Elizabeth Glaser Pediatric AIDS Foundation / *Until no child has AIDS.*

SUPPORTING IMPROVED HEALTH OUTCOMES FOR MOTHERS AND BABIES THROUGH THE USE OF ELECTRONIC DATABASE SYSTEMS

Lessons from the Elizabeth Glaser Pediatric AIDS Foundation
Zimbabwe Program's National Electronic Database Implementation

Acknowledgments

About the Elizabeth Glaser Pediatric AIDS Foundation Zimbabwe Program

EGPAF began supporting the Zimbabwe national PMTCT program in 2001 and has remained one of the MOHCC's key HIV prevention, care, and treatment implementing partners. In 2011, Zimbabwe launched its National Strategy for Eliminating New HIV infections in Children and Keeping Mothers Alive (2011–2015) using the 2010 World Health Organization (WHO) PMTCT guidelines as a catalyst. Since this launch, EGPAF has supported the rapid expansion and optimization of PMTCT services. As of June 2015, EGPAF continues to provide direct support to a total of 1,495 sites in 62 districts of Zimbabwe, representing coverage of 96% of the total 1,560 antenatal care sites. EGPAF remains the leading implementing partner in delivering HIV services to the national PMTCT and pediatric HIV program in Zimbabwe.

Background

Zimbabwe is one of 22 priority countries highlighted by the Joint United Nations Programme on HIV/AIDS (UNAIDS) in its Global Plan towards the elimination of new infections among children by 2015 and keeping their mothers alive, with a high HIV disease burden and in need of swift action to combat its mother-to-child HIV transmission rate.[1] In 2011, Zimbabwe developed an elimination of mother-to-child transmission of HIV strategy in line with the Global Plan, with targets to reduce new HIV infections among children by 90% and reduce HIV-associated maternal and child deaths by 50% by 2015.[2] Zimbabwe's adult (ages 15–49) HIV prevalence rate has shown a decline from a peak of 26.5% in 1997 to 15.7% in 2011 and 14.8% in 2014.[3] The decline in new infections may be attributed to increased coverage of antiretroviral therapy and prevention of mother-to-child transmission (PMTCT) services throughout the country.

Management of HIV and AIDS has been a complex undertaking for many resource-limited countries. Overburdened health delivery systems are managing multiple disease conditions with limited resources. The HIV epidemic has required health delivery systems to provide new health information, such as data on HIV testing and treatment, beyond the capacities of existing health management information systems. Health service providers who are required to generate client-specific data for national disease and care monitoring are already overwhelmed with clinical workloads and increasing noncommunicable disease burdens. At the same time, the health management information systems are still paper-based, yet there is an increasing demand for more comprehensive, quality health information that would allow systems to better plan for and manage health programs.

Information technology advances have led to the development of different forms of electronic medical record (EMR) systems for the health sector. Many countries are moving toward harnessing this technology—moving away from burdensome paper-based systems and working toward establishing nationwide EMR systems. The types of systems range from computerized patient registers maintained at health facilities to full EMR systems in which clinical data are captured in real time at the point of care and used for patient management. Depending on the types of systems used, the benefits of EMR can be significant and include improvement in accuracy and quality of data recorded; enhanced use of patient health care information by health practitioners across the continuum of care; and improvement in the quality of care provided to patients as a result of timely availability of health information to health care workers (HCWs).

With funding from the Children's Investment Fund Foundation (CIFF), EGPAF supported the Ministry of Health and Child Care (MOHCC) in implementing a longitudinal patient-level database within the national PMTCT program from 2011 to 2015. The electronic database (EDB) was implemented at 36 health facilities in five selected districts. The EDB was introduced to strengthen monitoring and evaluation (M&E) of the expanded PMTCT program under implementation of the WHO 2010 guidelines, and it captured PMTCT longitudinal client data from various service delivery points in maternal neonatal and child health units. This type of tracking was an essential step alongside implementation of the WHO 2010 guidelines, as the guidelines called for longer duration of treatment among women and children in the PMTCT cascade, making follow-up of those enrolled in PMTCT essential for program success.

