



THE POLIOVIRUS STRIKES AGAIN

By: Emily Swigart

OUTLINE

- **What is polio?**
- **History**
- **Viral Mechanism**
- **Treatments**
- **Eradication Efforts**
- **Recent Outbreaks**
- **Personal Impact**

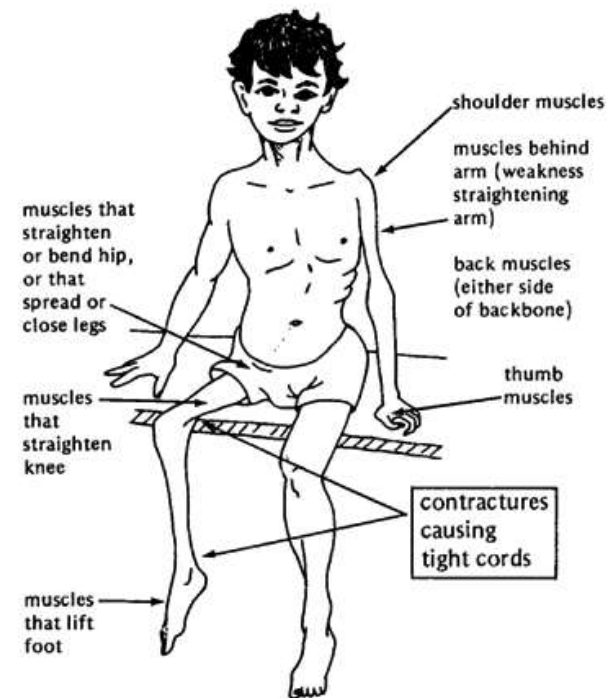


WHAT IS POLIO?

- **Polio: a disease that causes inflammation of the gray matter in the spinal cord and also affects the digestive system**
- **3 types: 1, 2, 3**
- **Spread through contact with feces and/or secretions of the nose & mouth from infected individuals**
- **In a small % of cases results in paralysis of leg, arm, and chest muscles**



MUSCLES COMMONLY WEAKENED BY POLIO



HISTORY

- Egyptian carvings
- 1789 – First clinical account by British physician Dr. Michael Underwood
- First polio epidemic in the U.S. in 1894
- New York – Summer of 1916
- March of Dimes – 1938
- 1970-1980 – Routine immunization in nearly all countries



<http://www.polioeradication.org/Polioandprevention/Historyofpolio.aspx>



<http://www.historyofvaccines.org/content/timelines/polio>

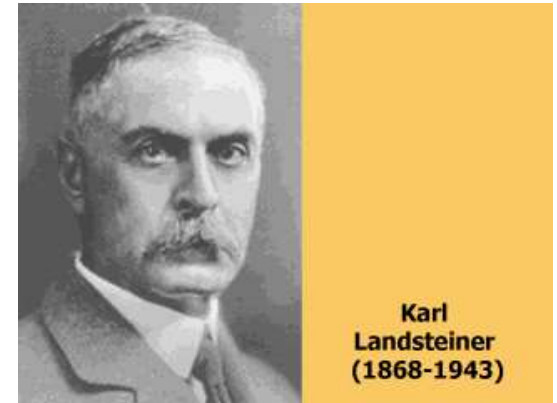


<http://www.polioeradication.org/Polioandprevention/Historyofpolio.aspx>



SCIENTIFIC HISTORY

- 1905 – Contagious nature discovered
- 1908 – Viral nature discovered (Popper and Landsteiner)
- 1931 – propose more than one type (Burnet and Macnamara)
- 1949 – confirm 3 types (Bodian and Morgan)
- 1941 – discover polio affects digestive system first (Sabin and Ward)



Albert Sabin, MD

<http://discovery.yukozimo.com/who-discovered-polio/>

<http://www.pitt.edu/~super1/lecture/lec10831/007.htm>

<http://www.cincinnatichildrens.org/research/cincinnati/ccrf/history/>

The Life Cycle of Polio

FINDING A VICTIM

The virus enters the body through contaminated food, dirty fingers or water tainted with sewage.

