Centers for Disease Control and Prevention

U.S. National Authority for Containment of Poliovirus

National Inventory for Poliovirus Containment:

Minimizing Risk of Poliovirus Release from Laboratories in the United States

The US Poliovirus National Authority for Containment of Poliovirus (NAC), located in the Centers for Disease Control and Prevention, Center for Preparedness and Response, appreciates your participation in this survey. This survey is designed to collect relevant laboratory inventory data to ensure compliance with requirements established in the WHO Global Action Plan (GAPIII) , as adapted for the WHO Region of the Americas. PerGAPIII, each country is required to complete a national inventory of poliovirus-containing materials. Unlike previous surveys, the 2018 survey focuses on institutions that may have poliovirus potentially infectious materials (PIM). PIM includes human respiratory secretion and fecal specimens collected for non-polio related work in a time and place where wild poliovirus (WPV) or vaccine-derived poliovirus (cVDPV) was circulating or where oral polio vaccine (OPV) was in use. Historical domestic and international specimens are more likely to fall into these categories. Additionally, PIM cultured in some common cell lines (see Appendix C: Common Cell Lines and Animals Susceptible to Poliovirus) in order to isolate other viruses of interest may have unintentionally amplified poliovirus, so respiratory or enteric viral isolates obtained from PIM specimens using any of these cell lines are also considered PIM.

The survey should be completed by laboratories, storage sites, or other facility types that test, extract, handle, or store biological samples from humans, experimentally infected animals, sewage, or environmental waters. The survey questions are intended to identify facilities that possess any materials that may contain poliovirus. The questions seek to distinguish between PIM containing wild poliovirus (WPV), circulating vaccine derived poliovirus (cVDPV), and oral poliovirus vaccine (OPV). With the release of the WHO PIM guidance in April 2018, extracted nucleic acid and specimens that **may contain only OPV** are no longer subject to containment under WHO GAP III. However, they are still considered to be part of the US inventory and should be reported.

For the purpose of this survey, PIM should be identified on the basis of where and when the specimens were collected, not on the basis of any test results see WHO's Annex 2: Country or Territory-Specific Poliovirus Data . If your facility intends to destroy all of the potentially infectious poliovirus material or infectious material it possesses, you will then be asked to complete an attestation of destruction of the material. This attestation form will be sent to you once the completed survey is received.

Survey Overview

For an overview of the survey, please click here. This document has been provided to help you prepare your survey responses and is not intended to be completed as a paper-based format. Appendices and other references can be found below. The survey must be completed online.

Survey Instructions

This survey is divided into six modules:

1. **Facility Information**
2. **Material Types**
3. **Inventory Information**
4. **Disposition of Materials**
5. **Key Facility Personnel**
6. **Attestation**

Throughout the survey, questions requiring a single answer are indicated by a circle (○) and check boxes (□) are used if multiple answers are permitted. Instructions are provided with certain questions. Definitions of key words used in the survey can be found in **Appendix A**. Please pay close attention to the instructions at the end of Modules A and B, as these

survey can be found in **Appendix A**. Please pay close attention to the instructions at the end of Modules A and B, as these will determine whether modules C and D need to be completed. Modules E and F will be completed by all survey recipients. The time needed to complete the online survey will vary depending on the complexity of your facility and the availability of needed information. If you begin the survey and then terminate it early, you will be provided with a return code via email. Click the survey link and enter the code when prompted by the system. Please contact poliocontainment@cdc.gov immediately if you have any questions about the survey or the questions it contains and someone will provide assistance.

National Inventory for Poliovirus Containment Survey

Ready to take the National Inventory for Poliovirus Containment? Click here.

Notice!

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If you no longer have the email, contact us at poliocontainment@cdc.gov and your survey link will be re-sent to you.

Appendices

Appendix A. Definitions

The definitions given below apply to the terms as used in the Global Action Plan III (GAPIII) standard or the PIM guidance.

Circulating VDPV (cVDPV): VDPV isolates for which there is evidence of person-to-person transmission in the community.

Global Action Plan III (GAPIII): The WHO global action plan to minimize poliovirus facility-associated risk after type-specific eradication of wild polioviruses and sequential cessation of OPV use (GAPIII). The 3rd edition of the Global Action Plan (GAPIII) aligns the safe handling and containment of poliovirus infectious and potentially infectious materials with the WHO Endgame Strategy and replaces both the 2009 draft version of the 3rd edition and the 2nd edition of the WHO global action plan for laboratory containment of wild polioviruses.

Inactivation: Procedures that render PV non-infectious and unable to grow or replicate in the absence of transfection reagents (e.g., transfection) or cellular manipulation (e.g., electroporation). Procedures to inactivate PV may include, but are not limited to, nucleic acid or protein extractions, specimen fixations (e.g., formalin, acetone), irradiation, heat, or enzymes (e.g., lysozymes).