This program brief describes the experience of implementing the PMTCT EDB system in Zimbabwe and reviews the process, requirements, implementation steps, challenges, and lessons learned from the implementation experience, which will inform the development of national EMR systems in Zimbabwe.

Purpose, Goals, and Objectives

The goal of implementing the PMTCT EDB in Zimbabwe was to improve health outcomes for mother–baby pairs through improved patient tracking and tracing. The objectives were to strengthen routine program performance measurement, improve mother–baby pair follow-up through electronic patient tracking, and support operations research and impact evaluations to enhance the effectiveness of the national PMTCT program. Longitudinal patient monitoring is difficult with paper-based registries. Patients are recorded in different registers for different services or recorded in different places at different visits, making it difficult to track patients through multiple visits. However, longitudinal patient monitoring helps to track retention in care and ensure the quality of care of the individual patient. The database was piloted between September 2011 and 2015 at 36 health facilities in five selected districts—Tsholotsho, Mazowe, Beitbridge, Hurungwe, and Mutare—as shown in Figure 1.
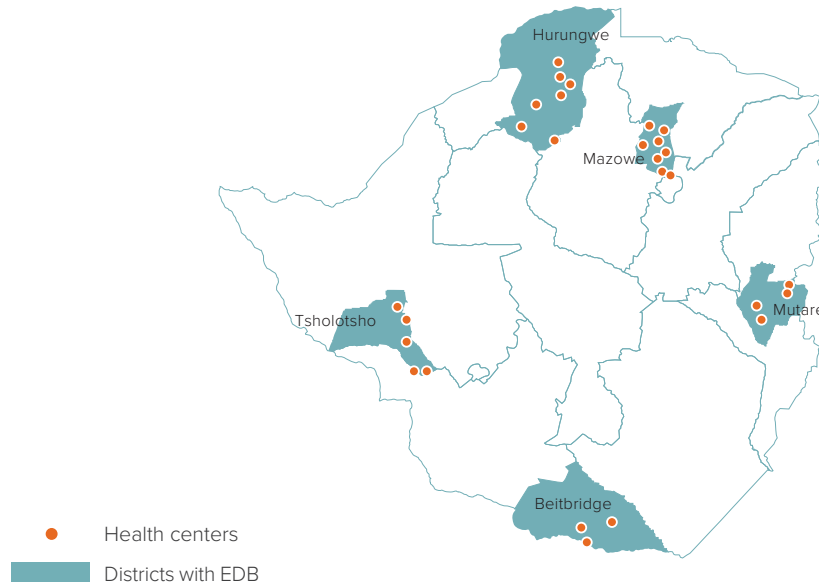

Figure 1. Districts and sites implementing the EGPAF-supported EDB

The EDB pilot sites were selected in collaboration with the University of California, Berkeley;* CIFF; and the MOHCC based on set criteria, including the following:

• Volume of HIV-positive women identified in antenatal care (ANC) to represent a mix of high-, medium-, and low-volume sites

• Geographic representation of the country's population and a mixture of urban and rural health facilities

• Accessibility of the sites using public transport (data would be captured in some sites by roaming data entry clerks [DECs] using public transport)

*The University of California, Berkeley was appointed by CIFF to be the external evaluator for the national PMTCT program.