SETTLING IN

The virus attaches to receptors on the intestinal walls. (Oral polio vaccine attaches to the same ones.) From there it can get into the bloodstream.

THE ATTACK

In 99.5% of cases, the virus causes no symptoms, or mild flulike illness.

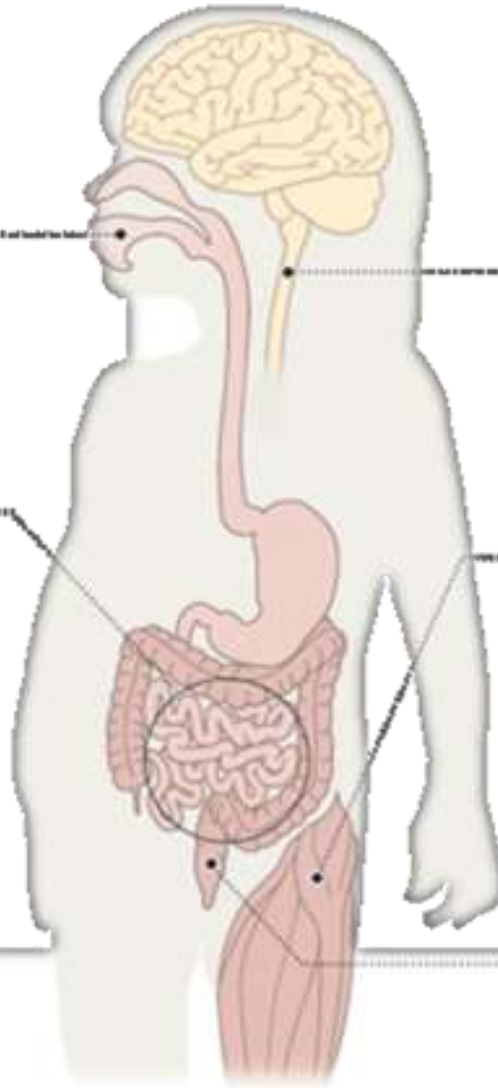
In less than 0.5% of cases, the virus attacks the central nervous system, destroying cells in the spinal cord.

THE DAMAGE

Nerve cell death can cause muscle paralysis, mostly in the legs.

MOVING ON

Even in people with no symptoms, the virus is excreted in feces that can contaminate food and water.



