Across Africa's meningitis belt, people have lined up for MenAfriVac.

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# A new vaccine vanquishes meningitis A in Africa

*By* **Kai Kupferschmidt**

For more than a century, the *Neisseria meningitidis* bacterium has swept across large swaths of Africa every few years. Striking during the dry season, it causes meningitis that kills 5% to 10% of those infected and leaves many others deaf or disabled. Although effective—and expensive—vaccines exist against the meningitis strains that plague Europe and the United States, no good one was available to protect Africans against serotype A, the most common strain in Africa. That has changed—and the result, says Brian Greenwood, an epidemiologist at the London School of Hygiene & Tropical Medicine, is "probably the most dramatic success I have ever seen."

In 2000, the World Health Organization convened global health experts who came up with an idea: Make a safe and effective vaccine specifically for Africa for an African price. And make it fast. With $70 million from the Bill & Melinda Gates Foundation, the Meningitis Vaccine Project, a public-private partnership headed by infectious disease specialist Marc LaForce, got started. The basics were agreed upon quickly: To induce long-lasting immunity, the vaccine would have to be a conjugate, a meningococcus A polysaccharide joined to a tetanus protein to elicit a stronger immune response. And it would have to cost less than 50 cents a dose, a price the Serum Institute of India Ltd. agreed to deliver even before development began.

MenAfriVac is that vaccine. By 2009, trials in Senegal, Mali, and other countries had shown the vaccine to be safe and effective, and in December 2010, Burkina Faso, at the time the hardest hit country in Africa's meningitis belt, became the first to roll out the vaccine. Within just 10 days, about 70% of the target population—anyone between 1 and 29 years old—had received it. No cases of meningitis A were recorded the next year. In Chad, three regions introduced the vaccine in December 2011 in the midst of an epidemic; during the first half of the following year, those regions recorded just 57 cases of meningitis, none of them caused by *N. meningitidis* A, Greenwood and his colleagues reported in January in *The Lancet*. Across the rest of the country, the case number was 18 times higher, 44 per 100,000. "In every single country where the vaccine has been introduced, group A *Neisseria* meningitis disease has fallen to zero," LaForce says.

What made it such a success? For one, people in West Africa desperately want the vaccine—almost every family there knows the devastating impact of meningitis firsthand, says Seth Berkley, who heads GAVI, the Vaccine Alliance, which has budgeted $370 million to introduce the vaccine across the continent. Another reason: Unlike earlier vaccines, MenAfriVac also gets rid of the bacterium in asymptomatic people, further increasing herd immunity. By the end of this year, Berkley estimates 200 million people will be vaccinated, with the remaining 100 million slated for 2015.

How long the vaccine's protection will last is still unclear, however, and scientists worry that other strains of the bacterium could take over the continent. Meanwhile, the Serum Institute of India has already set its sights on the next goal: an affordable vaccine that will protect against meningitis strains C, Y, W, and X as well. LaForce says that vaccine will enter field trials in 2015. ■

The CGD researchers eventually met with their critics, including Eckert, to sort through the literature, and they agreed that one large-scale intervention in Zambia had enough evidence that it worked, and thus deserved inclusion in the 2015 edition of *Millions Saved*. The study, by a team that included researchers from Harvard's School of Public Health and the PATH Malaria Control and Evaluation Partnership in Africa, enrolled 81,600 farmers, half of whom received insecticide-treated bed nets, whereas the other half didn't. There was a nearly 50% drop in self-reported malaria among farmers with the nets.

The debate seems set to continue. "What we've found doing a massive trawl of the literature is that the quality of evidence for well-regarded and well-funded interventions is still pretty poor," says Miriam Temin, the coordinating editor of the new edition of *Millions Saved*. It remains difficult for many to accept, she says, that just understanding the effect of a drug, a vaccine, or any other intervention on a human body isn't enough. "We think of the body as something with unknown processes," Temin says. "Wouldn't it be interesting if we thought of communities that way?" ■

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