

Bringing online immunization registries to low-resource countries

The problem with current immunization information systems

Today, most health workers at the service delivery level use paper-based systems to track individuals who have been vaccinated and the vaccines and other resources used during the process of immunization. Health workers then report these data through monthly, aggregated reports to supervisors who use them to monitor and evaluate key performance indicators such as immunization coverage, child dropout rates, and vaccine wastage.

This paper-based reporting system is labor intensive, is prone to errors, and can lead to the over-reporting of vaccine coverage rates. Increased pressures from migration and urbanization also lead to an overburdened system, making it much harder for health care workers to track child vaccinations. Furthermore, reporting systems do little to help health care workers in their day-to-day work and have no impact on the everyday management of the health facility—meaning that there is not much motivation to improve them.

At the same time, there is an increasing demand for accurate, relevant, and timely data to support decision-making at the national and global levels. For example, programs that rely on performance-based funding find it exceedingly hard to rely on data as reported by countries. Better immunization information systems are needed.

Boosting program performance while producing better data

Computerized immunization registries track each child's vaccinations and feed that information into a national database. This personalized recording system allows for individualized follow-up, helping to ensure that children receive all necessary vaccinations even if the children move to another area of the country. By tracking this information, immunization programs can reduce the number of defaulters (people who do not return for immunizations when they are due), find the unimmunized, and ensure that the right vaccines are distributed when and where they are needed. This minimizes vaccine wastage, loss, and stockouts. This system also allows for lot tracing down to the individual child receiving the vaccination, which is essential for vaccine safety and management of adverse events following immunization.

Demonstrating a computerized immunization registry system in Albania

Albania's immunization program reports very high immunization coverage, but like in many countries, its paper-based information system is unreliable and allows policymakers to perform only limited analyses. Project Optimize, a World Health Organization and PATH collaboration, worked with the Albanian Institute of Public Health to develop and implement an immunization information system that provides the type of high-quality, granular data that policymakers need.

That system is now in use by 24 nurses in one pilot district. Newborns are registered in the system by staff at the maternity hospital and assigned to one of the district's health centers. A schedule of future immunization appointments is then automatically generated, and when the appointments are due, children are included in the monthly plan of the health center that will be responsible for each child. As children then visit the health centers, their vaccinations are registered.



Computerized registries track each child's immunizations and feed that information into a national database.

In general, the system simplifies the monthly planning and reporting that nurses need to do. More importantly, by tracking individual children, the system can generate coverage reports automatically by comparing actual vaccinations with planned vaccinations. It can also show exactly which children have not been vaccinated: those who have been registered but have not yet received all their doses. This allows nurses to easily identify those who have not returned for follow-up visits. Nurses can then use the system to send short message service (text message) reminders to parents and caregivers.

The system also manages the stock of vaccines and consumables, which allows the Institute of Public Health to monitor the expiry dates, distribution, and usage of increasingly expensive vaccines. By linking vaccine lots to individual child records, lots can be traced through the stores and eventually to any children who have received a dose from a particular lot. This is essential for vaccine safety.



A nurse accessing immunization records for individual children in Albania.

The Albanian Ministry of Health has recently decided that the system should be scaled up to the rest of the country. In the longer term, the same platform could be used to support other public health functions, such as disease reporting. In May 2012, the ministry of health hosted a workshop for the countries of the South East European Health Network to share their experiences and start a collaboration between the countries, all of which are in different stages of improving their health information systems.

Next steps

Many high-income countries in Europe and the Americas have already implemented nationwide electronic registries, yet their use in low-resource countries has not been feasible until recently. Optimize and partners have piloted registry systems in Albania, Guatemala, and Vietnam, demonstrating that these systems are feasible in middle-income countries with good health systems and infrastructure. To move them to even more challenging settings, additional barriers will need to be overcome.

One of these barriers is the lack of “last-mile” Internet connectivity, which is not commonly available in many developing countries. However, mobile technologies may have the ability to bring information systems to even the most peripheral locations. In Albania, nurses in remote locations without good Internet access and stable electricity will shortly be able to access the system through a software application (“app”) on Android phones.

The next step involves developing a more robust and generic system that can be easily adopted and customized by a range of countries and that would be accessible by both mobile phone and the Internet. That way, health care workers could use the technology that is most appropriate for their context. In district offices and large urban clinics, computers with Internet access and printers may be most appropriate, while mobile phones or paper reports may make more sense for remote villages.

Project partners

- Albania: Institute of Public Health
- Guatemala: Ministry of Health Department for Health Management Information Systems, Ministry of Health Department for Expanded Programme on Immunization
- IBase
- INET
- OpenXdata, University of Bergen
- Vietnam: National Expanded Programme on Immunization