

Rethinking the vaccine supply chain

The right vaccine, in the right place, at the right time

“An ideal supply chain is one that ensures that the limits of science are not constrained by the limits of systems.”—Dr. Orin Levine, Associate Professor, Johns Hopkins Bloomberg School of Public Health

Over the past decade, the world has invested enormous resources and energy into the development of new and lifesaving vaccines. Current vaccination programs save more than three million lives per year, and new vaccines that focus on diseases affecting people in the world’s poorest countries can protect millions more.

But it’s not just about developing safe and effective vaccines. It’s about getting vaccines to the right place, at the right time, in the right condition. And that means delivery systems that are as advanced and innovative as the vaccines they support.

Optimize: Immunization Systems and Technologies for Tomorrow, a collaboration between the World Health Organization (WHO) and PATH, has been given a unique mandate to think far into the future: to put technological and scientific advances to work, helping define the ideal characteristics and specifications for health products, and to create a vaccine supply chain that is flexible and robust enough to handle an increasingly large and costly portfolio of vaccines and, ultimately, work efficiently with the delivery of other health commodities.

Upping the ante

For 30 years, countries have relied on the same system to store and transport vaccines safely from manufacturers to recipients—the “cold chain” keeps vaccines at controlled temperatures all along the way. As long as vaccines could be cheaply acquired in large quantities, this system worked, despite high rates of waste (more than 50 percent for some vaccines) and high maintenance costs.

As new vaccines arrive on the market, the landscape is changing. New vaccines can cost 100 times more than traditional ones. And technology innovations that protect these precious vaccines and reduce waste—such as single-dose vials and prefilled syringes—require significantly more space on trucks and in refrigerators, putting even more pressure on the system.

Counterbalancing this new stress on the cold chain is relief in other areas. Some of the vaccines that currently pass through the system are heat stable. The addition of the vaccine vial monitor, a small sticker that indicates exposure to heat, may mean that they can move out of the cold chain altogether.

The goal of project Optimize is to make sure the vaccine supply chain can meet these changing needs. PATH and WHO will work directly with countries to identify problems and

test solutions that could have a global application. The ultimate goal? Building in flexibility and efficiency to one of the world's most important delivery systems.

Vaccines—and the produce aisle?

Recognizing that supply chains are not unique to immunization, we are looking for solutions across the map. Fruits and vegetables, like vaccines, must be transported at specific temperatures to prevent spoiling. Can the technologies of those well-established supply chains work for vaccine delivery as well?

One possible solution: the passively cooled carts used to deliver produce to European supermarkets could be used to move vaccines from one storage location to another in developing countries. The carts maintain consistent temperatures, are capable of carrying a significantly higher volume than traditional vaccine cold boxes, and could save considerable expense in both the short and the long term.

Because high energy costs and unreliable power are major issues in developing countries, we are also exploring innovation in refrigeration technologies. Battery-free solar refrigerators, for example, could lead to major breakthroughs in the reliability and efficiency of refrigeration systems at health centers and clinics.

Systems that keep up with science

Innovation doesn't end with technologies. It can also be an answer for the inefficient management, paper-based tracking systems, and outdated policies that can derail vaccines before they reach the people who need them.

We are tapping into a wellspring of ideas across sectors and finding ways to put them to work for immunization: reaching out to the private sector for help with supply chain logistics, investigating computerized tracking systems, and supporting policies that allow heat-stable vaccines to be distributed out of the cold chain.

Over the next five years, Optimize will work to define the characteristics of an ideal supply chain, from health products to policies to logistics systems. By 2012, we hope to have a globally accepted roadmap that will make it possible to implement these innovations around the world—and the momentum to carry them forward.

By bringing together new technologies, advances in science, and improved immunization delivery, we will play a critical role in the effort to develop strong, adaptable, and efficient logistics systems—ones that are able to bring even more lifesaving health technologies to people around the world.