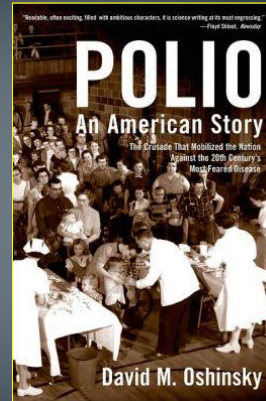


## The Quest to Conquer Polio

Dr. Kip L. McGilliard  
Department of Biological Sciences  
Eastern Illinois University



## POLIOMYELITIS

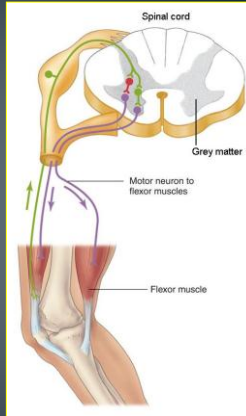
- Inflammation of the grey matter of the spinal cord.
- Acute infectious disease spread from person to person through the digestive tract.
- Main breeding ground is the small intestine.

## POLIOMYELITIS

- 90% have no symptoms.
- Mainly affects children.
- Symptoms: Sore throat, nausea, fever.

## POLIOMYELITIS

- In 1%, the virus attacks motor neurons in the spinal cord or brain.
- Paralysis of muscles.
- If brain stem is involved, muscles of breathing will be paralyzed.



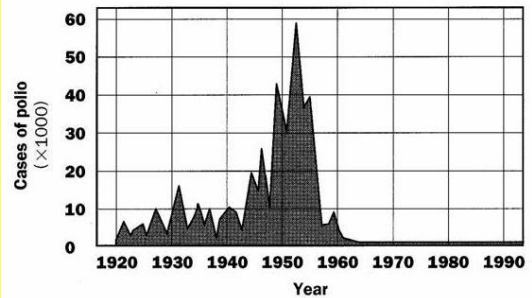
## IRON LUNG



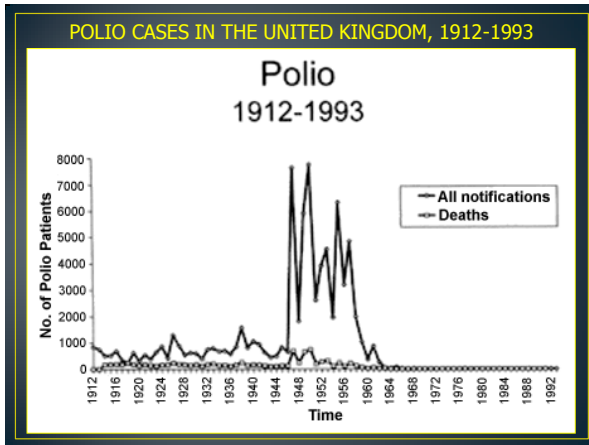
## IRON LUNGS



## POLIO CASES IN THE UNITED STATES, 1920-1990



Source: Centers for Disease Control, World Health Organization



## ROOSEVELT AND THE FIGHT AGAINST POLIO

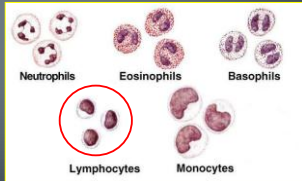
- 1924 -- Sought treatment at Warm Springs resort in Georgia.
- 1938 -- Foundation for Infantile Paralysis
  - Goals: Find a cure for polio and provide the best treatment for those already afflicted.
  - March of Dimes campaign
  - President's Birthday Balls

## IMMUNE SYSTEM

- Function -- Defense against disease-causing organisms.
- First line of defense -- skin and mucous membranes.
- Second line of defense -- leukocytes.

## IMMUNE SYSTEM

- Adaptive immunity.
- Delayed, but highly specific defense against foreign organisms.
- Involves lymphocytes.



## IMMUNE SYSTEM

- Adaptive immunity.
- Delayed, but highly specific defense against foreign organisms.
- Involves lymphocytes.
- Lymphocytes recognize invading organisms as foreign and begin to produce antibodies.