Design and Implementation

The EDB was implemented in four phases, beginning with consultation with key stakeholders, planning, and system selection. A phased approach was used so that lessons learned could be incorporated in subsequent phases. The time frames for the phases were important to allow implementation of necessary course corrections before implementation of the next phase. The phases and time frames are outlined in Table 1:

Phase	Phase Activity	Time Frame	Number of DECs	Number of EDB Sites
1	Consultation, planning, and system selection	January—July 2011		
2	System customization and implementation in initial sites	August 2011—March 2012	5	5
3	First expansion phase	March—April 2012	18	18
4	Second expansion phase	July—August 2012	19	36

Table 1. Overview of the Phases in the EGPAF-supported EDB Design and Implementation

PHASE 1

Consultation, Planning, and System Selection and Customization

The first phase involved consultations with the MOHCC and initial planning for the project. It involved in-country stakeholder consensus-building processes, including coordination and planning meetings with the MOHCC, appointment of a focal person at the national level to drive implementation of the EDB by the MOHCC, and development of a national technical working group to inform roll-out and implementation. The working group included staff from the National AIDS Council, the MOHCC, and EGPAF.

Dr. Angela Mushavi, national PMTCT and pediatric HIV and AIDS care and treatment coordinator of the MOHCC, opening the national training on the PMTCT EDB (Photo: EGPAF, 2015)

This phase also involved selection of the electronic system to be implemented. The system selection process drew on EGPAF's global experience in supporting the development of EDB systems in other countries. Zimbabwe's criteria for selection of a system included low cost of implementation, open access, on- and off-line functionality, and ability to link mother–baby pairs. The working group decided to implement IQ Solutions, developed by Futures Group International. EGPAF entered into a memorandum of understanding with Futures Group International for adaptation and implementation of the system in Zimbabwe.

PHASE 2

System Customization and Implementation at Initial 5 Sites

The technical working group started national-level planning for implementation and system customization to suit the Zimbabwe PMTCT program. Futures Group International supported initial system customization. EGPAF and the MOHCC recruited, trained, and seconded the first five DECs to five selected EDB sites for the first implementation phase. At the site level, the DECs worked closely with family and child health nurses, reporting to MOHCC health information officers with a second line of reporting to the EGPAF country office.

This approach ensured day-to-day supervision from the MOHCC and regular support by EGPAF. The DECs supported health workers in ensuring data completeness and accuracy in the paper-based registers before capturing the data in the EDB. EGPAF and the MOHCC started joint site-support visits to EDB sites during this phase. The objectives of the site-support visits were to:

1. conduct data validation;

2. provide on-site mentorship of the DECs and HCWs on M&E tools and the EDB;

3. assess program performance (monitor challenges faced and identify success stories); and

4. address other work-related operational issues for the DECs, such as office space, and so on.

Screenshot of the EDB

PHASE 3
First Expansion Phase

During the third phase, the EDB was rolled out to 13 additional sites. An additional 13 DECs were recruited, trained, and deployed for these 13 sites. This brought the total number of EDB sites to 18 by the end of April 2012.

EGPAF introduced DEC review meetings during this period. The first review meeting was held in July 2012 and the second in October 2012. These meetings were organized to strengthen the quality of data, the implementation of the EDB, and data utilization at the site level. The meetings were also a platform for information sharing with DECs and for further refinement of the database with DEC input.

PHASE 4
Second Expansion Phase

In the fourth phase, the EDB was expanded to another 18 satellite† sites, with 16 DECs required to support an additional site each, bringing the total to 36 sites (see Table 1). EGPAF also recruited a database officer to support implementation of the EDB from the national level and a central (roaming) DEC to provide additional support to other DECs, for an overall total of 19 DECs. The database officer was recruited after the increasing burden of providing remote technical support to DECs became apparent, while the roaming DEC was recruited after recognition of the need for a dedicated "relief" DEC when resident DECs‡ went on leave, to ensure continuity of data entry and DEC support to health workers.

DEC STRUCTURING AT PHASE 4

By Phase 4, EGPAF had 18 DECs supporting 36 health facilities distributed as follows: Mazowe district, 10 sites; Hurungwe district, 9 sites; Mutare district, 7 sites; Tsholotsho district, 6 sites; and Beitbridge district, 4 sites. Sixteen DECs supported 2 sites each, 1 DEC supported 3 sites, and 1 DEC supported 1 site. The number of sites supported per DEC was based on site volumes.

