VACCINE-DERIVED POLIO - SCIENCE

News: *A two-year-old child in Tikrikilla, Meghalaya has been infected with vaccine-derived polio. This is not a case of wild poliovirus, but an infection that presents in some people with low immunity.*

What's in the news?

- **More than 90% of vaccine-derived poliovirus** outbreaks are due to type 2 virus present in oral polio vaccines.

VACCINE-DERIVED POLIO

- Vaccine-derived polio is a rare condition that occurs when the **weakened (also called attenuated) strain of poliovirus used in the oral polio vaccine (OPV) mutates** and regains the ability to cause paralysis.
- **Polio, or poliomyelitis, is a highly contagious viral disease** that primarily affects children under five.
- The **oral polio vaccine (OPV)** has been instrumental in controlling and eliminating polio in many regions.
- However, in rare cases, the attenuated (weakened) virus in the OPV can mutate over time and revert to a form capable of causing paralysis.

Why Does Vaccine-Derived Polio Occur?

VDPV cases can arise under specific conditions:

- **Low Immunization Coverage:** In areas with low vaccination rates, the weakened virus from the OPV can circulate and mutate.
- **Poor Sanitation:** The poliovirus spreads through the fecal-oral route, making poor sanitation conditions a significant risk factor.
- **Mechanism:** The OPV contains a live, weakened virus that triggers an immune response without causing the disease. However, in under-immunized populations, the weakened virus can circulate and mutate, potentially regaining its virulence.
- **Circulating Vaccine-Derived Poliovirus (cVDPV):** When the mutated virus starts spreading in the community, it is termed cVDPV.

Key Points:

- **Response:** Health officials in Meghalaya have been put on high alert. Preventive measures, including **immunization campaigns**, are being emphasized to curb the spread.
- **Global Context:** According to the **World Health Organization (WHO), since 2000,** more than 10 billion doses of OPV have been administered worldwide, with 24 cVDPV outbreaks occurring in 21 countries.

Mitigation Strategies

To prevent and manage VDPV cases, several strategies are being employed:

- **High Immunization Coverage**: Ensuring that **all children receive vaccinations is crucial**. High coverage creates **'herd immunity,'** reducing the chances of virus circulation.
- **Switching to Inactivated Polio Vaccine (IPV):** Unlike OPV, IPV contains a killed virus, eliminating the risk of VDPV. However, IPV is more expensive and less effective at **community-level immunity** compared to OPV.
- **Enhanced Surveillance:** Regular monitoring and rapid **response to any poliovirus case** are essential to prevent outbreaks.

DIFFERENCE BETWEEN IPV AND OPV

IPV	OPV
Killed formolised virus	Live attenuated virus
Given IM/SC	Given orally
Induces circulating antibody; no local immunity	Both humoral and intestinal immunity
Prevents paralysis; does not prevent reinfection by wild polio viruses	Prevents paralysis and intestinal reinfection
Not useful in epidemics	Effective in controlling epidemics
Content is 10,000 times more than OPV; Costlier	Cheaper
Does not require stringent conditions during storage and transportation	Requires to be stored and transported at sub-zero temperature, unless stabilised

Source: https://www.thehindu.com/news/national/centre-says-meghalaya-polio-case-is-vaccine-derived/article68547351.ece