

Live Strains Soon Gone After Switch to IPV

BY BRUCE DIXON
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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."

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

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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 was changed.

Molecular sequencing traced all postswitch isolates back to OPV. "Since polioviruses evolve at a constant rate of 1% nucleotide substitutions per year, environmental isolates 6-12 months post switch with 99.7%-100% sequence homology to parental Sabin strains infer that these viruses were derived from OPV administered 1-3 months previously," said Dr. Huang and associates.

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."

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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).

"The evening of December 19th, 2002, Max fell asleep in my arms. I laid him down to bed. I checked on him a short while later and knew something was terribly wrong. My little boy had died."



"To this day doctors and medical examiners can't tell us what happened to our thriving, happy little boy. Five months after Maxwell's death, the medical examiner put us in touch with the SUDC program. That's **Sudden Unexplained Death in Childhood.** Finally, we found a resource where there are parents who are in the same situation as we are... looking for answers. And where there are professionals willing to continue looking for those answers. Without SUDC I can't imagine where our family would be today. They've been a godsend."

—Jennifer & Mitchell Best, Parents

The SUDC Program.

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