**POLIOVIRUS**

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<th>Animal Group(s) Affected</th>
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<td>Humans; non-human primates</td>
<td>Fecal-oral and respiratory routes.</td>
<td>Range from asymptomatic to paralytic, or sudden death.</td>
<td>Most severe signs include permanent flaccid paralysis of one or more limbs or muscle groups.</td>
<td>Symptomatic, supportive care, based on clinical presentation.</td>
<td>Vaccination - used extensively in humans.</td>
<td>Yes and humans are the primary reservoir.</td>
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**Fact Sheet compiled by:** Wynona C. Shellabarger  
**Sheet completed on:** 8 August 2011; updated on 30 August 2013  
**Fact Sheet Reviewed by:** Marcus Zervos, Tina Tan

**Susceptible animal groups:** Humans and non-human primates are affected although cases in NHPs are rare. Virus has been recorded in the feces of chimpanzees, macaques, and some myotates. Macaques and chimpanzees are not particularly susceptible and are rarely affected.  

**Causative organism:** Poliovirus types 1, 2 and 3, family Picornaviridae, subgroup Enteroviridae

**Zoonotic potential:** Yes as humans are the primary reservoir.

**Distribution:** Historically, the disease was present worldwide. Western Hemisphere has been declared free of indigenous poliovirus since September 1991 and the last case of endemic polio in the US was in 1979. This status has been achieved through the efforts of WHO and an international contingent spearheading the Global Polio Eradication Initiative (GPEI) and widespread use of vaccines in humans. Global eradication is still an active goal of these organizations, and incidence and transmission have continued to dramatically decline with continued use and distribution of vaccine. Currently, three countries maintain an endemic status: Afghanistan, Nigeria and Pakistan; an additional four African countries have continued incidence of imported-wild type polio.

**Incubation period:** Differs depending on type of polio but ranges from 3 to 35 days. Non paralytic disease has incubation period of 3 to 6 days; paralytic disease has incubation period of 7 to 21 days. Virus can be shed in the feces for 3 to 6 weeks post-exposure or after vaccination with oral polio vaccine (OPV).

**Clinical signs:** Although flaccid paralysis is the most noteworthy and potentially severe of the clinical signs described, poliovirus infection in humans can be highly variable and clinical signs are categorized based on presentation. The majority of human infections are asymptomatic (72%). About 24% of infections result in minor disease including those of the upper respiratory tract, gastrointestinal disturbances and flu-like signs with associated fever and muscle aches. In 1-2% cases, signs are more severe including meningitis, muscle weakness or paralytic flaccid paralysis of a single limb to quadriplegia, and respiratory failure with 0.1% of all reported polio cases resulting in the paralytic form in humans. Death occurs, but rarely, at 2-5% in children and 15-30% in adults that contract the paralytic form of this disease. A post-polio syndrome may occur in 25% to 40% of human cases as well, which develops decades after the initial infection. Although...
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rare, poliovirus infection has been described in chimps, orangutans, gorillas, macaques, and colobus monkeys, in captive, laboratory, and wild settings, and manifests with similar clinical signs to those of human infections.

**Post-mortem, gross, or histological findings:** Most severe lesions are associated with paralytic disease and include muscle wasting, inflammation, demyelination, apoptosis, destruction of interior horn cells of spinal cord, brain stem and/or lower motor neurons.

**Diagnosis:** Viral throat cultures may be positive within the first week of illness in humans. PCR testing of CSF, urine, and feces also can be used. Genetic oligonucleotide sequencing is performed to distinguish wild-strain from vaccine-induced strain polio once isolated. Retrospectively, serologic titers can be used to confirm diagnosis since IgM and IgG titers may take weeks to develop and become detectable.

**Material required for laboratory analysis:** Diagnostic samples include feces, CSF fluids, pharyngeal swabs, urine, and serum. Contact local and state public health and epidemiology officials for specific NHP sample submissions and guidance.

**Relevant diagnostic laboratories:**
Diagnosis, isolation and characterization of polioviruses from submitted human samples are coordinated by:
Center for Disease Control
Global Polio Laboratory Network/Polio and Picornavirus Laboratory (Division of Viral Diseases)
1600 Clifton Rd
Atlanta, GA 30333
(404) 639-2749
Fax: (404) 639-4011
www.cdc.gov

**Treatment:** Symptomatic treatment is based on severity of clinical signs, including pain relief and physical therapy. Mechanical ventilation used in humans with permanent respiratory muscle paralysis.

**Prevention and control:** Infected animals should be isolated and standard disinfection measures used with personnel protective equipment to minimize exposure to humans or other animals.

Vaccines are used extensively in humans to prevent disease. Inactivated (IPV) and oral polio (OPV) vaccines are currently available for human use, but since 2000, only IPV has been used in the US to minimize vaccine-associated paralytic polio (VAPP) incidence. However, OPV is still used in a number of other countries. Routine polio vaccination with OPV of great apes in captivity has been recommended historically but is currently at the discretion of the animal’s holding facility. Risk of exposure is low due to human vaccine eradication efforts. Type and schedule of vaccination in NHPs is extrapolated from human ACIP recommendations and vaccines available.

**Suggested disinfectant for housing facilities:** Poliovirus is known to be susceptible to heat, chlorine, formaldehyde, and UV light. Standard disinfection using a dilute bleach solution or one of the above products should be adequate. Removal of feces and bodily fluids before disinfection is required for effective disinfection.

**Notification:** If polio is suspected, veterinarians should work closely with local and state public health officials and epidemiologists. Contact CDC directly if local or state authorities are not available.

**Measures required under the Animal Disease Surveillance Plan:** Currently no measures are required. However, polio is epidemiologically important to monitor due to extensive worldwide eradication efforts in the human population.

**Measures required for introducing animals to infected animal:** Maintain potentially infected animals in isolation and quarantine conditions until presentation is resolved. Vaccination of conspecific naïve NHPs should be considered.
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**Conditions for restoring disease-free status after an outbreak:** Minimize fecal contamination and clean and disinfect potentially contaminated areas thoroughly for at least 3-6 weeks post-infection and vaccination series. Source of infection should be determined and NHP staff vaccination history should be reviewed and updated if necessary.

**Experts who may be consulted:**
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**References:**