

IDEA

**IMMUNIZATION DATA:
EVIDENCE FOR ACTION**



A Realist Review of What Works to Improve Data Use for Immunization

Evidence from low- and middle-income countries

**EXECUTIVE
SUMMARY**

Executive Summary



Data quality is a cornerstone of well-functioning health systems. Sound and reliable information enables better resource allocation, more targeted care, policy development, and implementation, and more effective health education and training. Calls to improve the quality and use of data feature prominently in several national plans of action and in global strategies like the Global Vaccine Action Plan.

The Global Fund to Fight AIDS, Tuberculosis and Malaria; US President's Emergency Plan for AIDS Relief (PEPFAR); and Gavi, the Vaccine Alliance; among others have also identified data quality and use as strategic focus areas. Despite the significant resources invested in developing national health information systems and the volume of health data available, the actual use of data in decision-making remains a challenge. As decision-makers and other stakeholders consider how to best allocate finite resources with the goal of improving immunization coverage and equity, there is a need to better understand what works to improve data use in decision-making and to identify effective and ineffective approaches, as well as any knowledge gaps.

The goal of the Immunization Data: Evidence for Action (IDEA) project is to identify, review, synthesize, and disseminate what works to improve the use of immunization data and why it works. In partnership with the Pan American Health Organization, the Health Systems Analytics team at PATH conducted a "realist" systematic review of existing research evidence to answer two principal research questions:

01. *What are the most effective interventions to improve the use of data for immunization program and policy decision-making?*
02. *Why and how do these interventions produce the outcomes that they do?*

The realist review approach, unlike a traditional systematic review, does not exclude evidence based on study design or quality. By considering information and evidence from a broader range of sources, realist reviews are well suited for studying complex interventions¹. We developed a Theory of Change (TOC) based on our review of existing health information and data use frameworks and logic models, as well as systematic reviews on topics related to health information system strengthening and evidence-informed decision-making to guide the review (see Figure 1). The TOC framed our hypothesis of the theorized mechanisms and contextual factors that work together to help decision-makers translate immunization data into information, and ultimately action. We identified intermediate outcomes as the necessary precursors to data use, including data quality and availability, analysis, synthesis, and discussion of data. The ultimate outcomes of interest in this review are the data use actions that are based on the World Health Organization's Global Framework to Strengthen Immunization and Surveillance Data for Decision-making². The TOC guided our analysis of how interventions led to improved data use; it also evolved iteratively over the course of the review as we gathered new evidence.

We reviewed 426 documents from published and grey literature and identified ten categories of data use interventions (Box A). We shared preliminary findings with

Intervention categories identified

01. Electronic immunization registries
02. Logistics management information systems
03. Health management information systems
04. Decision support systems
05. Data quality assessments
06. Data review meetings
07. Peer learning networks
08. Supportive supervision, mentorship, and on-the-job training
09. Training
10. Multicomponent interventions

immunization stakeholders during a workshop in May 2018; based on the feedback we also identified areas in which experience and evidence from other health sectors were applicable and expanded our search, adding another 123 documents to the body of literature reviewed.

Because of the nascence of the field, much of the immunization sector's knowledge on data quality and use interventions has not been rigorously evaluated or published. In addition to including studies and evaluations that applied scientific research methods or evaluation design, we also considered literature that did not qualify as a study or evaluation but had strong theoretical plausibility of improving data use, as judged by our TOC. We referred to these records as *promising strategies*, which we define as strategies that have not yet proven successful, but have potential for future success. We assessed the quality of studies using the Mixed Methods Appraisal Tool (MMAT), a checklist designed by Pace et al. for systematic literature reviews for appraising the quality of quantitative, qualitative, and mixed methods studies²³. We coded the included records and synthesized the evidence according to domains in the TOC. We rated the certainty of evidence after considering the study design and study quality, the number of studies and their agreement, and the context dependence of the evidence. The results were summarized in an evidence gap map matrix (see Figure 4) and in a synthesis table (Annex 5).

Despite the growing recognition that quality, timely, and accessible data are essential to every country's ability to deliver vaccines effectively to its population, few data use interventions have been rigorously studied or evaluated. There is limited evidence of how data can be effectively used to support data-driven action and decision-making. We found more evidence on the intermediate outcomes of data use interventions on data quality, availability, analysis, synthesis, interpretation, and review. The information and evidence we collected permitted us to develop stronger evidence-informed theories about what works to improve the quality and use of data, for whom, and under what circumstances. We reached the following conclusions.

Multicomponent interventions were the most prevalent and often more effective.

