DIRECTIONS IN GLOBAL HEALTH

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Sharing PATH's work with global health colleagues

# Optimizing vaccine supply systems

## Collaborative project helps country immunization programs meet increasingly complex needs

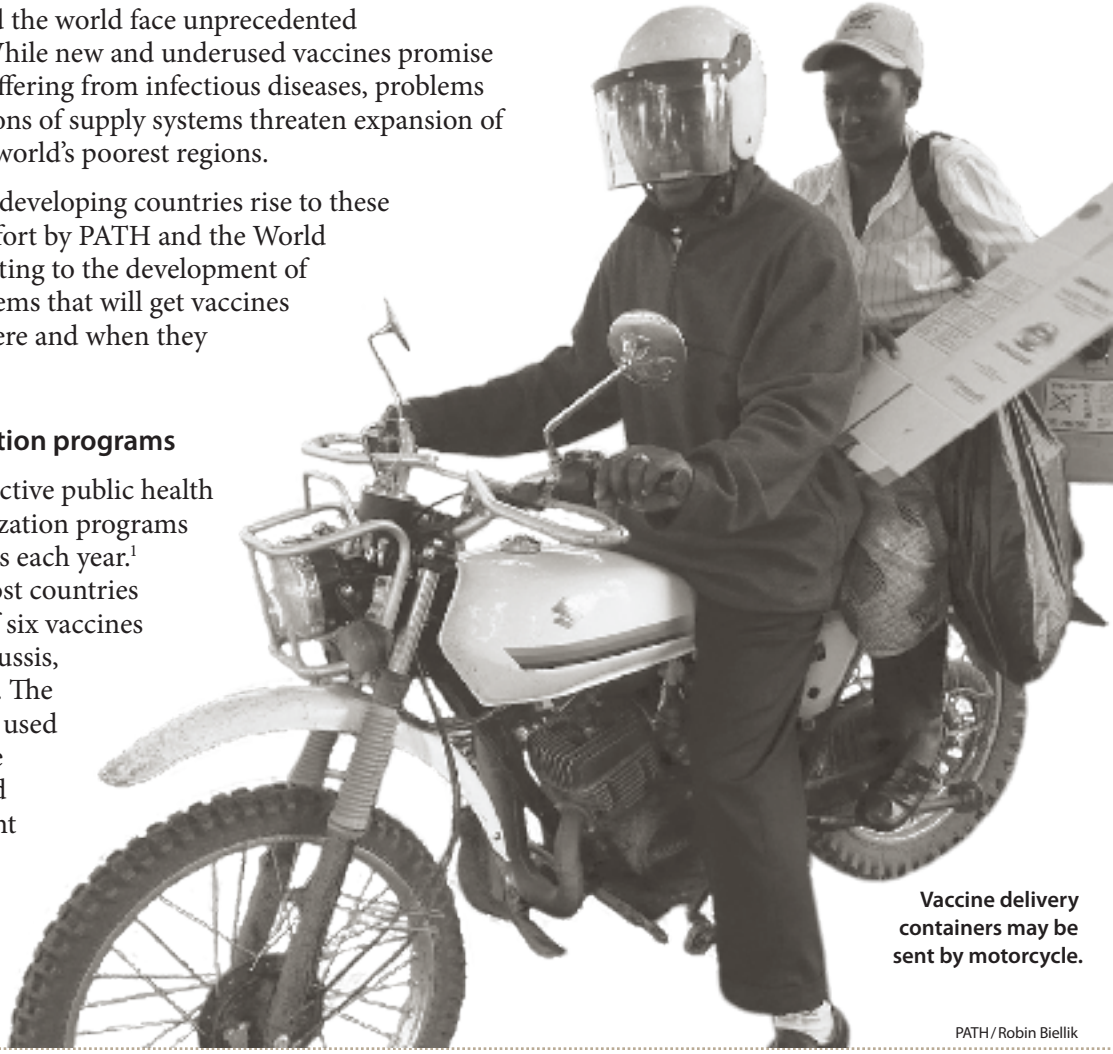
Immunization programs around the world face unprecedented opportunities and challenges. While new and underused vaccines promise further declines in death and suffering from infectious diseases, problems such as rising costs and limitations of supply systems threaten expansion of immunization programs in the world's poorest regions.

The Optimize project is helping developing countries rise to these challenges. This collaborative effort by PATH and the World Health Organization is contributing to the development of flexible and efficient supply systems that will get vaccines delivered in good condition where and when they are needed.

### Changing needs of immunization programs

Often described as the most effective public health intervention in history, immunization programs now save at least 2.5 million lives each year.[1] Since the 1970s, programs in most countries have used a standard package of six vaccines against diphtheria, tetanus, pertussis, tuberculosis, measles, and polio. The cold chain and logistics systems used to distribute these vaccines were developed before computers and sophisticated tracking equipment became widely available.

