

Unprotected People #82

Polio

Unvaccinated U.S. adult traveling abroad contracts vaccine-associated paralytic polio through contact with a child vaccinated with OPV

In February 2006, CDC reported on the first case of paralytic poliomyelitis identified in the United States since 1999 and the first imported vaccine-associated paralytic poliomyelitis (VAPP) case ever documented in the United States. The report describes the occurrence of imported VAPP in an unvaccinated 22-year-old U.S. woman who traveled abroad, where she was likely exposed through contact with an infant recently vaccinated with OPV. This case highlights the previously unrecognized risk for paralytic polio among unvaccinated persons exposed to OPV during travel abroad.

CDC published "Imported Vaccine-Associated Paralytic Poliomyelitis—United States, 2005" in the February 3, 2006 issue of MMWR. It was reported by M. Landaverde, MD, Pan American Health Organization; D. Salas, MD, M. Humberto, MD, Ministry of Health Costa Rica; K. Howard, R. Walker, MD, St. Joseph's Hospital and Medical Center, Phoenix; S. Everett, MPH, S. Robyn, Yavapai County Health Dept, Prescott; L. Erhart, MPH, S. Anderson, MPH, S. Goodykoontz, Arizona Department of Health Services; M. Pallansch, PhD, J. Sejvar, MD, Division of Viral and Rickettsial Diseases, National Center for Infectious Diseases; and K. Kenyan, MPH, J. Alexander, MD, L. Alexander, MPH, J. Seward, MBBS, Epidemiology and Surveillance Division, National Immunization Program, CDC. It is reprinted below in its entirety, excluding references.

Imported Vaccine-Associated Paralytic Poliomyelitis—United States, 2005

Paralytic poliomyelitis is rare in the United States because of the success of universal childhood immunization and the Global Polio Eradication Initiative. Poliovirus vaccine was introduced in the 1950s. Since then, the United States has eliminated indigenous wild poliovirus transmission, controlled imported wild poliovirus cases, and, through a

vaccine policy change (i.e., from live, attenuated oral polio vaccine [OPV] to inactivated polio vaccine [IPV]), eliminated vaccine-associated paralytic polio (VAPP) cases. The most recent VAPP case occurred in 1999. The primary risk for paralytic polio for U.S. residents is through travel to countries where polio remains endemic or where polio outbreaks are occurring. This report describes the first known occurrence of imported VAPP in an unvaccinated U.S. adult who traveled abroad, where she likely was exposed through contact with an infant recently vaccinated with OPV. This case highlights the previously unrecognized risk for paralytic polio among unvaccinated persons exposed to OPV during travel abroad.

In March 2005, an Arizona woman aged 22 years contracted paralytic polio while traveling in Central and South America. She arrived in Costa Rica on January 14, 2005, to participate in a university-sponsored study-abroad program. During her stay with a local family, she visited several tourist locations along the Pacific coast in Costa Rica, Panama, Nicaragua, and Guatemala. Her last trip before onset of illness was to an island territory of Colombia during February 25–28. On March 2, after she returned to the host family's home, she had fever and general malaise. During the next 24 hours, her symptoms worsened, and she began to have headache and neck and back pain. On March 6, she experienced acute leg weakness and was hospitalized locally and soon transferred to a hospital in San Jose, Costa Rica. On March 9, she was transported by air to Phoenix, Arizona, for further evaluation.

Upon admission to a hospital in Phoenix, the patient had bilateral areflexic lower extremity weakness and respiratory failure requiring intubation.

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Cerebrospinal fluid (CSF) studies on March 9 revealed lymphocytic pleocytosis, elevated protein (89 mg/dL), and normal glucose levels (53 mg/dL). The patient was initially treated for an acute peripheral demyelinating process, such as Guillain-Barre Syndrome (GBS), with corticosteroids and plasmapheresis. Electrodiagnostic studies, however, displayed reduced compound muscle action potentials, normal sensory nerve action potentials, and widespread denervation, consistent with a severe, asymmetric process involving anterior horn cells or motor axons. Magnetic resonance imaging of the cervical and thoracic spine demonstrated signal abnormality in the anterior cord, indicative of anterior horn-cell involvement. Serologic results for antibodies specific for West Nile and dengue viruses were negative. Stool specimens were collected on March 20 and sent to the CDC polio reference laboratory. The specimens were positive for Sabin-strain poliovirus types 2 and 3; no other enteroviruses were identified. The results of serologic tests for all three serotypes were greater than 1:10 for both acute and convalescent specimens. During the course of hospitalization, the patient recovered respiratory function, was transferred to a rehabilitation center for physical and occupational therapy, and was eventually discharged home for outpatient therapy. Sixty days after the onset of weakness, she had residual weakness in both legs.

The patient had never been vaccinated with either OPV or IPV because of a religious exemption. The Costa Rican family with whom she lived consisted of a mother, father, and daughter with no young children. The host family's son and daughter-in-law lived next door with two children, aged 2 months and 3 years, who visited the host family frequently. The infant received his first dose of OPV on January 19, 2005, 4 days after the woman arrived to live with the host family. Vaccination records indicated that both children were up to date for all other routine vaccinations. The patient had no known or reported exposure to young children during her 3-day trip to Colombia. She had no underlying medical or immune-compromising conditions.

