

Immunization information systems

Tenet 4: Immunization information systems help staff plan and manage immunization activities and resources while ensuring that adequate quantities of vaccines are always available to meet demand.

The visioning process

Over the course of 2010 and 2011, partners have joined forces to develop a shared, long-term vision for immunization supply and logistics systems and technologies. The goal of this vision is to guide key stakeholders at country, regional, and global levels in their work to strengthen supply and logistics systems. This process is being facilitated by project Optimize, a collaborative project of the World Health Organization and PATH.

In developing a vision for the future of information systems for immunization, the following characteristics serve as working hypotheses to help describe the desired state of future information systems:

- *Integrated:* Vaccines and other health commodities are managed through an integrated information system, meaning that subcomponents of this system are interoperable. Furthermore, information for planning and performance management of logistics is accessible by other health information systems.
- *Decision-making is supported:* Staff have the capacity to analyze and use information that is routinely available for evidence-based decision-making.
- *Data is captured at its origin:* Data about individual records (e.g., vaccines, immunization records, and cases) is accurately captured and digitized at the place where these events occur, and aggregated or disaggregated information is made directly available to appropriate users at all levels.
- *Flexible:* Logistics management information systems have robust core capabilities, yet can accommodate health system variations based upon the local context. The design is adaptable to different contexts, programs, and changes over time as needs evolve.
- *Design is driven by user needs:* Logistics management systems are designed to meet the broad requirements of end-users, managers, planners, recipients of health services,



Landscape analysis focus areas

Logistics management software

Integrated software solutions

Software modules for specific purposes

Targeted projects

Design standards

Hardware solutions

Development platforms and components

The vision

By 2020, state-of-the-art supply systems meet the changing needs of a changing world in order to enable the right vaccines to be in the right place, at the right time, in the right quantities, in the right condition, at the right cost.

For more information

PATH

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[www.path.org/projects/
project-optimize.php](http://www.path.org/projects/project-optimize.php)

World Health Organization

vaccines@who.int
[www.who.int/immunization_delivery/
systems_policy/optimize](http://www.who.int/immunization_delivery/systems_policy/optimize)

and other stakeholders.

- *Affordable and sustainable:* The total cost of ownership of logistics management systems is easily understood so decision-makers can evaluate the wider cost implications of adopting an information system across the health system. Logistics management information systems are designed for implementation and use in low-resource settings.
- *Reliable and secure:* Logistics management information systems are designed to be maintained and supported effectively and must always be available within the environmental constraints. They are also designed to protect data from unauthorized use and disclosure with varying levels of user access.
- *Consistent design framework:* Logistics management information systems take advantage of standards, common data, common software applications and technologies, and are properly supported by clear design and user documentation.

Landscape analysis

A landscape analysis was conducted to better understand what global stakeholders are currently doing to make sure that vaccine supply systems are supported by better information systems.

The working group first identified a number of software systems that are commonly used in global public health, both specific to logistics and integrated solutions. Overall, the main limitation of these software systems seems to be that most well-established systems have so far not been successfully deployed in a different context than the one for which they were designed.

In addition, some specific projects (implementation of a system in a specific setting) are included. These are notable because of their scale or approach. We also included projects that explore the development of standards or hardware. Finally, a special category comprises the platforms that allow for the use of mobile phones in health information systems (mHealth).

Preliminary gaps

The goal of the landscape analysis was to identify gaps that need to be addressed to realize the vision of future immunization supply systems. The preliminary gaps identified are as follows:

Generic last-mile logistics information systems

Many applications exist to control stock at central and regional levels, but there are few “last-mile solutions” suitable to be deployed affordably and sustainably at the service level and also integrated into central systems. Furthermore, most last-mile applications are designed for a specific type of commodity and lack the level of abstraction required to make them useful for all commodities (such as immunization, antiretrovirals, essential medicines, etc.) in use at the service level.

