

Polio at our doorstep: assessing Australia's risk amid Papua New Guinea's outbreak

A recent outbreak of polio in Papua New Guinea raises concerns about the potential spread to neighbouring countries, including Australia.

On 16 May 2025, the World Health Organization declared a polio outbreak in Papua New Guinea (PNG) after detecting circulating vaccine-derived poliovirus type 2 (cVDPV2) in wastewater samples from Port Moresby and Lae.

Later testing confirmed the virus in the faecal samples of two asymptomatic children in Lae, indicating community transmission of poliovirus. This resurgence is attributed to low immunisation coverage — only 47% of children are vaccinated, with some districts as low as 8% — and inadequate sanitation infrastructure.

This marks the first polio outbreak in PNG since 21 June 2018, raising concerns about the potential spread to neighbouring countries, including Australia.

Understanding poliovirus

Poliovirus is a highly contagious enterovirus belonging to the Picornaviridae family. It is a non-enveloped virus with a single-stranded positive-sense RNA genome, approximately 7500 nucleotides long. There are three serotypes: types 1, 2 and 3. Type 2 wild poliovirus was declared eradicated globally in 2015; however, vaccine-derived strains can emerge in under-immunised populations. In such settings, the attenuated virus from the oral polio vaccine (OPV) can mutate and regain neurovirulence, leading to outbreaks of cVDPV2.

Poliovirus causes polio or poliomyelitis, which invades the nervous system and mainly affects children aged 5 years and under. However, anyone (regardless of age) who is unvaccinated can contract the disease. The virus is transmitted by person-to-person mainly through the faecal–oral route through contaminated water or food. Less commonly, polio can also spread via respiratory droplets of an infected person from coughs or sneezes. Poliovirus can remain in the faeces for up to 35 days prior to clinical symptoms and up to 6 weeks once symptoms have appeared.

Up to 90% of those infected experience no or mild symptoms and the disease usually goes unrecognised. The incubation period is usually 7–10 days but can range from 4–35 days. Initial clinical symptoms include fever, fatigue, headache, vomiting and pain in the limbs. These symptoms usually last for 2–10 days and most cases recover fully. One in 200 infections result in irreversible paralysis (usually in the legs). Paralysis can occur within a few hours post infection. The mortality rate among those paralysed is 5–10%.



As of September 2024, the national polio vaccination coverage for Australian children aged one year was 93.97% (angellodeco / Shutterstock).

Polio in Australia: current vaccination landscape and challenges

Australia has been officially polio-free since 2000, a testament to the success of comprehensive immunisation programs and vigilant public health surveillance. Today, approximately 3940 polio survivors are registered in Australia, many of whom continue to manage long term health complications associated with the disease.

As recently as 24 December 2024, cVDPV2 was detected in Melbourne's wastewater. As of September 2024, the national polio vaccination coverage for children aged one year was 93.97%, with the Australian Capital Territory achieving the highest coverage of 95.86%.

While nationwide vaccination coverage is high, recent reports indicate a concerning decline in childhood vaccination rates, attributed to vaccine hesitancy and pandemic-related disruptions. Challenges such as vaccine hesitancy, misinformation and disparities in health care access will complicate efforts to maintain our polio-free status.

Advancements in poliovirus vaccine research

The introduction of two polio vaccines; an inactivated virus vaccine and a live-attenuated oral polio vaccine (OPV) by Drs Jonas Salk and Albert Sabin respectively in the late 1950s and early 1960s, was instrumental in reducing global wildtype polio cases by over 99% since the launch of the Global Polio Eradication Initiative (GPEI) in 1988. Despite these advancements, polio outbreaks persist. The majority of polio outbreaks in the world are caused by cVDPV2.

To mitigate this, the use of the older OPV was ceased in 155 countries (including Australia) by mid-May 2016 and replaced with newer vaccines like the novel oral polio vaccine type 2 (nOPV2), which are engineered to have greater genetic stability and a reduced risk of reversion to neurovirulence.

Moreover, in Australia, the use of inactivated polio vaccine (IPV) is standard, largely reducing the risk of domestic cVDPV outbreaks.

Polio surveillance and preparedness in Australia

A huge factor behind Australia's polio-free status is our public health infrastructure. In particular, our nationwide surveillance systems, such as the Polio Surveillance Program and the soon-to-be-released National Wastewater Surveillance Program, monitor for poliovirus among other pathogens, ensuring rapid response by medical and health care professionals to any detected cases.

Strategies for sustaining polio eradication in Australia

To ensure the continued eradication of polio within its borders, medical professionals and health care authorities in Australia must implement a multifaceted approach based on the following recommendations:

Enhancing immunisation coverage: addressing regional disparities in vaccination rates is crucial. Targeted outreach programs, especially in communities exhibiting vaccine hesitancy, can bolster immunisation efforts.

Strengthening surveillance systems: maintaining and expanding wastewater monitoring and clinical surveillance can facilitate early detection of poliovirus, enabling swift public health responses.

Public education campaigns: combating misinformation through transparent communication and community engagement can rebuild trust in vaccines, ensuring higher uptake rates.

International collaboration: continued public health support for vulnerable countries, particularly in neighbouring regions like PNG, is essential. Australia's financial and logistical contributions can aid in controlling outbreaks at their source, reducing the risk of importation.

Conclusion

Given Australia's high vaccination rates and strong public health measures, the likelihood of a polio outbreak is minimal. However, the recent outbreak in PNG serves as a stark reminder of the importance of maintaining high immunisation coverage and robust polio surveillance. Continued vigilance, public health preparedness, and international cooperation are crucial to prevent the incursion of poliovirus into polio-free regions.

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