Nearly all the interventions we reviewed leveraged more than one data use strategy. The more comprehensive the set of strategies, and the more they addressed barriers at various stages of data use (e.g., data availability, data quality, and data use skills) and touched upon multiple mechanisms driving data use behaviors and actions, the more likely they were to achieve results. By addressing different facilitators of data use, the multicomponent interventions employed interconnected, mutually reinforcing strategies that appeared to have a greater collective effect than a single intervention. Notably, successful intervention packages included strategies that addressed:

- ▶ *skill sets and capacity of data users;*
- ▶ *gaps in feedback mechanisms;*
- ▶ *data use within existing systems, workflows, and workloads;*
- ▶ *user-centered design principles;*
- ▶ *interaction between data producers and data users, and structured problem-solving;*
- ▶ *data use culture and motivation to use data; and*
- ▶ *long-term commitment of financial and human resources.*

Interventions that took a health systems approach to institutionalizing data use were more likely to be successful and sustainable.

Interventions were more successful over the long term when they focused on systematizing data use at all levels of the health system and as part of decision-making processes. This occurred by routinely conducting data review meetings at all levels, making national guidelines and protocols on data use available to frontline staff, creating dedicated staff positions at all levels of the health system to oversee data management and use activities, and incorporating training in data use in national in-service and pre-service training curricula.

We found limited or mixed evidence on the effectiveness of health management information systems, including electronic immunization registries, on data use, but they remain promising interventions for improving data use when accompanied by complementary activities.

Transitioning from paper to computerized health management information systems across all levels of the health system seems to have made higher-quality data more available to decision-makers and may have contributed to better data use at the district level when complemented by activities that reinforce data use. The effect on data use at the facility level, however, remains less conclusive. In many countries, the significant operational challenges, extended time required for a return on investment, and absence of complementary data use activities have contributed to the mixed results presented in the research literature. Full transition to computerized systems may be more successful when they are incrementally phased in only once a reliable foundation of data use infrastructure, human resource capacity, and skill base has been established.

Moderate- to high-certainty evidence exists to suggest that computerized logistics management information systems (LMISs) have made higher-quality data more available to decision-makers to improve management of supply chains.

Computerized LMISs that were implemented at district levels and higher seem to have had more success than similar efforts to digitize routine service-delivery data at a facility level. There were often fewer operational challenges when they were implemented at district and higher levels, where Internet connectivity, electricity, and information technology support were more reliable. In addition, we hypothesize that data users may have greater knowledge of how to use supply chain data to take action directly compared with routine service delivery data, which are more commonly collected for reporting by frontline health workers who feel little connection to or agency over the data. Although implementing computerized LMISs as a single intervention improves data quality and use, there were even greater gains in data use and supply chain performance when LMISs was complemented by other data use activities.

There is a dynamic, cyclical relationship between data quality and data use.

Although poor data quality was an important barrier to data use, we found limited evidence that single-component interventions to improve data quality led to improvements in data use. Conversely, we found stronger evidence that data quality improved through the use of data. As decision-makers started using their data more and identifying inconsistencies with data quality, they took more corrective actions to improve data quality.

This review was limited by several factors. Notably, our findings relied on what was reported in the literature, which sometimes lacked a thorough description of the factors that contributed to an intervention's success or failure and may have caused us to miss important contextual considerations. Our focus on routine immunization data helped to manage the scope of the review but risks further siloing immunization programs. We expanded the review to include literature from other health sectors (HIV and maternal and child health, specifically); however, these efforts were not as comprehensive and likely failed to capture all the available evidence on the topic. We also found limited studies and evaluations that included cost-effectiveness analyses and therefore were unable to examine the cost-effectiveness of interventions included in this review. Many promising reviews of data use more broadly are under way. The entire body of work should be considered together to inform strategic and cross-programmatic investments in interventions to improve data use.

This review targets various audiences and intends to provide relevant information and evidence on the most effective practices so that policy and program decision-makers, as well as funders and implementers, may choose and implement approaches with the highest impact on improving the use of data to expand vaccine coverage and equity, and ultimately reduce, or even eliminate, vaccine-preventable diseases. We anticipate that these findings will also be of interest to researchers and evaluators to prioritize gaps in the existing knowledge. Our recommendations are segmented by audience group to encourage action.