A challenge lies in demonstrating an innovative, low-cost, low-maintenance solution that would meet the basic logistics information needs for at least two health commodities (one of which should be vaccines) at the intermediate and lowest levels of a supply chain for a low-income country. Basic information needs include:

- The ability to register receipts, issues, and physical on-hand stock.
- The ability to reorder based on historical consumption data.
- The ability to keep track of stock at all nodes in the system (and have upward, downward, and lateral visibility of stock).

With additional valuable features providing:

- The ability to access and analyze historical data.
- The ability to report immunization coverage.

Plan for the scalability and sustainability of a logistics management information system in a specific country setting

There is a lack of in-country skills to plan for, design, implement, and sustain information systems projects. A challenge exists in demonstrating how a logistics management information system could be scalable and sustainable at the national level in a large country (with a population of 20 million or more). This may include exploring the following parameters:

- Skills and profiles that would be needed.
- Total cost of ownership model.
- Five-year plan and budget.
- Funding mechanisms.

Hardware

Many of the small-scale projects we documented rely on the use of personal mobile phones. While these provide excellent opportunities for fast and flexible development and deployment because they are so cheap and ubiquitous, there seems to be little effort spent on developing devices that are built specifically for their intended purpose. In the for-profit world, these devices (e.g., point-of-sales equipment) are very common, rugged, and reliable. Exploration is warranted regarding whether the public health world would also benefit from similar designs or solutions.

Landscape analysis summary table

By 2012, the vision statement will reflect evidence found through the following landscape analysis and other analyses. For more information, please contact optimize.who@path.org.

Vision of future immunization supply and logistics systems: Core tenets

1. Vaccine products and their packaging are designed with characteristics that best suit the needs and constraints of countries.
2. Immunization supply systems are designed to maximize effectiveness, agility, and integration with other supply systems, and to support continuous system improvement through learning, innovation, and leveraging synergies with other sectors.
3. The environmental impact of energy, materials, and processes used in immunization supply systems from the international to local levels is assessed and minimized.
4. Immunization information systems help staff plan and manage immunization activities and resources while ensuring that adequate quantities of vaccines are always available to meet demand.
5. Human resources policies provide immunization supply systems with adequate numbers of competent, motivated, and empowered personnel at all levels of the health system to overcome existing and emerging immunization supply challenges.

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Vision of future immunization supply and logistics systems: Tenet 4 landscape analysis summary—Immunization information systems

