbabwe

In coordination with other technical partners, UNDP and the Global Fund have supported the MoHCC to leverage digital technology to strengthen several core systems of the national health management information system and lay the groundwork for a unified central portal to manage health data across all health services.

The following sections detail the investments in these systems and the impact of UNDP's support.



electronic Patient Management Information System



[Electronic system for recording, storing, retrieval, and sharing of patient-level data]



Macro Database



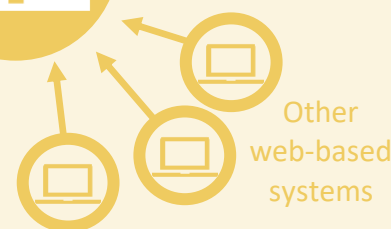
[Centralized collection of site-level ePMS databases]



District Health Information System 2



[Web-based national system that collects aggregate health data]



Central HMIS 'mother system'



Weekly Disease Surveillance System

[Transmits disease surveillance data to a central server in DHIS-2 for monitoring and detection of disease outbreaks]





electronic Patient Management Information System (ePMS)

As the country saw a 47-fold increase in the number of patients receiving ART in less than a decade, from 11,000 in 2004 to 518,800 in 2012, the paper-based system for monitoring and tracking HIV services failed to cope with the rapid expansion of patients receiving care. With more than 700,000 paper files to manage and a plethora of indicators, tracking patients and monitoring outcomes became overly cumbersome for already burdened health workers. The resulting inefficiencies in the timely and accurate collection of key patient data posed a risk to the provision of quality life-saving care.

This urgent gap became the impetus for the MoHCC to **pilot the ePMS in 2013 for the monitoring, tracking, storage, and retrieval of detailed patient-level data at health facilities and aggregate reporting at national level**. The move to adopt ePMS, initially for the national HIV and TB programmes, represented the first step in a longer-term vision to establish an integrated electronic system for management of patient data across the entire health system. A key catalyst for this starting point was the availability of resources for implementation, with US\$4.97 million to pilot it through a UNDP-managed Global Fund grant.

Critical to the piloting and scale-up was **early investments in governance structures for implementation, capacity building, and leveraging the good practices of similar ICT solutions** implemented in other countries. The MoHCC established a national ePMS Team and ePMS Technical Working Group, with staff from the MoHCC AIDS and TB units and key partners including the National AIDS Council (NAC), UNDP, WHO, UNAIDS, Elizabeth Glaser Pediatric AIDS Foundation, Newlands Clinic, Zvitambo, the CDC, USAID, John Snow, Inc., and Médecins Sans Frontières. In coordination with partners and informed by look and learn visits to Tanzania, Zambia, and Namibia, the MoHCC developed a roadmap in 2012 and, with UNDP support, contracted the University of Dar es Salaam to design and implement the system. Implementation kicked off in 2013 with a phased roll-out, starting with

the installation of ePMS at 85 sites, including central, provincial, district hospitals and city clinics, and scale-up to nearly 250 sites in 2014, including rural health centers and mission hospitals. During the roll-out, UNDP provided some 1,600 laptops, more than 80 PCs, and servers and printers to facilitate the set-up. Since the launch, ePMS has been installed at more than 620 sites countrywide, covering all HIV and TB delivery points, making it the most wide-spread information system in the country.

While the software provided the channel for easy recording, management and sharing of patient data, its ultimate **utility depended on the skills and ownership of the personnel** who managed it. UNDP played a central role supporting the MoHCC to carry out comprehensive trainings on ePMS during its initiation, as well as continuous, mentorship, supervision, and support throughout its expansion over the years. Given the challenge of high turnover of data entry clerks at health facilities, four nurses, a pharmacist, and a matron were trained in use of the new software at each facility, district, and provincial office along with all health information officers. A total of 700 data entry clerks were recruited in 2016 to reduce the burden on clinical staff, eventually reduced to 534 clerks at the beginning of 2018.

