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Using mobile phones to track immunizations

by Jørn Ivar Klungsoyr on behalf of www.openXdata.org and Jan Grevendonk, PATH

In August 2010, the Norwegian Research Council approved funding for a new project that will allow countries to manage immunization programs with increased accuracy and reliability by enabling health workers to record and register individual immunizations using mobile phones. The project, called Mobile Innovations in Recording Child Vaccination and Health Data in Immunization Registers (mVAC) builds on the work of its many partners and applies existing technologies in a fresh and innovative way that could radically improve the way vaccines are managed.

The goal of the three-year mVAC project is to develop an end-to-end mobile phone-based solution to create a fully digital system for recording immunizations at the individual level: one that can be implemented in almost any country with or without a public unique person identification structure or system.

The project uses an open-source software package called openXdata that allows users to create their own forms on a web-based interface and deploy that to mobile phones or devices. OpenXdata is being actively used in many different fields and will soon be implemented in Albania with Optimize and others. The software is constantly enhanced with input from users and developers on almost every continent. OpenXdata is a collaboration between many different institutions, companies, and individuals. As a result, openXdata software has the flexibility and simplicity to make it a good fit for different geographic environments and management systems.

How it works

Primary health care workers will be equipped with a low-cost, Java-enabled mobile phone with an integrated camera (approximately US\$40) to record and submit vaccination data to a central vaccination registry. Child health cards with 2-dimensional bar codes will serve as the primary identifier for individual children. Using the camera on the phone, health workers will scan the card on each visit to see a list of immunization tasks scheduled for that particular child. When the immunization is given, the health worker documents it on the mobile phone and on the card and digitally signs the encounter.

Children who have migrated from other areas can be tracked by their card, and children who have lost their card can be looked up by name and other key identifiers, such as location, mother's name, sibling names, etc., in the central register. The health worker can then issue a new card on the spot.

When the system is fully operational, the registry can generate lists of children in specific catchment areas who are overdue for vaccination and give it to the health worker prior to a session. Taking this a step further, the system can send automated SMS (short message service) text messages with reminders to parents that have signed up for this feature.

At the central level, the immunization registry allows the supply chain management system to deliver exactly the right amount and kind of vaccines to each individual facility based on monthly consumption data.

Why it is needed

Too often, decision-making that affects the lives of a large portion of the population depends on unreliable and fragmented data. Most reporting and documentation efforts today are based on pen and paper-based systems of past centuries that are error prone and preclude rapid aggregation and analysis of data. In the context of immunization, distribution planning is often based on demographic data. Stock levels are maintained to allow for immunization of 100 percent of the theoretical population plus a buffer stock. Since there is, at best, limited up-to-date knowledge of consumption data at lower levels, managers maintain high levels of buffer stock to compensate for a lack of data. With the introduction of pricier and bulkier vaccines, this is quickly becoming increasingly unfeasible and uneconomical.

A centralized immunization register addresses these problems and transforms supply chains from inefficient supply-driven systems to accurate and reliable demand-driven systems.

To learn more about the mVAC project, visit www.openxdata.org. Questions about the project can be directed to contact@openxdata.org.

China considers VVMs

by Qiyou Xiao, China National Biotec Group; Shuyan Zuo, WHO China; and Jack Zhang, PATH's China program

In June, the first national seminar and information session about the necessity and feasibility of using vaccine vial monitors (VVMs) on domestically produced vaccines used in China was hosted by the [Sinopharm Group](#). While the purpose of the meeting was exploratory, Sinopharm representatives indicated a two-fold interest in VVMs that has been growing over the past four years: (1) to improve the quality assurance of the vaccine cold chain in China, and (2) to prepare to enter the international vaccine market as a supplier to the United Nations Children's Fund (UNICEF).

The Sinopharm Group is China's largest pharmaceutical and health industrial group under the State-Owned Assets Supervision and Administration Commission of the State Council and parent company of six of China's largest manufacturers of Expanded Program on Immunization (EPI) vaccines. More than 60 people gathered in the city of Changchun including representatives from the Ministry of Health, China's [Center for Disease Control and Prevention](#), China's [State Food and Drug Administration](#) (SFDA), [TempTime](#) (makers of HEATmarker® VVMs), [Parteurop](#), [EuraBioLife](#), the six government institutes that manufacture vaccines and biological products under the Sinopharm Group, and the China offices of the World Health Organization (WHO) and PATH.

The representative from the Chinese SFDA discussed the need to improve vaccine quality, enhance the vaccine cold chain, and strengthen the public's opinion of vaccine quality and safety. Implementation of VVMs would help to achieve these goals.

Since 1996, WHO and UNICEF have [specified VVMs to be affixed to vaccines](#) prequalified for EPI vaccination campaigns. VVMs are now on 98 percent of vaccines procured internationally through UNICEF's Supply Division. Over the last six years the number of VVMs supplied has increased from 180 million to over 420 million per year.