Focus area	Project/concept	Partners involved	Description	Locations	Keywords
Development platforms and components	EMIT www.emitmobile.co.za	Cell-Life	EMIT is a cloud-based service that provides the ability to gather text data via Java-based handsets. A web-based console allows for the conducting of surveys and extracting data. Forms are created and administered with the aid of the Cell-Life team. The software resides on Cell-Life servers and interfaces with software on client's cell phones.	Not applicable	mHealth
Development platforms and components	EpiCollect www.epicollect.net	Imperial College London supported by Wellcome Trust	EpiCollect is a cloud-based service that enables the collection of rich content via Android and iPhone phones. A web-based console allows for form development, conducting of surveys, and data management.	Not applicable	mHealth
Development platforms and components	EpiSurveyor www.datadyne.org/episurveyor	DataDyne	EpiSurveyor is a cloud-based service that enables collection of text and global positioning system data using a variety of mid-ranged handsets. Software resides on EpiSurveyor servers and interfaces with client software on handset. The web-based console allows for form development, conducting of surveys, and data management.	Not applicable	mHealth
Development platforms and components	FrontlineSMS www.frontlinesms.com/spreadsheets.google.com/ccc?key=0Aki5_3vVWZ8tdGk4czl4eHcycGo2Y1NnWmhsUjdBTXc&hl=en#gid=0	FrontlineSMS	FrontlineSMS is an open-source platform that allows for data collection using basic phones and collects data only via SMS. The software enables management of users and deployment of SMS-based surveys. FrontlineForms, an add-on module for FrontlineSMS, allows users to leverage more advanced Java-based software to use forms for data collection.	Not applicable	mHealth
Development platforms and components	Mobile Researcher www.populi.net/mobileresearcher	Clyral	Mobile Researcher is a cloud-based service that enables data collection via SMS, wireless application protocol, and/or HTML. Data types vary with implementation. Software resides on Clyral servers and interfaces with client software on mobile handsets. A web-based console offers users the ability to develop forms, deploy surveys, manage field workers, and analyze responses.	Not applicable	mHealth
Development platforms and components	Mobitop http://mobisy.com/mobitop.html	Mobisy Samhita	Mobitop is a platform which allows applications to run across different mobile handset operating systems (OSs) including Android, Blackberry, iPhone, J2ME, Symbian, and Windows Mobile. Applications designed to run on this platform are therefore accessible to a wide range of mobile phones, saving development time required for customization of the application to each OS. Applications have been developed on this platform relating to preventative and curative health care and disease management.	Not applicable	mHealth
Development platforms and components	Nokia Data Gathering Toolkit www.nokia.com/corporate-responsibility/society/nokia-data-gathering/english	Nokia	Nokia Data Gathering allows for text and global positioning system data collection via handsets. Client (mobile) and server software are free to download and install. Server software allows for the development of customizable questionnaires, dissemination of forms to mobile phones, data collection on mobile phones, and data submission from mobile clients.	Not applicable	mHealth
Development platforms and components	Open Data Kit www.opendatakit.org	University of Washington, Google	Open Data Kit is a set of free tools used all over the world to make data collection and information delivery easier. Open Data Kit provides an out-of-the-box solution for users to build a data collection form or survey, collect the data on a mobile device and send it to a server, and aggregate the collected data on a server for extraction to useful formats.	Not applicable	mHealth
Development platforms and components	OpenXdata www.openxdata.org	OpenXdata Consortium	OpenXdata is an open-source platform for data collection via Java-based phones. A wide variety of data types can be collected, including global positioning systems. A user-hosted server allows for the management of groups, users, form creation, and conducting surveys.	Not applicable	mHealth
Development platforms and components	RapidSMS www.rapidsms.org	UNICEF	RapidSMS is the underlying framework used to build enterprise-level, SMS-based applications for data collection, logistics, and communication. The software provides the built-in functionality to help users create and customize SMS-based applications. Third-party developers have created applications built on RapidSMS which are also available out of the box.	Not applicable	mHealth
Development platforms and components	Voxiva www.voxiva.com	Voxiva	Voxiva is a cloud-based service that allows for data collection via a number of mobile platforms and channels. Voxiva provides a number of sector-specific services built around a core set of technologies allowing users to conduct surveys and collect data. Implementation, development, and form creation is done with the aid of Voxiva.	Not applicable	mHealth

Vision of future immunization supply and logistics systems: Tenet 4 landscape analysis summary—Immunization information systems