Editorial Note

This report describes the first case of paralytic poliomyelitis identified in the United States since 1999 and the first imported VAPP case ever documented in the United States. Although the patient initially had a working diagnosis of an acute peripheral demyelinating process, the clinical history, physical findings, and laboratory studies are typical for paralytic polio and inconsistent with GBS, transverse myelitis, or other forms of acute flaccid paralysis. The patient's only known exposure to OPV was through contact with the infant grandchild of her host family. The date of the patient's onset of illness in relation to OPV vaccination and her presumed contacts with the infant are within the expected ranges for contact VAPP cases (4–75 days and less than 30 days, respectively). The poliovirus antibody titers, uniformly high on both acute and convalescent serum specimens, are inconclusive. However, the isolation of Sabin-strain polioviruses types 2 and 3 from a stool specimen and absence of isolation or serologic evidence for infection with another agent known to cause polio-like symptoms (e.g., West Nile virus or enterovirus 71) is consistent with VAPP. A panel of polio experts convened by CDC confirmed this case to be paralytic polio on the basis of standard clinical evidence, and the case was classified as imported VAPP with onset of illness within 30 days before entry into the United States, in accordance with CDC protocol.

Cases of paralytic polio are now rare in the United States because of the success of the U.S. childhood immunization program and the Global Polio Eradication Initiative. In the United States, the most recent cases of paralytic polio caused by indigenous and imported wild polioviruses occurred in 1979 and 1993, respectively. From the early 1960s, when trivalent OPV became the vaccine of choice for the childhood immunization program, to the mid-1990s, approximately eight to 10 VAPP cases occurred annually. Most VAPP cases occurred in OPV recipients rather than among their contacts. In the United States in the 1990s, cases of contact VAPP occurred at a rate of one case per 13 million

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doses of OPV distributed. To reduce the risk for VAPP, the United States changed to a sequential IPV/OPV schedule in 1997 and then to an all-IPV schedule in 2000. This policy change resulted in elimination of VAPP in the United States, with the most recent case of VAPP, before this report, occurring in 1999. High coverage rates for poliovirus vaccination have been maintained among children aged 19–35 months with the transition from OPV to IPV. In 2004, approximately 92% of children in this age group received 3 doses of IPV as part of the routine infant and child immunization schedule. Coverage levels greater than 95% are reached after school entry, although the majority of states allow philosophical or religious exemptions.

Despite high vaccination coverage, another OPV-associated risk was identified recently in the United States. In September 2005, an unvaccinated, immunocompromised infant was found to be infected with a vaccine-derived poliovirus, presumably originating outside the United States in a country that uses OPV. Upon further investigation, four other children in two other families in the same small, rural community were found to be asymptomatic carriers of the virus. No cases of paralysis have been associated with circulation of this virus in the community.

The Global Polio Eradication Initiative has successfully reduced the burden of paralytic polio globally and the threat of imported polio in the United States. In 1988, when the initiative began, 125 countries reported cases of paralytic polio. At the end of 2004, six countries had endemic polio (Afghanistan, Egypt, India, Niger, Nigeria, and Pakistan) and transmission had been reestablished in six countries (Burkina Faso, Central African Republic, Chad, Côte d'Ivoire, Mali, and Sudan). The Americas were certified polio free in 1994, with the most recent reported case occurring in Peru in 1991.

For protection against polio, all infants and children in the United States, regardless of travel status, should receive 4 doses of IPV at ages 2, 4, and 6–18 months and 4–6 years. If accelerated protection is needed, the minimum interval between doses is 4

weeks, although the preferred interval between the second and third dose is 2 months. The minimum age for IPV administration is 6 weeks. Infants and children who have begun receiving the poliovirus vaccination series with 1 or more doses of OPV should receive IPV to complete the series.

Because of the minimal risk for exposure to polioviruses and because most adults are immune as a result of vaccination during childhood, routine poliovirus vaccination of adults (i.e., persons aged greater than or equal to 18 years) residing in the United States is recommended only for certain adult groups who are at increased risk for exposure to polioviruses. Adults who are traveling to areas where polio is still epidemic or endemic and who are unvaccinated, incompletely vaccinated, or whose vaccination status is unknown should receive IPV. Two doses of IPV should be administered at intervals of 4–8 weeks; a third dose should be administered 6–12 months after the second. If 3 doses of IPV cannot be administered within the recommended intervals before protection is needed, the following alternatives are recommended:

- If more than 8 weeks are available before protection is needed, 3 doses of IPV should be administered at least 4 weeks apart.
- If fewer than 8 weeks but more than 4 weeks are available before protection is needed, 2 doses of IPV should be administered at least 4 weeks apart.
- If fewer than 4 weeks are available before protection is needed, a single dose of IPV is recommended.

Adults who are traveling to areas where polio cases are occurring and who have received a primary series with either IPV or OPV should receive another dose of IPV before departure. According to available data, adults do not need more than a single lifetime booster dose with IPV.

In 2004, approximately 25 million U.S. residents traveled abroad to OPV-using countries in Central and South America, Asia, Africa, and Europe. Before

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the case described in this report, the risk for VAPP in an unvaccinated traveler to an OPV-using country with no wild poliovirus transmission was considered negligible. However, this case indicates that the risk for VAPP, although low, is not zero. Overall, the risk for paralytic disease in a traveler is much greater in a polio-endemic country or outbreak country (e.g., Nigeria) than in an OPV-using country that is free from wild poliovirus, although this increase in risk is difficult to quantify.

Polio among travelers is preventable. Travelers to countries where polio is endemic or where outbreaks are occurring should be made aware of the risk for acquiring paralytic polio in those countries and be vaccinated in accordance with

current recommendations. Healthcare providers assessing vaccine needs for unvaccinated adults traveling to countries that use OPV should be aware of the risk that OPV might pose to such travelers and should consider offering them polio vaccination. At least 4–6 weeks before departure, international travelers should contact travel medicine providers to obtain vaccinations and prophylactic medications. Providers should assess the need for itinerary-specific vaccines and ensure that travelers are up to date on all routine vaccinations, including polio vaccination. Information on vaccination requirements for international travelers is available from the CDC publication, Health Information for International Travel, 2005—2006 (<http://www.cdc.gov/travel/yb/index.htm>)