Inactivated Poliovirus Vaccine (IPV): The inactivated poliovirus vaccine was developed in 1955 by Salk and Youngner. IPV is a killed-virus vaccine and is administered by injection.

Infectious Materials (IM): Wild Poliovirus/Vaccine-derived Poliovirus (WPV/VDPV)

- Clinical materials from confirmed wild poliovirus (including VDPV) infections;
- Environmental sewage or water samples that have tested positive for the presence of wild polioviruses;
- Cell culture isolates and reference strains of wild poliovirus;
- Seed stocks and infectious materials from IPV production;
- Infected animals or samples from such animals, including human poliovirus receptor transgenic mice;
- Derivatives produced in the laboratory that have capsid sequences from wild polioviruses, unless demonstrably proven to be safer than Sabin strains. The safety of new derivatives containing wild poliovirus capsid sequences

will be assessed by an expert panel, on the basis of comparison to reference Sabin strains for (i) degree and stability of attenuation; (ii) potential for person-to-person transmission; and (iii) neurovirulence in animal models;
- Cells persistently infected with poliovirus strains whose capsid sequences are derived from wild poliovirus.

Infectious Materials (IM): OPV/Sabin

- Cell culture isolates and reference OPV/Sabin strains;
- Seed stocks and live virus materials from OPV production;
- Environmental sewage or water samples that have tested positive for the presence of OPV/Sabin strains;
- Fecal or respiratory secretion samples from recent OPV recipients;
- Infected animals or samples from such animals, including poliovirus receptor transgenic mice;
- Derivatives produced in the laboratory that have capsid sequences from OPV/Sabin strains;
- Cells persistently infected with poliovirus strains whose capsid sequences are derived from OPV/Sabin strains.

Nucleic Acid, Poliovirus: Full-length Poliovirus RNA, cDNA and total nucleic acid extracted from poliovirus infectious materials (e.g., a virus isolate) or potentially infectious materials (e.g., stool, respiratory specimen, sewage) using methods demonstrated to inactivate poliovirus, or synthesized RNA or cDNA (e.g., cDNA clone, synthetic transcript). Poliovirus nucleic acid can be handled outside of poliovirus containment under the condition that these materials will not be introduced into poliovirus permissive cells or animals (as defined in GAPIII and in the "Guidance for non-poliovirus facilities to minimize risk of sample collections potentially infectious for polioviruses") with or without a transfection reagent, except under appropriate containment conditions as described in GAPIII Annex 2 or Annex 3. Note: WHO has exempted full-length PV nucleic acids from GAPIII containment. However, WHO does require that full-length PV nucleic acids are included as part of the facility and national inventories

Oral Poliovirus Vaccine (OPV): Attenuated poliovirus strains (approved for use in oral polio vaccines by national regulatory authorities, principally Sabin strains). Also called 'Sabin vaccine', OPV contains live, attenuated (weakened) poliovirus strains. OPV formulations include:

- Trivalent OPV (tOPV), contains all three serotypes of Sabin strains (1 + 2 + 3); use of tOPV ended in April 2016
- Bivalent OPV (bOPV), contains Sabin strains 1 + 3; as of April 2016, only bOPV is used routinely
- Monovalent OPV (mOPV) contains only one serotype of Sabin strain

Poliovirus: A picornavirus consisting of three 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.

Potentially infectious materials:

- Fecal or respiratory secretion samples and their derivatives (e.g., stool suspensions, extracted nucleic acids, etc.) collected for any purpose in a geographic area where WPV/cVDPV is present or OPV is being used at the time of collection
- Products of such materials (above) from PV-permissive cells or experimentally infected polio-susceptible animals;
- Uncharacterized enterovirus-like cell culture isolates from human specimens from countries known or suspected to have circulating WPV/VDPV or use of OPV at the time of collection;
- Respiratory and enteric virus stocks derived from PV PIM and handled under conditions conducive to maintaining the viability or enabling the replication of incidental PV; and
- Environmental samples (i.e., concentrated sewage, wastewater) collected from areas known or suspected to have circulating WPV/VDPV or use of OPV at the time of collection.

Sample: 1) any material–biological, clinical or environmental sample – taken as a representation of a whole, used for analysis or medical diagnosis. 2) an unknown for which an assay is testing for an outcome.

Specimen: See definition for 'Sample'

Vaccine derived poliovirus (VDPV): Classified with wild polioviruses and usually demonstrate 1–15% sequence differences from the parental OPV strain; they may have circulated in the community (cVDPV) or have replicated for prolonged periods in immunodeficient subjects (iVDPV) or be ambiguous and of unknown origin (aVDPV).

