



Briefing Note Serial number 2022/040

Date 05/05/2022

Event: Identification of genetically-related vaccine-like poliovirus type 2 (PV2) in London sewage samples

Notified by UKHSA Immunisation and Vaccine Preventable Disease Division
UKHSA Polio Reference Service
National Institute for Biological Standards and Control (NIBSC),
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Background and Interpretation:

The WHO Global Specialised Polio Laboratory located at the National Institute for Biological Standards and Control (NIBSC) has informed UKHSA that vaccine-like type 2 poliovirus (PV2) isolates were found in three sewage samples collected from the London Beckton Sewage Treatment Works on the 8th February, 12th April and 26th April 2022. This sewage treatment plant covers a large catchment area across North and East London and a population close to 4 million.

The virus first isolated in February is vaccine-like showing only 1 VP1 nucleotide mutation from the Sabin 2 vaccine strain. Whole-genome sequence analysis revealed a recombinant structure between Sabin 2 and an unidentified non-polio enterovirus. Sabin 2 virus commonly recombines with other polio and non-polio enteroviruses during replication in humans, so this is not unexpected. Poliovirus was not detected in subsequent London Beckton sewage samples collected on 22nd February, 8th and 29th March, however, PV2 genetically-related to the February isolate (with the same recombinant structure) was found in sewage samples collected on the 12th and the 26th of April.

The identification of genetically-related PV2 isolates in three sewage samples collected from London Beckton over a period of 77 days is a concern, prompting the need to investigate if any level of indigenous poliovirus transmission is occurring. The likely scenario is that a recent vaccinee entered the UK in February 2022 from a country where monovalent type 2 Oral Polio Vaccine (mOPV2) or trivalent Oral Polio Vaccine (tOPV) is being used for supplementary immunisation campaigns. Healthy vaccinees will commonly shed polio vaccine virus for a few weeks and up to 60 days post-immunisation. Immunosuppressed individuals can shed poliovirus indefinitely. It is possible that one or a few closely linked individuals (for example within a single household) are shedding the type 2 poliovirus strain which has been found in the sewage samples, however additional investigations are required to assess if virus transmission has extended any further.

Sabin vaccine-like poliovirus type 1 (S1L) and poliovirus type 3 (S3L) have been regularly isolated from UK sewage samples in recent years (1-3 isolates per year). Sabin vaccine-like poliovirus type 2 (S2L) were identified in environmental samples collected from the London Beckton Sewage Treatment Works in November 2020 and October 2021. These were unrelated to each other and the 2022 PV2 isolates. To date, these have only been single detections and further virus characterisation has suggested that they were viruses from recent vaccinees entering the UK.



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tOPV was withdrawn for routine use worldwide in April 2016 and replaced with the bivalent Oral Polio Vaccine (bOPV), which contains only attenuated virus of types 1 and 3. This is because continued use of tOPV threatened to continue seeding new type 2 circulating vaccine-derived polioviruses (cVDPV2), despite the wild type 2 virus being eradicated in 1999. Several countries continue to use mOPV2 and tOPV for outbreak control. Pakistan, and Afghanistan have reported cases of Wild Polio Virus type 1 and Nigeria and several other countries have reported cVDPV cases in the last 12 months.

UKHSA [National Polio Guidelines](#) outline public health actions for consideration when one or more vaccine-related poliovirus type 2 [Level 2 (C)] is detected in environmental samples. The UKHSA has notified WHO and will issue an IHR alert.

Environmental surveillance

NIBSC are carefully analysing London Beckton environmental samples both by cell culture and molecular assays and sequencing the virus whole-genome for any relevant genetic markers. Avenues to enhance this environmental surveillance are currently being explored.

