



BID INITIATIVE BRIEFS: RECOMMENDATIONS AND LESSONS LEARNED

## Electronic immunization registries

The BID Initiative is grounded in the belief that better data, plus better decisions will lead to better health outcomes. It was designed in partnership with countries to enhance immunization and overall health service delivery by improving data collection, quality, and use. The BID Initiative takes a holistic approach to address immunization data challenges and strengthen evidenced-based decisions through a package of interventions including people, products, policies, and practices. These briefs summarize the approaches and interventions that the BID Initiative rolled out in partnership with the governments of Tanzania and Zambia and shares recommendations and lessons learned for others interested in improving immunization data quality and use.

### BACKGROUND

Electronic immunization registries (EIRs) have been central to the BID Initiative's work and a core product to address key data quality and data use challenges. EIRs help produce and manage data, providing people who use them in their daily work with better access to information and the ability to build their data analysis skills to improve data quality.

With a core principle of country ownership, the BID Initiative focused first on the data quality and data use challenges facing countries and then collaboratively identified interventions to best address the challenges. At a consultation meeting in late 2013, representatives from ten countries in sub-Saharan Africa worked through a process known as [Collaborative Requirements Development Methodology™](#) (CRDM) to develop a set of common requirements to address the shared challenges.

The common requirements became the basis for subsequent work in the BID Initiative's two demonstration countries, Tanzania and Zambia. Both countries decided to have an EIR as the primary tool in a suite of interventions to address data-related challenges. Key stakeholders in both countries adapted the common requirements to their specific country context, embracing the core principles of open technology and interoperability. The requirements were used to identify the software that would best meet each country's needs.

A national EIR can address many of the critical data-related challenges facing immunization programs by ensuring that all children are registered at birth and do not miss a potentially lifesaving vaccine and that the necessary stock is on hand when needed. Because paper systems lead to heavy workload burdens, EIRs also help health workers reallocate their valuable time, spending more time caring for patients and less time manually compiling reports.

## What are the steps in CRDM?

### DOMAIN

Set of functions and processes that defines the work of a specific area of the larger health system (e.g. supply chain).

### PROCESS FRAMEWORK

Set of processes that defines the boundaries of a domain and the relationships between them and other systems and domains.

### BUSINESS PROCESS

Set of activities and tasks that logically group together to accomplish a goal or produce something of value for the benefit of the organization, stakeholder, or customer.

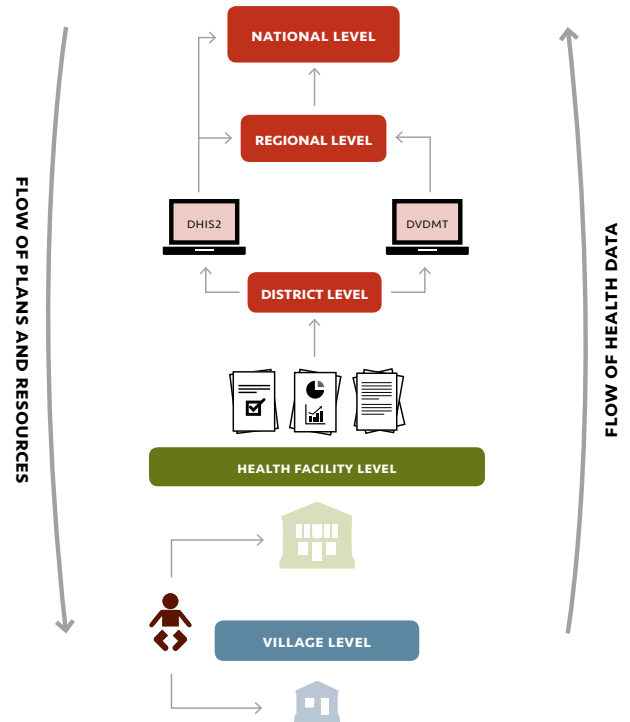
### ACTIVITY/TASK MODEL

Visual representation of a business process in terms of tasks, sets of tasks, and decision points in a logical workflow used to enhance communication and collaboration among users, stakeholders, and engineers.

