No Hib booster needed by vaccinated infants in Kenya

February 4 2016

A 15-year study carried out in Kilifi, Kenya and funded by the Wellcome Trust and Gavi, the Vaccine Alliance has shown that there is no need to give a Hib booster to toddlers to extend immunity into later childhood. The study provides the evidence public health officials need to be confident that Hib spread and infection in Kenya is under control.

Hib bacteria can cause meningitis, pneumonia and other potentially lethal infections, with children under five most at risk. The vaccination programme introduced in Kenya in 2001 is designed to build immunity to the bacteria in infancy and prevent spread between young children. Doses are administered to babies at six, ten and 14 weeks.

An additional booster dose of Hib vaccine is used in most high-income countries, including in the UK where it was introduced after immunity in children was found to wane. Kenya, like most low-income countries, has followed a World Health Organization (WHO) vaccination regime with no booster dose.

Professor Anthony Scott, who is based at the KEMRI-Wellcome Research Programme in Kilifi, Kenya and the London School of Hygiene & Tropical Medicine, UK, and who lead the study, said: "We had expected that over time population immunity would subside, but we have waited 15 years and it still hasn't happened."

He added: "Despite our fears, which were influenced by the UK experience, we can clearly say that a fourth dose of the Hib vaccine is

not needed to control this invasive bacterium in Kenya," he said.

Dr Laura Hammitt, from Johns Hopkins Bloomberg School of Public Health, and the first author of the study, said: "Our findings suggest that the current Hib vaccine programme in Kenya is highly effective and no booster dose is currently required. It is important to continue surveillance to determine if effective control persists."

The research team in Kenya believe that similar bacteria to Hib in the environment may provide a natural boost to the immune system keeping antibody levels high even though the Hib bacterium has stopped circulating in the community. In addition, a stronger antibody response to the vaccine course has given Kenyan infants longer protection than children in developed countries such as the UK.

The same may occur in other tropical regions of Africa, although eastern Gambia experienced an unexplained resurgence of the disease last year after more than ten years of control using a programme without a booster.

The Kenyan team analysed blood samples from more than 38,000 children under 13 years old admitted to hospital in Kilifi between 2000 and 2014 to monitor trends in invasive Hib disease. The team found that the vaccine reduced the chance of Hib disease by 93 percent over this period. They also repeatedly tested samples from healthy children in the community to find out how well Hib immunity lasts into later childhood. Eight years after the introduction of the vaccine they found that 79% of children in the disease risk group, aged 4-35 months, had antibodies at levels indicating long-lasting protection.

The team also tracked Hib bacteria in the general population by looking in nose swabs. Once a year, between 2009 and 2012, random residents of all ages were invited to undergo a nose swab sample. Although Hib was

commonly transmitted between the noses of children before the introduction of Hib vaccine, 8-11 years after the vaccine was introduced they found Hib in the nose of only one child out of 600

Dr Charlie Weller, Vaccine Strategy Lead at the Wellcome Trust, said: "The Hib vaccine is a public health success story for Kenya and a powerful example of the positive impact that long term vaccination programmes can have on the health of a population."

She added: "By evaluating the vaccine over a long period, the researchers have highlighted that children can have slightly different levels of response to the same vaccine in different countries. We can now use this data to inform the most appropriate vaccine schedule for each country."

"It is very rare to be able to track the success of a vaccine consistently over such a sustained period, but this is the only way to provide answers to important public health questions in vaccine programmes," said Professor Scott.

"It was a relief to find that children are successfully protected from this invasive disease using the WHO approved vaccine schedule and this also means that the residents and government won't have to take on the logistical and financial challenge of bringing children back for an extra dose in their second year of life."

Gavi provides funding the five-in-one pentavalent vaccine, which includes Hib, in the world's 73 poorest countries. Kenya was one of the first African countries to benefit. In the coastal community of Kilifi, a monitoring system has been in place since 2000 closely recording births, deaths, migrations and episodes of disease in a population of 280,000. The data provide unique insights to inform policy in East Africa.

More information: 'Effect of Haemophilus influenzae type b

vaccination without a booster dose on invasive H influenzae type B disease, nasopharyngeal carriage, and population immunity in Kilifi Kenya: a 15-year regional surveillance study' is published in *Lancet Global Health*.

Provided by Wellcome Trust