## IMMUNE SYSTEM

- Antibody = Protein molecule that recognizes specific chemical structures on the surface of invading organisms.
- Antigen = Structure that stimulates an antibody response.
- Antibodies are highly specific.
- Will defend against subsequent infections by that organism.


## VACCINATION

- Immune response is stimulated by deliberately introducing specific antigens into the body.
- Virus must be modified.
- Protects the individual and prevents spread of disease.

**SMALLPOX VACCINE**  
1796

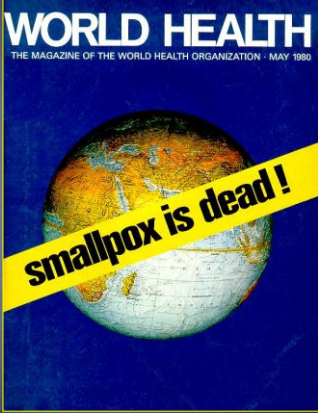


Edward Jenner  
1749 - 1823



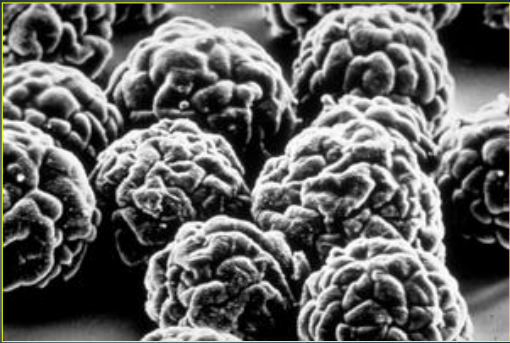
This slide features a portrait of Edward Jenner on the left and an illustration of his famous cowpox experiment on the right. The illustration shows a young boy being vaccinated by Jenner, with a woman and another child in the background.

**WORLD HEALTH**  
THE MAGAZINE OF THE WORLD HEALTH ORGANIZATION · MAY 1980



smallpox is dead!

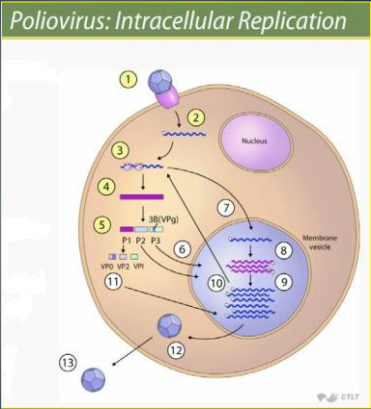
The cover of the May 1980 issue of World Health magazine features a globe with a yellow banner across it that reads "smallpox is dead!".



Poliovirus

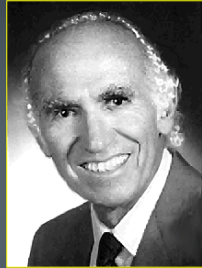
A scanning electron micrograph showing numerous poliovirus particles, which are spherical with a characteristic rough, bumpy surface.

**Poliovirus: Intracellular Replication**



The diagram illustrates the 13 steps of poliovirus intracellular replication. 1. Virus attachment to the cell. 2. Penetration of the virus into the cytoplasm. 3. Uncoating of the viral genome. 4. Translation of the viral genome into polyprotein. 5. Cleavage of the polyprotein into VP1, VP2, and VP3. 6. Formation of a replication complex. 7. Synthesis of viral RNA. 8. Formation of a membrane vesicle. 9. Replication of viral RNA. 10. Translation of viral RNA into new polyprotein. 11. Cleavage of the polyprotein into VP1, VP2, and VP3. 12. Assembly of new virus particles. 13. Release of new virus particles.

