Injecting digital technology into old-school immunization systems: building for sustainability and scale in Vietnam, Tanzania and Zambia

Dao Dinh Sang, Program Officer, PATH in Vietnam
Dawn Seymour, Global Deputy Director, BID Initiative
## Country Landscapes

<table>
<thead>
<tr>
<th>Context</th>
<th>Vietnam</th>
<th>Tanzania</th>
<th>Zambia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Population</td>
<td>92M</td>
<td>56M</td>
<td>17M</td>
</tr>
<tr>
<td>Coverage</td>
<td>91.4% (2014)</td>
<td>95% (2016)</td>
<td>98% (2016)</td>
</tr>
<tr>
<td>Percent completion of full immunization schedule</td>
<td>75.6% (2014)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Frequency that immunizations are provided at the health center</td>
<td>Monthly</td>
<td>Daily</td>
<td>Varies: once a month to three days a week</td>
</tr>
<tr>
<td>Level of health system for immunization</td>
<td>Commune</td>
<td>Facility</td>
<td>Facility</td>
</tr>
<tr>
<td>Migratory populations from neighboring countries</td>
<td>3 countries</td>
<td>8 countries</td>
<td>8 countries</td>
</tr>
<tr>
<td>Geographic inequalities between rural and urban</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Different contexts, shared challenges

- Incomplete or untimely data
- Lack of unique identifiers for infants
- Inaccurate or uncertain target population for calculating immunization rates
- Difficulty identifying infants who do not start immunization or who drop out
- Poor data visibility into supplies at the facility level to district-level data
- Complex data collection forms and tools
- Insufficient supply chains
- Inadequate data management and use capacity at all levels of the health system
- Workload for health workers with existing paper-based process
How it happened: from ImmReg and VaxTrak pilots to the National Immunization Information System

Optimize project developed three separate systems:

1. **VaxTrak** (WinForm):
   - Track vaccine transactions and aggregating immunization reports

2. **ImmReg** (Web-based):
   - Track immunization events of children under 1 year.
   - Send reminder SMS from a GSM modem.
   - Have 01 report.

3. **Fee-based report** (Web-based)

- **2011**
  - **01/2012**
  - **12/2012**
  - **01/2013**
  - **03/2014**
  - **12/2015**
  - **2016**

- VaxTrak: Pilot in 3 provinces + 13 districts in Phu Tho
- ImmReg: Pilot in 01 district (17 communes) in Ben Tre. ImmReg supported web-based and mobile app
- VaxTrak was rewritten to web-based
- Scale up ImmReg module to 164 communes in 9 district of Ben Tre
- VIS supported PC web-based and mobile-friendly version
- GSK & Save the Children award

- Working with GDPM, NEPI, Viettel to scale up to National Immunization Information System for both VaxTrak and ImmReg
- Add new modules for fee-based immunization service.
- Build a portal for parents and customers to manage their own immunization information.
- Add nutrition module...

- TOT training for provincial and regional officials in 4 regions in Nov 2016
- TOT training for district health workers in 19 provinces in 2017
There are strong challenges related to data quality around immunizations in Africa, yet few can identify which problems matter most and where.

- Lack of reliable, accessible, actionable data on the barriers impeding immunizations coupled with trained and empowered data users at all levels.

**The Vision**

- Empower countries to enhance immunization and overall health service delivery through improved data collection, quality, and use.

**The Approach**

- Partner with demonstration countries Tanzania and Zambia to:
  - Identify the most pressing routine immunization service delivery problems.
  - Develop, perfect, and scale solutions with the users on the ground throughout the health system.
  - Facilitate peer learning with other sub-Saharan African countries in design, testing, and applying interventions.
Why ImmReg was successful in scaling up

- Starting with a **small scale pilot** generated:
  - an evidence base for decision-makers in the MOH
  - a smoother transition to national system
  - buy-in for health leaders at provincial, district and commune level.

- **An evaluation provided clear evidence of results.** The 2015 evaluation of *ImmReg* in Ben Tre showed that the system:
  - reduced time needed to generate immunization reports (e.g. district health workers needed just 3 minutes to generate a report on all the children aged under 1 year, rather than 15 minutes)
  - increased on-time vaccination rates: the on-time delivery of pentavalent, measles and oral polio vaccines in Ben Tre province increased by up to 20 percent in one year.
  - Reduced dropout rates: the dropout rate between BCG to Measles 1 and Quinvaxem 1 to Quinvaxem 3 in Ben Tre province fell from 12.8 and 4.2 in 2013 respectively to 0 in 2015.

- **Engaging the government** at all stages, from system design, to early pilot, evaluation and scaling up, built strong commitments from government and health leaders.
Scale for Tanzania and Zambia

**Tanzania**
- Interventions rolled out across Arusha and Tanga Regions
- 611 facilities implementing solutions
- Over 160,000 children in the EIR
- Kilimanjaro and Dodoma Regions in 2018
- Scale to other regions in 2018
- Sustainability planning

**Zambia**
- Rollout underway in Southern Province
- 133 facilities implementing solutions
- Over 16,000 children in EIR
- Sustainability and scale plans underway
Functions of the National Immunization Information System

- **Barcode Scan**
- **SMS reminder**
- **Digital Portal**
- **Immunization Tracker & Planning**
- **Vaccine Tracker**
- **Report and Visualization**

