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A child in Kano, Nigeria, receiving polio vaccine in June 2010.

Lessons from polio eradication

Ridding the world of polio requires a global initiative that tailors strategies to communities, say **Heidi J. Larson** and **Isaac Ghinai**.

Ten years ago all seemed to be going well with poliomyelitis eradication. The number of polio cases globally had dropped by 99% from an estimated 350,000 in 1988 to fewer than 500 in 2001, thanks to the Global Polio Eradication Initiative (GPEI).

But getting rid of the last 1% of cases over the past decade has been a roller-coaster ride including ridding whole nations of the disease and flare-ups in previously polio-free countries (see 'The disease that won't die easily'). Arrayed against the effort have been: logistical barriers, especially in conflict areas; management challenges; uncertain funding; waning political will; persisting anti-vaccine rumours and resistance; silent infections — healthy carriers who spread disease; and rare cases of vaccine-induced polio.

Against these odds, polio eradication has pushed on stubbornly; perhaps too stubbornly, at times, alienating some local populations by seeming overly top–down in its approach. But, the world cannot give up the fight to wipe out the disease that was paralysing 1,000 children a day 25 years ago and whose eradication is estimated to benefit the world by US$40 billion–50 billion between 1988 and 2035[1]. The alternatives are more costly — long-term measures to keep the number of cases low or risk widespread resurgence of a disabling and fatal disease[2].

Happily, much has been learned, and is still being learned, from the polio eradication initiative; in particular, why some children remain unvaccinated. Prompted by several years of fieldwork (by H.J.L.) with the United Nations on community acceptance of vaccines, our research team at the London School of Hygiene and Tropical Medicine has established an early-warning system to detect and investigate vaccine rumours and public concerns before they erupt into widespread vaccine refusals (go.nature.com/zfvi9s).

Our research points to three key lessons for the endgame of polio eradication and for other immunization initiatives in the developing world. First, integrate social and political analyses into feasibility assessments, strategic planning and steering. Second, find out what is driving rumours and resistance. And third, design and monitor communication and engagement strategies that work hand in hand with technical strategies and enable local populations to feel ownership of their immunization programme[3].

THE PROBLEMS

To explore how rumours can snowball into a crisis, events in Nigeria and India are worth a closer look.

What happened in Nigeria in 2003 has become a case study in the importance of getting local populations on side early[4]. Five states in the predominantly Muslim north of Nigeria — Kano, Zamfara, Kaduna, Niger and Bauchi — boycotted polio vaccination when religious and political leaders endorsed rumours that oral polio vaccine was an American conspiracy to spread HIV and cause infertility. The rumours had circulated in Nigeria and elsewhere for many years, but the tense political situation following elections in April 2003 provided motives for state governments in the north to "make things difficult" for the federal government[5]. This happened against a background of intensifying polio-eradication campaigns in May 2003, international conflicts against Muslim countries, and court proceedings in the United States where Nigerian families were suing Pfizer for allegedy unethical proceedings during clinical trials of an antibiotic drug in Kano[4].

In most Nigerian states, the vaccine suspensions were short-lived. But the newly elected governor of Kano — the most populous state, home to about 10 million people — enforced the boycott for 11 months. This catalysed a resurgence of polio in the country, with more than five times the number of cases in 2006 than in 2002 (reported incidence jumped from 202 in 2002 to 1,143 in 2006). Nigerian strains of the virus spread to 15 other countries[6], many of which had been previously certified polio-free, and were detected as far away as Indonesia.

In India, resistance to vaccination came from within similar socio-economically

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marginalized, largely Muslim, communities that were also influenced by rumours that the polio vaccine was a Western ploy to sterilize Muslims.

A dramatic increase in polio cases — from 268 in 2001 to 1,600 in 2002 — led to an investigation. It revealed that more than 80% of the children infected in the 2002 outbreak were Muslim boys under two years old, and 80% were from the state of Uttar Pradesh — one of the poorest states in India[7].