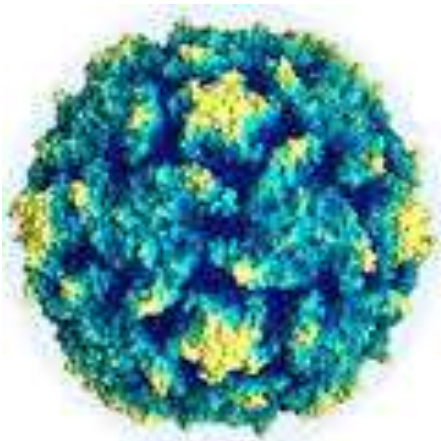
Source: World Health Organization

The New York Times



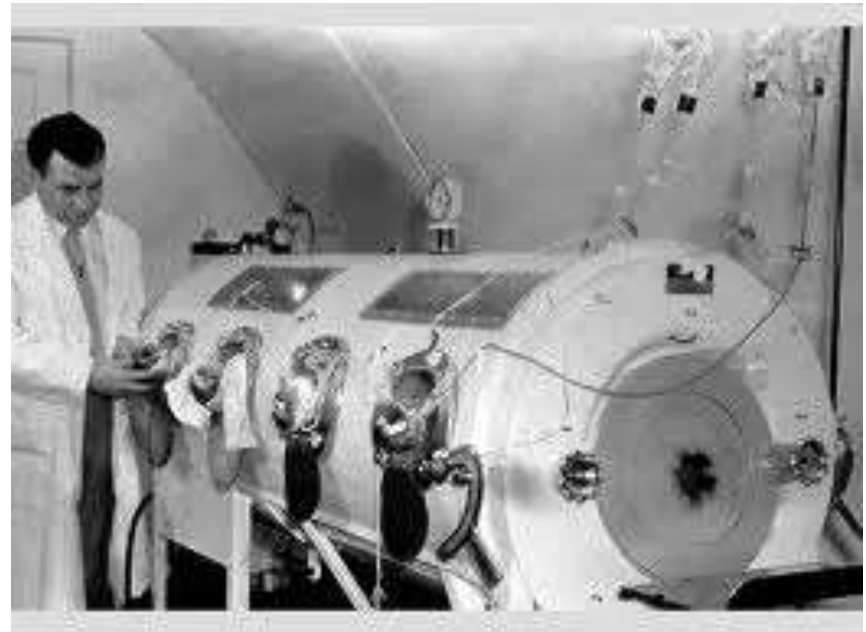
VIRAL MECHANISM

- **Two possible routes of virus into CNS:**
 - **Mouth → Digestive System → Blood → CNS**
 - **Peripheral Nerve → CNS (via axonal transport)**
- **Hypothesis – At neuromuscular junction:**
 1. **Endocytosis of virus into motor neuron cell body**
 2. **Viral RNA released into cytoplasm**
 3. **Virus replication**



