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Polio's detection in London is a wake-up call

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The UK Health Security Agency (UKHSA) has declared a "national incident" after poliovirus was detected in London sewage.[1] Detection of poliovirus in UK sewage is not in itself an unprecedented occurrence: between one and three polioviruses are typically detected every year, representing separate importations of the virus into the UK by travellers. However, detection of the current virus since February, and genetic sequencing showing its ongoing evolution, indicate likely circulation in the community, and therein lies the concern.

Testing of sewage and wastewater for poliovirus is a sensitive method of surveillance—in this case detecting the virus before it has caused any cases of paralysis. It was similarly used in 2013 in Israel to detect widespread circulation of poliovirus, which had originated from Pakistan, without any cases of paralysis reported.[2]

The poliovirus detected in London sewage is "vaccine derived." This finding does not make it any less worrying. The oral polio vaccine contains a live attenuated virus that replicates in the intestine to stimulate a protective immune response. Worldwide use of this vaccine has brought the world to the brink of polio eradication. However, very rarely (perhaps every 10 million doses or more[3]), the vaccine virus may lose its attenuating mutations and spread to cause a vaccine derived poliovirus (VDPV) outbreak. Circulating VDPVs are just as pathogenic and transmissible as the original, wild poliovirus.[4]

The UK stopped using the oral polio vaccine in 2004 and now relies on an inactivated polio vaccine (IPV), an injectable vaccine that contains a killed virus incapable of replication. Based on the small number of mutations in the VDPV in London sewage, it probably evolved from an oral vaccine administered during mass vaccination campaigns in Afghanistan and Pakistan in late 2021. A vaccinated child or their contact may have inadvertently brought the virus to the UK where it continued to spread.

Occasionally, individuals with primary immunodeficiencies may become chronic shedders of VDPV and this virus can be detected in sewage over a prolonged period. It is not known if any such individual is contributing to the current patterns of detection in London sewage, but the UKHSA have indicated local circulation beyond a single individual is likely based on the pattern of detection and observed genetic diversity.

The Beckton Sewage Treatment Works where the virus has been detected serves over four million people in north and east London. Further testing upstream will be used to help locate where the virus may be circulating. This is likely among communities with low vaccination coverage, although children and adults vaccinated with IPV can still be infected and spread the virus. While highly effective against paralysis, IPV is less effective than the oral vaccine at preventing infection and subsequent shedding of poliovirus in faeces.[5]

Poliovirus causes paralysis once every few hundred infections in unvaccinated individuals.[6] If this virus continues to spread, cases of paralysis will occur. Clinicians treating children with acute flaccid paralysis/acute flaccid myelitis (AFP/AFM) not explained by a non-infectious cause should alert the UKHSA and ensure two stool samples are collected, at least 48 hours apart, to allow testing for poliovirus.

Parents in London and across the UK need to ensure that their children are up to date with their vaccines. In London, 13% of infants aged 12 months have not been fully vaccinated against polio and in some London boroughs this number is substantially higher, reaching 32% in Hackney and the City of London.[7] Delayed vaccination or a failure to be vaccinated puts these children at risk of polio paralysis.

In Israel, the outbreak of imported poliovirus was controlled through the re-introduction of the oral poliovirus vaccine because of its superior protection against poliovirus shedding in faeces compared with IPV. In the UK, it is hoped that any circulation will die out or be brought under control using IPV. If an oral vaccine is required, a newly developed, more stable vaccine strain is available after its emergency use listing by the World Health Organization in 2020.[8] This vaccine can be used with minimum concern about the emergence of further VDPV.

The detection of VDPV in London is a wake-up call for the health service and parents. We must improve vaccination coverage in London and across the UK to keep polio and other vaccine preventable diseases at bay. It also reminds us of the unfinished task of global polio eradication. Wild poliovirus persists in two countries—Afghanistan and Pakistan—and was recently reintroduced to Africa after five years of elimination. With highly effective vaccines available to us, we have no excuse not to finish the task and end this ancient scourge.

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