*Continued on page 10*



**Vaccine delivery containers may be sent by motorcycle.**

PATH / Robin Biellik

INSIDE



PATH
A catalyst for global health

# Reaching a malaria milestone

## As a vaccine enters advanced testing, work to eradicate the disease moves forward

**Project name**
Malaria Vaccine Initiative (MVI)

**Locations**
Global

**Methods**
Capacity-building, public-private partnerships, technical assistance, technology development, technology evaluation

**Partners**
Crucell, GlaxoSmithKline Biologicals, Infectious Disease Research Institute, International Centre for Genetic Engineering and Biotechnology, Sanaria Inc., Seattle Biomedical Research Institute, Walter Reed Army Institute of Research

**Funders**
Bill & Melinda Gates Foundation, US Agency for International Development

**For more information**

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PATH / David Poland

**The world's first large-scale advanced testing of a vaccine against malaria began with these five children in Bagamoyo, Tanzania.**

ON A SUNNY MORNING LAST MAY, five mothers and their young children gathered at the Ifakara Health Institute in Bagamoyo, Tanzania, to make history. After more than eight years of collaboration by an innovative public-private partnership and more than 20 years of research, the children would be the first to take part in large-scale, advanced testing of a vaccine against malaria.

GlaxoSmithKline Biologicals' RTS,S (now also known by the trade name Mosquirix) is the first product to reach this advanced stage of development and is the leading vaccine candidate in the PATH Malaria Vaccine Initiative (MVI). Despite the promise of RTS,S, however, a single successful vaccine—even combined with the use of effective insecticides, insecticide-treated nets, and malaria drugs—will not be enough to realize MVI's vision of a world free from malaria.

### Adding vaccine candidates to the portfolio

As MVI concludes its tenth year, the initiative has realigned its research and development strategy to fill the vaccine pipeline with new candidates. Some build on the success of RTS,S, and others take different paths toward immunization. To maximize the potential for success against a disease that every year kills nearly 1 million people—most of them African children[1]—the initiative is exploring a range of promising vaccine approaches.

This year, four of MVI's vaccine projects have been in clinical testing phases. Another 20 feasibility studies are under way to find the

vaccine candidates of the future. Only the most promising of these will advance to clinical development.

### A long-standing scientific challenge

The search for safe and effective malaria vaccines has been long and challenging. Efforts have been hampered by financial hurdles and the technical complexities of developing a vaccine against parasites such as *Plasmodium falciparum*, the deadliest malaria parasite, and *P. vivax*, which causes a less severe but more widespread form of the disease. After the parasites pass to humans through the bite of infected *Anopheles* mosquitoes, they undergo changes that make it difficult to target the disease with a single vaccine.

RTS,S illustrates some of these challenges. In a recent study, the vaccine demonstrated 53 percent efficacy against clinical malaria.[2] Although these results align with the research community's goal to license a vaccine with at least 50 percent efficacy against severe disease by 2015, they are insufficient to meet the long-term goal of developing a product with 80 percent efficacy against clinical malaria by 2025. And MVI is now aiming even higher by targeting malaria eradication as the ultimate goal.

### Cultivating new approaches

To reach these goals, researchers collaborating with MVI are working on several approaches to malaria vaccines.

Some projects, including RTS,S, use a "pre-erythrocytic approach." These vaccine candidates trigger the immune system to defend against the parasite as soon as it enters a person's bloodstream or infects liver cells. This prevents the parasite from maturing and multiplying in the liver, reentering the bloodstream, and infecting red blood cells.

Although most malaria vaccine candidates use one or more components of the parasite to elicit an immune response, another approach uses a weakened form of the whole parasite. MVI is working with Sanaria Inc. to develop a novel vaccine candidate that uses this strategy with *P. falciparum*. This approach is currently being tested in adult volunteers in the United States.

Another method targets the malaria parasite when it is most destructive: when the parasite replicates rapidly in red blood cells. Although these vaccines are not expected to block all infection, they aim to decrease the number of parasites in the blood and thereby reduce the severity of illness. MVI will continue to make limited investments in this approach, which will help to develop additional components that can be combined with a pre-erythrocytic vaccine, for example, to boost its effectiveness.

### Targeting the mosquito

MVI is also looking for vaccine candidates that block the transmission of parasites from mosquitoes to humans. These products attempt to interrupt the life cycle of the parasite by inducing antibodies that prevent it from maturing in the mosquito after it bites a vaccinated person. Transmission-blocking vaccines would not prevent all cases of malaria, but they could significantly limit the spread of infection by reducing the pool of infected mosquitoes.

Although most research to date has targeted *P. falciparum*, the parasite most likely to kill, MVI is intensifying its support for work related to *P. vivax*. Eventually, products may be developed to target both species.

### Continuing need for collaboration

As the number of potential malaria vaccine candidates increases, scientists will need new and better technologies to assess their potential efficacy and decide which should go forward. MVI is supporting the development of both laboratory tools and human challenge models to help answer these questions.