During this phase, data collection, analysis, and use was strengthened at various levels of the health system. At the district level, health staff from EDB sites were sensitized on the importance of improving data quality in the primary source records and instructed on the use of EDB data in their program. At the provincial level, health information officers from all the districts and provinces began integrating the EDB into routine health information systems—that is, they included data from the EDB in their district health data.

Throughout Phases 2 through 4, MOHCC and EGPAF officers conducted routine supportive supervision visits to the EDB sites. Each EDB site was visited once a quarter. During these visits, the team provided support to the DECs, including updating the database where necessary, monitoring data entry and the quality of data entered into the EDB, and assessing the quality of the DECs' working conditions.

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†Satellite sites were sites that DECs would visit with a laptop to capture data according to a defined schedule. DECs would visit and capture data at satellite sites once a week.

‡A resident DEC was a DEC recruited and stationed at a particular site and capturing data at that site.

Project Impact

The EDB tracked longitudinal patient-level data, helping HCWs identify gaps in service delivery. The system also improved data utilization at the site level through the production of monthly PMTCT reports that were submitted to the MOHCC, as well as graphs and wall charts displayed in health facilities to showcase gaps or improvements in service delivery. The EDB generated lists of defaulting clients, whose names were given to community-based health workers for active follow-up in the community. DECs provided analyzed data to health facility staff, who identified gaps in service delivery and missed opportunities.

Monitoring of Retention in PMTCT

The EDB helped inform and improve programming by providing valuable longitudinal tracking of clients in the PMTCT cascade. The EDB provided data on factors such as patient retention on treatment as measured by pickup of drug resupplies. Retention data showed that there was a steady drop in patients collecting medicine resupplies after each consecutive visit. Only 77% of patients returned for their second drug pickup, 63% of patients returned for their third pickup, and only 45% of patients returned for their fourth pickup. As a result of the data generated by the EDB and recognition of the problem, a national track and trace system was established. Reports generated by DECs made it easier for the HCWs to closely monitor and follow up with clients who had missed appointments and link these clients to community workers, such as village health workers, who would then follow up with defaulters through telephone calls and/or home visits. As a result of the track and trace, six-month maternal retention has climbed up to 83% as shown in Figure 2.
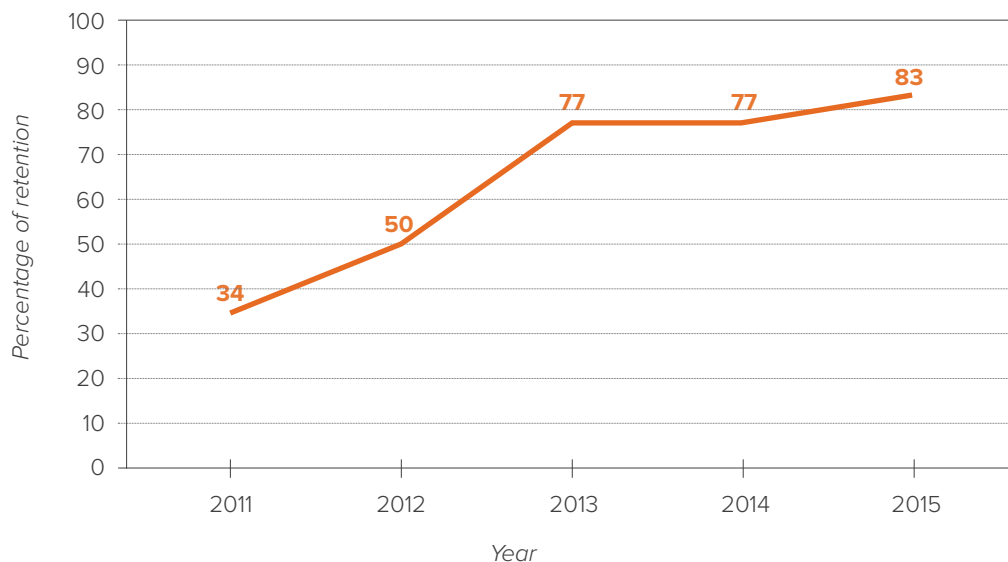