WHO Regions: WHO Member States are grouped into six WHO regions: Africa, Americas, South-East Asia, Europe, Eastern Mediterranean, and Western Pacific.

Appendix B. Country Information on Last Use of Trivalent Oral Poliovirus*

The table below provides the information about last year that trivalent oral poliovirus vaccine (tOPV) was used in each respective country. The purpose of the table is to provide you with information that will help you determine whether oral poliovirus (OPV) was circulating at a time and geographic location which your specimens/samples were collected.

In accordance with the WHO Polio Endgame Plan, the last routine doses of trivalent oral poliovirus vaccine (tOPV) were given in April 2016. If samples were collected during a time when vaccine derived poliovirus (cVDPV) was circulating or at or last date that tOPV was administered, the material is considered potentially infectious.

WHO Members

WHO Member State	Last Year of tOPV
United States of America	2000
Afghanistan (endemic)	2016
Albania	2016
Algeria	2016
American Samoa	2016
Andorra	2004
Angola	2016
Anguilla	2016
Antigua and Barbuda	2016
Argentina	2016
Armenia	2016
Aruba	2016
Australia	2005
Austria	2002
Azerbaijan	2016
Bahamas, The	2016

Bahrain	2016
Bangladesh	2016
Barbados	2016
Belarus	2016
Belgium	2001
Belize	2016
Benin	2016
Bermuda	2016
Bhutan	2016
Bolivia	2016
Bosnia and Herzegovina	2016
Botswana	2016
Brazil	2016
Brunei Darussalam	2012
Bulgaria	2007
Burkina Faso	2016
Burundi	2016
Cambodia	2016
Cameroon	2016
Canada	1996
Cape Verde	2016
Cayman Islands	2016
Central Africa Republic (CAR)	2016
Chad	2016
Chile	2016
China (People’s Republic of)	2016
Colombia	2016
Comoros	2016
Congo	2016

Cook Islands	2016
Costa Rica	2011
Cote d'Ivoire	2016
Croatia	2008
Cuba	2016
Curaçao	2016
Cyprus	2002
Czech Republic	2007
Denmark	1968
Djibouti	1963
Dominica	2016
Dominican Republic	2016
DPR Korea	2016
Democratic Republic Congo (DRC)	2016
Ecuador	2016
Egypt	2016
El Salvador	2016
Equatorial Guinea	2016
Eritrea	2016
Estonia	2008
Ethiopia	2016
Federated States of Micronesia	2016
Fiji	2016
Finland	1960
France	1983
French Guyana	2016
French Polynesia	2016
Gabon	2016
Gambia	2016

Georgia	2015
Germany	1999
Ghana	2016
Greece	2003
Grenada	2016
Guam	2016
Guatemala	2016
Guinea	2016
Guinee Bissau	2016
Guyana	2016
Haiti	2016
Honduras	2016
Hong Kong	2016
Hungary	2006
Iceland	Never Used
India	2016
Indonesia	2016
Iran (Islamic Republic of)	2016
Iraq	2016
Ireland	2001
Israel	1998
Italy	2002
Jamaica	2016
Japan	2012
Jordan	2016
Kazakhstan	2016
Kenya	2016
Kiribati	2016
Kuwait	2016

Kyrgyzstan	2016
Lao People’s Democratic Republic (LPDR)/Laos	2016
Latvia	2001
Lebanon	2016
Lesotho	2016
Liberia	2016
Libya	2016
Lithuania	2004
Luxembourg	2003
Macao	2016
Madagascar	2016
Malawi	2016
Malaysia	2016
Maldives	2016
Mali	2016
Malta	2016
Marshall Islands	2016
Mauritania	2016
Mauritius	2016
Mexico	2016
Monaco	Unknown
Mongolia	2016
Montenegro	2011
Montserrat	2016
Morocco	2016
Mozambique	2016
Myanmar	2016
Namibia	2016
Nauru	2016

Nepal	2016
Netherlands	Never Used
New Caledonia	2016
New Zealand	2002
Nicaragua	2016
Niger	2016
Nigeria	2016
Niue	2016
Northern Mariana	2016
Norway	1979
Oman	2016
Pakistan (endemic)	2016
Palau (Republic of)	2012
Palestine	2016
Panama	2016
Papua New Guinea	2016
Paraguay	2016
Peru	2016
Philippines	2016
Poland	2016
Portugal	2016
Puerto Rico	2016
Qatar	2016
Republic of Korea	2004
Republic of Moldova	2016
Romania	2008
Russian Federation	2016
Rwanda	2016
Saint Kitts & Nevis	2016