Although vaccine development is the first part of its mission, MVI is also working toward an equally important goal: ensuring eventual vaccine use. Already, the program is working with the World Health Organization and other partners to help policymakers in malaria-endemic countries make informed decisions about whether to use a vaccine, once approved for use. Then there is the challenge of ensuring adequate financing by donors and purchasing agencies to provide the vaccine. Only with all the needed pieces in place will a malaria vaccine make it to those who need it most. ■

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PATH / David Poland

**The first child received the RTS,S vaccine at the Ifakara Health Institute on May 26, 2009.**

# Preventing postpartum hemorrhage

## Expanding interventions to save mothers' lives

**Project name**
Prevention of Postpartum Hemorrhage Initiative

**Locations**
Global

**Methods**
Advocacy, research and pilot studies, systems strengthening, technical assistance, training

**Partners**
RTI International, EngenderHealth, International Confederation of Midwives, International Federation of Gynecology and Obstetrics

**Funder**
US Agency for International Development

**For more information**

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To learn more about the Prevention of Postpartum Hemorrhage Initiative, visit www.pphprevention.org.

POSTPARTUM HEMORRHAGE IS THE single largest cause of maternal death. Worldwide, it causes an estimated 150,000 deaths each year, mostly in developing countries.[1] Although Millennium Development Goal 5 has targeted a dramatic decline in the maternal death rate, women in sub-Saharan Africa and southern Asia remain at especially high risk.

For the past five years, PATH has led an effort to expand use of active management of the third stage of labor (AMTSL), an effective method for preventing many cases of postpartum hemorrhage. The Prevention of Postpartum Hemorrhage Initiative (POPPHI) has emphasized community-based approaches to increase access for all women. By broadening the use of AMTSL and other interventions, the project has laid the groundwork for global efforts to save thousands of lives.

### Addressing a global issue

AMTSL has three components: use of uterotonic drugs to reduce bleeding (oxytocin is the drug of choice), controlled cord traction, and uterine massage after the placenta has been delivered. A simple, low-cost intervention, it can help to avoid 60 percent of postpartum hemorrhage and thus avert a significant proportion of maternal deaths.[2]

Despite the proven benefits of AMTSL, a POPPHI survey of health providers in ten developing countries found that AMTSL was used correctly in only 0.5 to 32 percent of observed deliveries. Using the survey results, the project team successfully advocated for and supported numerous global policy changes that further women's access to AMTSL.

### In-country efforts to reduce postpartum hemorrhage

The project team focused on five countries with high maternal mortality rates and low use of AMTSL to scale up interventions, promote awareness, build providers' skills, and shape supportive policies.

**Bangladesh:** AMTSL was practiced in only 16 percent of vaginal deliveries in Bangladesh. POPPHI supported its partner, EngenderHealth, in training facility-level birth attendants in AMTSL and integrating the practice into training curricula. AMTSL use subsequently increased to 85 percent among the 25 districts where health workers received training. To prevent and treat postpartum hemorrhage in home deliveries, which account for most of the country's births, EngenderHealth registered the uterotonic drug misoprostol and helped the country establish a policy for its use. Additionally, the Government of Bangladesh made a commitment to national scale-up of prevention activities.

**Benin:** Although most birth attendants are trained in AMTSL, the project team found that only 18 percent of women received AMTSL practiced to standards. POPPHI helped the government develop a national action plan for improving training and practice

and tracking AMTSL coverage rates. This year, Benin's minister of health committed to increasing the number of midwives hired by the government to ensure that all women giving birth at facilities are assisted by a skilled attendant and receive AMTSL.

**Ghana:** Only 3 percent of health providers surveyed in Ghana in 2007 practiced AMTSL to standard. The results of the survey prompted policymakers and health providers to create an action plan to improve coverage rates. Ghana updated its safe motherhood guidelines to align with international standards and reflect best practice, and professional associations encouraged the private sector to use the new guidelines. The country added misoprostol to its *Essential Medicines List*, and POPPHI worked with the government to enact multiple strategies and alternative training approaches to increase AMTSL. The use of AMTSL subsequently increased ninefold.

**Indonesia:** With 32 percent AMTSL coverage, Indonesia had the highest rate among the countries surveyed. The team worked with the government and partners to revise assessment and supervision tools for AMTSL, support training among midwives and the ministry of health's hospital division, and develop a national action plan for prevention of postpartum hemorrhage. The country updated its AMTSL definition and guidelines and expanded the skills of midwifery tutors in AMTSL. A repeat national survey found that 40 percent of providers practiced AMTSL to standard in 2009.

**Mali:** Since introducing AMTSL in 2002 and 2003, Mali has shown a national commitment to scaling up the method for all facility-based birth providers. A study by POPPHI and its partners found that it is feasible and safe to train auxiliary midwives (*matrones*)—who assist in a high number of deliveries—to use AMTSL, including use of oxytocin in the Uniject® prefilled injection device. The team supported midwife training in Timbuktu and developed training materials for other regions of the country. AMTSL was integrated into education programs for nurses, midwives, and physicians. Mali established a task force to develop a plan for scaling up the intervention and monitoring progress, and in April 2009 the minister of health authorized *matrones* to practice AMTSL and use oxytocin. The two regions in which POPPHI worked now boast AMTSL coverage rates greater than 65 percent.

