

Collaborating with countries to improve supply chains

A changing environment

In the last decade, as the public health impact of vaccines has become increasingly clear, interest in and funding for new vaccine development and introduction have surged. Countries all over the world, including the poorest, are now beginning to add new and under-used vaccines to their standard immunization programs. With the higher cost of these new vaccines, programs are under considerable pressure to improve performance by minimizing wastage, improving forecasting, and implementing efficient vaccine management systems. Supply system innovations are urgently needed in order to ensure that these life-saving products reach the people who need them most.

Planning for the future

Optimize—a collaboration between the World Health Organization (WHO) and PATH with financial support from the Bill & Melinda Gates Foundation—has been given a unique mandate to think far into the future. The project aims to employ technological and scientific advances by defining ideal specifications for health products and creating a flexible and robust vaccine supply chain that can handle an increasingly large and costly portfolio of vaccines.

Demonstrating solutions that work

New system solutions and technologies must be aligned with future needs and their impacts proven in country contexts. Optimize is collaborating with countries and their ministries of health to define the value, benefits, and limitations of new technologies, systems, and management approaches through operational research supported by modeling. This will enable decision-makers and policymakers to evaluate and select the solutions that will work best in their unique contexts.

Country partnerships

After an extensive selection process and meetings with stakeholders, Optimize chose five diverse countries with whom to collaborate and demonstrate solutions as well as additional activities in two countries. All the countries selected have well-performing systems today but are facing increasing challenges with their impending new vaccine introduction plans.



Optimize country collaborations					
Country	Information systems	Integration	Cold chain	Private sector	Other activities
Albania	Computerized immunization information system		Remote temperature monitoring system		Supply chain modeling
Guatemala	Integrated health information system				
Senegal		Integration of supply systems and “moving warehouses”	Use of solar equipment to enable effective integration		Supply chain modeling
Tunisia		Integrated supply chain	Net-zero energy supply and cold chain	Improve understanding and linkages with the private sector	
Vietnam	Vaccine barcoding: track and trace Online reporting		Commune-level storage solutions		

Albania: Mobile technology supporting immunization programs

The vaccination landscape in Albania is changing and becoming more complex, making the management of its paper-based decentralized registries increasingly difficult. In addition, the introduction of new and more expensive vaccines in single-dose vials calls for better equipment, improved quality controls, and a strengthened cold chain. While Albania currently has a high-performing immunization system, the country wishes to respond to these challenges and plan for the future. Together, WHO, PATH, and the Albania Institute of



Public Health are employing improved immunization information systems that support vaccine distribution and storage practices. Pilot interventions will first be implemented in Albania’s Shkodra district with the ultimate goal of countrywide scale-up. These include:

- **Computerized immunization information system:** Implement an immunization information system that will focus on computerized individual immunization records and vaccine management at all levels, using both internet and mobile applications as appropriate.
- **Remote temperature monitoring system:** Demonstrate the managerial benefits of remote short message service (SMS)-based temperature alarm systems over traditional temperature loggers at the health-center level.
- **Supply chain modeling:** Model alternative distribution systems as input for proposed reorganization and rationalization of the subnational distribution system.

Guatemala: An integrated approach to health information systems

While Guatemala has high reported administrative immunization coverage rates, evaluation results indicate that coverage data lacks accuracy. The country is also planning to introduce new and expensive vaccines in the coming years and will need to strengthen the information systems and cold chain infrastructure in

Ministry of Public Health and Social Services are working together to address the challenges related to new vaccine introduction. This work focuses on:

- **Development and implementation of an integrated health information system:** This system aims to digitize data early in the immunization registry process, ideally at point of contact with the patient. This system design is based on user requirements discovered and documented through the collaborative requirements development methodology developed by the Public Health Informatics Institute and PATH.

Senegal: An energy-efficient and integrated supply chain

The supply chain that has contributed to a successful increase of vaccination rates has reached a saturation point in Senegal. Despite the outsourcing of some services to the private sector, the introduction of additional new vaccines poses numerous challenges, particularly in the context of decentralization and integration of public-health interventions. In response to these challenges, WHO, PATH, and the Ministry of Health in Senegal are collaborating to identify technologies and system interventions that can improve the vaccine supply chain in both the immediate future and the next 10 to 15 years. During the demonstration phase, project partners will adopt a road map for scaling up successful interventions and establishing a long-term vision for the evolution of immunization services and supporting systems.



