



**Figure 1 | A child receives an oral poliovirus vaccine (OPV).** Habib *et al.*<sup>1</sup> report that offering OPV together with educational materials, other immunizations and nutritional supplements improved uptake of the vaccine by children of preschool age in areas affected by conflict in Pakistan, in comparison to offering OPV alone.

Historically, the Western Hemisphere led the way in polio elimination. Beginning in 1962, Cuba used mass-immunization campaigns involving OPV to become the first country in the Americas to eliminate polio. Countries in Latin America and the Caribbean agreed to implement OPV mass campaigns through national immunization days in 1985. During the civil war in El Salvador in the 1980s, a ceasefire was declared to allow OPV campaigns to take place during ‘Days of Tranquillity’. In Mexico, OPV campaigns that initially stood alone eventually integrated other cost-effective health interventions, including the provision of vitamin A, oral rehydration therapy and health education, which were delivered in both homes and local communities<sup>3</sup>. The last case of polio in the Americas occurred in 1991 in Peru. The many lessons learnt from polio elimination in this region have since been used successfully in other areas of the world<sup>4</sup>.

In Pakistan, a relatively low proportion of the population is routinely immunized with OPV (the national average is 72%, with a regional variance of 29–90%)<sup>5</sup>. Habib and colleagues set out to investigate whether integrated approaches could improve such coverage in areas of civil unrest in that country. The authors’ community-based study recruited almost 90,000 children of preschool age (1 month to 5 years old) who lived in three high-risk districts for polio, and assigned them equally to three groups.

In the first group, children received only OPV (Fig. 1). The second group was offered

an integrated health package, consisting of educational materials for the community, OPV and other immunizations and nutritional supplements, provided at fixed and mobile health camps. The third group was offered the same package as the second, but with the addition of IPV. The researchers found that integrated health packages led to better community acceptance of polio vaccination and, consequently, coverage with OPV increased by 6.6% in the second group and 8.5% in the third group compared to the first.

Habib and colleagues’ study was conducted between June 2013 and May 2014, and its integrated approach has already been deployed in other areas of conflict in Pakistan. In those regions, the polio situation overall has improved in the past three years, owing to better epidemiological surveillance and improved security for the teams of health-care workers who administer vaccinations. As a result, only three cases of polio have been reported in Pakistan so far this year (as of 12 July). The challenge, however, remains in targeting cross-border polio transmission between Pakistan and Afghanistan, the last two places on Earth where the transmission of wild poliovirus is still documented. (Nigeria has not reported any such cases since August 2016.)

Community involvement will be essential if vaccination is to be accepted in these regions. Otherwise, many poor populations will not see the benefit of receiving a dose of vaccine in the absence of other much-needed health interventions. As Habib *et al.* propose, immunization programmes must become the

backbone for delivering other cost-effective interventions to the community if acceptance rates are to improve.

In addition to implementation challenges, technical barriers to the eradication of polio remain. The OPV used in the main push to eradicate polio consisted of three strains of attenuated virus, but a well-coordinated transition has succeeded in making use of an OPV that contains only two<sup>6</sup>. This should eliminate the occurrence of polio outbreaks resulting from mutation of the removed strain, which was the most common cause of cVDPV.

Another technical issue is that the enormous demand for IPV has surpassed the current production capacity, leading to a temporary shortage. A few countries are overcoming this by using a fractional dose of IPV administered into the skin, with good results. Transmission by infected individuals must also be tackled — for this, effective antivirals will need to be identified, and several are being tested. Finally, the production of IPV involves making an inactivated strain from wild poliovirus, which has the potential to escape from the laboratory. A transition to generating IPV with the same attenuated strains as those used for OPV will reduce the risk of such an occurrence.

Every year, the Global Polio Eradication Initiative helps to vaccinate 450 million children against polio. According to the World Health Organization, these efforts are estimated to have saved the lives of 1.5 million children, and to have prevented paralysis in 16 million people. The eradication of polio is arguably the world’s most ambitious global-health target, and is one that can be achieved only after the challenges and technical hurdles that still hamper its implementation have been tackled. We are very close, and the dividends will be enormous. Let’s finish the job, once and for all. ■

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#### CORRECTION

In the News & Views ‘Personalized test tracks cancer relapse’ by Alberto Bardelli (*Nature* **545**, 417–418; 2017), the *ERBB2* gene name was spelled incorrectly. The text has been amended online.