The POPPHI team also supported expansion of AMTSL throughout Africa, Asia, and Latin America and the Caribbean by issuing 16 small grants to encourage joint activities between obstetric/gynecology and midwife associations. Data indicate that, by the end of the grant period, 88 percent of targeted providers in all countries that received grants were practicing AMTSL.

## Evidence for the future

POPPHI's work has brought global recognition to AMTSL as an evidence-based and lifesaving intervention. By supporting policy changes and improving knowledge and use of AMTSL, the project has enhanced the ability of health care providers around the world to protect the lives of mothers and their children. ■

## Maximizing safe use of oxytocin

PATH is conducting a three-year project to build evidence for the safe use of oxytocin in communities to prevent postpartum hemorrhage. The oxytocin will be delivered via the PATH-developed Uniject® device. The autodisable injection device is prefilled with a dose of oxytocin and used by health workers to easily administer the drug outside of facilities or in remote locations. With our partners, PATH is conducting rigorous evaluation and research in Ghana, India, and Zambia to maximize the drug's safe use and answer key questions.



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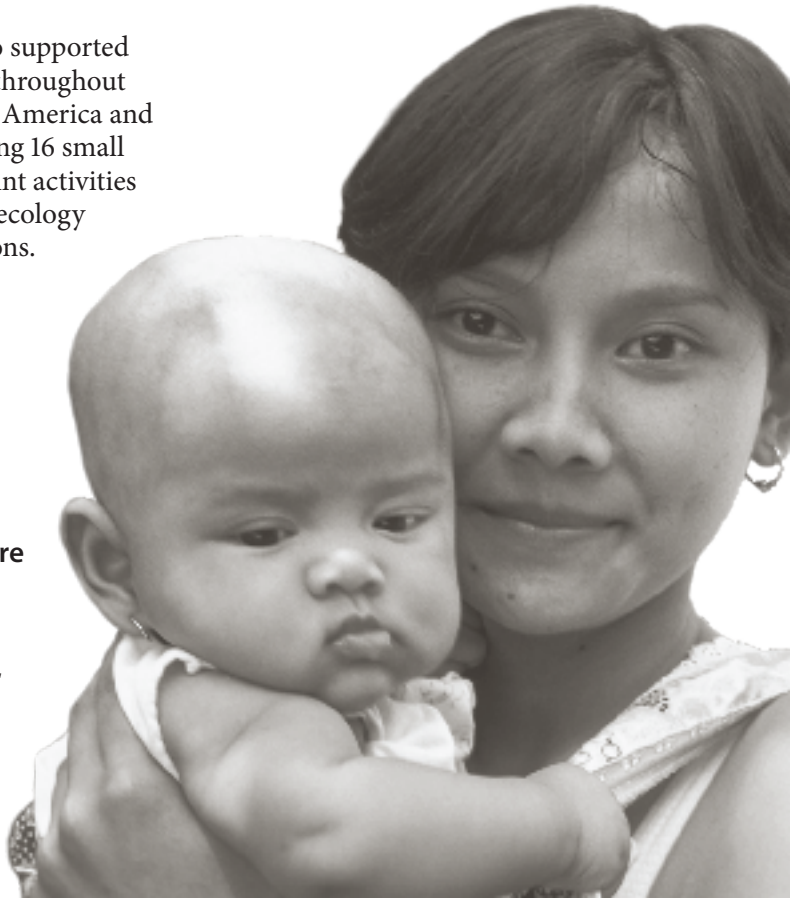

Richard Lord

Program development

# Meeting health needs in Tanzania

## Expanding and integrating work to address a growing list of concerns

**Project name**
PATH's Tanzania Country Program

**Location**
Tanzania (Dar es Salaam, Pwani, Arusha, Mwanza, Zanzibar)

**Methods**
Advocacy, capacity-building, communication, partnership development, service integration, social mobilization, technology application

**Partners**
Association of Private Health Facilities in Tanzania, D-Tree International, Ifakara Health Institute, National TB and Leprosy Programme, National AIDS Control Programme, University of California at San Francisco, Zanzibar AIDS Control Programme, Zanzibar TB and Leprosy Programme

**Funders**
Bill & Melinda Gates Foundation, US Agency for International Development , and other institutional and individual donors

**For more information**

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**Public health nurses provide HIV counseling.**

PATH

TANZANIA FACES SOME OF AFRICA'S greatest health challenges. These include high rates of tuberculosis (TB) and HIV/AIDS, frequent malnutrition among children, and poor access to health services because of widespread poverty.

Over the past ten years, PATH's work in Tanzania has grown to cover an increasing number of health needs. Initially focused on behavior change communication to improve adolescent sexual and reproductive health, the work evolved to include improvements in service delivery for patients with TB and HIV. Recently, PATH's efforts have expanded to involve multifaceted interventions, including technology solutions, to reduce the burden of malaria and improve TB diagnosis.

