APHL ASSOCIATION OF PUBLIC HEALTH LABORATORIES®

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2024 Poliovirus Containment Re-survey of APHL Member Public Health, Agriculture and Environmental Laboratories

Background

Poliovirus infection can cause crippling and potentially deadly poliomyelitis, making it a global concern. There are three serotypes of wild poliovirus (WPV): types 1, 2 and 3. WPV types 2 (WPV2) and 3 (WPV3) were eradicated in 2015 and 2019, respectively. Only WPV type 1 (WPV1) remains in circulation. In our globally connected world, poliovirus may still be encountered in clinical specimens, research samples and environmental samples like wastewater, which are handled in United States (US) laboratories. Laboratories need to understand the risk of encountering poliovirus and take steps to contain it.

This re-survey was conducted by the Association of Public Health Laboratories (APHL) in collaboration with the US Centers for Disease Control and Prevention (CDC). CDC uses the survey to assess the national inventory of poliovirus potentially infectious materials (PIM).

As global progress continues toward polio eradication, the risk posed by poliovirus PIM in US laboratories has become increasingly important. PIM is collected for non-polio related work from areas where poliovirus is circulating or where oral polio vaccine (OPV) is in use and is identified by the time and place of collection, not by test results. PIM can include:

- Human upper respiratory secretions
- Fecal specimens
- Sewage and wastewater samples
- Uncharacterized enterovirus samples
- Respiratory and enteric virus stocks derived from PIM
- Extracted nucleic acids samples.

With ongoing efforts to eradicate polio, understanding the landscape of poliovirus PIM in US laboratories remains critical.

Key Survey Findings

- **Of the 136 laboratories sent the survey, 113 (83.1%) responded.**
- **Most responding laboratories (n=111, 98.2%) did not possess known infectious poliovirus materials.**
- **Many laboratories work with one or more specimen or sample type(s) that are relevant to PIM (n=104, 92.0%).**
- **The majority of respondents, however, did not report possession of PIM in their inventory (n=108, 95.6%).**

APHL continues to work with federal partners to follow-up with laboratories that reported possessing PIM or whose responses required clarification. This survey has raised awareness of the importance of poliovirus containment and the role laboratories play in identifying and managing PIM.

Methodology

APHL fielded a 28 question survey to laboratory directors at 136 APHL member laboratories, including state and territorial public health laboratories, local public health laboratories, agricultural laboratories and environmental laboratories. APHL worked with CDC to create this survey. It was designed to align with the US National Inventory for Poliovirus Containment Survey, while also providing flexibility to add additional questions and streamline the collection of demographic information.

The survey contained six modules, paralleling the modules of the US National Inventory for Poliovirus Containment Survey:

A. Facility Information
B. Material Types
C. Inventory Information
D. Disposition of Materials
E. Key Facility Personnel
F. Attestation

Logic employed in the survey directed respondents to complete only the relevant modules based on their responses. Some modifications and additions to questions in these sections were made for this APHL re-survey.

The survey was emailed to laboratory directors on July 11, 2024 and administered online via Qualtrics. Initially set to close on August 21, 2024, the deadline was extended to allow for directed follow-up with laboratories to increase response rates. APHL, with consultant support, contacted laboratories in September 2024 to request responses, clarify the survey's relevance and answer specific questions. The survey closed September 20, 2024.

This report includes de-identified summary data from all respondents. For those respondents who consented, their full survey responses were provided to CDC for further analysis and linked to previous surveys of the laboratory. CDC then identified respondents for individualized follow-up actions based on responses identifying PIM or poliovirus infectious materials. APHL coordinated these follow-up actions with CDC throughout the winter of 2024-2025.

Results

Response Rates

Of the 136 laboratories that received the survey, 113 (83.1%) responded. This included 54 state and territorial public health laboratories, 46 local public health laboratories and 13 public health associate institutional laboratories (agricultural and/or environmental laboratories).

