

VACCINE-PREVENTABLE DISEASES

Detection of Sabin poliovirus type 2 vaccine strain in wastewater, Eastern Cape Province

The Centre for Vaccines and Immunology at the NICD conducts routine surveillance for poliovirus including polio vaccine strains from wastewater. Wastewater is tested from the inlet of wastewater plants before treatment and findings represent viruses present in faeces, not viruses present in drinking water. Environmental surveillance supplements the gold-standard acute flaccid paralysis surveillance system operating in the country.

On 2 August 2021, from a sample collected on 13 July 2021, the Centre reported the isolation of a Sabin vaccine serotype 2 from wastewater from Gqeberha, (Port Elizabeth), Nelson Mandela Bay district, in Eastern Cape Province of South Africa. This finding is surprising as there has been no use of oral poliovirus vaccine type 2 in South Africa since the switch of trivalent oral polio vaccine (OPV), containing Sabin vaccine serotypes 1, 2 and 3, to bivalent OPV, containing Sabin vaccine serotypes 1 and 3, in 2016.

The finding of Sabin OPV serotype 2 has been investigated to exclude the possibility that the vaccine strain has been circulating amongst community members in the Nelson Mandela Bay Metro. Investigations have not found any expired vaccine stocks that may have contained Sabin poliovirus type 2 present in medical facilities, hospitals or vaccine distribution depots in the area. As of 27 August 2021, there has not been a subsequent detection of type 2 poliovirus from that wastewater treatment plant, or three other treatment plants in the Eastern

Cape Province. This finding therefore likely reflects a traveller who was vaccinated with monovalent oral polio vaccine type 2 as part of a polio vaccination campaign in another country before coming to South Africa.

Polio is caused by a virus that used to be endemic worldwide. Poliovirus can cause sudden weakness, permanent paralysis, or death in susceptible individuals. Polioviruses have been targeted for eradication since the Global Polio Eradication Initiative was launched in 1988 with the initial target for eradication in the year 2000. In 2021, there have been only two cases of acute flaccid paralysis caused by wild-type poliovirus worldwide from the last endemic countries, Pakistan and Afghanistan. There have however been an additional 62 detections of wild poliovirus from environmental sources in Pakistan and Afghanistan.

Two vaccines provide excellent protection from polio disease, namely OPV or inactivated polio vaccine (IPV). In South Africa, children are protected with both vaccines. The live attenuated vaccine has the added advantage of inducing gastrointestinal immunity, which can interrupt shedding in faeces of any wild polio strains. Prolonged circulation for years in the environment in areas with low population vaccination coverage can allow reversion to neurovirulence, termed cVDPV. A new polio vaccine, novel OPV2 (nOPV2) received an emergency use listing in 2020 and is currently replacing monovalent OPV2 for outbreak response to cVDPV2. nOPV2 has been used in seven African countries in 2021.

Source: Centre for Vaccines and Immunology, NICD-NHLS; melindas@nicd.ac.za