

A polio-free world?

Advances against polio made in 2004 were lauded by WHO as “the most important progress ever made towards a polio-free world”. But the success of the global eradication initiative still depends on India’s efforts to tackle remaining polio strongholds. Paul Webster reports from Uttar Pradesh.

As monsoon rains lashed the village of Adampur and its 7000 inhabitants, WHO’s local polio surveillance coordinator, Ashok Talyan, braced himself for a tough upcoming test. “The villagers use the sugarcane fields as lavatories, so polio cases from dirty water usually spike after the monsoon floods the village”, Talyan explains, while inspecting vaccination efforts here, 250 km east of India’s capital New Delhi. “But this year could be different”, Talyan speculates. “We’re betting there won’t be any new cases.”

In an area known worldwide as a stubborn hotspot for polio, Talyan’s hopes for a breakthrough are pinned on a key tactical decision taken last May. That’s when the Indian Government and WHO decided to suspend the use of trivalent vaccines—targeted against all three types of wild poliovirus historically seen in India—in order to use a monovalent vaccine, targeted solely against the type seen most often, known as P1.

“The P1 virus is by far the most common here”, said Talyan, “and the P1 vaccine is a much stronger weapon against it than the trivalent vaccine. So this summer we’re hitting the P1 virus with a sledgehammer.”

17 years after UNICEF, WHO, the US Centers for Disease Prevention and Control, and an assembly of private organisations launched a US\$4 billion campaign to eradicate polio—which once crippled 350 000 children worldwide every year—northern India is now the key battleground. The challenge remains daunting. With an estimated 165 million Indian children under the age of 5 years requiring repeated vaccinations, campaigners describe India’s polio war as the largest health campaign in history.

Along with a dwindling handful of regions in Africa and Asia, Uttar Pradesh

and a neighbouring province, Bihar, now share top international polio risk status. As recently as 2002, India reported 1600 cases. Last year, thanks to the mobilisation of an estimated 2.3 million Indian health workers involved in vaccination efforts, that figure was beaten down to just 134 cases, 82 of which were in Uttar Pradesh and 39 in Bihar.

Thanks to this achievement, and the resumption in Nigeria last year of crucial vaccination campaigns derailed in 2003, WHO says 2004 saw “the most important progress ever made towards the goal of a polio-free world”.

Ashok Talyan is well aware the success of the eradication effort hangs on what transpires in the months ahead across his district of 1.5 million deeply impoverished families of sugarcane and mango farmers.

Although Uttar Pradesh is India’s most densely populated province, it is mostly rural. The vast majority of its 230 million inhabitants live without access to public hygiene facilities even as basic as pit latrines. “The conditions here are just about perfect here for polio and other water-borne diseases”, says Talyan, a Ukrainian-trained physician seconded to the WHO in 2002 from Uttar Pradesh’s health department.

To fight polio hut-to-hut across his district, Talyan uses a complex array of epidemiological plans. Every 6 weeks, more than 6000 local health officials and volunteers fan out under his direction to vaccinate every child in every village. Although polio vaccines are simple to administer, the vaccines have to be kept chilled in ice packs while motorcycle dispatch riders transport them deep into rural areas, where summer temperatures hover in the 40s and electricity is unreliable.

To keep vaccine refrigerators running during power cuts, impoverished rural

hospitals, such as the one where Talyan is based, must operate expensive diesel generators. But far more important than logistical matters, says Talyan, is the real problem of finding the kids.

In Adampur, Talyan relies on Yogandera Kumartyaga, a local health supervisor for the Uttar Pradesh government, to identify children hidden because their parents oppose vaccination. Many parents suspect the government is using vaccination for population control, says Kumartyaga. But with numerous surveillance teams posted along roadways throughout the district on vaccination days, children can be checked and quickly vaccinated outside their homes, he says. And many of the villagers seem aware the vaccinations are paying off. In Adampur, a woman named Yashoda standing with

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Polio used to cripple around 350 000 children worldwide every year

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her freshly-vaccinated 4-year-old son in the doorway to her home says that although polio-related paralysis was once common, “we haven’t heard of any cases at all this year.”