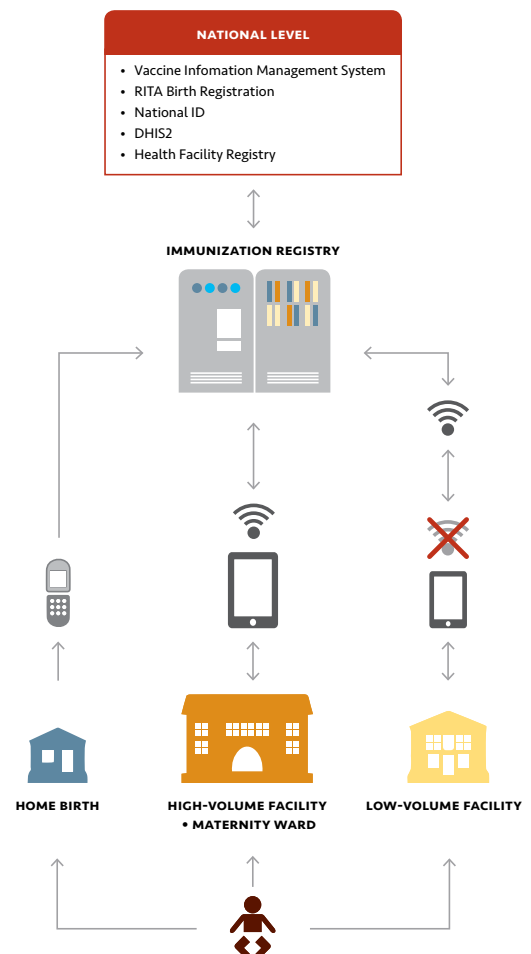
### REQUIREMENT

Statement that describes what an information system must do to support a task, activity, or decision. These are non-technology statements that usually begin with “the system must or shall...”

**FIGURE 1:** Before the electronic immunization registry was deployed.



**FIGURE 2:** The following figure depicts how the flow of information changed with the implementation of data quality and use interventions and after the electronic immunization registry was deployed.



When children come to a health facility for vaccination, or just to have their weight taken during well-child visits, the data are recorded in the national immunization registry. The electronic registry replaces paper systems and contains data on all children and their immunization histories, as well as other basic indicators collected for monthly reporting (including some nutrition indicators). Health workers register a child at the facility using a computer or tablet and assign each child a barcode/QR code with a unique identification number. The same barcode/QR code appears on the child’s health card. Children can be added and tracked in the registry through this barcode/QR code number, either by scanning the code or entering the number itself. All facilities have visibility into the data and can notify health workers when a scheduled vaccination was missed or when a facility is running low on vaccine supplies.

Facilities with Internet access can use a computer or a tablet to enter data about the child’s weight and vaccinations in real time, and facilities that are not connected can sync information to the national database the next time a connection is established. Every child is entered into the immunization registry at birth (or shortly after, ideally within 48 hours). This registration is done by the health facility or, with a home birth, by a village



PATHI/Fred Njobvu

representative or community health worker through short message service (SMS). The EIR then automatically generates an immunization schedule for each child. Because births are registered, clinics can expect to see children at six weeks of age and have enough information to trace children who miss their first visit.

This intervention addresses challenges related to:

- **Incomplete or untimely data.** As data are entered into the EIR and synced to the national database, any level of the health system can have access to the appropriate level of detail needed for their activities and decision-making.
- **Inaccurate or uncertain target population numbers.** If every child is entered into the EIR within 48 hours of birth, an exact number of births can be determined for a specific catchment area, especially for children under one year of age. More accurate population data will help in planning for service delivery and preparing coverage estimates.
- **Difficulty identifying infants who do not start vaccination or who drop out (defaulter tracing).** With an EIR, health workers know which children are missing vaccines, can look them up by name, and can contact their caregivers. They can also tell if a child was vaccinated outside of his or her “home” facility since the immunization registry will contain children nationwide.
- **Complex data collection forms and tools.** The EIR eliminates the need for health workers to generate reports at the end of the month as the information is visible to all levels of the health system. The data are also shared in the national health management information system to ensure that it is timely and easily accessible.