Commune Health Center

Fee-based Immunization Facility

Hospital
## EIR Functionalities

<table>
<thead>
<tr>
<th>Functionality</th>
<th>Vietnam</th>
<th>Tanzania</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Equipment</td>
<td><img src="image1.png" alt="Image" /></td>
<td><img src="image2.png" alt="Image" /></td>
<td><img src="image3.png" alt="Image" /></td>
</tr>
<tr>
<td>Unique identification of the child</td>
<td><img src="image4.png" alt="Image" /></td>
<td><img src="image5.png" alt="Image" /></td>
<td><img src="image6.png" alt="Image" /></td>
</tr>
<tr>
<td>ToDo List</td>
<td><img src="image7.png" alt="Image" /></td>
<td><img src="image8.png" alt="Image" /></td>
<td><img src="image9.png" alt="Image" /></td>
</tr>
<tr>
<td>Stock management</td>
<td>National-commune integration</td>
<td>Facility-District integration</td>
<td>Facility-District integration</td>
</tr>
<tr>
<td>Openness</td>
<td>ImmReg</td>
<td>OpenIZ</td>
<td>OpenSRP</td>
</tr>
<tr>
<td>SMS</td>
<td>Reminders, Notifications</td>
<td>Reminders</td>
<td>Reminders, Birth notifications</td>
</tr>
<tr>
<td>Data visualization</td>
<td><img src="image10.png" alt="Image" /></td>
<td><img src="image11.png" alt="Image" /></td>
<td><img src="image12.png" alt="Image" /></td>
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</tbody>
</table>
# Key successes

<table>
<thead>
<tr>
<th>Successes</th>
<th>Vietnam</th>
<th>Tanzania</th>
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</tr>
</thead>
<tbody>
<tr>
<td>User-centered design</td>
<td>Technical working group</td>
<td>User advisory group</td>
<td>User advisory group</td>
</tr>
<tr>
<td>Government engagement - all levels</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Interoperability</td>
<td>ImmReg + Vaxtrak + DHIS2</td>
<td>TImR + VIMS + DHIS2</td>
<td>ZEIR + DHIS2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Plans for ZEIR + mVacc + Logistimo</td>
</tr>
<tr>
<td>Scale</td>
<td>Nationwide</td>
<td>3 regions</td>
<td>1 province</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2 more regions in progress, 6 regions planned for 2018)</td>
<td>(data maturation and system integration before scale)</td>
</tr>
<tr>
<td>Sustainability</td>
<td>Multiple Approaches</td>
<td>District Data Use Mentors, Gavi HSS and TCA</td>
<td>Gavi TCA, EPI-OPT</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(in development)</td>
</tr>
<tr>
<td>Research, monitoring and evaluation</td>
<td>Monthly</td>
<td>Monthly data reviews</td>
<td>Monthly data reviews</td>
</tr>
</tbody>
</table>
Exercise!
Problem-solver Shark Tank
Meet the sharks!

Dao Dinh Sang
Project Officer
PATH in Vietnam

Dawn Seymour
Deputy Director
BID Initiative

Tran Trung Hieu
Technical Officer for Information Systems, PATH in Vietnam

Laurie Werner
Global Director
BID Initiative
## Shark Tank Challenges

<table>
<thead>
<tr>
<th>Group Number</th>
<th>Challenge</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><strong>The government gives you 6 months to scale nation-wide.</strong> What innovative solutions would you use to accomplish this?</td>
</tr>
<tr>
<td>2</td>
<td><strong>System development is ongoing during rollout:</strong> How would you go about managing software updates during this time?</td>
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<tr>
<td>3</td>
<td><strong>Limited resources</strong>, from both central and local governments: How would you do to overcome with this?</td>
</tr>
<tr>
<td>4</td>
<td><strong>Limited IT knowledge</strong> of health staff at lower levels: How would you train new users of technology?</td>
</tr>
<tr>
<td>5</td>
<td><strong>Parallel System Use:</strong> Ongoing legacy systems can prevent adoption of new tools. What criteria would you implement to end parallel system use?</td>
</tr>
</tbody>
</table>
Challenges and solutions

**The government gives you 6 months to scale nationwide. What innovative solutions would you use to accomplish this?**
- Inform about implementation plan ASAP
- Standardize paper-based records
- Enter data in advance

**System development is ongoing during rollout:** How would you go about managing software updates during this time?
- Notify end-users about updates when logging in
- Update manual and publish on the website
- 24/7 support through calling center or remote support apps

**Limited resources, from both central and local governments:** How would you do to overcome with this?
- Mobilize support from international organizations
- Partner with Enterprises

**Limited IT knowledge of health staff at lower levels:** How would you train new users of technology?
- Conduct cascade trainings for technical support network
- On-the-job trainings through supportive supervision visits
- Calling center or remote support apps

**Parallel System Use:** Ongoing legacy systems can prevent adoption of new tools. What criteria would you implement to end parallel system use?
- Set policies for transition plan (e.g. 95% of facilities must use digital)
- Important to set expectations so nurses know workload changes
Lessons learned and Recommendations

- **Building capacity** and a **network of support** at provincial and district levels is essential for successful uptake and long-term use of the system, as is considering **end-user feedback** in making system improvements.

- **Public private partnerships** can promote sustainability: the MOH outsourced to a major ICT company for long term sustainability.
## Links to Demos

<table>
<thead>
<tr>
<th>Electronic Immunization Registries</th>
<th>Demo Link</th>
</tr>
</thead>
</table>
| ImmReg (Vietnam)                          | http://tcmr.ytecoso.vn:8082  
Username: bt_ct_phutuc  
Password: 123456a@Xa |