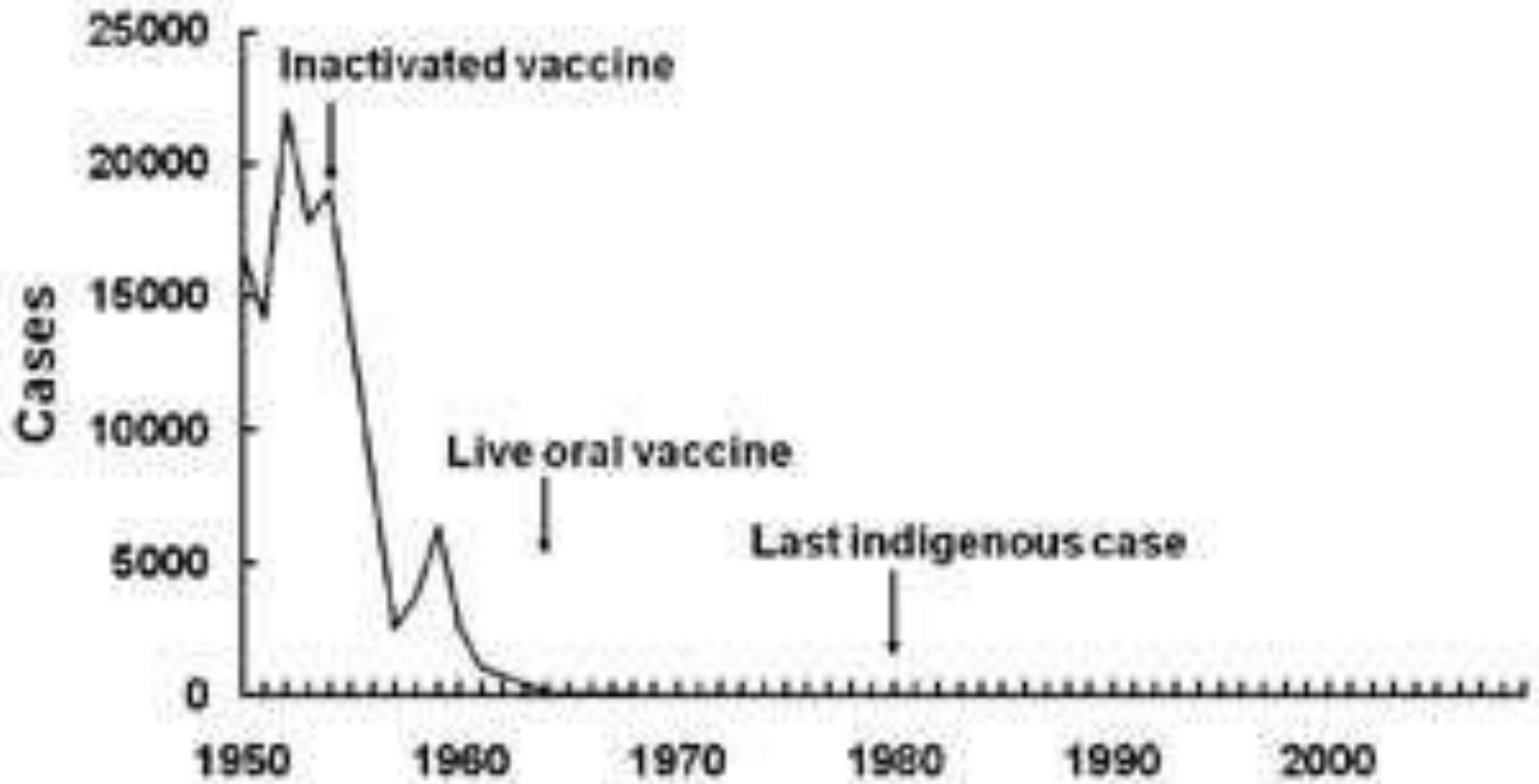
TREATMENTS

- **Treating Symptoms:**
 - **Iron Lung**
- **Vaccination**
 - **Salk**
 - **Sabin**



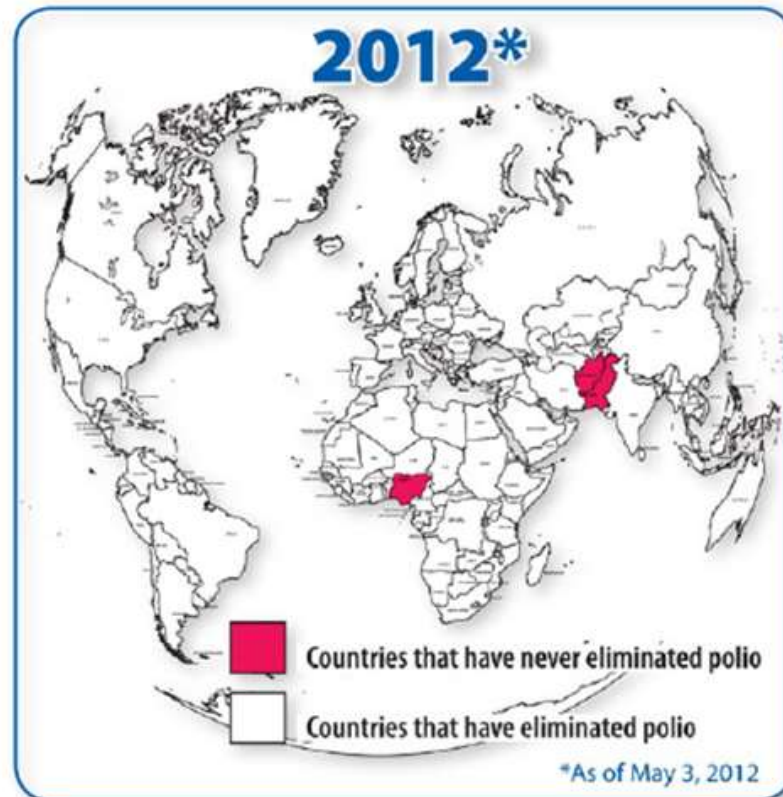
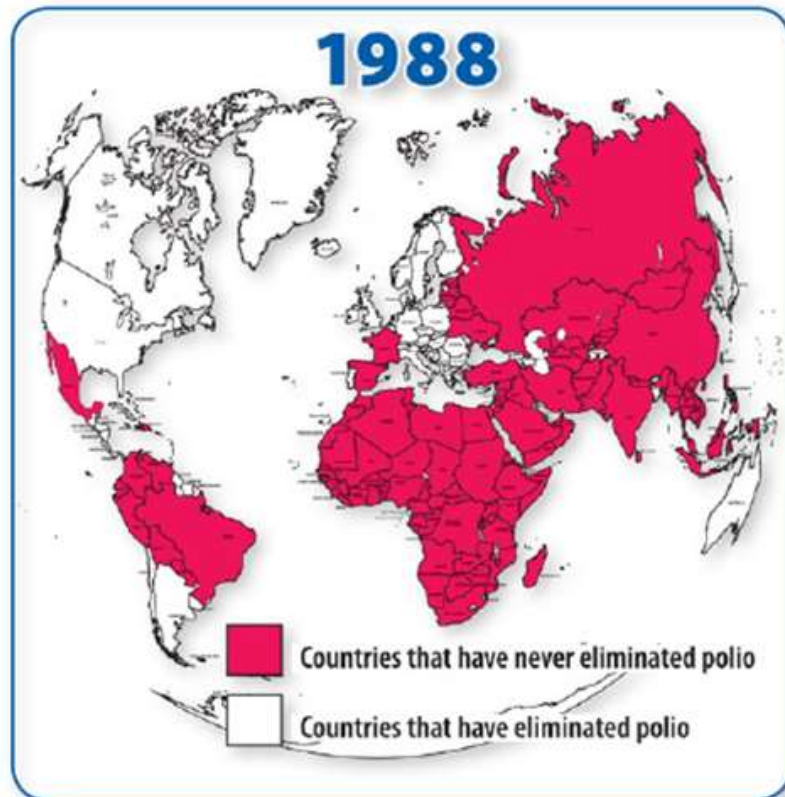
<http://www.historyofvaccines.org/content/timelines/polio>





