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AFRICA

Dose of Speed: African Nations Use High-Tech Methods to Move New Vaccines

Health workers, tech startups and UPS have joined forces to ensure children receive all four potentially lifesaving shots

By Alexandra Wexler / Photographs by Francis Kokoroko for The Wall Street Journal

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DANTENG, Ghana—African countries, which have been using cutting-edge technologies to deliver medicine to remote regions, are facing one of their biggest tests yet with the rollout of the world's first malaria vaccine.

In Malawi, Ghana and Kenya, health workers, tech startups and package-delivery giant United Parcel Service Inc., have joined forces to ensure children receive all four potentially lifesaving shots of the malaria vaccine.

The Ghanaian government is in talks with South San Francisco-based automated-logistics company Zipline Inc. to start delivering the malaria vaccine to remote locations via drones, a service it already provides for other products, including intravenous antibiotics, blood platelets and snake antivenom.

Developed by GlaxoSmithKline PLC, the malaria vaccine requires four doses over roughly 18 months, which makes the vaccine the most complex ever to be launched in the developing world, public-health experts say. If administered successfully, the vaccine could be a key step toward eradicating a disease that kills nearly half a million people annually, most of them children and most of them in Africa.

National vaccination campaigns across Africa are improving, thanks in part to Gavi, an international public-private partnership that works with partners like UNICEF and the World Health Organization to buy vaccines in bulk at low cost from drug companies and then distributes them to poor nations. Gavi-supported vaccines immunized 66 million children in 2018.

Still, an estimated 19.4 million infants under 1 year old didn't receive routine immunizations last year, including in populous African countries such as Nigeria and Democratic Republic of Congo, according to the WHO.



A medical drone gets ready to take off from Omenako, Ghana.



A drone drops medical supplies at the Danteng Health Service Center.

One central challenge, public-health experts say, is spotty basic infrastructure, such as roads to remote villages and power grids, or reliable population registries. Overcoming these obstacles is taking on new urgency as vaccines grow more complex, requiring multiple doses over longer time frames and the ability to maintain optimal storage temperatures in some of the world's hottest nations.

UPS staff are training health-ministry officials on how logistics systems can be used to manage vaccine inventory and improve distribution. UPS also helps fund the development of tools such as software that allows health ministries to view trends in vaccine use and receive automatic alerts to reorder when inventories are low, rather than managing the vaccine stocks manually on an Excel spreadsheet.

The company worked with Gavi to develop five-day intensive training courses, and its experts mentor trainees.

"We can get the product safely to the country, but what happens once it gets into the country, there are really serious problems," said Kevin Etter, a former UPS executive who was loaned to Gavi at its Geneva headquarters to pilot the training programs. Storage and last-mile transport of

vaccines often fell to pharmacists, nurses, doctors and often “somebody’s uncle that just happens to have a vehicle—it is very informal and unstructured,” Mr. Etter said.



Ghana is scaling up an electronic medical-record system that will track children from birth through school in places like Danteng.

In Ghana, the government is storing data on the doses of the malaria vaccine on tablets, tracking the progress in real time. The country is also scaling up an electronic medical-record system that will track children from birth through school, where mobile clinics gather information on smartphones. It is exploring using SMS reminders to make sure parents bring their children for their follow-up shots.

Months into the rollout, the dropout rate for the malaria vaccine has been low, at about 16%, with some children having received as many as three doses, said Anthony Nsiah-Asare, director-general of the Ghana Health Service.

“The main issue will be the vaccine at age 2 years,” he said. The government is tying that fourth dose to a Vitamin-A shot given around the same time in the hopes that more parents will return, while increasing outreach and literature in communities.

Attention to and investment in vaccination and national health-care systems has intensified across the continent since the 2014 Ebola epidemic, which ravaged the West African nations of Sierra Leone, Liberia and Guinea. The epidemic, which killed some 11,300 people, left local health systems depleted.

“We saw clearly the coverage going backward in those three countries: The system was not strong enough to cope with that shock,” said Richard Mihigo, coordinator of WHO’s immunization and vaccine-development program for Africa.

Putting permanent systems into place means countries don’t have to reinvent the wheel every



Linda Danso, a 28-year-old nurse, picks up a package delivered by the Zipline medical supply drone at the Danteng Health Service Center.

time there is an outbreak or a new vaccine is introduced.

Initiatives in poor countries could also act as a testing ground for companies wanting to get a slice of the growing health-care logistics market in the U.S., where Zipline is planning to roll out deliveries by drone to rural areas by early next year and UPS recently received regulatory approval to operate a drone airline. UPS said it would initially focus on expanding its drone-delivery service to hospitals, but plans to expand beyond the health-care industry.

SHARE YOUR THOUGHTS

How can a malaria vaccine be developed and distributed in a cost-effective manner across countries affected by the disease? Join the conversation below.

Zipline also delivers blood products and other lifesaving vaccines to a community health clinic in Danteng, Ghana, a town of about 800 people around three hours' drive from the capital Accra. Previously, patients would have been referred to a hospital about 30 minutes away by taxi for the same treatments.

Visits to the Danteng clinic have risen by about 50% since the just-in-time delivery was implemented in May. "They are decreasing the inefficiencies in the system," said Celestina Asante, municipal director of health in Ghana's Kwahu West municipality, which includes Danteng.

Linda Danso, a nurse at the clinic there, recently ran out of polio vaccines during routine immunizations. Instead of telling parents to return with their children in a few weeks, she sent a WhatsApp message from her smartphone and about an hour later, more polio vaccines literally dropped from the sky.

“They run from their houses to this place, just to see,” she said.



*—Betsy
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