Success in responding to the health needs of Tanzanians will depend on effective integration of interventions to change behaviors, strengthen health systems, and implement appropriate technologies. The results of PATH's efforts will hinge on integrating our work with that of other stakeholders and contributing to local capacity-building.

### Significant health challenges

Although Tanzania has made substantial progress over the past 20 years in improving living standards, enormous health challenges remain. For example, 12 percent of children die before their fifth birthday, and life expectancy at birth is only about 50 years.[1] An estimated 6 percent of adults are living with HIV/AIDS,[2] and the orphan population is growing rapidly. Tanzania is also a high-burden country for TB,[3] and malaria is a constant drain on limited health resources.[4]

After PATH opened a project office in Dar es Salaam in 2005, we focused on coordinating responses to TB and HIV co-infection. Initially, we concentrated our TB–HIV integration activities in four high-burden regions: Dar es Salaam, Pwani, Arusha, and Mwanza. We added Zanzibar in 2008. In collaboration with local partners, PATH developed national training packages and guidelines to support this effort and seconded staff at the regional and district levels to introduce HIV testing as a routine element of TB diagnosis, conduct training, and provide supportive supervision. Over time, activities expanded to include introduction of strategies to link the public and private sectors to improve referrals.

By the end of 2008, PATH had helped to scale up TB–HIV service integration to 26 districts, representing almost 50 percent of Tanzania's TB burden. A total of 321 service-delivery outlets provided collaborative TB–HIV services, and 86 percent of new TB patients were counseled for HIV testing, tested, and given their results.

### Further work to address TB

In 2008, PATH began to implement a range of new activities to strengthen implementation of Tanzania's overall TB control strategy. For example, to assist the central TB reference laboratory in upgrading equipment and


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**PATH advanced the HIV/AIDS management skills of more than 60 health care workers in Kibaha District in June 2009.**

improving safety and services, PATH helped to procure 40 new light-emitting diode microscopes, a freezer, and other supplies. We also worked with partners to support training on use of new diagnostic technologies.

PATH is now piloting intensive case finding of new TB patients by involving traditional healers and staff at private pharmacies. These health workers use an approved screening tool to identify patients suspected of having TB and then refer them to health facilities for diagnostic confirmation and management. In addition, PATH and colleagues at the University of California at San Francisco are providing technical assistance to the National TB and Leprosy Program as it initiates work to diagnose and treat drug-resistant TB.

PATH recently began a series of advocacy, communication, and social mobilization activities to increase awareness about TB at the community level. This work includes preparing a school-based TB and TB–HIV curriculum to improve knowledge among students, developing and disseminating communications materials, and piloting TB PhotoVoice. PhotoVoice is a tool for using photos of the daily lives of people living with TB to promote client-centered care and reduce stigma.

PATH is also testing new uses of mobile phone technology to improve care for TB patients. Mobile phones may prove useful for reporting routine TB program data and thereby reducing the workload of community health workers.

## New work to control malaria

PATH has also recently expanded work to prevent malaria in Tanzania and elsewhere. For example, we are helping to scale up malaria control with the Malaria Control and Evaluation Partnership in Africa (MACEPA), a program at PATH, in collaboration with the National Malaria Control Programme of the Ministry of Health and Social Welfare. This project is documenting the achievements, challenges, and changes in malaria illness and death in Tanzania and transferring the lessons learned to other countries through the MACEPA Learning Community. This effort supports trainings and workshops on conducting malaria indicator surveys, developing grant proposals, and using geographic information systems for indoor residual spraying programs.

Tanzania is also playing a critical role in a phase 3 trial of the world's most clinically advanced malaria vaccine candidate, known at RTS,S. In May, the PATH Malaria Vaccine Initiative launched the trial at Tanzania's Ifakara Health Institute (see related article on page 2).

## Going with others to go far

As a reflection of our growing role in Tanzania, PATH recently established a Tanzania Country Program, with Mohammed Makame, MD, MPH, serving as program leader. PATH now has more than 40 staff members based in Dar es Salaam.

Successfully advancing PATH's work to improve health in Tanzania will require integrating efforts with those of our key partners, including the Ministry of Health and Social Welfare. As noted in an oft-quoted African proverb, "If you want to go fast, go alone. If you want to go far, go with others." ■

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# From innovation to improved outcomes

## Using monitoring and evaluation systems to promote long-term programmatic success

**Project name**
Monitoring and Evaluation Strengthening Initiative

**For more information**

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This is the first in a series of articles about PATH's organizational approaches and initiatives.

AS RESOURCES FOR TACKLING HIV/AIDS, tuberculosis, malaria, and other global health challenges have grown, so has the need for robust monitoring and evaluation to measure the impact of interventions.[1] Funders need clear evidence that their investments are improving program and health outcomes. Also, rigorous evaluation is essential to understand the comparative cost-effectiveness of various interventions and to optimize resource allocations.[2]

Two years ago, PATH launched an effort to improve monitoring and evaluation (M&E) skills and practices across the organization. One component of the M&E Strengthening Initiative involves identifying and tracking high-level, cross-program indicators to assess organizational performance in achieving our mission. Although this initiative is still in the early stages, expected long-term benefits include linking our work directly to specific improvements in health-related outcomes and boosting programmatic effectiveness over time.

