The Design, Development and Deployment of an Electronic Immunization Registry: Reflections and Guidance from Vietnam

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The faces behind the webinar....

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Dr. Nguyen Tuyet Nga - Vietnamese Country Director, PATH, Vietnam

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Ms. Maya Rivera – Communications Officer, PATH, Vietnam
Agenda:

1. Presentation- 15 min
   1. Introducing IDEAL-Vietnam
   2. History and Functions of the NIIS
   3. Design
   4. Development
   5. Deployment
   6. Next steps

2. Interview with National Expanded Program on Immunization and PATH IDEAL colleagues – 15 min

3. Discussion/Q&A – 15 min
National Expanded Program on Immunization in Vietnam

• Annual birth cohort: ~1.7 million.
• Most vaccines are given at commune health centers on monthly immunization days (weekly in some provinces) except for the Hepatitis B birth dose.
• There are geographic inequalities, with lower coverage rates in hard-to-reach areas.
• Before June 2017, immunization information systems were primarily paper-based systems, with some computer-based systems for reporting aggregated data.
EPI structure in Vietnam

Ministry of Health

General Department of Preventive Medicine

National Institute of Hygiene and Epidemiology (NIHE)
National Expanded Program on Immunization (NEPI)

Northern IHE/EPI
- 28 Preventive Medicine Centers/CDCs
- District Health Centers
- Commune Health Centers

Pasteur Institute of Nha Trang
- 11 Preventive Medicine Centers/CDCs
- District Health Centers
- Commune Health Centers

Pasteur Institute of Ho Chi Minh City
- 20 Preventive Medicine Centers/CDCs
- District Health Centers
- Commune Health Centers

Central Highlands IHE
- 4 Preventive Medicine Centers/CDCs
- District Health Centers
- Commune Health Centers

Provincial Health Departments

Fee-based facilities
From paper-based records to a national digital database: ImmReg and the National Immunization Information System (NIIS)
From ImmReg and VaxTrak to the National Immunization Information System

Optimize project developed three separate systems:
1. **Vaxtrak**: Track vaccine transactions and aggregating immunization reports
2. **ImmReg**: Track immunization events of children under 1 year.
3. **Fee-based report**

- **Vaxtrak**: Pilot in 3 provinces + 13 districts in Phu Tho
- **ImmReg**: Pilot in 01 district (17 communes) in Ben Tre

**Vaxtrak** was rewritten to web-based

- **03/2014**: Scale up ImmReg module to 164 communes in 9 district of Ben Tre
- **03/2014**: GSK & Save the Children award

|-----------|---------|---------|---------|---------|---------|-------------|-----------|

- **Vaxtrak** was scaled up nationwide (63 provinces)
- **ImmReg**: 7 provinces implemented to district level by themselves

- **Integrate** Vaxtrak and ImmReg as one comprehensive system for vaccine and immunization (VIS)
- Add new modules for pregnant women

- **Transition to paperless immunization records**
- Working with GDPM, NEPI, Viettel to scale up to National Immunization Information System for both Vaxtrak and ImmReg.
- The NIIS was officially launched nationwide in 2017

- **2018-2020**: Support 2 provinces Ha Noi and Son La transition to paperless immunization records

- **TOT training for provincial, regional officials and district health workers**

Support 2 provinces Ha Noi and Son La transition to paperless immunization records
**Design:**
Defining EIR requirements based on end-user priorities and identified problems.

**Development:**
Creating and testing of EIR software based on predetermined system needs and key functions.

**Deployment:**
Introduction of the EIR system across relevant levels of the health system.
System functions: Immunization Registry Module

Commune Health Center

- Barcode Scan
- SMS Reminder
- Immunization Tracker & Planning
- Dashboard and reports
- E-Immunization Card

Fee-based Immunization Facility

Hospital

Under development
Introducing Digital immunization information systems: Exchange And Learning from Vietnam
IDEAL-Vietnam

Goal: To explore and disseminate evidence and lessons learned from Vietnam’s implementation of the NIIS to support successful implementation of EIRs in other countries.

