OPV Risk Abates Soon After Switch to Killed Vaccine

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Live, attenuated poliovirus vaccine strains do not persist for extended periods after the oral vaccine is replaced by the inactivated poliovirus vaccine in a developed country with a temperate climate, Q. Sue Huang, Ph.D., and colleagues reported.

The study is part of an ongoing effort to develop strategies on when and how to stop oral poliovirus vaccine (OPV) immunization once the disease is eradicated, said Dr. Huang of the Institute of Environmental Science and Research, Porirua, New Zealand (Lancet 2005;366:394-6).

The authors explained that after OPV vaccination, poliovirus is excreted by healthy children for 2-3 months and the virus' persistence in populations is limited. "Reports from several developing countries, though, indicate that circulating neurovirulent vaccine-derived poliovirus strains can be sustained for extended periods and cause poliomyelitis when population immunity is low."

It's important that the study be repeated in tropical, developing countries where transmission of OPV viruses is likely to be more intense.

When in 2002 New Zealand's immunization schedule changed from OPV to inactivated poliovirus vaccine (IPV), Dr. Huang's team began to monitor the persistence of OPV strains excreted by the last cohorts of immunized children.

"We did systematic, population-based surveillance for OPV virus circulation and evolution before, during, and after the OPV/IPV switch with combined pediatric inpatient, acute flaccid paralysis, enterovirus laboratory, and environmental surveillance systems," the investigators said.

The first three methods targeted people most likely to be excreting poliovirus, but only environmental surveillance—obtaining composite samples from sewage systems that serve 28% of the population—was able to detect polioviruses 2 months after the OPV to IPV switch.

"Before the OPV/IPV switch, the poliovirus isolation rate was 94%. This proportion decreased after the switch, but not as rapidly as with other surveillance methods. The decline was maintained in the posttransitional period (April 2002 to April 2003) such that, after May 2002, polioviruses were only detected once every 3 months," the investigators said.

Enterovirus (pediatric inpatient) surveillance found no poliovirus isolates in stool samples 1 month after the vaccine protocol change.

Molecular sequencing traced all post-switch isolates back to OPV administered 1-3 months previously.

The scientists reckoned that these viruses most likely originated in recently vaccinated children or their close contacts from an OPV-using country, which shows that New Zealand "remains vulnerable to vaccine or wild-type virus importation."

Dr. Huang and associates said it's important that the study be repeated in tropical, developing countries where transmission of OPV viruses is likely to be more intense. "The findings of such studies are vital to formulate polio immunization policies in the postcertification era. Simultaneous global cessation of OPV after a mass immunization campaign to maximize population immunity and minimize vaccine-derived poliovirus circulation could be adopted if there is minimum risk of sustained vaccine-derived poliovirus circulation."

In an accompanying editorial, Calman MacLennan, M.D., and Jenny MacLennan, M.D., of the University of Malawi, Blantyre, said that while this study suggests that replacement of OPV with IPV can, in an environment like New Zealand's, greatly reduce, and perhaps prevent, persistence of vaccine-related polioviruses, "these findings do not address what happens if vaccination with OPV is stopped without switching to IPV and whether similar results would be obtained in tropical developing countries.

"While the lack of long-term persistence of vaccine-related poliovirus in New Zealand is encouraging, it does not yet allow for the cessation of poliovirus vaccination in any country," they said (Lancet 2005;366:351-3). ■