Figure 2. Retention of mothers on ARVs, EDB data from 2011–2015[†]

[†]*From 2011 to 2013, retention was measured by 2nd Zidovudine pick-up under Option A regimen and from 2014 to 2015 Option B+ retention of HIV-positive women on ART was measured at 6 months using client visits.*

Longitudinal follow-up data for mothers also indicated that client mobility is a major challenge for mother–baby pair follow-up in Zimbabwe. Only about 50% of the mothers booking for ANC delivered at the same health facility where they booked for prenatal care. Some women were referred to higher-level health facilities for delivery, while others relocated and delivered in other regions. The EDB was not set up to track clients from one health facility to another.

> **ROAMING DEC**
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> The roaming DEC relieved a resident DEC who was going on leave to ensure continuity of data capture and avoid backlogs. This DEC was introduced in Phase 4 after it became clear that the volume of data was so large that DECs going on leave would come back to huge backlogs and need to work overtime to clear the backlog.

Identification of Late ANC Enrollment Among Pregnant Women

The EDB allowed DECs (and the program more generally) to track the gestational age of pregnant women at ANC booking and assess whether women were coming to the facility early enough to receive the best care for themselves and their babies. These EDB data prompted HCWs to increase awareness of the importance of early ANC booking at the community level through the involvement of community leaders and peer educators, and by broadcasting TV and radio programs that focused on messages regarding the importance of early ANC visits during pregnancy. As these efforts continued, data from the EDB started to indicate a decline in mean gestational age at booking and an increase in the proportion of pregnant women booking before 14 weeks' gestational age (Figure 3).
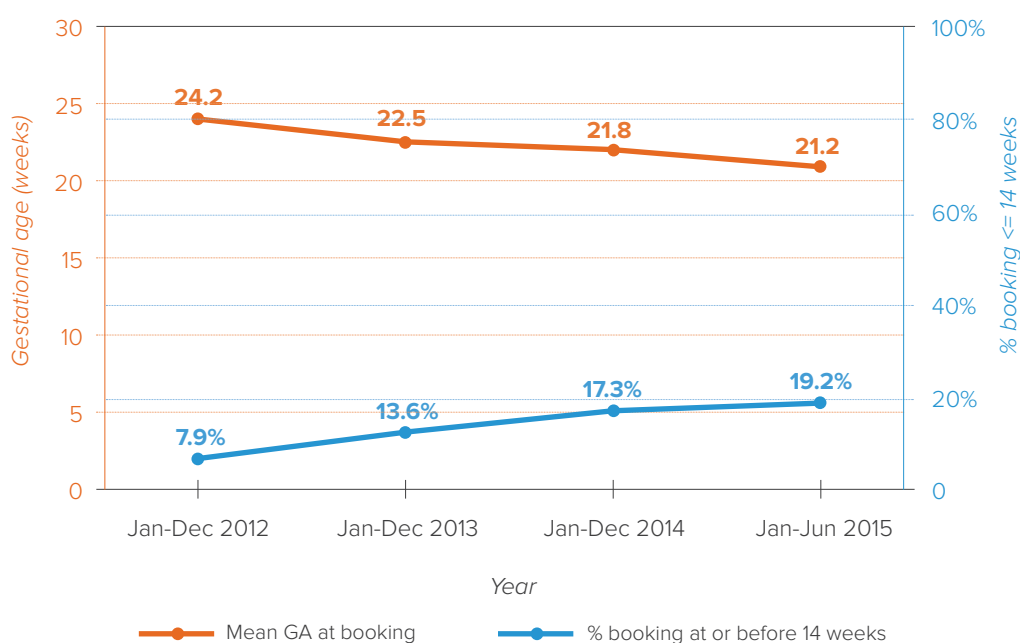
Figure 3. Gestational age (GA) at booking by quarter (January 2012–June 2015), EDB sites

