NEWS IN FOCUS

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Trials of the world's first vaccine against malaria in sub-Saharan Africa have shown that it offers only modest protection.

PARASITIC DISEASE

Vaccine gets cautious boost

Malaria immunization endorsed for small-scale use in Africa.

BY EWEN CALLAWAY & AMY MAXMEN

The world's first vaccine against malaria should be rolled out in limited pilot demonstrations in Africa, an advisory group to the World Health Organization (WHO) in Geneva said on 23 October.

The decision — which the WHO's director-general is expected to formally endorse in November — follows 28 years of development by the London-based drug firm GlaxoSmithKline (GSK) and other backers including the Bill & Melinda Gates Foundation in Seattle, Washington; together they have spent US$565 million on the drug.

The demonstrations, involving up to 1 million children, are needed because the vaccine is ineffective against malaria unless children receive four doses spread out over 18 months, and even then it offers only modest protection.

"If this vaccine is not effective and we use it widely, we have spent a ton of money where it could be better placed," said Jon Abramson, a paediatric infectious-disease specialist at Wake Forest School of Medicine in Winston-Salem, North Carolina, and chair of the WHO Strategic Advisory Group of Experts (SAGE) on Immunization, in a press briefing.

The imperfections of the vaccine, called RTS,S and sold as Mosquirix, are well known: trials in more than 15,000 children, who were followed for up to four years in seven countries in sub-Saharan Africa, found that a series of four shots reduced the number of malaria cases by only 36% in young children, and by 26% in infants[1]. Still, even such a modest effect could be significant because malaria kills around half a million people annually, mostly children, and all other candidate vaccines are in much earlier stages of development.

The advisory group recommended a series of 3–5 pilot demonstrations in areas with a medium to high incidence of malaria, involving up to 1 million children in total. These will reveal whether parents bring their children back for all four doses of the vaccine, said Abramson. The pilots will also investigate safety issues associated with the vaccine, such as the potential to develop meningitis.

The demonstrations could start in 2016 and are expected to last 3–5 years. Seth Berkley, head of Gavi, the Vaccine Alliance, in Geneva, Switzerland, says that his organization will ▶

soon decide whether it will help to pay for the pilot demonstrations. "It certainly is possible that the board will say yes to this, but there's no guarantee," he says. As data roll in, SAGE will review its position: a final decision on whether to recommend deploying the vaccine more widely could come during this period.

Even if that happens, it is not clear what the uptake would be. Although African malaria-control officials welcome RTS,S, they say that they would need more funding to deploy the vaccine. Budgets for malaria prevention and treatment using measures such as insecticide-treated bed nets and artemisinin-combination therapies are already stretched thin.

GSK says that it will charge $1–10 per shot, covering the company's manufacturing costs and a return of 5%, to be reinvested in new vaccines for malaria or other diseases that are common in the developing world. But funding will also be needed to deliver the vaccine to children and for programmes to disseminate information. Parents must understand that their children can still get malaria even with the vaccine, says James Tibenderana, development director at the Malaria Consortium in Uganda.

POOR MATCH

SAGE's decision to pilot the vaccine follows the publication of a study on 21 October, which revealed[2] that the vaccine's poor performance in clinical trials is in part because it mimics a strain of the malaria parasite *Plasmodium falciparum* that is not commonly found in Africa.

The vaccine is composed partly of a fragment of circumsporozoite (CS) protein, which is found on the surface of the parasite. People who have been given RTS,S build up some immunity to malaria. But different parasites have slightly different CS proteins — and the study showed that fewer than 10% of parasites infecting some 5,000 children in the trials matched the CS protein in RTS,S. If the vaccine could be re-engineered to include bits of several surface proteins, it would be more effective, says Dyann Wirth, an infectious-disease researcher at the Harvard T. H. Chan School of Public Health in Boston, Massachusetts, who led the 21 October study.

That redevelopment could take years, although some researchers have been discussing the possibility, according to David Kaslow, who oversees the vaccine's development at the non-profit health organization PATH. "It's not trivial to tweak the vaccine to match the prevalent strains in an area," he says, "but it's not impossible."

In the meantime, the advice to run demonstrations of RTS,S sends the right message, says Adrian Hill, a vaccinologist at the University of Oxford, UK. "What the field needs is other players to come forward and accelerate their more modern vaccine candidates." ■

1. RTS,S Clinical Trials Partnership. *Lancet* **386,** 31–45 (2015).
2. Neafsey, D. E. *et al. N. Engl. J. Med.* http://dx.doi.org/10.1056/NEJMoa1505819 (2015).

Ice cores allow scientists to analyse past precipitation and temperature changes.

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CLIMATE SCIENCE

Super-fast drills hunt for oldest ice

Researchers will test machines that can penetrate kilometres in days rather than years.

BY ALEXANDRA WITZE

Drilling through ice sheets is a tedious task. It takes years of fieldwork to retrieve long ice cores that keep a continuous record of the climate stretching back hundreds of thousands of years.

Now there is a faster way to bore deep into Earth's history. Anxious to get to ice as old as 1.5 million years, nearly double the age of the oldest existing core, climate researchers have developed a new generation of 'rapid-access' ice drills. Some of these rigs will face their first major tests during the Antarctic field season that begins this month.

These speedy tools take roughly a week, rather than years, to penetrate several kilometres of ice. They blitz through the topmost layers of ice to reach the ancient freeze beneath, where tiny bubbles of trapped air serve as a time capsule of environments long vanished.

One of the biggest and most ambitious machines, a US project known as the Rapid Access Ice Drill (RAID), is being shipped in November from its construction site in Salt Lake City, Utah, to McMurdo Station in Antarctica (see 'Climate clues'). The British Antarctic Survey will test a much smaller drill, also named RAID (for Rapid Access Isotope Drill) in December at the Sky Blu station on the Antarctic peninsula. French and Swiss research teams are developing their own fast drill designs.

The drills sacrifice detail for speed, however. They chip up or melt the ice as they go, so extracting an intact core is impossible. But these fast drills will be able to do quick surveys of places where researchers might return in future field seasons to extract a full ice core at a more leisurely pace. The US$10.5-million US RAID drill, for instance, is designed to plough through more than 3 kilometres of ice in about a week. That speed would allow it to hop around Antarctica and drill several exploratory holes per season — instead of one hole over several seasons.

Even so, finding the planet's most ancient ice will not be easy. "We're looking for a very fortuitous set of circumstances that allow for

CORRECTION

The News story 'Vaccine gets cautious boost' (*Nature* **526,** 617–618; 2015) incorrectly stated that David Kaslow was involved in the early development of RTS,S.