

DIRECTIONS

December 2013 Volume 10, Issue 2

IN GLOBAL HEALTH



Reaching a major milestone in Japanese encephalitis control

PATH catalyzes the transformation of a little-known vaccine from China into an internationally approved innovation to save lives

In October, the World Health Organization (WHO) gave a critical seal of approval for a vaccine against Japanese encephalitis. WHO's prequalification of the vaccine, known as SA 14-14-2, means that millions more people across Asia will be protected from a devastating disease.

Prequalification of the vaccine caps a decade of effort by PATH and our partners to improve control of Japanese encephalitis (JE). Our work first increased global understanding of the burden of JE, then uncovered an effective but largely unknown JE vaccine previously developed in China, and finally built the capacity of the Chinese manufacturer to meet strict international regulatory standards.

The vaccine's approval by WHO represents a major milestone in international health, as well as a striking example of how innovation from across the globe can be harnessed to save

CONTINUED ON PAGE 4 »

Natawiti Thani

Sharing PATH's
work with global
health colleagues



PERSPECTIVE: Kathy Neuzil on how vaccine from China will increase health equity
PAGE 2 »



Partnership to bring
rapid test for river
blindness to market
PAGE 3 »



Using community-
led videos to
improve health
PAGE 6 »

IN BRIEF
PAGE 7 »
NEWS AND
NOTES
PAGE 8 »

PERSPECTIVE

Vaccine from China will increase health equity

Japanese encephalitis (JE) is a devastating disease that mainly affects poor children in rural parts of Asia. Until recently, it has received scant international attention, even though it kills up to 15,000 people each year and leaves thousands more with permanent neurological disabilities. For me, the lack of attention to JE has been a vivid example of health inequities across the globe.

That's why I'm so excited about the World Health Organization's recent prequalification of a high-quality, low-cost vaccine against JE and the GAVI board's decision to accept applications for support to introduce the vaccine. This vaccine provides hope that billions of people in JE-endemic regions will eventually be protected.

PATH and our partners have helped to make this vaccine—known as the SA 14-14-2 live, attenuated JE vaccine—available for widespread use across affected regions. Although the vaccine has been used in China for years, we helped the Chinese manufacturer meet international regulatory requirements to facilitate broader use.

Over the past decade, PATH's role in improving JE control has included helping to improve methods of diagnosing and tracking the disease, leading clinical trials to establish the vaccine's immunogenicity and safety, and providing technical and financial support to ensure that the manufacturer, the Chengdu Institute of Biological Products, could meet the strict standards required for prequalification. We also negotiated with the manufacturer to ensure an affordable public-sector price. In addition, we supported vaccination campaigns in countries that forged ahead even

before prequalification—campaigns that have already reached more than 200 million children in 11 countries besides China.

The SA 14-14-2 vaccine highlights that innovative solutions to health challenges may come from many countries and are sometimes hiding in plain sight. At PATH, one of our goals is to work across borders, cultures, and languages to discover and advance the most promising health technologies from innovators around the globe.

The story of this JE vaccine also shows that successful innovation takes much more than scientific expertise. Although Chinese researchers developed the vaccine decades ago, it has taken years of persistent effort by PATH and our partners to make this vaccine widely available. Driving innovation to scale is one of the hallmarks of PATH's work.

Prequalification of the JE vaccine signals the beginning of a new era in vaccine development and production as China enters the global marketplace. I believe vaccines developed and produced in China, India, and other emerging countries will play a crucial role in increasing market competition in the years ahead. New sources of high-quality, low-cost vaccines will help us further alleviate suffering among the world's poorest and most vulnerable groups and increase global health equity.

*Kathy Neuzil, MD, MPH,
directs PATH's Vaccine Access
and Delivery Global Program*



NEW ON PATH.ORG

Breakthrough innovations to save women and children

www.path.org/innovations2015/

Ten low-cost health solutions could save more than a million lives over the next two years by addressing the greatest health threats to women, newborns, and children. Read our overview.

PATH leaders on the state of global health

www.path.org/blog/2013/08/future-global-health/
Our president and board members talk to the Skoll World Forum about the art and science of innovation.

A lifesaver for newborns

www.path.org/blog/2013/10/lifesaver-for-newborns/

For less than 50 cents a dose, a new formulation of the antiseptic chlorhexidine can prevent newborn deaths from umbilical cord infection. See the video.