### POLIO VACCINE 1955



Jonas Salk  
1914 - 1995

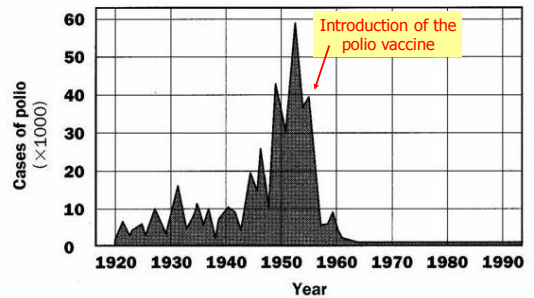
### POLIO VACCINE



### POLIO VACCINE

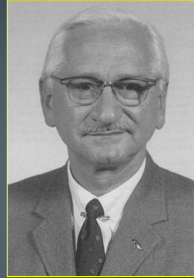


### POLIO CASES IN THE UNITED STATES, 1920-1990



Source: Centers for Disease Control, World Health Organization

## ORAL POLIO VACCINE 1962



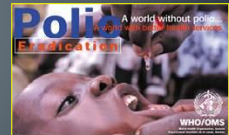
Albert Sabin  
1906 - 1993

## GLOBAL ERADICATION OF POLIO

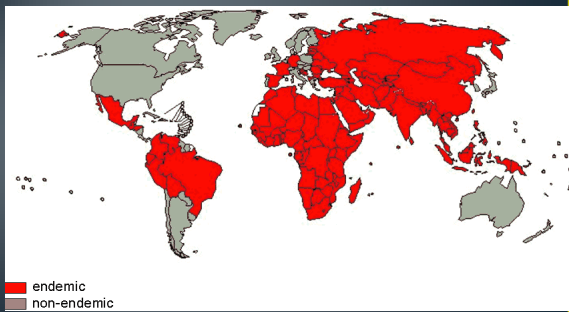
- Combined effort of:  
Rotary International  
World Health Organization  
UNICEF

- Initiated 1988.

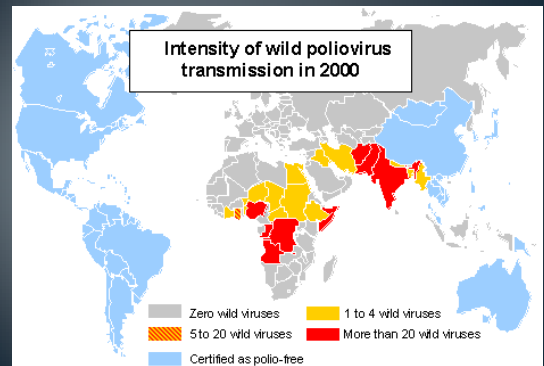
- Goal was to eliminate polio by 2005.

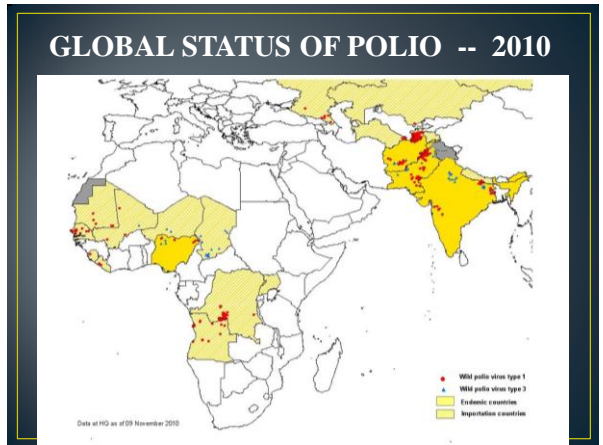
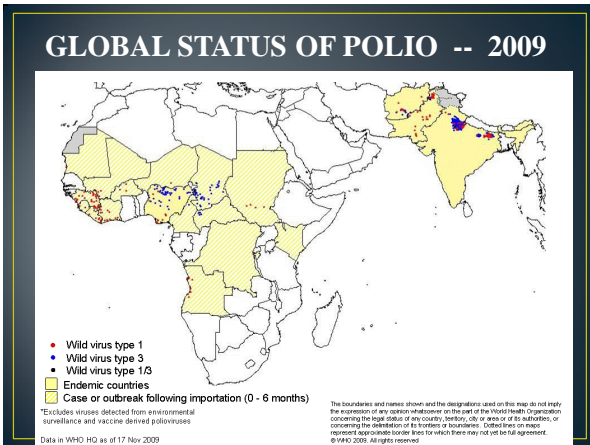
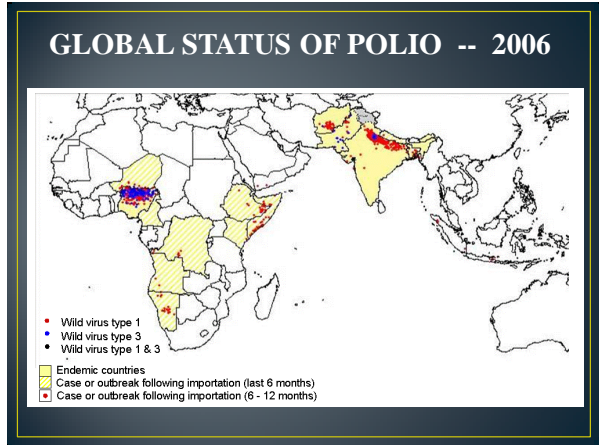
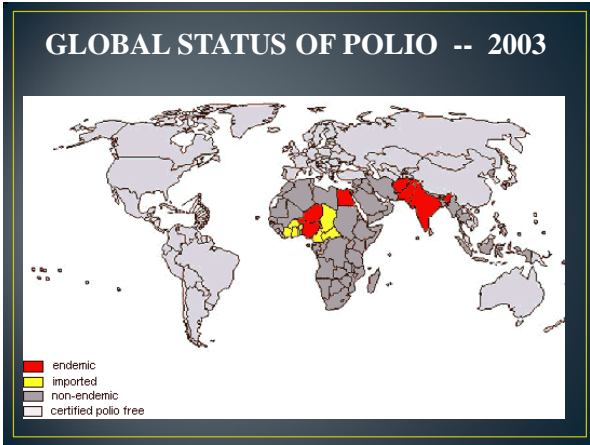