- **Integration of supply systems:** Implement and validate a supply chain management approach that integrates vaccines in the supply chain from the central to the regional level as well as a distribution-based system using “moving warehouses” for distribution of vaccines and drugs to district pharmacies and health posts.
- **Use of solar equipment to enable effective integration:** Implement an energy supply approach using a hybrid solar and electric grid system at the regional level and battery-free solar refrigerators at the peripheral level.
- **Supply chain modeling:** Develop and apply a computer-based system for vaccine and drug supply chain logistics in Senegal for costing and forecasting future developments.

Tunisia: Health supply chain solutions that benefit the environment

Tunisia is rethinking its supply chain system in order to introduce new vaccines into what is currently a very solid immunization program. In response to these challenges, WHO, PATH, and the Government of Tunisia are collaborating to demonstrate the benefits of new logistics and supply chain solutions. The project goals are outlined below:

- **Integrated supply chain:** Make national supply chains more efficient by decreasing the steps that vaccines have to go through before reaching their final destination.
- **Net-zero energy supply and cold chain:** Energy required for the storage and transport of the streamlined and integrated system will be generated through solar panels installed in one regional and three district stores.
- **Improve understanding and linkages with the private sector:** Conduct operational research on private-sector supply chains for vaccines in order to understand their potential role in the future.

Vietnam: Bringing innovation to immunization supply systems

Vietnam's immunization system was designed before modern technology, and their distribution system was designed around a relatively weak infrastructure. While the country currently has a broad reach of electricity, telecommunication, and transportation networks, Vietnam's vaccine delivery system is due for an upgrade. This is a prime opportunity to take the system into the future by pioneering new technologies and system designs. Optimize and the National Institute of Hygiene and Epidemiology will test technologies and system interventions expected to support the anticipated immunization system expansion while also building a national long-term vision for immunization services and supporting systems.



- **Vaccine barcoding track and trace:** Evaluate the benefits of using barcode readers to track vaccine stock movements and transmit the data to a central system to increase accuracy and improve inventory management.
- **Online reporting:** Investigate whether moving from paper-based to online immunization reporting can decrease reporting time and increase visibility of information for program decision-making.
- **Commune-level storage solutions:** Demonstrate commune-level vaccine storage solutions in three provinces to determine which solutions are feasible and affordable.

South Africa: Outsourcing solutions

A promising solution to an overburdened public health sector supply chain is to outsource functions (e.g., storage and transport) that would be better managed by a private-sector third-party logistics provider. Optimize is currently reviewing the outsourcing experience in South Africa's Western Cape. The goal of the activity is to demonstrate the benefits of outsourcing as a supply chain solution to address anticipated challenges in the vaccine supply chain in South Africa and other countries in the region.

Thailand: Vendor-managed inventory systems

In Thailand, the vendor-managed inventory (VMI) system is a streamlined approach to inventory management and order fulfillment. The VMI system involves collaboration among suppliers and customers that changes the traditional procurement and distribution processes. Reportedly, the VMI system increases management efficiency of supply chain systems and will reduce vaccine wastage. However, evidence is needed to support this claim. Optimize plans to collaborate with Thailand to assess the Expanded Program on Immunization vaccine supply chain and logistics system through a retrospective, quasi-experimental study comparing costs and performance of the conventional and VMI systems.



Creating a road map

Optimize is tapping into a wellspring of ideas across sectors and finding ways to put them to work for immunization. PATH, WHO, and all country partners are working to define the characteristics of an ideal supply chain from health products to policies to logistics systems. By 2012, the Optimize project hopes to have a globally accepted road map that will make it possible to implement these innovations around the world—and the momentum to carry them forward. By bringing together new technologies, scientific advancements, and improved immunization delivery, this project will play a critical role in the effort to develop strong, adaptable, and efficient logistics systems that are able to bring more lifesaving health technologies to those who need them.