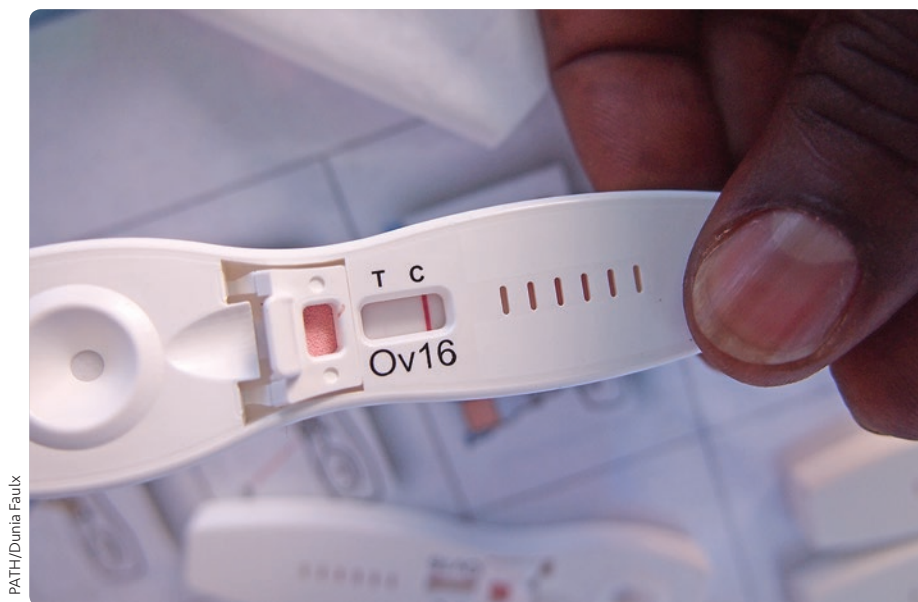
Africa: trade or aid?

www.path.org/blog/2013/07/africa-trade-or-aid/

This blog post highlights different approaches to advancing health and economic development in low-income nations. Targeted health aid remains vital.

Partnership to bring rapid test for river blindness to market

Advancing innovation from the laboratory to widespread use



PATH/Dunia Faulx

The new test for river blindness uses a drop of blood and is fast, accurate, and easy to use.

PATH has collaborated with scientists at the National Institutes of Health, a South Korean manufacturer, and others to bring a new rapid test for river blindness to market. The simple, affordable test will support efforts to accelerate elimination of the disease and prevent the recurrence of river blindness in endemic areas.

A burden for vulnerable communities

River blindness—also known as onchocerciasis—is a parasitic infection transmitted to humans through the bite of the blackfly. It causes itching, skin disfigurement and, with chronic exposure, permanent blindness. It also leads affected communities to abandon productive agricultural fields for fear of infection. Worldwide, 37 million people suffer from the disease, and an estimated 180 million are at risk, mostly in poor, rural communities near streams and rivers in Africa.

International partnerships have helped to reduce the burden of

onchocerciasis by ensuring that affected communities can access the only effective treatment, a drug called ivermectin. In many regions, a combination of mass treatment and blackfly control has decreased disease prevalence, paving the way for elimination.

These efforts rely on continuous, community-wide testing, which allows control programs to target efforts and monitor recurrence. The best currently available test is an invasive, labor-intensive procedure called a skin snip. Eliminating onchocerciasis will require improved diagnostic tools.

Developing a better test

The new point-of-care test developed by PATH is based on the detection of antibodies to a parasite antigen called Ov16, which was identified by scientists at the National Institute of Allergy and Infectious Diseases (NIAID). The test detects onchocerciasis by checking for these antibodies in a single drop of blood

from a finger prick. It is fast, accurate, easy to use, and less painful for patients than the skin snip test.

In 2012, NIAID scientists evaluated test prototypes and found excellent performance. In addition, PATH studied how users interact with the test and used their feedback to refine the test's design.

To bring the test to market, PATH sought a manufacturing partner that could meet regulatory and process requirements to create and effectively distribute the product at an affordable price. After onsite assessments of several candidates, we selected Standard Diagnostics, a firm based in South Korea.

Next steps

In early 2013, PATH transferred the technology for the test to Standard Diagnostics, which is now pursuing regulatory approval and preparing for manufacturing. PATH will continue to support these efforts and facilitate introduction in local markets. We are partnering with the African Program for Onchocerciasis Control and other groups on field-based demonstration studies of the test to generate an evidence base for policymakers and national program managers.