Saint Lucia	2016
Saint Vincent and the Grenadines	2016
Samoa	2016
San Marino	2002
Sao-Tome et Principe	2016
Saudi Arabia	2016
Senegal	2016
Serbia	2016
Seycheles	2016
Sierra Leone	2016
Singapore	2016
Slovakia	2005
Slovenia	2003
Solomon Islands	2016
Somalia	2016
South Africa	2006
South Sudan	2016
Spain	2004
Sri Lanka	2016
St Maarten	2016
Sudan	2016
Suriname	2016
Swaziland	2016
Sweden	Never Used
Switzerland	2004
Syrian Arab Republic	2016
Taiwan	2016
Tajikistan	2016
Tanzania	2016

TFY Republic of Macedonia	2016
Thailand	2016
Timor-Leste	2016
Togo	2016
Tokelau	2016
Tonga	2016
Trinidad and Tobago	2016
Tunisia	2016
Turkey	2016
Turkmenistan	2016
Turks and Caicos Islands	2016
Tuvalu	2016
Uganda	2016
UK of Great Britain and Northern Ireland	2004
Ukraine	2016
United Arab Emirates	2016
Uruguay	2012
Uzbekistan	2016
Vanuatu	2016
Venezuela	2016
Viet Nam	2016
Virgin Islands (UK)	2016
Wallis and Futuna	2016
Yemen	2016
Zambia	2016
Zimbabwe	2016

*The information in this table was modified from the 2015 U.S. National Poliovirus Containment Survey: Appendix B: Summary of Country Information on Last Known Polio Cases.

Appendix C. Common Cell Lines and Animals Susceptible to Poliovirus

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Poliovirus grows in nearly all human and monkey cell lines, in addition to mouse L cells (L20B, Lα) that express the human poliovirus receptor (CD155). The below lists highlights some, but not all, cell lines susceptible to poliovirus.

Poliovirus Sensitive Cell Lines

Cell Line	Origin
A-549	Human
CaCo-2	Human
HEK	Human
HeLA	Human
HEp-2	Human
MRC-5	Human
PERC-6	Human
RD	Human
WI-38	Human
Various neuroblastoma (e.g. IMR-32, SK-N-MC)	Human
BGMK (sometimes referred to as BGM or GMK)	African green monkey
LLC-MK2	Rhesus macaque
MA-104 (Vero derivative)	African green monkey
Primary monkey kidney cells	Old world monkeys
Vero	African green monkey
L20B	Transgenic mouse cell line
la	Transgenic mouse cell line
E-MX	Hybrid; mixture of cell lines
R-MX	Hybrid; mixture of cell lines

Animals Susceptible to Poliovirus

Old World Monkeys and higher primates
Human poliovirus receptor (PVR; CD155) transgenic mice

Appendix D: Preferred Methods for destroying poliovirus infectious or potentially infectious materials*

Autoclave and Incineration

Autoclave	The use of moist steam under pressure is the most effective method for sterilizing laboratory materials. • All cultures and contaminated materials should be autoclaved in leak-proof containers (*e.g.*, autoclave bags placed in a leak-proof tray) before disposal. • Packaging should allow the penetration of steam. • After being autoclaved the materials may be placed in transfer containers for transportation to the disposal point. • Autoclaves should be validated in order to ensure that sterilizing conditions are fulfilled under all loading patterns.
Incineration	Incineration is the method of choice for final disposal of contaminated waste, including carcasses of laboratory animals, preferably after autoclaving. **Incineration of materials is an alternative to autoclaving only if:** • the incinerator and transport to the incinerator is under laboratory control; • the incinerator is provided with an efficient means of temperature control and a secondary burning chamber.

*Source: World Health Organization. WHO/CDS/CSR/LYO/LAB/2003. Geneva, 2003.

If other means of destruction are to be used, contact the National Authority for Poliovirus Containment (poliocontainment@cdc.gov) prior to destruction.

Please note that the disposal of laboratory and medical waste is subject to various national regulations. In general, ash from incinerators may be treated in the same way as normal domestic waste and removed by local authorities. Autoclaved waste may be disposed of by off-site incineration or in licensed landfill sites.

Annex 2

Country or Territory-Specific Poliovirus Data

Guidance for potentially infectious poliovirus materials (PIM)

PIM Guidance

PIM Frequently Asked Questions

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CDC has determined that the information collection activities conducted under the project are exempt from the requirements of the Paperwork Reduction Act (PRA) as they fall under the activities authorized under the National Childhood Vaccine Injury Act (NCVIA) at section 2102(a)(6)-(a)(7) of the Public Health Service Act (42 USC 300aa-2(a)(6)-(a)(7).

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