Material Types

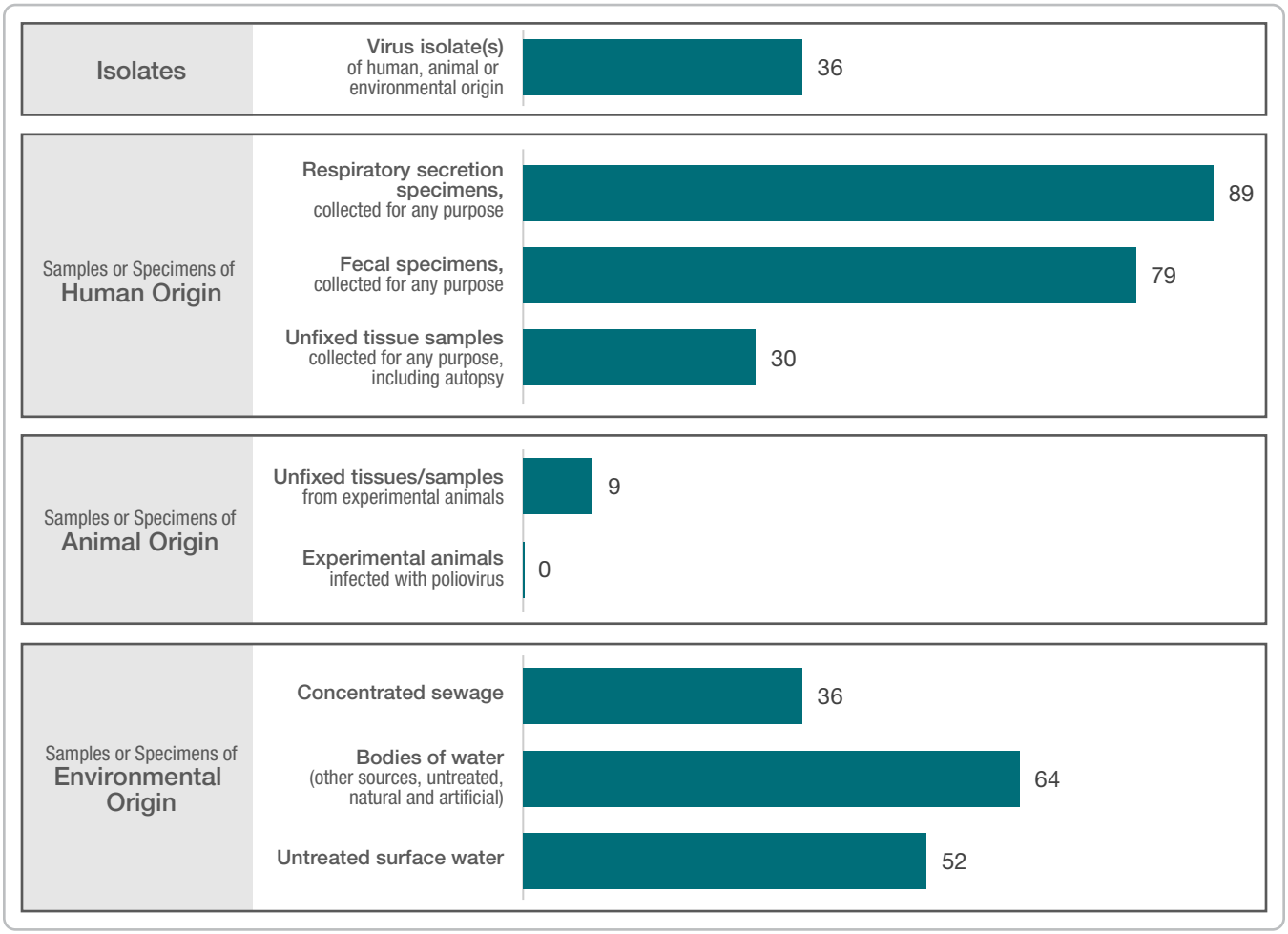
Poliovirus Infectious Materials

When asked directly about materials known to contain polioviruses, the majority of laboratories (n=111, 98.2%) reported they did not possess any such materials. Laboratories that reported working with or storing known poliovirus have received guidance on appropriate inventory tracking and management practices for these materials.

Potentially Infectious Materials

Laboratories were asked questions about types of samples and/or specimens they store and work with to determine the general scope of their work and whether they interact with PIM related sample and/or specimen types. As expected, many laboratories (n=104, 92.0%) reported working with or storing one or more PIM specimen or sample type (**Figure 1**).

Figure 1: **Number of Laboratories Working with or Storing Each Sample or Specimen Type**



When asked about the dates and locations of collection for the sample/specimen types in Figure 1 to help determine whether they may be PIM, some respondents reported collection in dates or places that may indicate a likelihood of PIM:

- Collected from populations involved in international travel or recent migrant populations (or collected from environmental sources in regions with these populations) (n=20)
- Collected within the US prior to the year 2000 (n=15)
- Collected at an unknown time and/or location (n=6)
- Collected in a location and at a time in which cVDPV was identified (n=2)
- Collected outside of the US (n=1)

The majority of respondents (n=75, 66.4%) reported that none of these time or place conditions applied for the samples or specimens in their laboratory. Those who reported they did not work with any of the sample or specimen types described and that none of these conditions applied were directed to complete the survey by moving directly to Module E (contact information on key facility personnel) and Module F (consent and attestation).

Inventory Information

Respondents who reported samples collected at times and places that may qualify as PIM and/or who reported possessing any materials known to contain polioviruses were directed to provide additional information on their laboratory's inventory.