Since ePMS began, **UNDP has helped the MoHCC to train over 4,000 health workers and 700 data entry clerks with ICT skills**. Further to ensuring the smooth functioning of the system, the basic computer literacy and data skills gained by health workers in the process has provided the foundation for MoHCC's long-term vision for e-health.

“The training really helped. It was through UNDP that we got the courage to launch digital systems.”

– Trymore Chawurura, Deputy Director, ICT, MoHCC

Along with the development of ICT skills, by using ePMS, health workers have gained a greater appreciation for the value of data as a tool for decision-making and programming, contributing to strong ownership of the system and commitment to accurate data collection. Through ePMS, a nurse at a clinic or a district health officer can readily view information that includes common patient registrations, demographic details, past medical history, patient follow up visits, laboratory investigations, rates of patient survival, and prescription and dispensing of medicines.

By eliminating the multiple entry of patient information, computerized data aggregation and the automated retrieval and analysis of data has **reduced the workload and associated costs** of data entry and reporting at the health facility level. The ability to track patients and follow up has also contributed to improved adherence to treatment.

“If a patient doesn’t come for an appointment, we can record it and follow-up through the system. Thanks to ePMS, we have seen more patient follow-ups at the health facility.”

– MoHCC staff

Since the ePMS facilitates monitoring at the patient level, the reports submitted to districts, provinces, and central level are a true reflection of what is happening at a particular facility. As a result, health workers and policy makers have gained **access to more reliable data on patients and the number of people on treatment**: key information for maintaining quality services at the scale required. The system moreover ensures the security of patient data and simplifies oversight and verification processes.

Macro Database



When the ePMS was established in 2013 as the first large-scale electronic system of its kind in the health sector, it was designed to fill an urgent gap in information management for HIV and TB programmes at the service delivery level. Given challenges with network connectivity and interlinking of sites at the time, it was modeled to work as a stand-alone, offline system. While invaluable for data collection and management at the last mile, the facility-based and disease-programme centric nature of ePMS limited the scope of data analysis at the national level and the possibility for retrieval of patient records across different health facilities. The MoHCC received only the aggregated ePMS data submitted by provinces, while patient records remained accessible only at the facilities where they were collected.

To enable richer analysis and storage of patient-level records at the national level, the MoHCC identified the **need for a centralized repository to collect all ePMS databases**. Informed by a learning exchange visit to Tanzania in 2015, the MoHCC determined to establish a Macro Database initially targeting HIV and TB then later expanded to cover all disease programmes. Through UNDP, the MoHCC contracted a team of ICT professionals to initiate implementation of the Macro Database in 2017, focusing first on HIV data, followed by the integration of TB and modules for other diseases. The solution connects health facilities to district hospitals, which connect to provincial hospitals that are linked to the national data center, such that **records entered at facilities become available in near real-time** for statistical analysis and patient search.

Before the Macro Database, health workers faced challenges with tracking patients who transferred from one facility to another, as data entered into ePMS could not be shared across facilities. **The linking of patient records across institutions and provinces** through the central database has helped to reduce issues of double counting cases and loss of patients to follow-up. With more than 900,000 health records



contained in the ePMS, the consolidated database provides an invaluable information source to the MoHCC for evidence-based programming and policy decisions. Improved visibility of reliable patient-level information at the national level **has minimized data gaps** and contributed to improved quantification of medicines, forecasting needs, resource mobilization, and coordination with partners. Among the benefits of the statistical analyses function has been the **ability for the MoHCC to best target treatment to vulnerable groups** affected by stigma and discrimination without putting key populations at risk.

“Data from ePMS was used to identify where there are high yields of HIV positive people, so we could focus support for key populations. We could also see in the demographic data where there were hotspots of sex workers. Disclosure is a challenge for LGBTQI-identifying people but the system gives us the data.” – MoHCC ICT staff

Beyond the immediate benefits to HIV and TB programming, the Macro Database constitutes an **important step towards broader MoHCC efforts to establish a single platform for centralized management of de-centralized health information systems**. The MoHCC will build on this model to enhance the interoperability of other information systems and achievement of the country’s vision for e-health.