### Designing new tools to track performance

Like other organizations working to improve global health, PATH has successfully evaluated the short-term effects of individual projects for many years. It has been more challenging to assess higher-level programmatic or health impacts

### Q&A on cross-program indicators

As vice president for PATH's global programs, Jacqueline Sherris, PhD, oversees program evaluation and impact assessment. She answered the following questions about PATH's cross-program indicators.

**Q:** What have been the biggest challenges in developing cross-program indicators for advancing technology?

**A:** The biggest challenge—and the most fun—has been working with individuals and teams to build a common framework for our product-development work, and then together determining what indicators are most pertinent and powerful for assessing progress.

**Q:** What have you learned so far from this initiative?

**A:** It is vital to focus on how the information we gain will help PATH make more of a difference with the resources we have. If indicators do not help to improve our work at all levels, they need to be revised. Everyone involved needs to engage in the exercise from that perspective and be willing to take risks to see what works best.

**Q:** What advice would you give to other organizations considering work like this?

**A:** Developing and using cross-program indicators is an organizational change exercise, not a technical M&E exercise. The rewards are great but require strong support from leadership, a broad organizational culture of M&E, and an ongoing commitment to transparently sharing and using the information gained.

during the life of a single project or even a small number of projects.

To get a fuller picture of institutional performance over time, PATH staff supported development of cross-program indicators evaluating progress in key areas. The indicators map to the conceptual framework or theory of change underlying PATH's work. If our work to advance health technologies, strengthen systems, and encourage healthy behaviors is successful, we expect to see health improve overall.

Evaluation of our work to advance technologies has moved most rapidly. During 2008, staff selected six indicators to measure progress through the six stages of PATH's framework for product development, as illustrated in the figure to the right. One of the indicators, for example, tracks progress to validate products and technologies through completion of clinical trials or testing. Another focuses on meeting regulatory requirements to allow introduction of new products. The ultimate goal is to measure long-term progress toward improving access to lifesaving health technologies.

PATH staff recently completed the first round of data gathering on the health technology indicators. In July and August, more than 50 PATH project teams used an online tool to enter data based on work during the first half of 2009. Teams entered more than 100 results, which were aggregated by phase of product development. A team developing a malaria vaccine, for example, reported completion of clinical trials involving children in Mozambique, and this result was aggregated with data from other teams conducting clinical trials of other products.

## Analyzing and using cross-program data

In the short term, we are using the results to create a descriptive analysis of PATH's product-development pipeline. The initiative is also helping to increase staff M&E skills and organizational capacity. Over time, we will use the data to better understand and accelerate the impact of our work by:

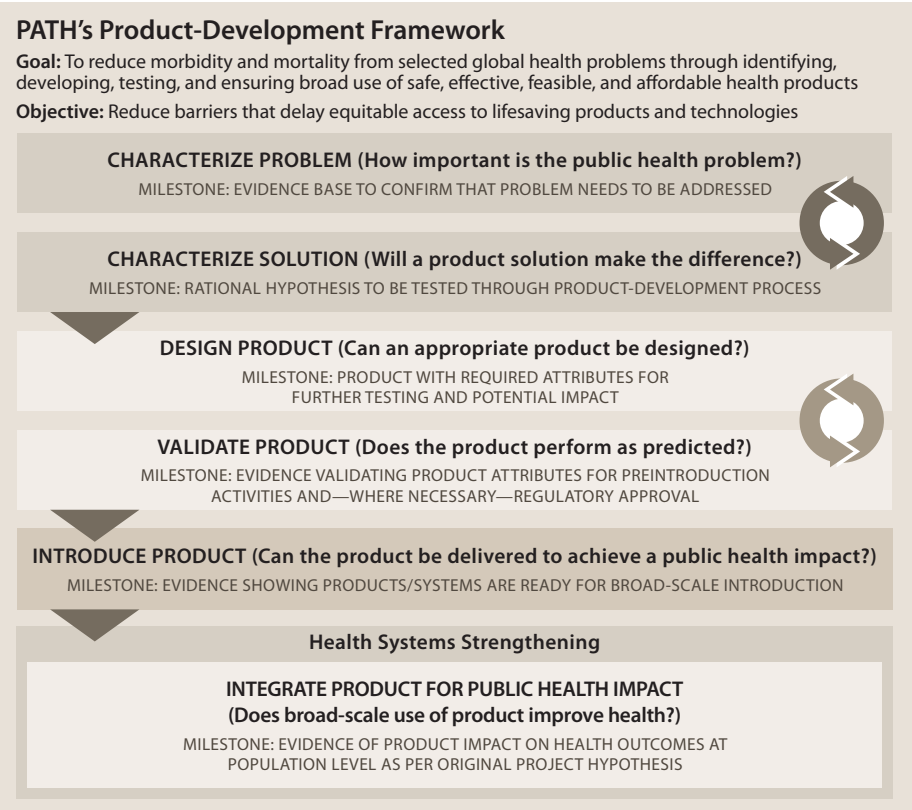
- Linking our work to specific improvements in access to health products and technologies.
- Informing organizational investment in areas with potential to accelerate implementation of new or underused technologies.
- Identifying areas of potential cross-program synergy.
- Capturing and sharing best practices that can be scaled up.

