

**Vaccination against poliomyelitis: review and celebration of fifty years 1955-2005. Colour lithograph, 2005.**

**Contributors**

March of Dimes Birth Defects Foundation.  
Rotary International.

**Publication/Creation**

[London] : Nature Publishing Group, [2005]

**Persistent URL**

<https://wellcomecollection.org/works/uhcu5s3d>

**License and attribution**

Conditions of use: it is possible this item is protected by copyright and/or related rights. You are free to use this item in any way that is permitted by the copyright and related rights legislation that applies to your use. For other uses you need to obtain permission from the rights-holder(s).



Wellcome Collection  
183 Euston Road  
London NW1 2BE UK  
T +44 (0)20 7611 8722  
E [library@wellcomecollection.org](mailto:library@wellcomecollection.org)  
<https://wellcomecollection.org>



## "A MILESTONE FOR HUMANKIND"

— Sir Gustav Nossal, March 2005

# ERADICATING POLIO: 50 YEARS OF VACCINES

## POLIOVIRUS: BIOLOGY AND DISEASE

Polio is a contagious viral disease that can strike at any age, but mostly affects children under the age of five. The poliovirus enters the body via the mouth, multiplies in the throat and gut, enters the blood stream and, when ingested by antibodies, invades the spinal cord and destroys motor neurons. Most patients have no symptoms, while around five per cent experience fever, sore throat, nausea and vomiting, and one in every 200 becomes irreversibly paralyzed, usually in the legs. There is no cure, only protection through vaccination.



Poliovirus is a relatively small virus (27 nanometres in diameter) with genetic material consisting of ribonucleic acid, or RNA. Research continues into the molecular events underlying infection, in the hope of developing new drugs against this and related viruses.

## IRON LUNGS

In the 1950s, huge breathing machines known as 'iron lungs' became a constant sight in hospitals. They assisted breathing during the acute phase of polio in which around 10 per cent of patients experience temporary paralysis in their chest muscles, and are at risk of death through asphyxiation.



## OUTBREAKS

Polio is an ancient scourge that spreads from person to person via infected saliva and stools. With the introduction of polio vaccines in the 1950s, most countries have eradicated wild-type polio, yet it continues to be endemic in parts of South Asia and Africa, fuelled by conditions of poor hygiene. Nowhere else need vaccination as polio outbreaks can still occur – either when an infected person arrives from another country or in the rare instance when the live oral polio vaccine virus mutates back to a virulent form.



## VACCINES: WHAT & HOW

The two main types of polio vaccine used today are based on those developed by Salk (IPV) and Sabin (OPV). IPV elicits protective antibodies in the blood that block the spread of the virus to the central nervous system, and therefore provides excellent individual protection against paralytic polio. However, it triggers only low levels of immunity in the gut, whereas OPV confers strong gut immunity which limits wild virus multiplication and reduces its spread from person to person. This explains why mass vaccination campaigns with OPV can rapidly stop person-to-person transmission of wild poliovirus. For a few months, OPV virus is shed into the stool of healthy immunized children, and in areas where hygiene and sanitation are inadequate this can result in immunization of close contacts. OPV is cheaper to produce than IPV and easier to administer as drops by mouth, and can be given by volunteers without the need for health care workers, needles or syringes. OPV remains the vaccine of choice in areas where wild poliovirus is endemic.

Standard OPV consists of all three poliovirus types (trivalent OPV) while a new monovalent type 1 OPV provides a boost in immunity against type 1 poliovirus.

## SIGNS OF SUCCESS

The drive to eradicate polio promises to parallel the successful campaign against smallpox. Before the Salk vaccine was introduced in 1955, there were more than 21,000 polio cases annually in the USA alone. When the Global Polio Eradication Initiative (GPEI) began in 1988, poliovirus was still endemic in more than 125 countries on the continents, causing more than 150,000 cases worldwide. This has plummeted to more than 99 per cent, to 1,263 cases in 2004. Just six countries remain polio-endemic (wild poliovirus circulating): Afghanistan, Egypt, India, Pakistan, Nigeria and Niger, with Nigeria accounting for the highest number – 789 cases – in 2004. Intensified vaccination campaigns are also continuing in five other countries with re-established polio transmission: among the imported poliovirus from Nigeria circulating for longer than six months – Burkina Faso, Central African Republic, Chad, Côte d'Ivoire and Sudan.



## THE END GAME

GPEI hopes to achieve its goal of interrupting wild poliovirus transmission by the end of 2005 or soon after. Millions of volunteers and vast publicity campaigns are aiming to reach as many children as possible on National Immunization Days. In 2006, GPEI hopes to certify the world polio-free, and to ensure that polio never returns. As part of the 'end game' strategy, more countries have adopted OPV with IPV so as to avoid polio outbreaks caused by circulating OPV strains, and others will follow suit. The main priority will then be to ensure safe containment of laboratory stocks of poliovirus, and to stockpile vaccines in readiness for any future accidental exposure or bioterrorism.