But eradication is by no means assured. In the war on polio, remarks Talyan, what is local all too quickly goes global. In June, DNA tests on a poliovirus from a new case in Angola, almost 6000 km away, linked it to Uttar Pradesh. On a visit to Talyan’s office, Rajeh Singh, a doctor who coordinates polio campaigns across a subregion of Uttar Pradesh home to 60 million, said the disease is proving much harder to stamp out than was predicted as recently as 2 years ago.

When two cases of type 3 virus—not being vaccinated against while the P1 vaccine campaign continues this summer—were identified in mid-July in Uttar Pradesh, Sunil Bahl, WHO’s New Delhi-based technical supervisor for the National Polio Surveillance Programme, spiritedly defended the decision last spring to vaccinate only against the P1 virus. Because the live P1 vaccine virus does not have to compete in the gut with the other two virus types for cells susceptible to infection, Bahl explains, just one dose of type 1 vaccine confers immunity in roughly 80% of those vaccinated, compared with only 30–40%

for the trivalent vaccine. So the decision to target P1 in recent months was wise, he says. Even so, he conceded, “we’re going to have to go back to using the trivalent form of the vaccine next month. But we planned to do that all along.”

Not all polio experts exhibit the same confidence. At the University of Pittsburgh, Donald Henderson, who led the successful campaign to eradicate smallpox worldwide by 1977 before helping lead the successful campaign to eradicate polio in the western hemisphere by 1985, says the fight in Uttar Pradesh is proving worryingly difficult. “Interestingly”, Henderson notes, “Uttar Pradesh was also a real problem area for smallpox back in the 1970s.”

Henderson sees the decision to focus the attack on the P1 virus alone as a semi-desperate measure. But, given the formidable difficulties in Uttar Pradesh, Henderson agrees the switch to monovalent use “was about the only strategy possible, given financial constraints and campaign fatigue.”

Even so, Henderson worries the switch in strategy is a sign of trouble. “This has never been done before—I don’t think the data is really there to judge it one way or another. I think the idea of using monovalent vaccine in

areas where you’ve only got type 1 makes sense. But in areas where you’ve got type 3, it’s riskier.”

In Geneva, Roland Sutter, a CDC epidemiologist seconded to WHO, says the switch back to using monovalent vaccine made sense because type 2 polio has not been seen anywhere since 1999, and type 3 has not been seen in many high-risk areas, including Egypt, for many years. “In Egypt and northern India there was a feeling you couldn’t get much improvement in the vaccination campaigns”, Sutter says. “So the Indian Expert Advisory committee recommended three rounds with type 1, after which we’ll go back to the trivalent vaccines. It’s so much better to alternate the vaccines—you get much higher seroconversion. I think its pretty much done what we expected.”

With confidence high that the strategy to switch vaccines will significantly drive back type 1 polio in India this year, Sutter has now begun developing strategies to sharply reduce vaccine distribution once wild viruses have been curbed in the world’s last high-risk regions. Because the vaccines contain wild virus, at least a few polio outbreaks every year are traced to vaccine viruses which have mutated back into wild viruses. “It’s a live virus which is transmissible”, Sutter explains. “If you get through eradication and don’t solve this part of the problem, [the vaccine virus] could mutate again and become a wild virus again. So we’re setting plans to stop distribution of all live vaccines. I just wish we could be done with eradication.”

In New Delhi last July, with no new cases of P1 virus identified since vaccination efforts were targeted against it alone in Bihar and Uttar Pradesh last May, WHO’s Sunil Bahl argued that strong progress is being made: “We’ve got our fingers crossed”, he said, echoing Ashok Talyan on the ground in Adampur. “We’ll know what’s happening once monsoon season ends.

Paul Webster