The new test, together with mass drug treatment, has the potential to help vulnerable communities finally end the suffering caused by onchocerciasis. ■

FOR MORE INFORMATION

Contact Tala de los Santos, project director, at tdelossantos@path.org.

This work has been supported by a grant from the Bill & Melinda Gates Foundation and with the support of the US National Institutes of Health.

Read more about this work at <http://sites.path.org/dx/ntd/oncho/>.

Reaching a milestone in Japanese encephalitis control

» CONTINUED FROM PAGE 1

lives. It set the stage for a recent decision by the GAVI Alliance to accept applications for support to introduce the vaccine in low-income countries with a high JE burden.

As the first vaccine from a Chinese manufacturer to achieve prequalification, SA 14-14-2 also signals the start of a new era in vaccine development and production. The emergence of China as a manufacturer of high-quality, low-cost vaccines will increase competition in the global vaccine market and may fundamentally shift how vaccines are made, delivered, and priced for the developing world.

A devastating disease

Nicknamed “brain fever,” JE begins like the flu, progresses to a brain infection, and ends by killing up to 30 percent of its victims and leaving many more with permanent brain injuries. The virus that causes

JE is hosted by wading birds that flock to rice fields and by pigs. It is transmitted to humans by mosquitoes.

Because JE mainly strikes poor, rural communities

in Southeast Asia and the Western Pacific and is largely unknown in the Western world, it has historically received little international attention. Yet approximately 4 billion people are at risk for JE, and an estimated 70,000 cases each year result in up to 15,000 deaths.

There is no treatment for JE. The only viable solution is prevention through vaccination.

Project roots

In the early 2000s, PATH was helping to strengthen immunization services in the state of Andhra Pradesh, India. When health workers in the region routinely voiced concerns about JE, PATH staff began to suspect that the disease was a bigger problem than previously realized. In 2003, we secured a grant to better understand the disease, determine the health and economic burden it placed on countries, and pave the way for widespread use of a vaccine that could safely and affordably prevent it.

We began by establishing reliable methods of diagnosing and tracking JE. We helped private-sector partners develop standard diagnostic tests, and we worked with WHO and governments to set up surveillance systems

and a web-based platform for sharing data about JE incidence. These efforts allowed countries to better understand the extent of JE and focus prevention efforts.

Hope from a hidden vaccine

In 2005, an outbreak of JE killed nearly 2,000 people, mostly children, in India and Nepal. Governments and international organizations strengthened their resolve to control the disease. Although health experts believed that a vaccine was the best solution, the affected countries lacked the resources to develop a vaccine, and commercial firms in wealthy countries lacked a financial incentive to invest in a new vaccine that would be affordable for use in low-income communities.

Although vaccines against JE were already available at the time and international travelers to Asia were routinely vaccinated against JE, the commonly used vaccine had significant drawbacks. Three doses were required, and the vaccine was extremely time-consuming and expensive to produce.

In search of a solution, PATH surveyed the field for a better JE vaccine and discovered that an affordable vaccine had already been developed in China. In fact, China had by then vaccinated more than 200 million children with its SA 14-14-2 vaccine, which was safe, effective, and required only one dose. But it was virtually unknown outside China.

Taking action

Because prior use of the vaccine was limited largely to China, international health officials called for



Japanese encephalitis project timeline

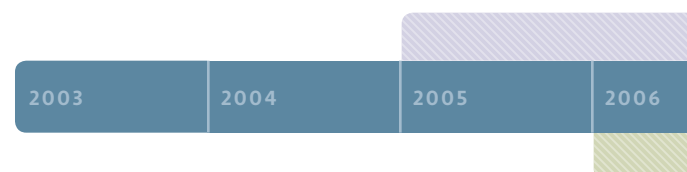


2003

PATH received a grant from the Bill & Melinda Gates Foundation to launch the Japanese encephalitis (JE) project.

2005

The World Health Organization (WHO) recommended a gradual shift to generation JE vaccines, such as the SA 14-14-2 vaccine.



2006

PATH provided a collaborative supply of the vaccine and

additional clinical studies before approving wider use. In collaboration with the manufacturer, WHO, and ministries of health, PATH led clinical trials to determine that the vaccine was safe and effective for use among populations in multiple countries.

To help countries plan for introduction, we modeled the cost-effectiveness of immunization strategies—either integrating JE vaccine into existing immunization programs or combining routine vaccination with mass campaigns to reach children and adolescents. And to ensure affordability, PATH negotiated with the manufacturer—the Chengdu Institute of Biological Products—to establish a special public-sector price.