Focus area	Project/concept	Partners involved	Description	Locations	Keywords
Hardware solutions	SmartConnect www.cs.washington.edu/affiliates/meeetings/talks1011/orourke2010.pdf	University of Washington, Invenco, PATH	This refrigerator-based device will be used to measure refrigerator temperature and keep track of stock transactions through barcode readers and SMS gateways.	Nicaragua, Vietnam	last mile
Integrated software solutions	ACSiS www.accesstec.ca	Accesstec Inc.	ACSiS is an integrated health-sector management system. The hub of ACSiS is the electronic health record, a prerequisite for all other functional modules. The supply chain management module is designed to track the inventory of pharmaceuticals and medical supplies at each facility. Inventory is tracked in a first-expiry first-out manner.	Belize, Bhutan, Canada, Guyana, Saint Lucia, Somalia	integrated health information system, stock management system
Integrated software solutions	OpenMRS www.openmrs.org	OpenMRS Consortium (Partners in Health)	OpenMRS is a community-developed, open-source, enterprise electronic medical record system platform.	Global	medical records
Integrated software solutions	Sage www.sage.co.uk/software_and_services/business-wide_solutions/sage_erp_x3-1-1.aspx	WHO/Essential Medicines and Pharmaceutical Policies	Sage is an enterprise, resource-planning system that was jointly implemented by a group of West African Francophone national pharmacies for stock control.	22 West African countries	warehouse management system
Logistics management software	CCEM 2 www.path.org/publications/detail.php?i=1569	PATH	CCEM 2 is a Microsoft Access-based software tool to manage cold chain equipment and forecast equipment needs for multiyear country plans according to new vaccine schedules, energy availability, and equipment selection policies.	Kenya	equipment inventory management
Logistics management software	District Health Information Software 2 (DHIS 2) www.dhis2.org/functionality	University of Oslo www.hisp.uio.no	DHIS 2 is a tool for collection, validation, analysis, and presentation of aggregate statistical data tailored to integrated health information management activities. It is a generic tool rather than a pre-configured database application. DHIS 2 is a modular web-based software package built with free and open-source Java frameworks. It has a multi-language graphical-user interface.	19 projects ranging from national implementation to pilot testing in Africa and Asia	data analysis tool, health information system
Logistics management software	GpTürk www.gpturk.com	GpTürk	The GpTürk integrated system covers temperature control, medical records, and logistics for vaccines.	Turkey	immunization registration, reporting, stock management system, temperature monitoring
Logistics management software	iDART www.cell-life.org/idart	Cell-Life, The Desmond Tutu HIV Foundation	iDART is a free software solution designed to support the dispensing of ARV drugs in the public health-care sector. It supports in the management of ARV stocks and can produce reports and manage collection of drugs by patients. The software is also designed to address the reporting requirements of government, international funders, and internal clinical data such as identifying patients who have not collected their medication for an extended period of time.	Implemented by a number of ARV-dispensing sites in South Africa	stock management system
Logistics management software	IQSMS www.iqstrategy.net/frmiqsms.shtml	Futures Group International	IQSMS is a mobile application that enables data to be sent to a central computer server which aggregates the inputs for data export to Microsoft Excel. The application also has reporting capabilities. Available in English and Swahili.	Currently used in a number of health facilities in Tanzania	mhealth
Logistics management software	Logistimo www.samaanguru.org	Logistics for Global Good	Logistimo offers a simple and scalable solution without the need for expensive hardware. It uniquely provisions low-end mobile phones to capture transactional data, track inventory, place orders, forecast demand, optimize inventory, and generate demand analytics.	India	integration, last mile, mHealth

Vision of future immunization supply and logistics systems: Tenet 4 landscape analysis summary—Immunization information systems