To ensure the right ICT infrastructure for the realization of this vision, UNDP also supported the MoHCC to build a **state-of-the-art data center and central server** to house all health data. One MoHCC staff noted, “having our own server is empowering; it means we can host our own data in country instead of on an international partner’s server.”



District Health Information System 2 (DHIS-2)

With the MoHCC’s adoption of DHIS-1 in 2010 and replacement of obsolete computer equipment at all levels, as supported by UNDP, PEPFAR, and other partners, the country saw major

Powering the systems. Sustainably.

While electronic systems offer the means for more timely and complete information management, their functioning **depends on reliable energy and connectivity**. Continued power outages across the country pose challenges for timely data entry into ePMS and other systems. To address this challenge, UNDP, with Global Fund support, has helped more than 400 rural health facilities across 10 districts in Zimbabwe to transition to solar energy as part of its **Solar for Health (S4H) initiative**. It continues to work with the MoHCC to support the expansion of solar energy in the sector.

“Electronic systems won’t survive if electricity is not there. Solar for Health has greatly contributed to the sustainability [of the HMIS]. The combination of 3,550 sites now internetworked and over 405 sites with solar is a good combination. You know your data will arrive if facilities are on solar and connected to the network.”
– Trymore Chawurura, Deputy Director, ICT, MoHCC



improvements in the completeness of reporting received at district level. A subsequent assessment, however, revealed persisting challenges pertaining to timeliness of reporting. The system also did not resolve the issue of parallel reporting systems and the burden on health

facility staff to complete multiple registers with separate indicators.

In 2012, PEPFAR supported the MoHCC to pilot DHIS-2 in one province, Manicaland. Following the success of the pilot, **UNDP collaborated with PEPFAR, RTI, UNICEF, and other partners to scale DHIS-2 to all provinces in 2013**, with additional resources of US\$2.7 million. UNDP engaged the University of Oslo to provide technical support for the upgrade, including training of MoHCC staff, which enabled the roll-out of DHIS-2 to the district level. Adapted from an established software previously implemented in more than 30 countries, the new online version marked a major transition away from paper-based reporting across the country. It has since been rolled out country-wide, covering the national MoHCC offices as well as 63 district, 10 provincial, and 4 city health information offices. By eliminating the manual submission of data between the district, provincial, and national level, DHIS-2 reduced data entry backlogs. The digital platform **enables users at all levels to instantly view the data** soon after its capture by district staff, translating to dramatic **improvements in timely reporting for decision-making**.

Most critical, DHIS-2 offered the **possibility of building an integrated national data repository**, not only aggregating data from disease-specific programmes, but eventually capturing other information sources down to the patient level for a complete picture of the health system. Since its launch, DHIS-2 has incorporated the Weekly Disease Surveillance and 13 programme databases, including the Morbidity and Mortality Information System, Psych, Rehab, Village Health Worker Form, and Early Infant Diagnosis. Efforts are ongoing to integrate all parallel systems into DHIS-2 and eventually into the EHR system. UNDP has also supported the MoHCC to develop DHIS-2 trackers, starting with one for malaria pre-elimination. Work is ongoing to develop trackers for other programmes such as interventions for key populations.

The central data repository offered through DHIS-2 has **enhanced efficiencies and integration in reporting across programmes**. The

completeness of monthly reporting increased from an average of 40% in 2010 to 85% in 2018. The visible benefits of DHIS-2 to the national HIV and TB programmes where it was first piloted have resulted in more partners opting for inclusion in the platform, eliciting a demand-driven scaling process.

