

# From paper to e-records: Vietnam's electronic immunization registry



How a pilot idea grew into the National Immunization Information System

## Evolution of immunization records in Vietnam

Vaccinations have saved the lives of more children than any other medical intervention in the past 50 years, and an effective immunization approach is a critical factor in the eradication of disease. To be effective, doses must be administered at the appropriate intervals. In Vietnam, paper-based systems for tracking immunization were making it difficult to ensure children and pregnant women were getting the timely protection they needed to defend them from dangerous but preventable diseases.

In 2012, PATH began collaborating with Vietnam's National Expanded Program on Immunization (NEPI) under the Optimize project, funded by the Bill & Melinda Gates Foundation, to find innovative ways to improve immunization coverage for women and children. Together they developed and tested ImmReg, a digital database that houses and tracks immunization records, and VaxTrak, a digital tool for tracking vaccine stocks and distribution.

Beginning in one district in Ben Tre Province, PATH secured further funding from the United Nations Foundation to scale up ImmReg across the province, while VaxTrak was scaled up by the government of Vietnam to track vaccine stocks in 2016. PATH worked closely with the local and national government from the very beginning, and in just five years, ImmReg and VaxTrak evolved into Vietnam's National Immunization Information System (NIIS).

The evolution of ImmReg into the NIIS is a prime example of PATH's ability to use digital health solutions to address public health challenges and work with governments to take these innovations to scale.

## Embracing the future of digital

### What are the problems with paper-based systems?

Prior to 2012, Vietnam's immunization records and reporting systems were entirely paper-based. This system was inefficient and prone to errors.

Health workers at local commune health centers (CHCs) spent hours entering patient data, manually searching large ledgers to identify children due for vaccination each month, collecting data to report to higher-level officials, and hand-delivering invitations to parents and caregivers for designated immunization sessions for their children. Data inaccuracies could result in vaccine shortages or waste and missed or delayed vaccinations, leaving children and pregnant women at risk.



Example of previous paper-based record system in a provincial preventive medicine center in Vietnam. Photo: PATH/Cuong Nguyen.

### What are the benefits of moving to digital?

ImmReg solved these issues and improved on-time immunization coverage by making it easier to record, track, and use immunization data.

ImmReg streamlined the documentation process by providing electronic immunization records and automatically generating lists of people due for vaccination and reports. This liberated staff from cumbersome paperwork, allowing them to prioritize patient care, and it reduced the potential for missed vaccinations due to human error. ImmReg was also able to send short message service (SMS) reminders to parents, caregivers, and pregnant women to remind them of vaccination appointments. The SMS reminder system saves staff time and money and makes it easier for families to manage their health.

Each of these operational improvements add up to a tangible improvement in access and uptake of vaccinations. The 2015 evaluation of the pilot in Ben Tre illustrated an up to 20 percent increase in on-time delivery of measles vaccine, oral polio vaccine, and Quinvaxem (a five-in-one vaccine for diphtheria, tetanus, whooping cough, hepatitis B, and *Haemophilus influenzae* type b).

### Scale-up: From pilot to national system

Given the pilot's quantifiable successes, Vietnam's Ministry of Health (MOH) requested that PATH use this experience to support the development of a government owned and funded nationwide immunization database and reporting system: the National Immunization Information System (NIIS).

With support from the GSK and Save the Children Healthcare Innovation Award between 2015 and 2018, PATH supported the General Department of Preventive Medicine (GDPM) at the MOH and Viettel Information and Communications Technology solutions center (Viettel ICT) to build, test, refine, and scale up the NIIS.

## Government commitment for a national system

The NIIS was officially launched by Deputy Prime Minister Vu Duc Dam and the MOH in March 2017. In just six months, the NIIS was introduced in 90 percent of commune health centers across the country. As of June 2018, the NIIS was reported to be available in 99.8 percent of CHCs across provinces and their districts nationwide, with more than 11 million children and women being registered into the system.