## GLOBAL STATUS OF POLIO -- 1988

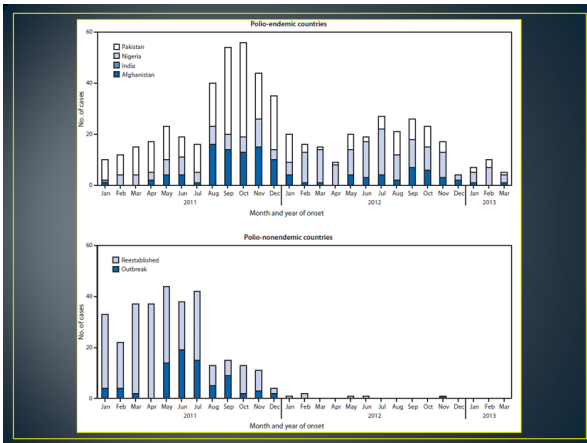
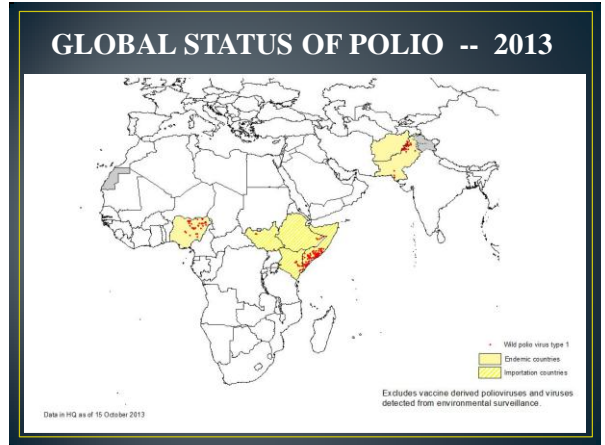
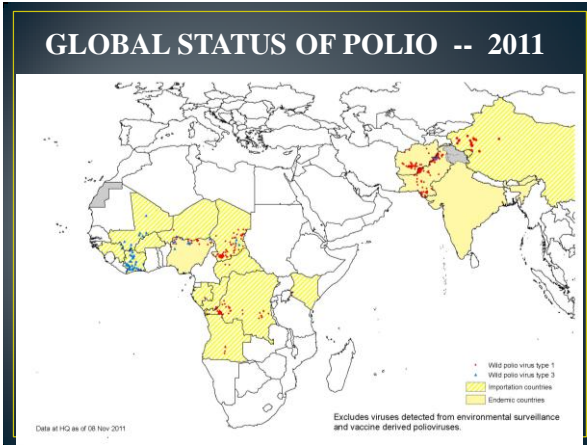


## GLOBAL STATUS OF POLIO -- 2000









What does the future hold?