EDB Use in Quality Improvement Projects

EDB data were used in quality improvement activities at the site level. At one health facility, Kasimure Clinic, the EDB was used in a male partner involvement quality improvement project. Baseline EDB data revealed that there was low testing of partners of women attending ANC. The HCWs set up a quality improvement project in which they called on chiefs in the community to mobilize to encourage partner testing in ANC. After one year of this active campaign for male partner involvement and testing in ANC, a steady increase of roughly 20 percentage points was observed, from 4%–6% partner testing in 2012 to 24%–29% partner testing in 2013 (Figure 4).
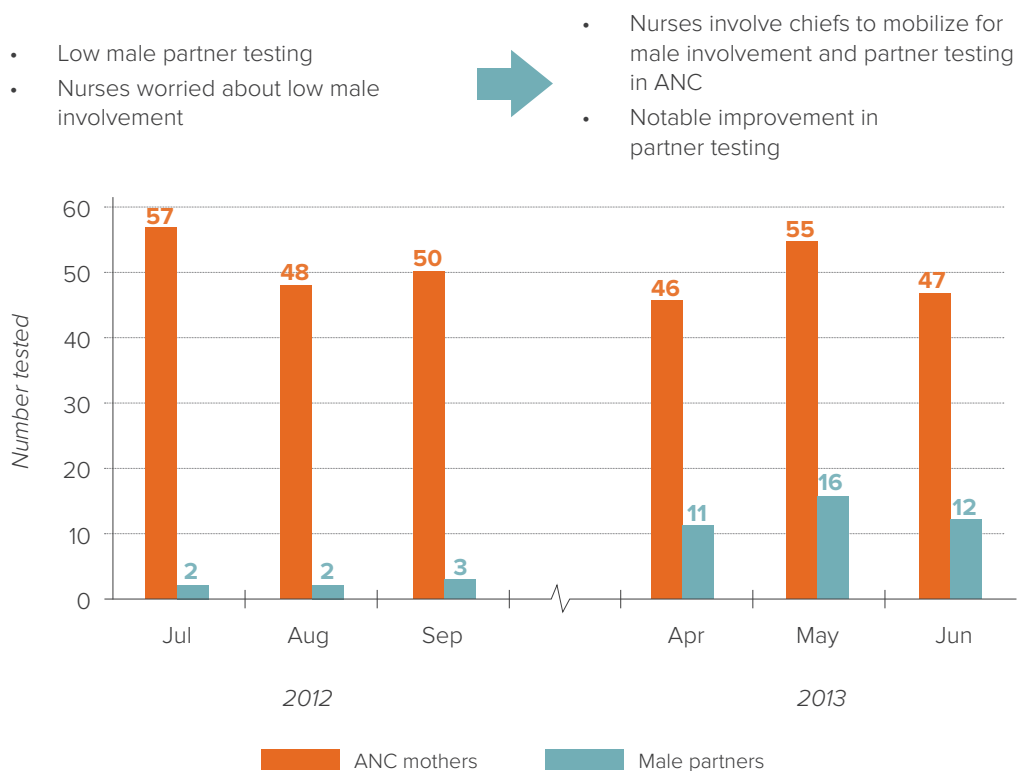
- Low male partner testing
- Nurses worried about low male involvement

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- Nurses involve chiefs to mobilize for male involvement and partner testing in ANC
- Notable improvement in partner testing

Figure 4. Example of EDB data use in quality improvement projects: Kasimure Clinic— HIV-positive pregnant women who were tested for HIV in ANC together with their partners

Key Lessons Learned

The lessons learned from the EDB implementation process and initial use were as follows:

- EDB development: Consultations with the MOHCC at the national and provincial levels ensured full support for the system and DECs. Clear system requirements guided the system selection. The IQ-Care software used in the EDB was developed by Futures Group International, and the involvement of Futures Group in the national training on the system and early phases of system customization ensured successful customization and a good understanding of the system from the outset.