- By the end of the project, we will have published and disseminated actionable lessons learned from the Vietnam context to contribute to the growing body of guidance and evidence emerging, by contributing knowledge gained from a national scale established system in a middle-income country. This will include implementation guidelines based on the Vietnam experience, as well as academic publications that feature key analyses and collected learnings to inform governments, as well as normative and donor agencies.
- We will encourage awareness and adoption of this information by publishing our work in a variety of media sources and peer-reviewed publications, and diffuse our learnings at conferences and in community forums.
- We aim to create awareness and understanding of Vietnam’s experience to inform, influence, and accelerate the successful implementation of similar tools at a global scale.

We also aim to use this project to help the MOH improve the uptake and effective use of the NIIS.
Stage 1: EIR Conception, Planning and Design
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1. Conduct landscape assessments that prioritize end-users

- The landscape analysis in Vietnam helped to identify and understand the problem, review policies, and determine current technical capacity and infrastructure.

- And provided a snapshot into existing capacity and challenges for implementing an EIR.

- Assessments provided user feedback that helped to design a sustainable system.
Stage 1: EIR Conception, planning and design

2. Establish a project team with clear leadership delegation

• In Vietnam, MOH leadership was supportive and took the initiative for decision-making needed to scale up the EIR.

• Supportive leadership helped to increase end-user commitment

• Forming a TWG helped to communicate between expert groups and work with the system synergistically
Stage 1: EIR Conception, planning and design

3. Perform a costing analysis

- Cost-modeling for scale-up helps to ensure the sustainability of the project.

- The budget needs to include formative research and the development, implementation and maintenance of the system.

- A budget should be allocated for continuous improvements, oversight, and system maintenance with clear roles delegated to partners.
Stage 2: Development of the Software
1. Define requirements

- Ensuring functional requirements and system requirements helped to identify many critical data-related challenges within the paper-based system that needed to be solved through the development of an EIR.

- These challenges were translated into system requirements to inform the development of the software in Vietnam.
Stage 2: Development of the software

2. Mapping to standard

• Creating or establishing interoperability standards to govern an exchange between information systems is essential.

• Interoperability strategies such as API, should be considered as early as possible during the development of the system.

• Government leaders should develop policies to push facilities to connect to the system and exchange data.
Stage 2: Development of the Software

3. Testing

- The scalability of the system should be considered. It is important to ensure that the EIR can support and sustain a large amount of data that continuously increases.

- Stress tests need to be conducted to anticipate how many clients the system can store without slowing down the system and burdening end users who are using the system online.

- Utilizing lessons learned from previous versions of the system saves time in scale-up and software development.
Stage 3: EIR Deployment
Stage 3: EIR Deployment

1. System Rollout

- The pilot system in Vietnam helped to detect bugs in the system early on and understand acceptability from end-users
Stage 3: EIR Deployment

2. Establishing Human Resources

• Human resources need to be under consideration early on because of staff turnover/changes

• Documentation of the system is key so that if leaders who know the system well leave the team, the system can be understood by the replacement staff.

• Allocating human resources from experienced nongovernmental organizations is a good way to save money and develop a well-balanced and experienced working team.
Stage 3: EIR Deployment

3. Training

- Refreshment training is still needed to improve the end-users' knowledge and skills.
- With limited financial resources, e-learning is a useful source of training.
Stage 3: EIR Deployment

4. Implementation Burden

- Protocols should be developed to recognize duplications between both the paper and digital systems.

- Detailed SOPs for the detection of duplications were developed in Vietnam and training was provided for health workers with clear roles and responsibilities for each level of staff.
Stage 3: EIR Deployment

5. Data Quality and Data Use

• Data quality should be ensured by monitoring and evaluation activities.

• Routine review and data quality checks should be conducted regularly to ensure that all end users are entering the data into the system (on-time, completely and accurately)

• In Vietnam, a readiness assessment helped to assess the data quality and determine the readiness to move to entirely paperless.
Post-Deployment: Sustained Use of the System and the Continuation to Paperless:

As Vietnam continues to move forward to a completely paperless immunization record system, it is important to continue monitoring user feedback and assess the acceptability of the system. The following factors should be continuously analyzed:

1. Resistance to change
2. Workload brought on by new data-entry procedures
3. Necessary time to register a new vaccine recipient into the system
4. Use of reports by different user profiles
5. Low system uptake from fee-based facilities
6. Data quality
7. Duplication due to the lack of unique client ID
8. Interoperability with other systems
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Interview with National Expanded Program on Immunization (NEPI) and PATH

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Mr. Dao Dinh Sang – Program Officer, PATH, Vietnam:
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Any Questions? Comments?
Thank you for your time!