The Ministries of Health of Indonesia and India have required VVMs on all domestically produced vaccines for use within the country for several years. If China follows suit, three of the world's most populous countries will have shown great leadership in adopting a proven technology to improve vaccination program effectiveness and access to immunization.

Cold chain “think tank” attempts a unified vision for immunization logistics

by Steve Landry, Bill & Melinda Gates Foundation; Anne Schuchat, CDC; Xavier Tomsej, USAID; Thomas O'Connell, UNICEF; David Lee, Management Sciences for Health, and Jean-Marie Okwo-Bele, WHO

In July 2010, Optimize convened workshops in Washington, DC and Seattle, WA, to engage a wide range of stakeholders in shaping a [unified vision](#) for the future of immunization technologies and logistics systems in low- and middle-income countries. During the workshops, participants reviewed the history and current state of developing-country immunization systems and shared their perspectives on the challenges facing current systems, the desired future state (i.e., by 2025) of these systems, and work streams required to reach the desired state.

While the ultimate goal is clear—state-of-the-art supply chains must enable the right vaccines to be in the right place, at the right time, in the right quantities, in the right condition, and at the right cost—achieving that goal is a bit more complicated. As more vaccines become available in developing countries and place a larger financial and structural burden on immunization systems, it is becoming evident that the current supply chain systems are inadequate.

With this in mind the Cold Chain and Logistics Task Force (under the leadership of the United Nations Children's Fund [UNICEF]) has assembled a “think tank” to develop a shared vision for future supply system solutions and a space to discuss options and trade-offs of proposed technologies, policies, and procedures that can significantly impact the way vaccines are distributed. Think tank members include representatives from UNICEF Programme and Supply Division; John Snow, Inc.; US Centers for Disease Control and Prevention; Clinton Foundation; World Health Organization, the GAVI Alliance, Management Sciences for Health, and others. Optimize is acting as a temporary secretariat for this effort.

In its current iteration the vision is organized around five tenets:

1. *Vaccine products and their packaging are designed with characteristics that best suit the operational needs of countries.* This includes quality and safety as well as specific product attributes such as vial size, labeling, and packaging. Inherent in this tenet is a desire to create sustainable mechanisms for collaboration and a dialogue with manufacturers.
2. *Immunization supply systems are designed to maximize effectiveness and efficiency and are built around mechanisms that support continuous learning to improve system performance.* This means that supply chain systems are streamlined and efficient, adaptable to varying volumes and quantities of vaccines, and demand driven based on accurate projections of need at the clinic level.
3. *Immunization supply systems are part of an integrated health supply system that maximizes synergies and makes the most appropriate strategic links with the private sector.* Inherent in this tenet is a need to evaluate synergies between multiple vertical delivery systems and outsource logistics components to private-sector operators as appropriate.
4. *The environmental impact of energy, materials, and processes used in immunization supply systems from the international to the local-level is assessed and minimized.* This may include moving some vaccines into a controlled-temperature chain outside of the usual system of refrigeration. It may also include the control of energy costs through technologies, vehicle choice, waste management, or distribution strategies that save energy or resources.
5. *Data produced by effective, affordable, and sustainable information systems and technologies are used to inform and drive immunization supply systems.* Ideally, all information system requirements for immunization are integrated and used for decision-making, and individual records are disaggregated and used to estimate demand.

The vision will serve as a common platform behind which key partners at all levels (country, regional, and global) can unite. It will allow partners to identify gaps and orient their work in a direction that supports logistics and supply systems today, yet ensures that they are able to address the challenges of tomorrow as efficiently, effectively, and sustainably as possible.

To participate in the visioning process, please contact: optimize.who@path.org.

The first global training on effective vaccine management

by Hailu Makonnen Kenea, Souleymane Kone, and Modibo Dicko from WHO; and Andrew Garnett, consultant

On July 29, 2010, after ten days of intensive and interactive training, 29 global, regional, country, and independent cold chain and logistics individuals completed the first training course on [effective vaccine management \(EVM\)](#) assessment in Cairo, Egypt. The participants of the first EVM training course will now be able to conduct systematic reviews of in-country immunization supply chains and develop the necessary improvement plans to meet current and future program needs.

The training course, jointly sponsored by the Department of Immunization Vaccines and Biologicals (IVB) at the World Health Organization (WHO), the United Nations Children's Fund (UNICEF), and project [Optimize](#) (WHO-PATH), comes at a time when vaccine supply chains are facing new challenges resulting from the introduction of new and costlier vaccines with bulkier presentations and novel characteristics. The EVM tool is designed to help logisticians prepare for and manage these challenges successfully.

Staff from WHO and UNICEF regional offices, [John Snow Inc.](#), the [GAVI Alliance](#), Ministries of Health representatives, and private logistics consultants participated in the training course, which was provided in both English and French.

Course content

The first part of the training course focused on the quality management principles behind EVM and introduced participants to the use of the software and guidance materials. Participants then took part in a series of scenario-based training exercises designed to explore the scope of the package and to familiarize attendees with the EVM questionnaire.