Moving forward, PATH will collect data on the health technology indicators twice each year. In 2010, we expect to finalize indicators and begin to collect cross-program data on PATH's success in other key areas, including systems strengthening.

## Role in strategic planning and accountability

PATH is currently developing a strategic plan to guide our work from 2010 through 2015. Our M&E systems, including our work on cross-program indicators, will play a critical role in monitoring progress, achieving objectives, and documenting improvements in health-related outcomes.

PATH's M&E Strengthening Initiative also aligns with a larger push by the global health community to further improve transparency, accountability, and stewardship. Sustaining the high level of resource commitment needed to meet the world's greatest health challenges will hinge on how well the global health community can measure impact and communicate the results to funders and other stakeholders. ■

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# Optimizing vaccine supply systems, *from page 1*

Although countries now have opportunities to introduce many more vaccines—such as those for hepatitis B, *Haemophilus influenzae* type b, pneumococcal disease, and rotavirus—the new products are often much more expensive than previous vaccines.[2] Also, technological innovations that protect vaccines and reduce wastage, including single-dose vials and prefilled delivery tools, require significantly more space on trucks and in refrigerators, putting even more strain on delivery systems. The rising costs and expanding storage needs mean that immunization program managers must maintain lower stock levels, reduce wastage, accurately forecast vaccine demand, and work harder to prevent equipment breakdowns.

## Multipronged approach to improving delivery systems

The Optimize team is tackling the problem through a multipronged approach focusing on:

- **Innovation.** Defining ideal product characteristics, increasing dialogue with industry, and advancing policies and mechanisms to promote innovation.
- **Facilitation.** Engaging key partners to develop a joint vision for the future and to establish an implementation strategy.
- **Demonstration.** Implementing specific interventions with collaborating countries, documenting experiences, and modeling potential impact.

Activities to improve delivery systems in collaborating countries include work to improve supply chains, tailor refrigeration to specific needs, and use alternative energy sources.

## Integrating and improving supply chains

Improving supply chain logistics is one of the project's major objectives. In Tunisia, for example, the project is working with the ministry of health to integrate supply systems for heat-sensitive vaccines with previously separate systems for temperature-sensitive drugs. Streamlining the supply chain will improve availability, distribution efficiency, and storage quality for these products.

In Senegal, work to integrate supply systems includes assessing the feasibility of a "moving warehouse" distribution system. With this pilot system, district staff not only provide monthly deliveries to rural clinics but also maintain refrigerators and collect data on use of vaccines and supplies.

Both the Senegal and Tunisia projects are gathering baseline data and assessing the existing supply chains using the recently completed Effective Vaccine Management tool, which merges and streamlines two previously used evaluation tools. The new tool gives countries a simplified method to assess the entire vaccine supply chain, from the central to health center levels, and provides supporting documents to help address identified challenges.

## Taking advantage of vaccines' heat-stability profiles

Although some vaccines lose potency when stored outside the standard cold chain temperature range of 2°C to 8°C for even short periods, others do not spoil even with prolonged heat exposure. Allowing heat-stable vaccines to spend time outside of refrigeration systems under controlled temperatures for specific periods could facilitate outreach efforts and free up valuable space in the cold chain.

In Vietnam and Uganda, in association with a PATH project to immunize girls against human papillomavirus, the Optimize team is attaching small temperature-recording devices to vaccine cold boxes transported to schools and community health facilities. The temperature recordings from multiple geographic settings and seasons will show the conditions

PATH / Carib Nelson

**Optimize is exploring new technologies, including battery-free solar refrigeration systems, to improve vaccine storage and delivery systems.**

that vaccines might experience if stored or transported in ambient temperature chains.

In Mali, at the invitation of the ministry of health, the team recently studied the existing practice of using oral polio vaccine outside of the cold chain during national immunization campaigns—a practice that stems from a shortage of available carriers and ice. On alternate days during the study, vaccinators used vaccine in carriers either with or without icepacks. Even by the end of a sweltering day, heat-sensitive vaccine vial monitors showed that all vaccine transported without icepacks was still usable. Distribution without icepacks also resulted in less wastage from problems caused by melting ice, which can render vaccine unusable by destroying labels.

Data collected from these activities will inform upstream work to develop a regulatory and policy framework for storing and transporting vaccines at controlled temperatures outside of the standard cold chain temperature range based on their individual stability profiles. The field-level data are critical for ensuring that any changes in licensing are compatible with country needs and conditions.