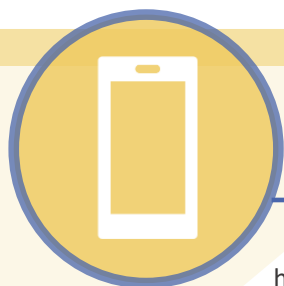
“The rest of our partners are now following the support UNDP provided to the MoHCC and are asking to be on DHIS-2. Managers are beginning to say, ‘I can own my programme because I have the data to quantify and justify [our work].’”

– MoHCC staff

Key to the effective roll-out of DHIS-2 was UNDP’s **support to the people and infrastructure** that enable its implementation. Prior to the launch, UNDP undertook extensive efforts to strengthen the ICT infrastructure, including the installation of fixed and mobile internet connections at 82 provincial and district offices and hospitals, provision of 10,270 ICT equipment consisting of laptops, PCs, and servers. In addition, UNDP paid and continues to pay internet subscriptions for the facilities, which has ensured availability of reliable internet. These investments have also supported the functioning of complementary electronic HMIS, including ePMS. As part of the launch, UNDP also supported trainings on DHIS-2 for 1,410 health workers, alongside UNFPA-supported trainings.

Since the expansion of DHIS-2 in 2013, UNDP has facilitated **continuous capacity development** with the University of Oslo, the originator of the system, through trainings and learning exchanges. It has also had three agreements with the University of Oslo to provide technical support for the roll-out of DHIS-2 in Zimbabwe, proving an important collaboration for ensuring its sustainable implementation and scale-up. The MoHCC hosted international DHIS-2 Academies in 2015 and 2018, and sent staff from ICT, HMIS, and programme units to attend trainings at the University of Oslo and DHIS-2 academies in other countries organized by University of Oslo. In 2018, MoHCC staff participation in a workshop in Tanzania helped to facilitate nationally-led upgrades to enhance

security, analytic and integration capabilities. With the University of Oslo and other partners, UNDP will continue to support the institutionalization of regular upgrades to DHIS-2 and the accompanying skills-building and development of standard operating procedures required for sustainability as the system expands.



Weekly Disease Surveillance System (WDSS)

Before 2005, Zimbabwe had one of the strongest health information and surveillance systems in the region. In 2006, however, the country experienced a collapse of the two primary communication channels, the fixed telephone network and two-way radio, that the system relied on for data transmission. As a result, the monthly reporting system and Weekly Disease Surveillance System (WDSS) were unable to transmit complete surveillance data to the national level, with reporting levels dropping to 45% by 2006. By 2010, only 9% of rural health facilities had functioning telephone lines and 11% had functioning VHF radio. With an incomplete picture of the situation on the ground, the data became virtually unusable for national planning.

To remedy the situation, **in 2011, UNDP and the Global Fund, along with Health Information Systems Programme – SA (HISPSA) and RTI, assisted the MoHCC to introduce Frontline SMS, a cell phone-based surveillance system.** Starting in 2011, UNDP initiated implementation with the purchase of cell phones, targeting rural health facilities that had no means of communication. By 2014, UNDP provided more than 1,700 cell phones, ensuring complete coverage across all health facilities. UNDP also assisted the MoHCC to train more than 1,400 health workers on the use of the new programme, allowing for a smooth national roll-out in 2012.

With Frontline SMS, **data captured on cell phones is automatically sent to a computer database in real-time**, transmitting the surveillance data from service delivery points to the district, provincial, and national levels. UNDP’s monthly payment of airtime bills for each phone ensures uninterrupted connection. The **timeliness and completeness of surveillance reporting has dramatically improved** through the introduction of Frontline SMS, from weekly **reporting submission rates under 50 percent in 2010, to above 95% in 2018** across an average of 1,330 health facilities – more than double the number of sites that submitted reports on time before the cell phone system. Moreover, with the integration of the Frontline SMS-enabled WDSS into DHIS-2 in 2014, all health personnel along the decision chain, from the policy level to service delivery points, can access the data needed for timely action.

“[The availability of surveillance data in DHIS-2] has been good for implementation. Every facility is configured in our system and we can analyze the data at every level.”