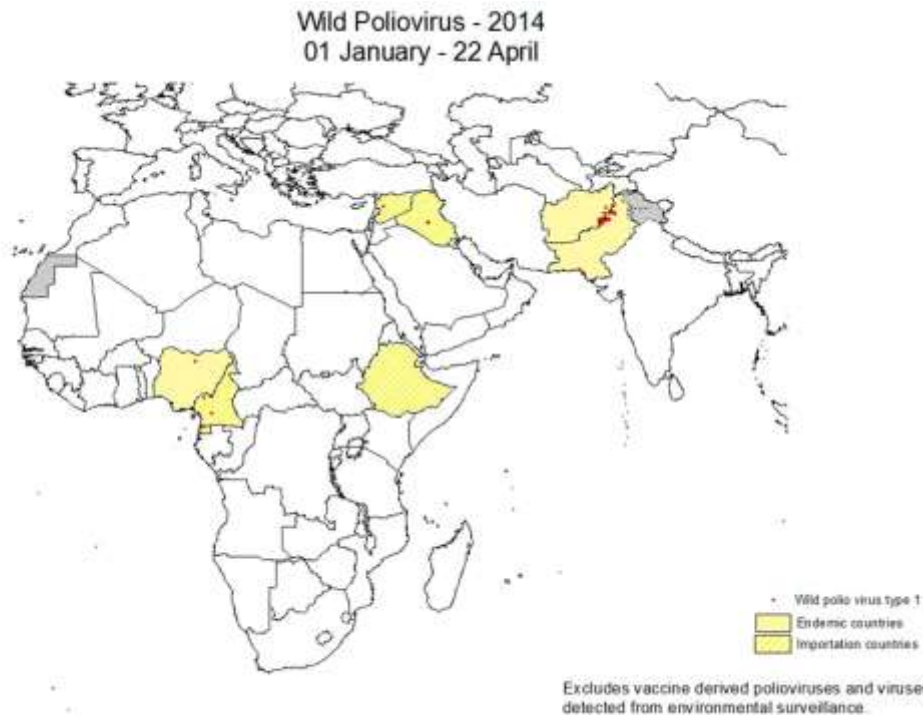
ERADICATION EFFORTS

- Global Polio Eradication Initiative – created 1988
- Goals for 2010-2012:
 - 1) “end outbreaks occurring in 2009 by mid-2010”
 - 2) “end outbreaks occurring during 2010 to mid-2012 within 6 months of confirmation” (“Outbreaks following,” 2010)



RECENT OUTBREAKS

- 2009 – West Central Africa – 12 countries
- 2010 – Mali, Mauritania, & Sierra Leone
- Areas of Africa and Pakistan – 2013
 - Horn of Africa & Somalia
 - Regional warlord in Pakistan closed area



<http://www.premiumtimesng.com/news/15753-6-nigeria-winning-war-polio-report.html>

PERSONAL IMPACT



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