Focus area	Project/concept	Partners involved	Description	Locations	Keywords
Logistics management software	Mobilisr www.open-mobile.org/technologies/mobilisr-enterprise-open-source-mobile-messaging	Open mobile consortium, Cell-Life, Praekelt Foundation	Mobilisr is an open-source mobile messaging platform. It is a web-based system that allows management of communications via a mobile phone using a range of mobile technologies: broadcast SMS, interactive keyword SMS, SMS subscribe and unsubscribe, static USSD, and interactive USSD. Future releases will include IVR, location-based services, WAP, and voicemail push (where a recorded voicemail is sent to people's phones). Examples of how these can be used include: bulk SMSs sent to patients at an ARV clinic reminding them to take their medication, and interactive USSD used to gather patient feedback on service quality.	South Africa	mhealth
Logistics management software	PipeLine Monitoring and Procurement Planning www.deliver.jsi.com/dhome/resources/tools/softwaretools/pipeline	JSI, USAID DELIVER	PipeLine Monitoring and Procurement Planning software helps program managers gather critical forecasting information, ensure that products arrive on time, maintain consistent stock levels at the program or national level, and prevent stockouts.	Global	forecasting
Logistics management software	ProQ www.deliver.jsi.com/dhome/resources/tools/softwaretools/proq	JSI, USAID DELIVER	ProQ is a software tool that quantifies HIV test requirements based on realistic forecast demand, assessment of existing supply chain capacity, and availability of resources for procurement.	Global	forecasting
Logistics management software	Quantimed www.msh.org/projects/sps/Resources/Software-Tools/Quantimed.cfm	Management Sciences for Health	Quantimed is designed to improve the accuracy of order planning and budgeting by providing a systematic approach to organizing and analyzing data. Quantimed facilitates the calculation of commodity needs using either a single or combination of three primary quantification methods: past consumption, morbidity patterns, and proxy consumption.	Global	forecasting
Logistics management software	SIGMED and SIGMED Lite www.medict.nl/SignedLite/content_001.htm	medICT	SIGMED is a computerized drug management information system designed for central and regional warehouses. Functions include: forecasting and planning, procurement and purchasing, warehousing and distribution, and inventory management and sales. SIGMED Lite is designed for health facilities and pharmacies. It encompasses all functions of SIGMED described above except warehousing and distribution.	Pharmacie Populaire du Mali in Mali (fully integrated with the accounting software package) and at central medical stores in Malawi	stock management system
Logistics management software	Stock Management Tool/District Vaccine Data Management Tool www.who.int/immunization_delivery/systems_policy/logistics/en/index5.html	WHO	The Stock Management Tool and District Vaccine Data Management Tool are Microsoft Excel-based and control immunization supply stock (receipts, levels, buffer, issues) at the central and district levels.	Global	stock management system
Logistics management software	Supply Chain Manager www.deliver.jsi.com/dhome/resources/tools/softwaretools/supplychainmanager	JSI, USAID DELIVER	Supply Chain Manager supports integrated supply chains by enabling health organizations to track the large variety of products used by their diverse programs. It also enables logistics managers to export data for use by other software applications in logistics or public health.	Global	stock management system
Logistics management software	Vaccination Supplies Stock Management www.technet21.org/index.php/documents/view-document-details/926-vaccination-supplies-stock-management-vssm.html	WHO	VSSM is a computer tool to assist vaccination program managers and storekeepers to organize and manage the stock of vaccines and other related supplies. VSSM's focus is on vaccines and diluents; however, it also caters to all other supplies. VSSM is open-source software based on Microsoft Access and all source codes are provided to users. Anyone familiar with Access can modify VSSM, add new fields, and manipulate reports to suit specific programmatic purposes.	Global	warehouse management system

Vision of future immunization supply and logistics systems: Tenet 4 landscape analysis summary—Immunization information systems