– MoHCC staff

Early detection is crucial to suppress the outbreak of diseases. With complete data and accurate weekly reporting, the WDSS has been able to effectively fulfill its **vital role as an alert system** for the country, quickly pushing information to all levels for immediate reaction.

“Results are transmitted automatically to the health facility. We are able to track areas where a certain disease is concentrated and know what the disease condition is every week.”

– MoHCC staff

The widespread presence of Frontline SMS at health facilities has also provided **low-cost opportunities for enhancements to other reporting systems.** In 2013, based on the success recorded under the WDSS, the MoHCC configured the reporting system for Early Infant Diagnosis to ride on the existing software, enabling the real-time transmission of laboratory results to be sent to health facilities. More broadly, the Frontline SMS-enabled WDSS has contributed to **improved**

coordination and synergies across disease programmes. As the WDSS tracks indicators across disease components, it has helped to facilitate joint programming and report writing workshops among stakeholders providing HIV, TB, and other health services. Each week, all actors across the chain come together to conduct the surveillance. The MoHCC at the national and provincial level ensures the widespread dissemination of the data through the production of bulletins shared with stakeholders down to the community level.

Frontline SMS has provided a foundation for MoHCC to further leverage digital technology to expand access to data that informs key health

“WDSS helps with decision making at all levels. At the end of the week, you are able to assess the magnitude of problems you are facing on priority diseases.”

– Manes Munyanyi, Deputy Director, Health Information and Surveillance Systems

decisions, including among patients and communities. Working with UNDP, UNICEF, and other partners, the MoHCC will explore means of riding on existing infrastructure at the community level, such as personal cell phones, to extend the scope of data collection and use for disease surveillance and other health interventions.



Building towards an integrated HMIS

The ability to share information across multiple data systems is crucial for a country to provide quality health services across the continuum of care. Siloed information systems overburden health workers and result in duplicate reporting, waste of scarce resources, and programmatic inefficiencies that can compromise the safety of patients and overall quality of care. While the digitization of core health information systems over the past decade has revolutionized data collection and analysis for better health service delivery, failure to integrate the different systems risks the continuation of information silos and duplicated efforts across different interventions.

As a first priority to make headway towards the vision of an inter-connected HMIS, the MoHCC identified the need to link patient-level information with aggregated district level health information. A survey in 2015 revealed discrepancies between the number of HIV patients reported in DHIS-2 and ePMS, with the information entered separately into each system and transmitted to central databases from different levels. **The MoHCC initiated work in 2017 to develop a new interoperability layer in DHIS-2 to bring the two systems together. This integration will not only improve the accuracy of data, but also provide a more comprehensive view of the health system** given the scope of information covered by the two platforms. This includes 13 health databases thus far through DHIS-2 and a centralized repository of patient-level data across health facilities through the Macro Database.





UNDP contracted the University of Oslo to provide the technical support and training for the process, with the interfacing of DHIS-2 and ePMS constituting the first phase in the longer-term development of an integrated national HMIS. Given the high risk involved, the University of Oslo supported the MoHCC to conduct an assessment of the needs and set up a multi-stakeholder project team to lead the endeavor. This approach ensured a **highly participative process with stakeholders at all levels** to inform the governance arrangements, infrastructure, data security, and other key issues entailed in the design and implementation. Further to the software components that would enable the two systems to speak to one another, there was also the need to address the gaps between them, with DHIS-2 operating across the more than 1,600 facilities in the country and ePMS, with its focus on select disease programmes, collecting data from some 600 facilities. To facilitate complete patient-level reporting, sites without ePMS were enabled to manually enter data directly into DHIS-2, complementing the aggregated datasets uploaded from ePMS-connected sites.

