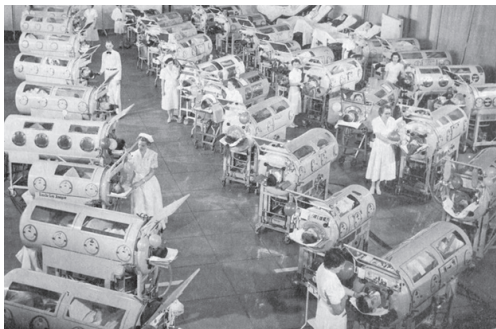


The Man in the Iron Lung and the fight to end Polio

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Paul Alexander from Texas, U.S contracted polio when he was six, and was paralyzed for life. Today he is 74, and one of the last person in the world still using an iron lung, an External Negative Pressure Ventilator . The Guinness World Records in 2023 declared Paul Alexander the longest iron lung patient ever.

In the early and mid 20th century, polio was one of the most feared diseases which killed or paralyzed over half a million people every year. In 1928, Philip Drinker and Louie Shaw two Americans, developed the "iron lung" , an artificial respirator to save the lives of those left paralysed by polio and unable to breathe. Most patients would spend around two weeks in the device, but those left permanently paralysed faced a lifetime of confinement.



Children in iron lungs during a polio outbreak in the US in the 1950s .

Global Polio Eradication Initiative (GPEI) launched in 1988 ,and as a result, global incidence of polio has decreased by 99.9%

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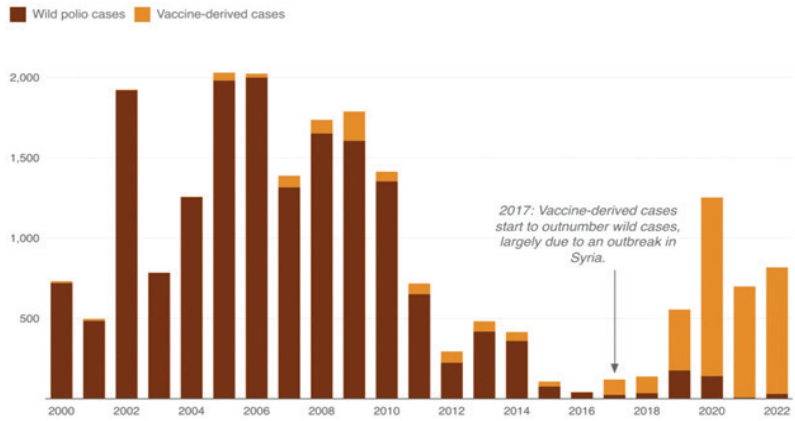
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since GPEI's foundation. An estimated 16 million people today are walking who would otherwise have been paralysed by the disease, and more than 1.5 million people are alive, whose lives would otherwise have been lost. Two of the three serotypes of WPV types 2 and 3 have been certified as eradicated worldwide and wild poliovirus continues to circulate in only two countries Pakistan and Afghanistan.

What is going on in GPEI ?

Polio made headlines around the world in recent months when the virus was detected in relatively high-income country settings . Many African countries which were declared polio-free are now having outbreaks due to circulating vaccine-derived poliovirus (cVDPVs) . Last year, the United States, which had officially eliminated polio in 1979, had a case of the paralytic disease due to cVDPV. The virus has also been found in sewage samples in London, Finland and Jerusalem, all places where it was eradicated decades ago.

The worst outbreaks of vaccine-derived po-



Vaccine-derived polio cases have overtaken 'wild' polio cases. Source: WHO

Polio are in parts of Nigeria, Somalia, the Democratic Republic of Congo and Yemen. Last year there were 461 cases of paralytic polio in the Congo more than in any other country in the world. In Polio, only one out of every 200 poliovirus infections result in clinically evident paralysis. That means when there is a case of paralysis, as has been reported in New York, it's only the tip of the iceberg.

Polio Eradication Strategy 2022-2026: Delivering on a Promise

To achieve WPV eradication and end cVDPV transmission, the Global Polio Eradication Initiative (GPEI) launched a new strategy – Polio Eradication Strategy 2022-2026: Delivering on a Promise. The GPEI will transform its approach in each region and country through five mutually reinforcing objectives that lay the foundation to achieve two elemental goals: Goal One to permanently interrupt all poliovirus transmission in the final WPV-endemic countries of Afghanistan and Pakistan, and Goal Two to stop circulating vaccine-derived poliovirus (cVDPV) transmission and prevent outbreaks in non-endemic countries.

If a population is adequately immunized, it will be protected against both wild as well as vaccine-derived polioviruses. If there are pockets of undervaccinated individuals, wild or vaccine derived poliovirus can pop up anywhere. We need to ramp up the surveillance and catch-up immunization campaigns. Delayed detection of both WPV1 and cVDPV2 transmission is one of the greatest risks

Identification of a paralysis case is only the tip of the iceberg, and cannot detect community level transmission in early stages and so poliovirus surveillance is one of the key pillars of the global poliovirus eradication effort. The primary system to detect poliovirus transmission is surveillance for polio cases among individuals with acute flaccid paralysis (AFP), supplemented by environmental surveillance (ES) for poliovirus detection in sewage and wastewater, and surveillance for poliovirus among individuals with primary immunodeficiency disorders (PIDs), referred to as immunodeficiency-associated vaccine-derived poliovirus (iVDPV) surveillance

Strengthening the AFP surveillance

AFP [Acute Flaccid Paralysis] surveillance and environmental surveillance is going to be crucial in our country going forward. Acute Flaccid Paralysis is defined as a sudden onset of weakness or floppiness in any part of the body in a child <15 years of age or in a person of any age in whom clinician suspects Polio. A non-polio AFP rate of at least 2/100000 children under 15 years of age indicates adequate surveillance sensitivity. Two stool specimens, each of more than 8 grams and at least 24 hours apart, are collected and are transported in a cold chain to NIV Bangalore for Virological study. Stool specimens should ideally be collected within the first 14 days from the onset of paralysis. However, if an AFP case is reported late, stool samples can be collected up to 8 weeks from the onset of paralysis.

Conclusion

Vaccine-derived polio virus presents a complex challenge in the global effort to eradicate polio. The dilemma lies in balancing the benefits of OPV with the risks of VDPV. Addressing VDPV requires a combination of surveillance, rapid response, careful vaccine management, and community engagement. Efforts to minimize the risk of VDPV outbreaks must continue alongside the broader goal of eradicating polio to ensure a safer and healthier future for all children worldwide.

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