Vaccine resistance in India varied from the overt to the covert. During house-to-house visits with UNICEF to communities in Uttar Pradesh, we were sometimes told there were no children present, only to hear a baby crying in a back room. Other families closed their windows and doors when they heard vaccinators approaching. One vaccinator showed us scratches on her arms where household members had physically resisted immunization. Although mothers were often the ones to say no to health workers, their reasons for doing so often pointed to the influence of a husband or a powerful mother-in-law.

There are similarities between the Indian and Nigerian experiences. Vaccine refusals were centred on marginalized communities that lacked other basic services, such as clean water, and were suspicious of frequent door-to-door, free, polio vaccinations. Both settings involved communities responding to perceived external threats (Western conflicts or minority status) and in both, vaccine refusers became acceptors through public engagement.

THE SOLUTIONS

Faced by a sequence of such crises, the GPEI recognized that it needed a new way of working. Didactic, mass-communication approaches — such as street banners, posters and radio announcements — were doing little to persuade the most marginalized and the resistant populations.

In India, in response to the 2002 outbreak, the GPEI developed an ambitious strategy, working more closely with formal and informal social networks[8] and through local institutions such as the Aligarh Muslim University in Uttar Pradesh and the National Islamic University in New Delhi[7]. Community members were trained and deployed as mobilizers and became local 'champions' for polio eradication, countering resistance to vaccination from within their communities. The significant decline in polio cases in Uttar Pradesh is testament to the success of these relationships. The state has not seen a case of polio for more than a year.

There was also a realization that the effectiveness of engagement strategies needed to be measured by the outcomes, namely the number of children vaccinated and the number of polio cases — not just the number of community meetings or posters promoting vaccination and announcing immunization days[3].

Another innovation is the mapping of key influencers of vaccine acceptance or refusal. In Kano, Nigeria, for example, each mosque, market, school and household is plotted on a map and visited by vaccinators. Understanding the role of local traditional, religious and political leaders in India and Nigeria was essential. The visit of American philanthropist Bill Gates in early 2009, and his personal advocacy with the sultan of Sokoto and with the governor of Kano, were crucial in renewing the commitment of the states in northern Nigeria to eradicate polio.

Polio remains endemic in Afghanistan, India, Nigeria and Pakistan. There were 1,351 cases globally last year. The good news reported by the GPEI's Independent Monitoring Board[2] is that polio cases fell by more than 90% in India and Nigeria in 2010. And, even in Afghanistan, the numbers dropped by 34%. The most worrying news is that the number of polio cases in Pakistan increased by 62% in 2010. This is because of a convergence of waning political will and competing priorities such as the catastrophic floods in 2010, persisting vaccine rumours and refusals, and health-worker fatigue[9]. Mobilizing political will and engaging the public will be crucial both to Pakistan's success and to the global effort.

In 2009, the GPEI commissioned country-specific evaluations on the major barriers to polio eradication. What they revealed is how locally varied the barriers are and that "there is no single 'right way' to engage with communities"[10]. In some situations, highly visible involvement of political leaders has promoted polio vaccination — the governor of Kano vaccinating his own child after the boycott, for example. In Afghanistan, however, the evaluation recommended that "the visible involvement of political figures in vaccination campaigns" be reduced to reflect the political neutrality of the programme in a politically sensitive environment.

"Uttar Pradesh has not seen a case of polio for more than a year."

For the last leg of the race to eradicate polio, health workers must engage marginalized communities and listen to local concerns before pushing ahead with a strategy. The same lessons should be applied to other vaccination campaigns. And we must all recognize that humans are as challenging, if not more so, than the virus itself. ■

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THE DISEASE THAT WON'T DIE EASILY

Global polio cases numbered in the hundreds of thousands in the 1980s and early 1990s. Eradication efforts reduced them to as few as 500 in 2001, but the disease lingers on.