India and beyond

By 2006, just a year after the deadly JE outbreak in India and Nepal, millions of Indian children received the vaccine. Other vaccination campaigns soon followed in Cambodia, Sri Lanka, and the Democratic People's Republic of Korea (North Korea).

By 2013, the vaccine had reached more than 200 million people in India and ten other Asian countries besides China. PATH and our partners provided technical assistance to these countries, ranging from developing introduction strategies to evaluating immunization programs.

Leveraging China's capacity

PATH helped the Chinese manufacturer achieve WHO prequalification as a critical step in expanding access to the vaccine. We provided technical and financial support to meet international standards for quality, safety, and

efficacy. We also assisted in the design and financing of a new manufacturing facility to ensure an adequate, stable, and affordable supply of vaccine.

PATH continues to be closely involved in improving JE control. We are serving as a technical resource, advocating for use of the vaccine, and leading a multicountry project that builds on the best practices we developed to introduce and scale up JE vaccination.

Broader implications for the future


A decade of work by PATH and our partners has helped to improve JE control and make a safe, effective, and affordable JE vaccine widely available. Future financial support by the GAVI Alliance and other groups will help to bring the vaccine to all those who need it.

Achieving WHO prequalification of this vaccine has broader implications for the future. China's entry in the global marketplace for high-quality vaccines promises to further increase competition and reduce costs, making vaccines even more accessible to those in the world's poorest regions. ■

FOR MORE INFORMATION

Contact Monica Graham, communications officer, at mgraham@path.org.

This work has been supported by a grant from the Bill & Melinda Gates Foundation.

 Read more about PATH's work to control Japanese encephalitis at www.path.org/projects/japanese_encephalitis_project.php.

WHO)
new-
ne



2009

PATH supported construction of a new Chinese manufacturing facility.

2013

WHO prequalified the vaccine, and GAVI decided to accept applications for support to introduce the vaccine.

2005–2012 PATH conducted clinical trials in multiple populations.

2007

2008

2009

2010

2011

2012

2013

2014

2006–2013 Vaccination campaigns reached more than 200 million people.



2012

Files needed for prequalification were sent to WHO.

vided input for a WHO position paper on JE and
ed with the Chinese manufacturer to ensure a
ow-cost SA 14-14-2 vaccine. India licensed the
d began vaccination campaigns.

Using community-led videos to improve health

New approach by PATH may revolutionize health education and behavior change communication

An innovative approach centered on community-led use of digital video technology shows potential to transform health education and behavior change communication. The new method empowers communities with skills and low-cost tools to effectively improve health knowledge and behaviors.

PATH and our partners developed the approach, sometimes called Digital Public Health, which combines scientific evidence and visual demonstrations by community members. PATH's role has included building the capacity of community partner groups, providing technical expertise to ensure that videos provide scientifically sound information, and evaluating results for possible scale-up.

Origins of the new approach

Public health programs have historically improved health knowledge and behaviors by asking experts to develop informational materials and then distributing these to target groups. These materials can be costly to produce, however, and are often based on a one-size-fits-all approach that may not work for people in all locations.

Digital Green, a nonprofit organization based in India, has pioneered the use of community-based videos to change behavior. For example, it has engaged local farmers to help with videos demonstrating agricultural techniques, such as how to build a compost pit. The videos are then featured in public screenings led by facilitators who explain the techniques and encourage their use.

PATH and our collaborators at the University of Washington have

partnered with Digital Green to adapt the model to health. A pilot project in India evaluated the feasibility of using the new technique to improve maternal and newborn care. The project found that community members were enthusiastic about developing, starring in, and sharing health videos, and preliminary data have shown that videos created by and for the community have improved local health knowledge and practices.

How it works

The model goes far beyond simple video production. Key elements include:

- A community advisory board to identify video topics and guide activities.
- Training and technology transfer for community-based organizations.
- Development of key messages and storyboards by community members.
- Production of videos featuring community members.
- Facilitator-led dialogue sessions for video dissemination.
- Creation of a local, open-access digital video database.
- Collection and reporting of indicators to track screening and impact.

These elements stimulate community engagement, excitement, and creativity surrounding behavior change communication while ensuring scientific accuracy and careful monitoring of results.



Videos are shown in public screenings led by facilitators who explain concepts and behaviors.

Brittany Fiore-Silva

Community-driven process to enhance impact


By shifting the driving force for change from health experts to community members, the approach may prove exceptionally effective for modifying behaviors in many health areas. Areas of special promise include immunization, reproductive health, maternal and child health, nutrition, and sanitation.