- **Poor visibility into supply data.** With the basic stock management information in the EIR, health workers can plan to ensure they have sufficient stock, and district managers can manage their stock across all of the facilities in their area.

## RECOMMENDATIONS BASED ON LESSONS LEARNED

Key recommendations based on lessons learned during the BID Initiative’s work in Tanzania and Zambia to develop EIR platforms are outlined below.

1. **Establish clear system requirements and expectations with all key stakeholders at the beginning of the process.** It is critical that everyone is aligned on what the EIR will deliver (and what it will not), and that the system requirements match the available technology, timelines, resources, and national standards and policies. Throughout the development process, there should be continuous verification and communication. Build in time to discuss critical decisions or any changes to the requirements or the development road map.
2. **Allow sufficient time for software development and testing.** It is important to use the agile development methodology, which requires ongoing prioritization of requirements, user feedback, and issues. Set a list of minimum requirements that are needed for rollout, versus requirements and user feedback that could be incorporated during rollout. This ensures an iterative and incremental development process, allowing sufficient user feedback at critical moments.





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3. **Ensure a user-centered design methodology to provide timely testing and input throughout system development.** User input on key items will both ensure the most effective system and help maintain excitement and momentum, as well as build ownership. Clear expectations should be set with users so they are prepared to see various iterations and change throughout the process. One option is to slot user feedback as “must haves” versus “nice to haves” based on timelines and required functionality.
4. **Build in sustainability plans from the beginning by including the ministry of health throughout all processes and by engaging local technology partners as needed.** This includes capacity-building for system management and data management, as well as providing learning and sharing opportunities such as workshops and conferences for government counterparts.
5. **Pair the EIR tool with data use interventions to build greater understanding of the value of data at all levels of government.** Health workers will focus on the system when it is first introduced. However, it is important to reinforce data use practices alongside the system so they understand how entering, collecting, and analyzing the data will improve service delivery—for example, by helping to identify and follow up with defaulters or by helping to ensure that health workers have enough vaccine stock on hand when needed.
6. **Use SMS birth notifications selectively and where appropriate.** SMS birth notifications to register home births are a critical method to include all births in the EIR but may be most cost-effective if targeted to areas with a high percentage of home births. Because the training and follow-up required with village representatives or community health workers can be costly, focusing SMS home birth notifications in specific areas can provide a greater return on investment.
7. **Remain flexible throughout the process, shifting strategies as new lessons are uncovered.** In Tanzania, there was an effort to introduce a simplified paper form for the facilities where connectivity was a challenge. As work progressed across the first region, many challenges around the logistics of the paper forms occurred, and the Tanzania government decided to move entirely to electronic forms by introducing use of a smaller, less expensive tablet for more rural facilities. In Zambia, the government chose to implement a fully electronic system from the beginning of its process.
8. **Collaborate with the government and partners to understand the current landscape.** Understanding what systems currently exist, what program and data goals the systems serve and potential areas of complementarity and divergence is critical to ensuring that there is consensus and support. Fostering consensus also helps government stakeholders and partners to harmonize messaging for system users, and address resistance among new users, who may perceive the system as duplicative or additional work.

Cover photo: PATH/Gabe Bienczycki

#### BID Initiative

##### Street Address

PATH  
2201 Westlake Avenue, Suite 200  
Seattle, WA 98121 USA

##### Mailing Address

PATH  
PO Box 900922  
Seattle, WA 98109 USA

206.285.3500  
www.bidinitiative.org  
bidinitiative@path.org

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