Beyond facilitating the availability of complete and timely information populated by two 'live' data systems, **the integrated platform has contributed to enhanced use and analysis of evidence at all levels of the health system**. Whereas aggregated data is crucial for national planning and analysis of health service performance, patient-level data allows health personnel to track individual patients, ensuring their adherence to treatments, and provides demographic insights that help the government to target service delivery. By capturing both databases in a single system, the integration helps to improve the accuracy of data and serves as an invaluable evidence base. The dashboard-driven nature of both ePMS and DHIS-2 allow easy visualization and analysis of trends and gaps based on a limited set of indicators.

The platform has encouraged the use of the information up to the Office of the President, serving to **inform the allocation of resources and development of national strategies** based on the priority needs in the country. Another outcome has been **enhanced coordination** between actors who engage with the data. Previously, health staff completed

separate reports on the performance of HIV, TB, malaria, and other programmes. The integrated platform has helped to break down siloes, bringing together ePMS and DHIS-2 technicians with programme personnel managing different disease programmes for joint reporting and more integrated programming.

Based on resource availability, the MoHCC, supported by UNDP, the University of Oslo, RTI and other technical partners, will gradually incorporate other information systems, building on the interoperability layer in place. This has already included the integration of a DHIS-2 module for malaria reporting and work towards a module for TB. The University of Oslo is now working with the MoHCC to leverage DHIS-2 to enhance the UNDP and Global Fund-supported Adolescent Girls and Young Women (AGYW) strategic initiative managed by the NAC and MoHCC. Having completed an assessment in 2018, the University of Oslo is working with the NAC and MoHCC to develop a DHIS-2 tracker tool for AGYW. The system will enable more effective monitoring and evaluation of the AGYW initiative and its integration with the broader DHIS-2 infrastructure, including data tools to strengthen implementation of HIV services for key populations.

Bolstered by the progress thus far, the MoHCC with UNDP and other partners has developed **a vision to establish a 'mother system'** under the EHR, with the national Macro Database, that will serve as a single portal for all HMIS in the country. Nevertheless, several challenges remain. With the MoHCC having now shifted from the ePMS to the EHR as the primary patient-level information system, there is a need to ensure alignment between the two systems. Power outages and human resource gaps impede data entry processes, with some health facilities lacking data entry clerks and receiving support through roving staff. With the increased possibilities for integration offered by the developments to DHIS-2, a top priority also remains in strengthening the efficiency of systems for the collection, storage, and analysis of increasingly larger data-sets. UNDP's investments in the national ICT infrastructure, including the development of a new data center and server in the MoHCC, has been key in this regard.



Integration success factors

Key success factors for the process of integrating DHIS-2 with ePMS and other systems have included:

- Leveraging **technical experts** from the University of Oslo, **strong collaboration** with key health information system technical partners in Zimbabwe, and availability of **sufficient funding** through Global Fund/UNDP support;
- Maintaining the same working group for ePMS as that for DHIS-2, and with dedicated funding, ensuring **adequate time** commitment from the team to focus solely on the integration work;
- Conducting a robust scoping exercise to understand the needs and way forward. Without **proper planning** and expertise, the integration could cause damage to both systems;
- Ensuring that each new system **built on the knowledge and infrastructure** put in place for previous ones, which also contributes to cost savings;
- **Building on the initial gains** achieved through DHIS-2 as a case to bring new players on board, including TB and malaria programmes.



This case study is based on a number of interviews with government and technical partners in Zimbabwe conducted in 2019. Information was supplemented by data from the following sources:

National Health Information Strategy for Zimbabwe 2018-2022

ICT Situational Analysis Report, by request of Zimbabwe's MoHCC, 2016

The ePMS for Zimbabwe, Assessment Report, 2014. MoHCC AIDS and TB Department

ePMS Strategic Plan 2013-2016, MoHCC AIDS and TB Department

MoHCC Zimbabwe Information Communication Technology (Digital Health) Policy, 2018

ePMS – Zimbabwe: UNDP case study, 2015

Innovation in the Zimbabwe Health Information System: UNDP case study, 2014