PATH's rigorous evaluation of results will build evidence on the method's effectiveness for improving health practices and outcomes. Expansion to other geographic regions and key topic areas is under way to validate scalability. ■

FOR MORE INFORMATION

Contact Kiersten Israel-Ballard, senior program officer, at kisrael-ballard@path.org.

This work has been supported through contributions from private foundations and individuals to PATH, from Digital Green through an award from the UK Department for International Development, from the National Science Foundation, and from the University of Washington Department of Computer Science and Engineering.

 Read about other PATH projects to improve maternal and child health at <http://sites.path.org/mchn/our-projects/>.

Tackling intertwined threats from diabetes and tuberculosis

Diabetes is a growing challenge to global health and productivity. The number of people living with diabetes is expected to reach nearly 600 million by 2035.

Diabetes and tuberculosis (TB), a persistent concern in many low-resource settings, are common among the same populations, and the two diseases amplify each other. Diabetes weakens the immune system, tripling the risk of developing TB, and TB increases the risk of diabetes.

PATH uses innovation to increase access to prevention and care for diabetes and other noncommunicable diseases. Our work to address the intertwined threats of diabetes and TB is guided by the World Health Organization's *Collaborative Framework for Care and*



PATH/Gabe Blenczycki

Control of Tuberculosis and Diabetes and includes:

- Collaborating in Mexico with the Secretariat of Health and the National Institute of Public Health to evaluate two new point-of-care screening technologies in seven states. These methods may make it easier to cross-screen patients for diabetes and TB.
- Working in Tanzania with the government and local partners to design and implement a national plan that will integrate diabetes and TB care to improve the reach and efficiency of

services. The project is piloting an integrated training curriculum for health workers.


- Partnering with BD, a global medical technology company, to identify how the systems and protocols used in laboratories focusing on TB and HIV might be applied to improve laboratory services for diabetes in Ethiopia.

Through this work, PATH is developing catalytic evidence to integrate solutions for noncommunicable diseases into existing services and systems—an established global health priority. ■

FOR MORE INFORMATION

Contact Helen McGuire, director for noncommunicable diseases, at hmcguire@path.org.

Portions of this work have been supported by the US Agency for International Development.

 Read more about PATH's work to address diabetes and TB at www.path.org/publications/detail.php?i=2256.

New toolkit for success with information systems

PATH and the World Health Organization (WHO) have published a toolkit to help public health managers plan effectively for implementation of information and communications technology in health information systems. The toolkit draws on lessons learned during project Optimize, a five-year partnership between PATH and WHO to improve the vaccine supply chain.

Although ministries of health and donor organizations are increasingly recognizing a need to upgrade health information systems and pilot projects are proliferating in Africa and Asia, there have been

few success stories to date in large-scale implementation of electronic systems. In many cases, inadequate planning has led to poor results. The new toolkit can help managers boost the likelihood of success.

The toolkit is based on extensive research and demonstration projects in Albania, Guatemala, Tunisia, and Vietnam. It outlines an eight-step process to help decision-makers:

- Identify the solution that best fits their needs and context.
- Choose the external help and expertise they need.
- Develop, scale, and then sustain their chosen solution.

Although the toolkit is not an exhaustive technical guide and does not address larger strategic


questions about the adoption of electronic information systems, it includes practical tools and tips to help managers anticipate and prevent implementation challenges. It also features a list of suggested resources for those seeking additional guidance.

The toolkit is available on the PATH website at www.path.org/publications/detail.php?i=2343. ■

MORE INFORMATION

Contact Brian Taliesin, systems analyst, at btaliesin@path.org.

This project has been supported by a grant from the Bill & Melinda Gates Foundation.

 Read more about PATH's work on health management information systems at <http://sites.path.org/hmis/>.

NEWS AND NOTES


PATH NEWS

Kaslow named VP of product development

PATH has appointed David C. Kaslow, MD, to the newly created position of vice president of product development. Previously director of PATH's Malaria Vaccine Initiative, Kaslow has more than 25 years of experience in research and development, including leadership positions at Merck Research Laboratories and the National Institutes of Health.


In his new role, Kaslow will oversee all five of PATH's product development programs as well as our China program, which also focuses on product development.

