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Polio outbreak from oral vaccine identified -- and controlled -- in China

A 2004 outbreak of polio in China traced back to live attenuated oral polio vaccine (OPV), which is widely used in global eradication efforts, highlights the small but significant risk to eradication posed by the use of OPV at suboptimal rates of coverage. The study, reported in the Sept. 1 issue of *The Journal of Infectious Diseases*, and now available online, describes the first outbreak of poliomyelitis in China in more than a decade and the first in that country caused by vaccine-derived virus.

This marks the fifth outbreak of vaccine-derived poliomyelitis reported in the world since 2000, the year in which China was certified free of wild-type poliovirus.

The study was conducted in 2004 by Jingjin Yu, MD, and colleagues in Beijing and elsewhere, involving virus isolated from an outbreak in Guizhou province in rural China. Reported national immunization coverage in China is close to 90 percent, but children in the affected area of Guizhou, the poorest province in China, had much lower rates of immunization at the time of the study: only 72 percent of one- to three-year-olds had received at least three doses of the oral vaccine.

The investigators identified six children (three cases and three contacts) in two small towns who had had acute and residual polio-like paralysis and from whom the same type of vaccine-derived poliovirus (type 1) was isolated. A seventh child with paralysis was negative for type 1 virus, but it was found in a close contact of that child. None of the children had been immunized against polio.

Based on the virus strain's known rates of mutation, the finding indicated that the isolates had been circulating for less than a year. This is in contrast to past experience with vaccine-derived strains, which have tended to persist for several years--suggesting how quickly this strain can revert to a paralytic and transmissible form.

Once the outbreak was identified, a province-wide immunization campaign was mounted targeting all children under age 5, with reported coverage of more than 90

percent. To date, the outbreak strain has not been found in any child with polio-like paralysis in the province or elsewhere in China.

In an accompanying editorial, Walter Dowdle, PhD, of the Task Force for Child Survival and Development and Olen Kew, PhD, of the Centers for Disease Control and Prevention, suggest that the China outbreak indicates that vaccine-derived poliovirus can emerge within pockets of lower OPV coverage in countries with overall high levels of immunization and disease surveillance, and that the virus can be contained if identified quickly. They also emphasize the importance of paying close attention to regions that have historically acted as reservoirs of polio, despite the fact that such remote communities as Guizhou were long thought to be unlikely sites for the re-emergence of the virus after eradication because of a lower frequency of exposure.

According to Dowdle and Kew, important questions about the use of oral polio vaccine arise from this outbreak. In 2003, the World Health Organization recommended discontinuing the use of live virus vaccine after the eradication of the disease and containment of poliovirus stocks. But the cost of switching entirely to inactivated polio vaccine would present financial challenges to poor nations, as the cost of the inactivated preparation is estimated at \$2.00 to \$3.00 per dose, in contrast to 3 cents per dose for the live attenuated oral vaccine. As Yu and colleagues point out, immunization policies will have to be carefully considered in light of both medical and financial concerns.

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