**1952** The largest ever polio epidemic in the USA with 57,279 reported cases.

**1955** The Salk vaccine, developed by Dr Jonas Salk, is licensed for use in the USA.

**1958** The Sabin vaccine, developed by Dr Albert Sabin, is licensed for use in the USA.

**1960** The first polio-free country, Israel, is certified.

**1961** The first polio-free country in Africa, Mauritania, is certified.

**1962** The first polio-free country in Asia, India, is certified.

**1963** The first polio-free country in Europe, Greece, is certified.

**1964** The first polio-free country in the Americas, Cuba, is certified.

**1965** The first polio-free country in the Middle East, Jordan, is certified.

**1966** The first polio-free country in Oceania, New Zealand, is certified.

**1967** The first polio-free country in Africa, Mauritania, is certified.

**1968** The first polio-free country in Asia, India, is certified.

**1969** The first polio-free country in Europe, Greece, is certified.

**1970** The first polio-free country in the Americas, Cuba, is certified.

**1971** The first polio-free country in the Middle East, Jordan, is certified.

**1972** The first polio-free country in Oceania, New Zealand, is certified.

**1973** The first polio-free country in Africa, Mauritania, is certified.

**1974** The first polio-free country in Asia, India, is certified.

**1975** The first polio-free country in Europe, Greece, is certified.

**1976** The first polio-free country in the Americas, Cuba, is certified.

**1977** The first polio-free country in the Middle East, Jordan, is certified.

**1978** The first polio-free country in Oceania, New Zealand, is certified.

**1979** The first polio-free country in Africa, Mauritania, is certified.

**1980** The first polio-free country in Asia, India, is certified.

**1981** The first polio-free country in Europe, Greece, is certified.

**1982** The first polio-free country in the Americas, Cuba, is certified.

**1983** The first polio-free country in the Middle East, Jordan, is certified.

**1984** The first polio-free country in Oceania, New Zealand, is certified.

**1985** The first polio-free country in Africa, Mauritania, is certified.

**1986** The first polio-free country in Asia, India, is certified.

**1987** The first polio-free country in Europe, Greece, is certified.

**1988** The first polio-free country in the Americas, Cuba, is certified.

**1989** The first polio-free country in the Middle East, Jordan, is certified.

**1990** The first polio-free country in Oceania, New Zealand, is certified.

**1991** The first polio-free country in Africa, Mauritania, is certified.

**1992** The first polio-free country in Asia, India, is certified.

**1993** The first polio-free country in Europe, Greece, is certified.

**1994** The first polio-free country in the Americas, Cuba, is certified.

**1995** The first polio-free country in the Middle East, Jordan, is certified.

**1996** The first polio-free country in Oceania, New Zealand, is certified.

**1997** The first polio-free country in Africa, Mauritania, is certified.

**1998** The first polio-free country in Asia, India, is certified.

**1999** The first polio-free country in Europe, Greece, is certified.

**2000** The first polio-free country in the Americas, Cuba, is certified.

**2001** The first polio-free country in the Middle East, Jordan, is certified.

**2002** The first polio-free country in Oceania, New Zealand, is certified.

**2003** The first polio-free country in Africa, Mauritania, is certified.

**2004** The first polio-free country in Asia, India, is certified.

**2005** The first polio-free country in Europe, Greece, is certified.

**2006** The first polio-free country in the Americas, Cuba, is certified.

**2007** The first polio-free country in the Middle East, Jordan, is certified.

**2008** The first polio-free country in Oceania, New Zealand, is certified.

**2009** The first polio-free country in Africa, Mauritania, is certified.

**2010** The first polio-free country in Asia, India, is certified.

**2011** The first polio-free country in Europe, Greece, is certified.

**2012** The first polio-free country in the Americas, Cuba, is certified.

**2013** The first polio-free country in the Middle East, Jordan, is certified.

**2014** The first polio-free country in Oceania, New Zealand, is certified.

**2015** The first polio-free country in Africa, Mauritania, is certified.

**2016** The first polio-free country in Asia, India, is certified.

**2017** The first polio-free country in Europe, Greece, is certified.

**2018** The first polio-free country in the Americas, Cuba, is certified.

**2019** The first polio-free country in the Middle East, Jordan, is certified.

**2020** The first polio-free country in Oceania, New Zealand, is certified.

**2021** The first polio-free country in Africa, Mauritania, is certified.

**2022** The first polio-free country in Asia, India, is certified.

**2023** The first polio-free country in Europe, Greece, is certified.

**2024** The first polio-free country in the Americas, Cuba, is certified.

**2025** The first polio-free country in the Middle East, Jordan, is certified.

**2026** The first polio-free country in Oceania, New Zealand, is certified.

**2027** The first polio-free country in Africa, Mauritania, is certified.

**2028** The first polio-free country in Asia, India, is certified.

**2029** The first polio-free country in Europe, Greece, is certified.

**2030** The first polio-free country in the Americas, Cuba, is certified.

March of Dimes

Rotary International

nature publishing group npe

WORLDWIDE

Polio is a contagious viral disease that can strike at any age, but mostly affects children under the age of five. The poliovirus enters the body via the mouth, multiplies in the throat and gut, enters the blood stream and, when ingested by antibodies, invades the spinal cord and destroys motor neurons. Most patients have no symptoms, while around five per cent experience fever, sore throat, nausea and vomiting, and one in every 200 becomes irreversibly paralyzed, usually in the legs. There is no cure, only protection through vaccination.