Focus area	Project/concept	Partners involved	Description	Locations	Keywords
Logistics management software	VillageReach Management Information System www.villagereach.org www.villagereach.org/vrsite/wp-content/uploads/2010/07/100723-Mozambique-National-Expansion-Plan.pdf	VillageReach	VillageReach provides technical assistance to provincial government health authorities to operate the dedicated logistics system for the direct distribution of vaccines and related commodities to health posts. Integral to the dedicated logistics system is the use of the VillageReach Management Information System, which produces ongoing routine metrics to enable continuous adjustments to improve health system and/or program performance. Furthermore, VillageReach builds systems to incorporate regular supportive supervision for all aspects of the logistics and supply chain system as well as health center operations.	Mozambique	integration, last mile
Other	Common Requirements Development Methodology www.phii.org/resources/doc/CRDM%20LMIS%20Final%20Report%2020101013.pdf	PATH, Public Health Informatics Institute, WHO	This is a methodology to guide the systematic discovery and documentation of user requirements through business process analysis.	Global	user-driven design
Other	Assessing the National Health Information System www.who.int/healthmetrics/tools/hisassessment/en/index.html	WHO, Health Metrics Network	This tool provides a broad-based assessment of the system's own environment and organization, responsibilities, roles and relationships, and of the technical challenges of specific data requirements.	Not applicable	health information system, information system assessment tool
Other	Health Unbound www.healthunbound.org/technology/applications	Health Metrics Network, mHealth Alliance	Hub is an online forum for the dialogue and exchange of ideas relating to health systems. It is designed to bring together health practitioners, implementers of health information initiatives, government leaders, nongovernmental organization donors, international organizations, the private sector, and system users.	Not applicable	community, landscape
Other	OpenLMIS openlmis.org	VillageReach	OpenLMIS is a community-led initiative dedicated to furthering understanding and development in LMIS to support improvements in health system supply chains in low-income countries around the world.	Not applicable	community, repository
Targeted projects or organizations	12580 service www.chinamobileltd.com/images/pdf/2011/sr/en/8.pdf www.csap.cam.ac.uk/media/uploads/files/1/mobile-communications-for-medical-care.pdf	China Mobile	12580 is a mobile appointment booking system that enables remote payment for services and appointment booking via call center staff. The system generates a number or two-dimensional barcode which is entered on a self-service terminal on arrival at the hospital. The system covers 93 hospitals and has served 4.25 million patients.	Guangdong, China	hospital information system, mhealth
Targeted projects or organizations	Care2x www.care2x.org/node/20	NA	Care2x is an open-source integrated hospital information system developed by a community of volunteers. Functionality includes organizing quick order catalogs, product database management, automatic signaling of reception of orders, product search and archive functions, ordering of pharmaceutical products, and a central depot for medical products and other materials. The system supports multiple languages.	Under development	hospital information system, stock management system
Targeted projects or organizations	ColaLife www.colalife.org	ColaLife	ColaLife is working to get Coca-Cola to open up their distribution channels in developing countries to carry "social products" such as oral rehydration salts to save children's lives. The child mortality rate has not changed significantly over the last three decades indicating that we need to explore new options like ColaLife.	Zambia	integration
Targeted projects or organizations	Epotheary cs.nyu.edu/~mpaik/pubs/epotheary.pdf	New York University	Epotheary is an authentication system that uses two-dimensional matrix barcodes and mid-level phones with a geographic information system and cameras for authentication and track/trace applications. The system enables the location of consignments to be known whenever the two-dimensional code is scanned or photographed.	United States	drug authentication service, mhealth

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Focus area	Project/concept	Partners involved	Description	Locations	Keywords
Targeted projects or organizations	GeoVac www.path.org/files/CP_geovac.pdf	Ministry of Labor, Health and Social Affairs of Georgia, Curatio International Foundation, USAID, Partners for Health Reformplus Project	GeoVac is a Microsoft Excel tool designed to quickly process immunization coverage data with output reports providing insight into the use and distribution of vaccines, an assessment of adequacy of supplies as well as major barriers (medical contraindications, parental refusals, etc.) to the functioning of the immunization system.	Georgia	health information system, immunization
Targeted projects or organizations	Human Resource for Health Information Software (HRHIS) www.hisp Tanzania.or.tz/hris.php	Ministry of Health and Social Welfare, Norwegian Embassy, Japan International Cooperation Agency, University of Oslo, Ifakara Health Institute, Clinton Health Access Initiative, - Muhimbili University of Health and Allied Sciences School of Public Health & Social Sciences	HRHIS is custom-designed open-source human resources management software. Reporting can aggregate data by location, organization, unit, or cadre.	Tanzania	human resources information system
Targeted projects or organizations	InSTEDD http://instedd.org/	InSTEDD, Many partners	InSTEDD manages a portfolio of projects designed to make technological innovations accessible to humanitarian and public health organizations. Applications include: structured data reporting through mobile phones, GeoChat for communication and coordination of surveillance and rapid response health teams in disease control management, and an appointment reminder tool which enables home-based care workers to track and remind HIV/AIDS patients to attend appointments.	Cambodia, Thailand	mhealth
Targeted projects or organizations	Mobile Product Authentication http://sproxil.com/technology.php	Sproxil	Mobile product authentication enables consumers to confirm the authenticity of the drug by scratching a label on the drug packaging to reveal a code number. This number is sent for free by SMS, in encrypted form, to a database server. An immediate text reply confirms whether the drug is genuine or fake (or if the secure code has already been used or is not recognized). A pilot project ran in Lagos, Abuja, and Port Harcourt covering 125 participating pharmacies. 735,000 blister packs of BIOFEM's Glucophage used in diabetes treatment were labeled, over 22,000 SMS messages were sent, and 67,612 unique customers were served.	Three-month pilot in Nigeria completed April 2010	drug authentication service, mhealth
Targeted projects or organizations	Mobile Technology for Community Health www.mobileactive.org/motech-new-approach-health-care	Columbia University, Grameen Foundation	This is an integrated community-based health information system that is based on openMRS and uses OpenXdata.	Bihar, Ghana	medical records, mHealth
Targeted projects or organizations	Project Optimize www.path.org/projects/project-optimize.php	WHO, PATH	Optimize has specific activities in five countries to demonstrate child immunization registries using mobile phones, last-mile LMIS, moving-warehouse LMIS, and lot-track and trace systems.	Albania, Guatemala, Senegal, Tunisia, Vietnam	integration, last mile