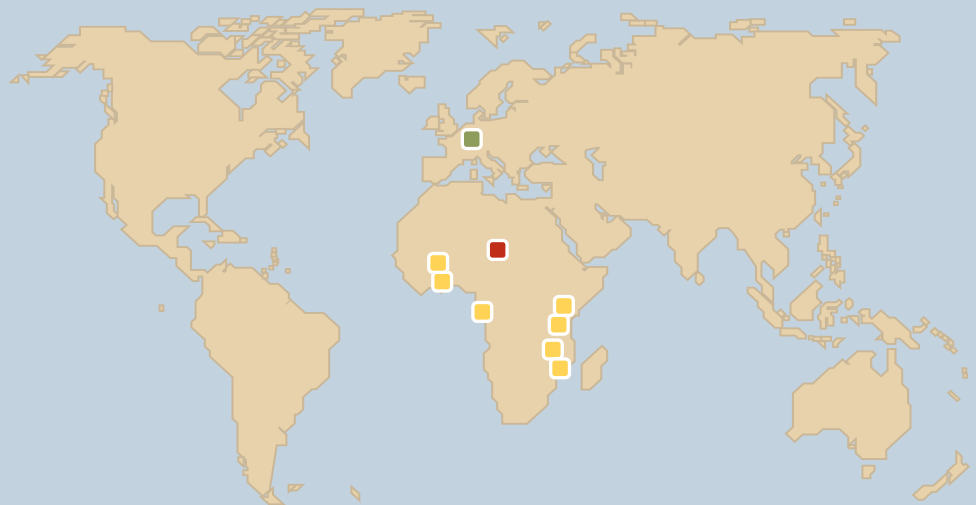
Kaslow's appointment "represents PATH's continued commitment to innovation and its power to improve lives," said Steve Davis, PATH's president and CEO.

 Read more about Kaslow's appointment at www.path.org/news/press-room/637/.

Thai program becomes independent organization

After working in Thailand for more than 25 years, PATH in November transitioned our Thai program to become its own nongovernmental organization (NGO). The new organization, called path2health, is a mark of our success in Thailand, where socioeconomic conditions have improved, the disease burden has changed, and local funding can sustain the new NGO. The NGO will implement health innovations and conduct advocacy with emphasis on health system strengthening.


 Read more at www.path.org/blog/2013/10/a-new-thai-ngo/.



PROGRAM NOTES

■ CHAD: Meningitis vaccine shows dramatic impact


A study published in *The Lancet* found that the groundbreaking MenAfriVac® vaccine—developed through a partnership led by PATH and the World Health Organization—has cut the incidence of meningitis by 94 percent in Chad. The study evaluated the effectiveness of the West African nation's mass immunization campaign in 2011 that reached 1.8 million children and young adults. Since 2010, more than 100 million people in ten African countries have received MenAfriVac®, produced by the Serum Institute of India, Ltd.

 Read more at www.path.org/news/press-room/644/.

■ EUROPE: SILCS diaphragm enters commercial market


The SILCS diaphragm, designed by PATH and our partners, went on sale in Europe in June. Our German commercialization partner, Kessel Marketing & Vertriebs

GmbH, is marketing and selling the single-size, easy-to-use device as the Caya™ contoured diaphragm to give women more contraceptive options. The diaphragm's European debut is an important step toward reaching the estimated 222 million women worldwide who lack access to modern family planning methods.

 Read more at www.path.org/news/press-room/634/.

■ MULTICOUNTRY: Malaria vaccine candidate cuts disease in children

New clinical trial results show that the malaria vaccine candidate RTS,S—being advanced by the PATH Malaria Vaccine Initiative—helps to protect infants and young children against malaria for up to 18 months. Based on these results, presented in October, vaccine developer GlaxoSmithKline plans to submit RTS,S for regulatory review next year.

 Read more at www.path.org/news/press-room/651/.

PATH is an international nonprofit organization that transforms global health through innovation. We take an entrepreneurial approach to developing and delivering high-impact, low-cost solutions, from lifesaving vaccines and devices to collaborative programs with communities. Through our work in more than 70 countries, PATH and our partners empower people to achieve their full potential.

Directions in Global Health shares information about PATH's programmatic work with colleagues around the world. To subscribe to this newsletter, please send your contact information to publications@path.org. To subscribe to other PATH publications—including *News From PATH*, our organizational e-newsletter—go to www.path.org/sign-up.php#news.



MAILING ADDRESS: PO Box 900922, Seattle, WA 98109 USA
STREET ADDRESS: 2201 Westlake Avenue, Suite 200, Seattle, WA 98121 USA
www.path.org | info@path.org