Clinical and laboratory surveillance

Health professionals are strongly encouraged to fully investigate and report Acute Flaccid Paralysis / Acute Flaccid Myelitis (AFP/AFM) cases as part of national surveillance for polio. Any patient presenting with acute flaccid paralysis, should:

- i. be reported by calling the UKHSA national duty doctor line (020 8200 4400) between 9am and 5.30pm 7 days a week
- ii. have the following samples collected and sent to the UKHSA Virus Reference Department for poliovirus isolation and further characterization:
 - a. **two stool samples 48 hours apart**
 - b. throat swabs / naso-pharyngeal aspirate (NPA) and
 - c. cerebro-spinal fluid (CSF) (if collected)
- iii. have an enhanced surveillance questionnaire completed by their responsible clinician

In addition, stool samples are encouraged for all acute neurological illness presentations including meningitis. Characterisation of circulating enteroviruses is an essential component of enhanced polio surveillance. Current sample referral levels are low and coverage may not be representative of the present burden of enteroviruses. **Local and regional laboratories should refer all local enterovirus positive samples to the Enteric Virus Unit (EVU).** Please refer to the [National Polio Guidance](#) for further details.

Polio immunisation coverage

The UK is committed to global polio eradication and key to achieving this is maintaining high vaccine coverage (95%) in the routine childhood immunisation programme. It is essential to maintain high uptake at the national, regional and local levels in order to reduce the risk of importations (including of vaccine-like poliovirus) leading to transmission in under-vaccinated communities and paralytic presentations occurring.

Implications and recommendations for UKHSA Regions

UKHSA Regions, particularly Health Protection Teams (HPTs) are asked to share this briefing note with local health services and clinicians, in particular microbiology colleagues and Infectious Disease physicians, Local Authority Directors of Public Health and acute Trusts.

Health Protection Teams should:

- remind hospital clinicians of the need to appropriately investigate all acute neurological illness presentations according to national guidance
- remind local laboratories that:
 - a. they should refer all local enterovirus positive samples to the Enteric Virus Unit



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- b. stool samples are the best sample for the detection of polioviruses, in addition to CSF and respiratory samples for other enteroviruses.
- c. all enterovirus positive stool samples should be referred to UKHSA Colindale for further typing work

In addition, HPTs should use all available opportunities to highlight the importance of maintaining high vaccine coverage for the routine childhood immunisation programme with local partners, such as Screening and Immunisation Teams / Local Authorities DsPH and Public Health teams / Clinical Commissioning Groups / Integrated Care Systems / primary care health professionals.

Particular actions to focus on are:

- a) the need to catch up children under 5 years who missed out on routine vaccines due to the COVID-19 pandemic. This is particularly important in practices and local authorities where vaccine coverage for the primary DTaP/IPV/Hib/HepB course is below 85%
- b) the importance of primary care colleagues checking newly registered children and adults are up to date with their routine immunisations, especially new migrants, asylum seekers and refugees.

Implications and recommendations for UKHSA sites and services

Consultants in Public Health Infection and Consultant Microbiologists in Public Health Laboratories are requested to forward this briefing note to their local NHS Laboratories / microbiologists who may be involved in testing for suspected cases of AFP.

In addition, can they remind **local laboratories** that:

- a. they should refer all local enterovirus positive samples to the Enteric Virus Unit
- b. stool samples are the best sample for the detection of polioviruses, in addition to CSF and respiratory samples for other enteroviruses

Implications and recommendations for local authorities

LAs to work with local partners to highlight the need to:

- a) catch up children who missed out on their routine immunisations due to the COVID-19 pandemic. This is particularly important in practices and local authorities where vaccine coverage for the primary DTaP/IPV/Hib/HepB course is below 85% UKHSA Briefing Note Issued
- b) check newly registered children and adults are up to date with their routine immunisations with a particular emphasis on new migrants, asylum seekers and refugees.

References/ Sources of information

1. UKHSA National Polio Guidelines: <https://www.gov.uk/government/publications/polio-national-guidelines>
2. Acute Flaccid Paralysis/ Acute Flaccid Myelitis guidance is available here: <https://www.gov.uk/government/collections/acute-flaccid-paralysis-syndrome>
 - a. How to report cases of acute flaccid paralysis/ acute flaccid myelitis (including advice on samples to be collected and submitted for investigation)
 - b. Information for management of case patients (including infection control advice)
 - c. Surveillance forms for prospective and retrospective notification (and a link to online select survey form)
 - d. Information for patients