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Focus area	Project/concept	Partners involved	Description	Locations	Keywords
Targeted projects or organizations	<p>SMS for Life www.rbm.who.int/psm/smsWhatsit.html</p>	<p>Tanzanian Ministry of Health and Social Welfare, Novartis, Roll Back Malaria Partnership Secretariat, Medicine for Malaria Venture, The Swiss Agency for Development, Vodacom, Vodafone, IBM</p>	<p>SMS for Life is an innovative public-private partnership that harnesses everyday technology to improve access to essential malaria medicines in rural areas. It uses a combination of mobile phones, SMS messages, and electronic mapping technology to track weekly stock levels at public health facilities in order to eliminate stock-outs, increase access to essential medicine, and reduce the number of deaths from malaria.</p> <p>SMS for Life was initially piloted across three districts in Tanzania, covering 129 health facilities and 226 villages, representing 1.2 million people. When launched in 2009, 26% of all health facilities did not have any ACTs in stock, but by the end, 99% had at least one ACT dosage form in stock. In addition, 888,000 people in the three pilot districts had access to all malaria treatments at the close of the pilot, versus 264,000 people at the start, which helped to reduce the number of deaths from malaria.</p>	Tanzania	mHealth, stock management
Targeted projects or organizations	<p>Vaccine Link www.csap.cam.ac.uk/media/uploads/files/1/mobile-communications-for-medical-care.pdf</p>	China Mobile	<p>Vaccine Link is a vaccine information system targeted particularly at parents of children already registered with immunization stations. This service sends vaccine notices to parents via mobile phones and can also send information on other child health topics such as infant feeding, early education, maternal and child health care, child and parenting classes, etc. Vaccine Link is available in three cities: Shenzhen, Foshan, and Qingyuan. It had 100,000 subscribers as of October 2010.</p>	Guangdong, China	immunization, mhealth

Abbreviations used: ACT, Artemisinin-based combination therapy; ARV, antiretroviral; DHIS 2, District Health Information Software 2; HRHIS, Human Resource for Health Information Software; Hub, Health Unbound; IVR, interactive voice recording; J2ME, Java2 Platform Micro Edition; JSI, John Snow, Inc., LMIS, logistics management information systems; mHealth, mobile health; OS, operating system; SMS, short message service; UNICEF, United Nations Children’s Fund; USAID, US Agency for International Development; USSD, unstructured supplementary service data; VSSM, Vaccination Supplies Stock Management; WAP, wireless application protocol; WHO, World Health Organization.