- EDB deployment: The involvement of the MOHCC in recruitment, training, and deployment of DECs ensured a smooth introduction of the system and integration of DECs in health facilities.

- EDB implementation support: Bipartite DEC supervision, joint MOHCC and EGPAF routine site-support and supervision visits, and EDB review meetings enhanced implementation, data quality, and EDB utilization.

- Data quality strengthening: The EDB improved data quality in patient registers, as DECs frequently brought missing data and accuracy queries to health workers and provided one-on-one coaching on data points in registers and indicator reporting in monthly progress reports.

- EDB utilization: The EDB tracked patient-level data, which helped HCWs identify gaps in service delivery. The EDB improved data utilization at the site level. The EDB was used to produce monthly PMTCT reports submitted to the MOHCC, as well as graphs and wall charts displayed in health facilities. Leveraging documentation in patient registers using the electronic system and DECs enabled health workers to better identify needed improvements and solutions to enhance the functioning of health service delivery. EDB data use at the site level provided HCWs with evidence to assess and improve the quality of care provided to patients and to target human and material resources toward improvement of the quality of services provided.

Challenges

Table 2 summarizes the challenges faced during implementation of this activity, and the actions taken to address them.

Challenges	Responses to Challenges
Transportation for DECs to get to and from different clinics	Flexible hours to allow for travel time and also to allow for easy access to registers during clinic off-hours
Unstable electricity supply at the facility to power DEC laptops	Solar-powered laptop batteries that recharge in the sunlight (procured and supplied by EGPAF)
Weak data-use culture among health workers to document patient information	Data-use meetings; printouts of graphs and tables to allow for data use during reporting and client appointments; buy-in from leadership on the importance of documentation; and DECs included in the district review meetings to share EDB data
Limited access to registers by DECs to enter data into laptops during normal working hours	Flexible working hours to allow for data entry during non-working hours
Quality of data found in registers	M&E training for HCWs and one-on-one coaching for HCWs on new indicators and reporting

Table 2: EDB Implementation Challenges

Conclusions

The EDB provided critical and previously unavailable PMTCT program data, including data on early ANC attendance, partner testing, loss to follow-up and retention in care, and infant HIV outcomes by mother's PMTCT interventions. These data require patient tracking across multiple registers or fields and require linking women in ANC to their partners and their babies, which is difficult using paper-based registers. Evidence on the extent to which women were booking for ANC in line with WHO guidelines informed community mobilization interventions on early ANC booking. Data on low retention rates and high default rates informed interventions for patient tracking and tracing. EDB data analysis at the site level led program implementers to make corrections to strengthen service delivery. Through the EDB, sites were able to identify defaulting clients and activate tracking and tracing systems (through the use of community cadres) to improve retention.

The EDB informed the development, roll-out, and implementation of the national electronic patient management system (ePMS), a national electronic patient tracking database system that was later developed by the MOHCC. The ePMS is using the model of data entry by DECs that was used in the EDB, and the same model of training and national-level support and supervision. The EDB will be phased out as the national roll-out of the ePMS continues.

References

1. Joint United Nations Programme on HIV and AIDS (UNAIDS). The global plan towards the elimination of new HIV infections among children by 2015 and keeping their mothers alive 2011-2015. Geneva, Switzerland: UNAIDS; 2011.

2. Zimbabwe Ministry of Health and Child Care (MOHCC). National strategy for elimination of new HIV infections in children and keeping mothers alive, 2011-2015. Harare, Zimbabwe: MOHCC; 2011.

3. MOHCC. National spectrum HIV estimates. Harare, Zimbabwe: MOHCC; 2013.

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