



More children will be receiving injected killed polio vaccine in a bid to finally eradicate the virus.

## HEALTH

# Vaccine switch urged for polio endgame

*Inactivated virus vaccine could deliver the final blow.*

EWEN CALLAWAY IN KADUNA CITY, NIGERIA

By sunrise on a warm December morning, Janila Shulu's team are out in the dirt roads and alleyways of Ungwan Rimi, a poor neighbourhood in a predominantly Muslim section of Kaduna city in northern Nigeria. Three female health workers, accompanied by a community leader, dart from house to house, squeezing a few drops of polio vaccine into the mouths of all the young children they can find, even those who pass by on the street. By 1 p.m., after giving hundreds of doses, they stop for the day — the first of a national five-day effort.

Such campaigns are the backbone of the global push to eradicate polio, but this month the World Health Organization (WHO) in Geneva, Switzerland, proposed a shift in vaccination strategy from oral vaccines to injected ones that may have to be administered in clinics. The change is needed to mop up the last remaining pockets of polio, but experts say that it poses challenges in places such as Kaduna

city, which have poor access to health care.

The new policy is an important step towards eradication, says Nicholas Grassly, an epidemiologist at Imperial College London, but implementing it will be difficult. "There are some big ifs as to whether it can happen," he says.

Jonas Salk is credited with developing the first polio vaccine in 1955, an injected vaccine containing killed virus, but the oral live vaccine devised a little later by his competitor Albert Sabin is the workhorse of the Global Polio Eradication Initiative. This public-private effort, started in 1988 and coordinated by the WHO, has cost about US\$8 billion so far. The Sabin vaccine is composed of three live but crippled strains of polio. It is cheap and easy to administer, making it ideal for national campaigns that involve tens of thousands of minimally trained workers.

But the live viruses in the Sabin vaccine can revert to disease-causing forms, especially in populations where

immunity is not widespread. Northern Nigeria has been battling such vaccine-derived outbreaks since 2005, and one emerged last year in Pakistan (see *Nature* **485**, 563; 2012).

In a 4 January announcement, the WHO called for oral polio vaccine containing the polio strain type 2, one of the Sabin vaccine strains, to be phased out — perhaps in as little as two years. The wild form of type 2 has been stamped out globally, but vaccine-derived forms of the strain still circulate in Nigeria and neighbouring countries. Oral polio vaccination will continue, but it will use a vaccine that protects against just the two other types of polio virus that are still circulating in their wild form in Nigeria, Pakistan and Afghanistan.

Meanwhile, the policy also calls for the introduction, as quickly as possible, of the oral vaccine's old competitor: the inactivated Salk vaccine. That costs more than ten times as much as the oral vaccine and requires trained health workers to administer it, says Roland Sutter, a vaccinologist at the WHO. But it carries no risk of causing polio. By giving children an inactivated vaccine that protects against all three subtypes of polio, health workers hope to gradually stamp out vaccine-derived outbreaks.

"You have to have a transition period" in which both oral and inactivated vaccines are used, "because if you stop cold turkey you're going to have outbreaks", says Vincent Racaniello, a virologist at Columbia University in New York city. Once the remaining wild polio types are wiped out, the WHO will phase out all oral polio vaccines.

The high cost of the inactivated polio vaccine remains a significant hurdle for the plan, which depends on a reduction in cost to less than 50 cents per dose from the current cost of more than \$2, says Sutter. Boosting the immune response by including adjuvants, and delivering the vaccine under the skin instead of into muscle, could help to lower the dose required and cut costs, as could new kinds of vaccine, he says.

Health infrastructure poses another big hurdle, says Grassly. Delivering the vaccine in clinics instead of door to door will pose a challenge for Nigeria, which has one of the lowest rates of routine immunization in the world. Less than 50% of children receive a complete schedule of childhood vaccinations, and in parts of northern Nigeria that figure is around 10%.

"We as a global community have to do a much better job of integrating polio and routine immunization," says Zulfiqar Bhutta, an immunization expert at Aga Khan University in Karachi, Pakistan, and a member of the WHO committee that issued the new vaccination policy. He sees the eventual switch to inactivated vaccines as an opportunity to align polio eradication with routine immunization. "We should have done this a lot earlier," he says. ■

**NATURE.COM**  
For more on the  
challenges facing  
vaccine campaigns:  
[go.nature.com/a3nzqx](http://go.nature.com/a3nzqx)