## Using alternative energy sources

Because high energy costs and unreliable power supplies are major issues for developing-country immunization programs, the Optimize team is exploring new technologies that use alternative energy sources to keep vaccines cool. These include solar-powered refrigerators and passive cooling systems.

Although solar-powered refrigeration has been a promising technology for rural health outposts for many years, shortcomings of available battery technology have hindered widespread use. To overcome this challenge, Optimize is planning to conduct laboratory and field testing of a battery-free solar refrigerator that uses an ice bank to cool the system through nights and cloudy days. The team is also helping to advance use of new longer-lasting, maintenance-free batteries—such as the types of batteries used in the Toyota Prius and Segway personal transporter—for solar refrigerators.

For small, remote health facilities with limited access to maintenance and repair services, the best approach to refrigeration may be passive cooling devices—that is, vaccine storage and delivery containers that are periodically recharged with cold packs, ice packs, or other cold sources. Optimize is currently partnering with private firms to create incentives for developing a new generation of high-efficiency cold boxes and vaccine carriers that will keep vaccines at required temperatures for extended periods of time through passive cooling.

## A roadmap for the future

Through these and other activities, Optimize is working to transform vaccine distribution systems to meet expanding needs. A key function is defining the characteristics of an ideal system, including logistics, policies, and features of vaccines and related supplies. By 2012, Optimize plans to have a globally accepted roadmap for improving supply systems around the world—and the momentum to carry this critical work forward.


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## Systems strengthening

**Project name**
Optimize

**Locations**
Global

**Methods**
Advocacy, capacity-building, demonstration projects, operations research, policy, procurement, regulatory systems strengthening, technology development and introduction

**Partner**
World Health Organization

**Funder**
Bill & Melinda Gates Foundation

### For more information

Please contact Michel Zaffran, project director, at mzaffran@path.org.

Visit www.path.org/projects/project-optimize.php to learn more.

# Awards, new work, and a new home for PATH

### PATH wins Hilton Humanitarian Prize


PATH has received the 2009 Conrad N. Hilton Humanitarian Prize, the world's largest humanitarian award. The prize is presented annually by the Conrad N. Hilton Foundation to recognize extraordinary contributions toward alleviating human suffering. The recognition comes with a $1.5 million award.

In announcing the award, Steven M. Hilton, president and CEO of the foundation, highlighted PATH's work to bring new ideas and affordable technologies to some of the most challenging global health issues, often working closely with the private sector to make innovative solutions available. PATH will use the prize funds as innovation capital to support new initiatives.

### Ultra Rice® technology earns special recognition

For its work to advance Ultra Rice micronutrient fortification technology, PATH was named a Tech Awards Laureate for 2009. PATH also received a $50,000 prize, given to only one of three laureates in each of five categories. The Tech Museum of Innovation in San Jose, California, sponsors the annual Tech Awards program to recognize individuals and organizations that are applying technology to benefit humanity and spark global change.

Ultra Rice is a culturally appropriate, cost-effective rice fortification technology that can deliver critical micronutrients to people suffering from malnutrition. The rice-shaped grains are fortified to meet a population's specific nutrient needs, then mixed with traditionally milled rice and cooked customarily.

PATH was also named a laureate in 2003 for work to advance the Uniject® prefilled, single-use injection device and in 2007 for the vaccine vial monitor, which measures heat exposure over time.

### New publication on private-sector collaboration

PATH leverages public-private partnerships to advance development of health technologies for low-resource settings. PATH's approach and several case studies illustrating our work with a range of partners can be found in *Maximizing the Benefits of Public-Private Partnerships*. For an electronic copy of this new publication, please go to www.path.org and enter the search term "maximize public-private."

### HIV/AIDS work in Democratic Republic of Congo

A PATH-led consortium has received a contract with the US Agency for International Development to strengthen and integrate HIV prevention, support, and treatment services in the Democratic Republic of Congo. PATH and our partners will focus on reducing HIV/AIDS transmission among vulnerable groups, such as sex workers and their clients, truckers, miners, and military personnel. To learn more, go to www.path.org and enter the search term "Congo."

### Our new headquarters

PATH is moving from our current headquarters in Seattle's Ballard neighborhood to a new building in the city's South Lake Union district. The January move will put PATH at the center of an emerging "nexus for global health" in Seattle, closer to key global health and biotech partners. The new building will also enhance the capacity of PATH's in-house laboratory and product-development shop and allow room for growth.



PATH is an international nonprofit organization that creates sustainable, culturally relevant solutions that enable communities worldwide to break longstanding cycles of poor health. By collaborating with diverse public- and private-sector partners, we help provide appropriate health technologies and vital strategies that change the way people think and act. Our work improves global health and well-being. For more information, please visit www.path.org.

*Directions in Global Health* shares information about PATH's programmatic work with colleagues around the world. To subscribe, please send your contact information to publications@path.org. To learn more about PATH's work, visit the PATH website or subscribe to one or more of our electronic newsletters. These include *News From PATH* and several topic-specific e-newsletters. To subscribe, go to www.path.org/sign-up.php#news.

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