Participants had an opportunity to apply this course-based knowledge by carrying out a rapid assessment of six facilities within Cairo, covering three levels of the Egyptian immunization supply chain. The outcome of the field visits was then synthesized into a report and a draft improvement plan.

The latter part of the training course reviewed the outcomes and lessons learned during the Vietnam, Senegal and Tunisia assessments and also reviewed other related developments designed to improve the immunization supply chain.

Next steps

The EVM software tool has been field-tested in Ethiopia and Pakistan and was subsequently used to conduct formal assessments in Vietnam, Senegal, and Tunisia.

The first official release of the EVM software package will be announced shortly. It is hoped that the EVM initiative, and the training and advocacy which support it, will provide a solid foundation for a continual cycle of assessment, follow-up, and reassessment, ensuring the quality of the supply chain remains satisfactory in all countries.



EVM Training Participants, Cairo, Egypt, July 29, 2010

Photo: WHO/EVM Team

New committee to advise the World Health Organization on immunization practices

by Shelley Deeks, Ontario Agency for Health Protection and Promotion and IPAC Chairperson, and Rudi Eggers, WHO/IVB

In late June, Dr. Jean-Marie Okwo-Bele, Director of Immunization, Vaccinations and Biologicals (IVB) at the World Health Organization's (WHO) welcomed the first biannual meeting of the [Immunization Practices Advisory Committee](#) (IPAC). In his opening remarks he explained that IPAC, which replaces the Technical and Logistics Advisory Committee (TLAC), was formed to advise WHO on issues relating to the practical and operational aspects of immunization programs, ultimately helping WHO achieve the goals set out in the [Global Immunization Vision and Strategy](#).

According to its terms of reference, "IPAC has no executive, regulatory, or decision-making function. Its

sole role is to provide advice and recommendations to the director of WHO/IVB in three interconnected areas.” These areas include (1) strategies, such as those relating to immunization delivery, integration with other disease control efforts, and implementation of policy recommendations, (2) operations, such as those relating to management, vaccine introduction, supply chain, information systems, and financial sustainability, and (3) tools and technologies, such as those relating to vaccine packaging, assessment tools, and immunization strengthening. In the few cases where IPAC recommendations relate to strategic matters, they will require further discussion and endorsement by the Strategic Advisory Group of Experts.

At the first meeting, the 12 IPAC founding members selected by the Director of WHO/IVB plus five permanent observer members¹ covered several topics relating to immunization program performance and policy implementation. Initial discussions focused on the need to continue developing visual cues to help health workers interpret and implement a revised [multidose vial policy](#) (MDVP). Based on earlier recommendations from the TLAC, a set of draft visual cues have been developed and are currently being tested among health workers in three countries. IPAC members weighed in on the process, discussed the need for more intense field testing and consideration of legibility on vaccine vials, and developed a timeline for the work going forward.

The group also discussed the [proposed process for determining programmatic suitability of vaccines for prequalification](#) (PSPQ), pinpointing areas that need further consideration, and agreeing on next steps for aligning the work with the MDVP revisions. The next topic of discussion related to hepatitis B control programs and the challenges of offering birth doses in countries lacking infrastructure, financing, and trained personnel to deliver vaccinations. The IPAC decided on several areas for further discussion, with the goal of providing a global recommendation on practices related to the birth dose of hepatitis B vaccine in its next meeting.

The final topic of discussion related to data collection issues that arise when “routine” immunization is complemented by campaign-like delivery methods such as Child Health Days, Materials Child Health Weeks, and Immunization Weeks. With over 100 countries participating in these “periodic intensification of routine immunization” activities, there is a need for global guidance to help countries standardize and efficiently record coverage data. IPAC members are developing draft guidance materials to present at the next meeting.

The IPAC meeting adjourned with multiple action items and a preliminary list of priority topics for its next meeting in Geneva on November 4 to 5, 2010. Meeting reports, founding members, and the committee’s terms of reference are available on the [IPAC web page](#).

1. Five permanent observer members represent the following organizations: United States Centers for Disease Control and Prevention, International Federation of Pharmaceutical Manufacturers Associations, Developing Country Vaccine Manufacturers Network, PATH, and United Nations Children’s Fund (UNICEF).

Announcements

- [BBC World Service reports on the vaccine cold chain \[28 minutes\]](#).
 - [PATH is awarded \\$5.2 million contract to stabilize pandemic influenza vaccine](#).
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Meetings

- [TechNet Consultation, November 30 to December 3, 2010, Kuala Lumpur, Malaysia](#).
 - [Second Immunization Practices Advisory Committee \(IPAC\) meeting, November 4 to 5, 2010, Geneva, Switzerland](#).
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New material

- *Designing vaccines for developing-country populations*
Authors describe the ideal attributes, delivery devices, and presentation formats for vaccines destined for developing-country populations. Published in [Procedia in Vaccinology](#).
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Request for information

- If you are working on a logistics project, or even if your project has a logistics component, we want to make sure your work and learning feed into the [vision for future logistics](#). Sharing information on your project is easy and only takes a few minutes. Please share your information [here](#).

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