UK Health Security Agency

PIM survey definitions and references

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Poliovirus potentially infectious materials

Poliovirus potentially infectious materials refers to a sample that has a chance of inadvertently containing polio because it had been collected at a time and place when polio was circulating in the community.

Sample

Any material – biological, clinical, or environmental – used for analysis or medical diagnosis.

Poliovirus

A picornavirus consisting of 3 serotypes: 1, 2 and 3; protective immunity is type-specific.

Poliovirus serotypes are further subdivided into wild (circulating in nature) and Sabin strains (attenuated strains used for oral polio vaccines). Poliovirus types 2 and 3 have been eliminated in the wild. In this current stage of polio eradication, only type 1 wild poliovirus continues to circulate in endemic areas. It is highly infectious and causes paralytic polio.

Nucleic acid, poliovirus

Full-length poliovirus RNA, cDNA, or total nucleic acid extracted from poliovirus infectious materials (for example, virus isolate) or potentially infectious materials (for example, stool, respiratory specimen, sewage) using methods proven to inactivate poliovirus, or synthesised full-length RNA/cDNA (for example, cDNA clone, synthetic transcript).

These materials can be handled outside poliovirus containment, provided they are not introduced into polio-permissive cells or animals, with or without transfection reagent unless such cells have been rendered non-polio permissive.

Oral poliovirus vaccine (OPV)

Also known as the ‘Sabin vaccine’, contains live, attenuated poliovirus strains. OPV formulations include:

- trivalent OPV (tOPV), containing all 3 serotypes of Sabin strains (1, 2, and 3); general use of tOPV ceased in April 2016
- bivalent OPV (bOPV), containing Sabin strains 1 and 3; as of April 2016, only bOPV is routinely used
- monovalent OPV (mOPV), containing only one serotype of Sabin strain

Vaccine-derived polioviruses (VDPVs)

Usually show 1 to 15% sequence differences from the parental oral polio vaccine (OPV) strain. They may have circulated in the community (cVDPV), replicated for prolonged periods in immunodeficient subjects (iVDPV), or be ambiguous and of unknown origin (aVDPV).

Poliovirus potentially infectious materials (PIM) may contain WPV, VDPV or Sabin/OPV. These include:

- faecal or respiratory secretion samples collected while polioviruses were circulating (for example, during the use of Sabin/OPV vaccination or when a cVDPV was present in the community)
- products of such materials from poliovirus-permissive cells or animals
- respiratory or enteric virus stocks handled under conditions where WPV, VDPV or Sabin/OPV strain contamination or replication is possible within the laboratory
- environmental samples (for example, concentrated sewage, wastewater) collected from areas known or suspected to have circulating polioviruses at the time of collection

Poliovirus, Sabin (OPV/Sabin strains)

Attenuated poliovirus strains approved for use in oral polio vaccines by national regulatory authorities.

Poliovirus, OPV-like

Isolates consistent with a limited period of virus excretion or person-to-person transmission, showing less than 1% difference from parent OPV strains for poliovirus types 1 and 3, and less than 0.6% difference from the type 2 parent OPV strain by full Viral Protein 1 sequence homology. The phenotype of clinical and environmental OPV-like isolates need not be determined, as most are assumed to be of low virulence.

Common cell lines and animals susceptible to poliovirus

Poliovirus grows in nearly all human and some monkey cells as well as mouse L cells.

Global Action Plan IV (GAPIV)

These standards outline the safe handling requirements and community safeguards for facilities retaining WPV/VDPV, Sabin/OPV infectious materials (IM) and WPV potentially infectious materials (PIM). It aligns the safe handling and containment of poliovirus IM and PIM with the Polio Eradication Strategy 2022 to 2026.

After eradication of wild poliovirus and cessation of oral poliomyelitis vaccination in the UK, minimising the risk of reintroducing poliovirus in the country is critical. To reduce the risk of a facility-associated release of poliovirus, the number of facilities designated to retain poliovirus

will be reduced to a minimum, and the biorisk management of these facilities enhanced by strict compliance to appropriate safeguards.

Further references

WHO country case data, visit the WHO GPEI website for the most current country- and territory-specific poliovirus case data.

Guidance for non-poliovirus facilities to minimize the risk of sample collections potentially infectious for polioviruses (PIM Guidance).

Potentially Infectious Materials, Poliovirus (PIM) Identification Tool: to help determine if samples or collections, for example human stool samples, respiratory samples or environmental sewage, stored or handled in your laboratory may be potentially infectious for polioviruses.

Additional definitions can be found in the WHO Global Action Plan (GAP IV).

About the UK Health Security Agency

UK Health Security Agency (UKHSA) prevents, prepares for and responds to infectious diseases, and environmental hazards, to keep all our communities safe, save lives and protect livelihoods. We provide scientific and operational leadership, working with local, national and international partners to protect the public's health and build the nation's health security capability.

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