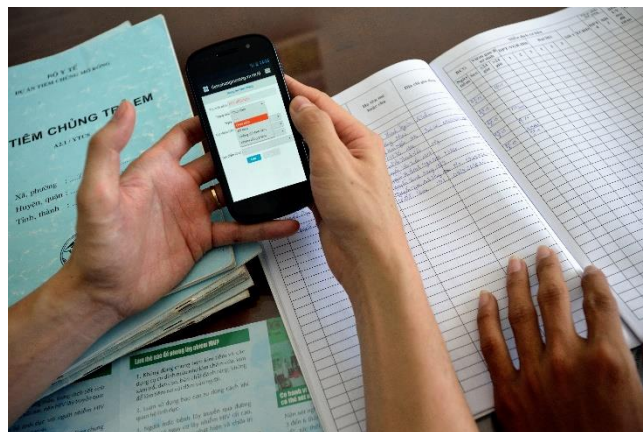
The NIIS is implemented across all of Vietnam's multiple health care facility levels, which provide free vaccinations under Vietnam's Expanded Program on Immunization (EPI) or fee-based vaccinations on demand, including hospitals, provincial and district health centers, CHCs, and private health facilities. Each plays a vital role in making sure all babies in Vietnam receive necessary immunizations on time.

## How Vietnam's NIIS works

- When a baby is born (in Vietnam, this is usually in a health facility), the hospital will register the newborn into the NIIS database, creating a unique identifier and barcode. This barcode is printed and placed on the baby's immunization card. This barcode and ID number will follow this child through adulthood, making sure that no matter where he or she goes in Vietnam, immunization records are easily found in the system.
- Health workers at CHCs use the NIIS to generate lists of children who are due for immunizations and send SMS reminders to parents to let them know when to bring their child for vaccination. They also use the system to check that they have enough vaccines in stock.
- Immunization days for EPI vaccines in Vietnam are held once or twice a month. On these days, CHC staff use the NIIS to enter vaccine delivery data, updating individual records and automatically logging vaccine stock.
- Fee-based facilities will provide EPI vaccines all days of the month, but they also utilize NIIS to track clients' immunization records and call them for vaccinations.

## Mobile phones as vital health tools

The NIIS uses mobile technology to improve on-time vaccination rates and save time and money. Today, nearly all of Vietnamese adults have a mobile phone, with increasing proportions of those being smartphones. SMS reminders are an excellent way to save time and labor; however, they can be expensive for some patients and require an SMS data plan. PATH is supporting Viettel ICT and GDPM to develop an e-immunization card app, a smartphone- or web-based application that will support parents to track their children's vaccinations online and provide free notifications to remind them about vaccination appointments.



NIIS enables parents and caregivers to receive vaccination reminders on their mobile devices. Photo: WHO/Mark Leong.

## A case for global learning

ImmReg was able to grow from a pilot into the NIIS because it was designed for scale from the very beginning. Local end users and decision-makers were engaged from the start, a comprehensive evaluation presented the case for investment and expansion, and the use of mobile technology and integration of fee-based facilities demonstrate an understanding of the future of Vietnam's health care system. The strong commitment and forward-thinking vision of Vietnam's national leaders is also key to success.

Vietnam's journey toward paperless immunization records is exciting and impressive, but it has not been without hurdles. Inconsistent data quality and limited capacity in software use, data analysis, and data use among health workers as well as low uptake of the NIIS among fee-based and private-sector facilities are some key challenges that are vital to address in order to transition to an entirely paperless system as planned.

At the same time, Vietnam's ability to implement and successfully adopt these tools at a national scale presents a valuable learning opportunity for other low- and middle-income countries that can benefit from the introduction or scaling of electronic immunization registries.

PATH's Introducing Digital Immunization information systems—Exchange And Learning from Vietnam (IDEAL-Vietnam) project, funded by the Bill & Melinda Gates Foundation, will continue to provide technical assistance to support the MOH to consolidate NIIS uptake and improve data quality and data use, at the same time as capturing and disseminating the key lessons learned from Vietnam's experience of developing, introducing, and scaling the NIIS.

Vietnam provides a relatable and reachable case study for many countries. The lessons learned here will inspire, encourage, and support governments and change-makers globally to better use immunization data to increase coverage of on-time lifesaving vaccines.



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PATH is a global organization that works to accelerate health equity by bringing together public institutions, businesses, social enterprises, and investors to solve the world's most pressing health challenges. With expertise in science, health, economics, technology, advocacy, and dozens of other specialties, PATH develops and scales solutions—including vaccines, drugs, devices, diagnostics, and innovative approaches to strengthening health systems worldwide.

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