CHECKLIST OF ACTIONS TO SUPPORT DATA USE

Theory of Change
Data Use Actions



How to improve data use at the **HEALTH FACILITY LEVEL?**



How to improve data use at the **HEALTH DISTRICT LEVEL?**



How to improve data use at the **NATIONAL LEVEL?**



**Implementers
(and national
level actors)**

Cross-cutting actions

- The data use intervention's design is based on an assessment of current data quality and use challenges and their root causes, including assessing the mechanisms, behavioral drivers, and contextual factors that may act as barriers or facilitators to specific data use actions.¹
- The intervention specifies the data use actions (from the TOC) it aims to support.
- The data use actions are actionable by the intervention's intended users and are of significance to the program itself.
- All parties are clear which data use action the intervention will reinforce and strengthen.
- The intervention has a clear theory for how it will work.
- It is clear how the intervention will use multiple mechanisms and behavioral drivers to achieve its intended data use actions.
- The intervention clearly targets specific bottlenecks known to constrain data use in the intervention setting.
- The intervention aligns with national guidelines on processes and procedures for data collection, analysis, and use by health care workers.
- During the design and conception phase of the intervention, an M&E strategy was developed to measure whether data are being used as intended and as defined by the data use actions it is intended to address.

- The intervention establishes or strengthens feedback loops between data collectors (e.g., health care workers in a facility) and decision-makers at higher levels.
- Implementers support harmonization across projects and alignment with local policies and guidelines on health care workers' roles and responsibilities in relation to data analysis and use.

- District level health workers have the needed tools and training to deliver effective supportive supervision, including ways to provide proper feedback to facility health care workers and ways to support the intended data use actions.
- District level staff have clarity on their roles and responsibilities in relation to data analysis and use.

- Data use strategies focus efforts on increasing use of evidence in policy decision-making.
- Data Improvement Plans (DIPs) include actionable recommendations.
- DIPs are monitored to ensure facilities and districts take action on the recommendations.

¹ Refer to the IDEA TOC which outlines the potential mechanisms (demand, access/availability, quality, skills, structure & process, communication), behavioral drivers (capability, motivation, opportunity), and contextual factors..



**Policymakers
and
Multilaterals**

Cross-cutting actions

- The intervention aligns with national guidelines on processes and procedures for data collection, analysis, and use by health care workers.
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| <ul style="list-style-type: none"> □ Health facilities are equipped with sufficient human resources—including dedicated staff where feasible—to perform tasks associated with data collection, management, and analysis. □ Front-line health worker training curricula focuses on training staff to use routine service delivery data for decision-making and problem solving and shifts perceptions away from data serving the sole purpose of reporting up through the system. | <ul style="list-style-type: none"> □ Tools that organize data into meaningful information are implemented with complementary strategies for discussing data analyses and determining actions to be taken. □ Strategies are implemented to improve the quality of supportive supervision to focus on improving data use skills and practices. | <ul style="list-style-type: none"> □ National guidelines contain well-defined processes and procedures for data collection, analysis, and use by health care workers across all levels of the health system. □ National guidelines include clear guidance on various types of decision-making informed by data, as well as guidelines for how health workers are expected to use data in various scenarios. |
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Theory of Change
Data Use Actions



How to improve data use at the **HEALTH FACILITY LEVEL?**



How to improve data use at the **HEALTH DISTRICT LEVEL?**



How to improve data use at the **NATIONAL LEVEL?**



Funders

Cross-cutting actions

- Investments address documented bottlenecks to data use and use multi-component and theory-driven approaches to resolving those challenges.
- Investments are funded based on what is known to work, or has high likelihood of success in a given context.
- Investments are aligned with national policies and strategies for data use or ehealth and with other investments.
- Investments are accompanied with a robust M&E plan that will contribute to filling existing evidence gaps, including cost-effectiveness.

- Data quality investments have been equally balanced with strategies to improve data use.

- Investments include components of quality improvement methodologies to provide structured approaches to interpret data, prioritize problems, and find solutions.

- Investments are geared towards data use strategies and efforts to increase use of evidence in policy decision-making.

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The IDEA review was funded by the Bill and Melinda Gates Foundation and developed in partnership between PATH and PAHO. The IDEA steering committee includes global and regional senior leaders in the areas of immunization, data quality, and use from WHO, CDC, UNICEF, and Gavi; as well as country representatives from both the BID Learning Network and Improving Data Quality for Immunizations project core countries. The committee helped guide the direction of the work to ensure its relevance for multiple agencies, countries, and decision-making bodies.

Disclaimer: The views expressed herein are solely those of the authors and do not necessarily reflect the views of the Foundation or their agencies or institutions of employ.

**For information about the IDEA project
and to access to the full review visit:
<https://www.path.org/ideareview>**

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