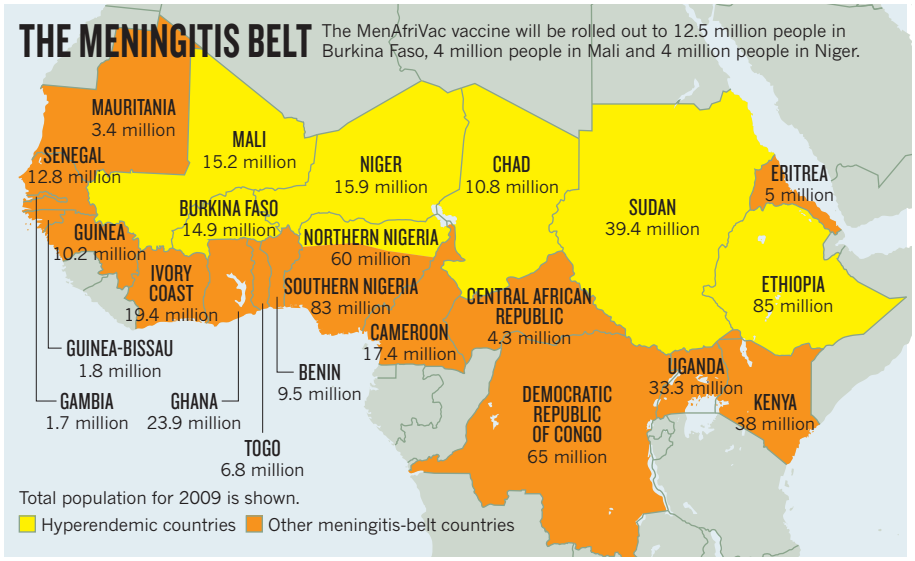
SOURCE: PATH



PUBLIC HEALTH

Vaccine offers meningitis hope

First affordable and effective weapon against killer meningococcal meningitis A rolled out in Africa.

BY DECLAN BUTLER

From Senegal to Ethiopia, December heralds the arrival of intense epidemics across Africa's 'meningitis belt' (see map). Killing thousands, and leaving many more with a host of after-effects such as brain damage and deafness, the scourge of meningitis A terrifies communities.

This year will be different. Millions will receive a new vaccine, MenAfriVac, that promises protection against the meningococcal bacterium *Neisseria meningitidis*. It is the culmination of ten years' work by an international consortium to develop a vaccine at a price low enough for massive use in Africa: just US$0.40 a dose. "MenAfriVac is a fantastic initiative," says Andrew Riordan, a meningitis expert at Alder Hey Children's NHS Foundation Trust, in Liverpool, UK. "For the first time, we may be able to prevent these huge epidemics."

The Meningitis Vaccine Project (MVP), led by the World Health Organization (WHO) and PATH, a non-profit body based in Seattle, Washington, was born in 2001 after a particularly bad epidemic in 1996–97 caused 250,000 cases and 25,000 deaths (see 'Epidemic cycle'). Commercial manufacturers in developed countries could not produce the vaccine at such a low target price, according to Marc LaForce, director of the MVP. So the consortium did the research itself, and contracted the Serum Institute of India in Pune to make the vaccine. The entire research and development cost of the project was just $70 million — five to ten times less than typical vaccines. LaForce hopes that the MenAfriVac model can be applied successfully to other vaccines.

During next month's campaign, backed by the WHO and the United Nations Children's Fund (UNICEF), the government of Burkina Faso will vaccinate everyone aged 1–29 — the group hit hardest by the disease, numbering 12.5 million people. Mali and Niger will each vaccinate 4 million people in the same age bracket.

Meningitis A epidemics cause fewer cases and deaths in Africa than AIDS or malaria, but this masks its huge social and economic toll in those countries. "When the epidemic arrives, the entire community shuts down," says LaForce. The disease — which infects the meninges, the membranes surrounding the brain and spinal cord — begins with mild symptoms of stiff neck, high fever, confusion and headache, but can kill within 48 hours. Of those infected with meningococcal meningitis A, 5–10% die and 10–20% of survivors are left with severe disabilities.

Until now, the only weapon against meningitis A in Africa was a polysaccharide vaccine that offered protection for a very short time. Using it as a preventative vaccine would have required repeated vaccination of the population — a logistically and financially impossible approach. So it was used only to vaccinate people after an epidemic was under way, often too late to have an impact. By contrast, MenAfriVac is a longer-lasting conjugate vaccine, in which an antigen is coupled to a protein to provoke a stronger immune response. LaForce says that clinical-trial subjects who received the vaccine more than three years ago are still protected.

The previous polysaccharide vaccine also did not work well in children, whereas MenAfriVac is approved for children aged one year and over, and trials are under way for children as young as one month, with results expected next year. MenAfriVac has the added advantage of stopping people from becoming carriers that spread the disease, protecting unvaccinated people through 'herd immunity'.

In June, the WHO decided that the vaccine met international standards of safety and efficacy, and results from phase III trials have been submitted for journal publication. The roll out will be accompanied by a 'pharmacovigilance' system for reporting adverse events.

Several international groups, including the US Centers for Disease Control and Prevention in Atlanta, Georgia, and the Norwegian Institute of Public Health in Oslo, will run surveillance programmes to prove the vaccine's effectiveness to donors and governments.

Yet millions may miss out. Some $475 million is needed to expand coverage to other countries in the meningitis belt, says Marie-Pierre Preziosi, an official at the WHO's Department of Immunization, Vaccines and Biologicals in Geneva. Raising the money will be challenging, she says, particularly because the GAVI Alliance, the main sponsor of vaccination in low-income countries, is facing a financial crunch (see *Nature* **464,** 338; 2010)

Ultimately, public-health officials would like to deploy several conjugate vaccines that protect against not just meningococcal type A but also the other subgroups in the region that can cause smaller meningitis epidemics.

For now, researchers are satisfied that an affordable meningitis vaccine will at last be available in Africa. As Andrew Pollard, a meningitis researcher at the Jenner Institute at the University of Oxford, UK, says: "The roll out of MenAfriVac in Burkina Faso is a triumph for this unique partnership." ■

SOURCE: MVP

EPIDEMIC CYCLE

Africa's meningitis epidemics usually take place in irregular cycles every 5–12 years.