Poliovirus Infectious Materials

While the majority of laboratories surveyed (n=111, 98.2%) did not report possession of poliovirus infectious material of any type, four total types of infectious materials were reported in the survey (clinical materials confirmed to contain poliovirus, isolates from cell cultures and reference strains of poliovirus, seed stocks and infectious materials use in the production of injectable poliovirus vaccines, and seed stocks and infectious materials used in the production of OPV/Sabin vaccines).

Respondents who reported possessing poliovirus infectious materials were asked to provide details on the specific types of infectious materials in their inventories by strain, along with the estimated number of vials or containers of each type.

Potentially Infectious Materials

Respondents who indicated that they may have relevant samples or specimens were asked to report specifically on a range of PIM types they may possess (Table 1). Respondents were directed to resources to define the dates and locations of last known poliovirus cases and last use of OPV in the US (and other geographical locations if necessary) to aid in identifying PIM. Those who did identify PIM were asked to specify the types of PIM in their inventories by strain and report the estimated number of vials or containers for each type. Most laboratories (n=108, 95.6%) did not report any PIM inventory.

Table 1: Reported Potentially Infectious Materials

Type of PIM	Count
Respiratory secretion samples collected for any purpose at a time and in a geographic area when wild poliovirus (WPV) or vaccine-derived poliovirus (cVDPV) was circulating	5
Respiratory secretion samples collected for any purpose at a time and in a geographic area where Sabin/OPV was being used in routine or supplemental immunization programs	3
Fecal specimens collected for any purpose at a time and in a geographic area when WPV or cVDPV was circulating	4
Fecal specimens collected for any purpose at a time and in a geographic area where Sabin/OPV was being used in routine or supplemental immunization programs	1
Environmental samples of water or sewage that have not been tested for the presence of poliovirus	14
Uncharacterized viral isolates from poliovirus susceptible/sensitive cells	0
Isolates from poliovirus-sensitive cells with cytopathic effect resembling uncharacterized enterovirus from countries which are known or suspected to have had circulation of WPV or cVDPV at the time of collection	3
Stocks of respiratory virus isolated from specimens collected in a time and geographic location where WPV, Sabin/OPV or cVDPV was circulating and handled under conditions conducive to maintaining the viability or enabling the replication of incidental poliovirus	3
Stocks of enteric virus isolated from specimens collected in a time and geographic location where WPV, Sabin/OPV or cVDPV was circulating and handled under conditions conducive to maintaining the viability or enabling the replication of incidental poliovirus	3
Nucleic acid extracted from fecal or respiratory secretion specimens, or environmental samples collected for any purpose at a time and in a geographic area with circulating wild poliovirus including cVDPV or OPV/Sabin	5
Unsure (respondents were directed to elaborate with an open response)	7

Disposition of Materials

Respondents were asked about their plans for infectious materials and/or PIM. First they were asked if they had previously identified such inventory in a US National Inventory for Poliovirus Containment Survey. Of the 25 respondents to this question, only 22% were aware that their laboratory had previously identified infectious and/or PIM inventory; 59.3% reported they had not and 18.5% were unsure. Those who had previously identified materials reported either destroying or retaining the reported materials. None reported having transferred or inactivated materials.

Describing their current plans for any infectious or potentially infectious materials, 52% planned to retain, 44% to destroy and 4% to inactivate materials they may have. Respondents were asked to provide strain types for the materials they planned to retain, destroy and/or inactivate. No respondents reported an intent to transfer materials.

Discussion

The majority of laboratories surveyed do not store known poliovirus samples in their inventories; those indicating possession of poliovirus have previously completed inventories for CDC and/or are working in coordination with CDC to manage their inventories. Many APHL member laboratories work with specimen or sample types that can be PIM, dependent on the time and place of their collection. Laboratories should be aware of this possibility and take steps to mitigate risks from PIM.

APHL and CDC reviewed the responses from those who consented to share their data and CDC assisted in identifying laboratories from which further information on their materials and intentions was needed. APHL has worked with CDC to follow-up with laboratories that indicated they possess PIM or whose responses required clarification to confirm possession of PIM. This follow-up has included providing guidance documents on managing PIM and requesting updated inventory forms from laboratories that previously completed a US National Inventory for Poliovirus Containment Survey.

This survey has raised awareness across member laboratories of the importance of poliovirus containment and the role of public health laboratories in identifying and properly managing PIM in their laboratories. To extend this awareness, APHL is working in collaboration with CDC to develop brief online informational modules that will soon be made broadly available to educate laboratorians on the identification of PIM and the steps they need to take to reduce the risks of PIM to themselves, their colleagues and their communities.

Association of Public Health Laboratories

The Association of Public Health Laboratories (APHL) works to strengthen laboratory systems serving the public's health in the US and globally. APHL's member laboratories protect the public's health by monitoring and detecting infectious and foodborne diseases, environmental contaminants, terrorist agents, genetic disorders in newborns and other diverse health threats.

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