

# Polio Immunization: Moving Forward

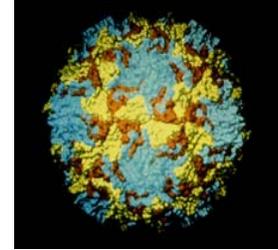
Fogarty International Center

National Institute of Allergy  
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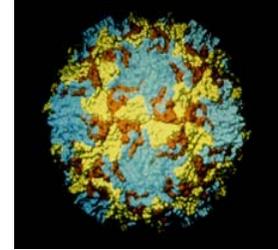


- Centers for Disease Control and Prevention
- Fogarty International Center
- Food and Drug Administration
- Foundation for the National Institutes of Health through grants from March of Dimes Foundation, Merck & Co., Inc., Sanofi Pasteur SA, and an anonymous donor
- National Institute of Allergy and Infectious Diseases
- National Institute of Child Health and Human Development
- Office of Disease Prevention, Office of the Director, National Institutes of Health





# Program Organizing Committee

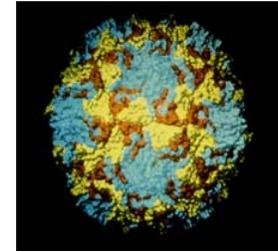


- Ellie Ehrenfeld, Ph.D., National Institute of Allergy and Infectious Diseases (Co-Chair)
- Roger Glass, M.D., Ph.D., Fogarty International Center (Co-Chair)
- Joel Breman, M.D., D.T.P.H., Fogarty International Center
- Konstantin Chumakov, Ph.D., Food and Drug Administration
- Walter Dowdle, Ph.D., Task Force for Child Survival, Atlanta
- T. Jacob John M.D., Christian Medical College, Vellore, India
- Catherine Laughlin, Ph.D., National Institute of Allergy and Infectious Diseases
- Mark Miller, M.D., Fogarty International Center





# Panel Chairs

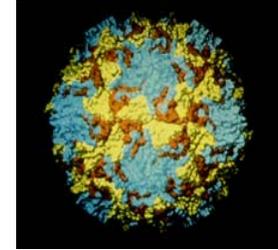


- Current Status: Bruce Aylward, WHO
- Current Challenges to Eradication: Jacob John, Christian Med. Coll. India
- OPV: Vadim Agol, Moscow State U
- IPV: John Modlin, Dartmouth Med. Sch.
- Risk/Benefit: Peter Wright, Vanderbilt Med. Ctr.
- Current and Future Immunization policy: Walter Dowdle, Task Force Child Surv and Dev.
- Current Research: Konstantin Chumakov, FDA
- Future Directions: Sam Katz
- Conclusion and Discussion: Ellie Ehrenfeld and Roger Glass





## Global Program on Polio Eradication

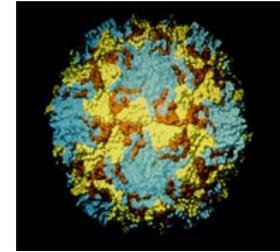


- Begun in 1988 by WHO, UNICEF, CDC, Rotary International, and, LOCAL GOVERNMENTS
- Extraordinary Success
  - 125 Endemic Countries, 345,000 cases in 1988
  - 4 Endemic Countries, 1723 cases in 2006
- Yet Effort Appears to Have Stalled
  - Lowest Number of Cases Seen in 2001





## Polio Immunization: Moving Forward



- Consider Impediments to Eradication
- Discuss the Strength of the Scientific Evidence
- Focus on Strategies for Optimal Design and Deployment of Live and Inactivated Vaccines
- Identify Knowledge Gaps Amenable to Further Research



# Polio: a personal perspective



# Fogarty's role in the polio effort

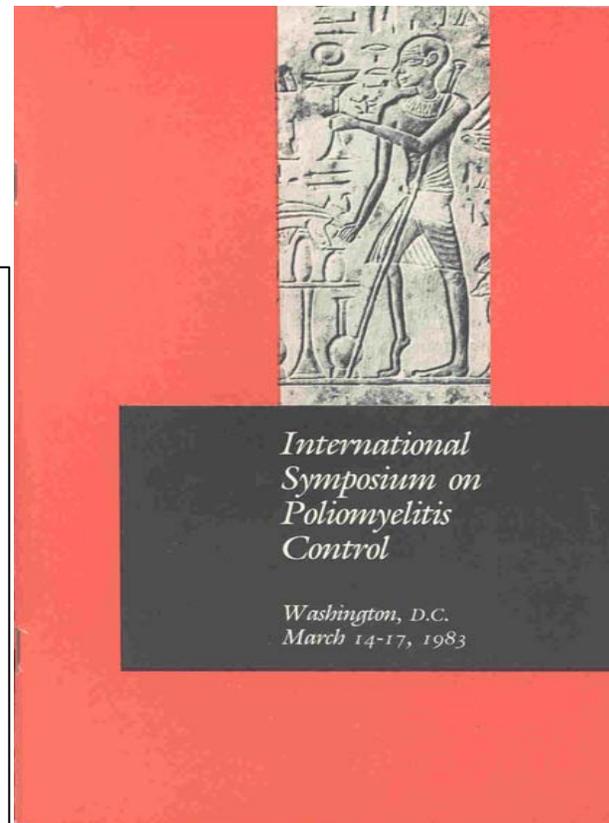
Fogarty  
International  
Center

Program:

**The Eradication of  
Infectious Diseases  
May 27-28, 1980**

Stone House  
National  
Institutes of Health

U.S. DEPARTMENT OF  
HEALTH AND  
HUMAN SERVICES  
Public Health Service  
National Institutes of Health



*International  
Symposium on  
Poliomyelitis  
Control*

*Washington, D.C.  
March 14-17, 1983*

**Reviews of Infectious  
Diseases**

Volume 6, Supplement 2      May-June 1984

**International Symposium on  
Poliomyelitis Control**

Dorothy M. Horstmann, Thomas C. Quinn and  
Frederick C. Robbins

# Nathanson on eradication in US

REVIEWS OF INFECTIOUS DISEASES, VOL. 4, NO. 5, SEPTEMBER-OCTOBER 1982 © 1982 by  
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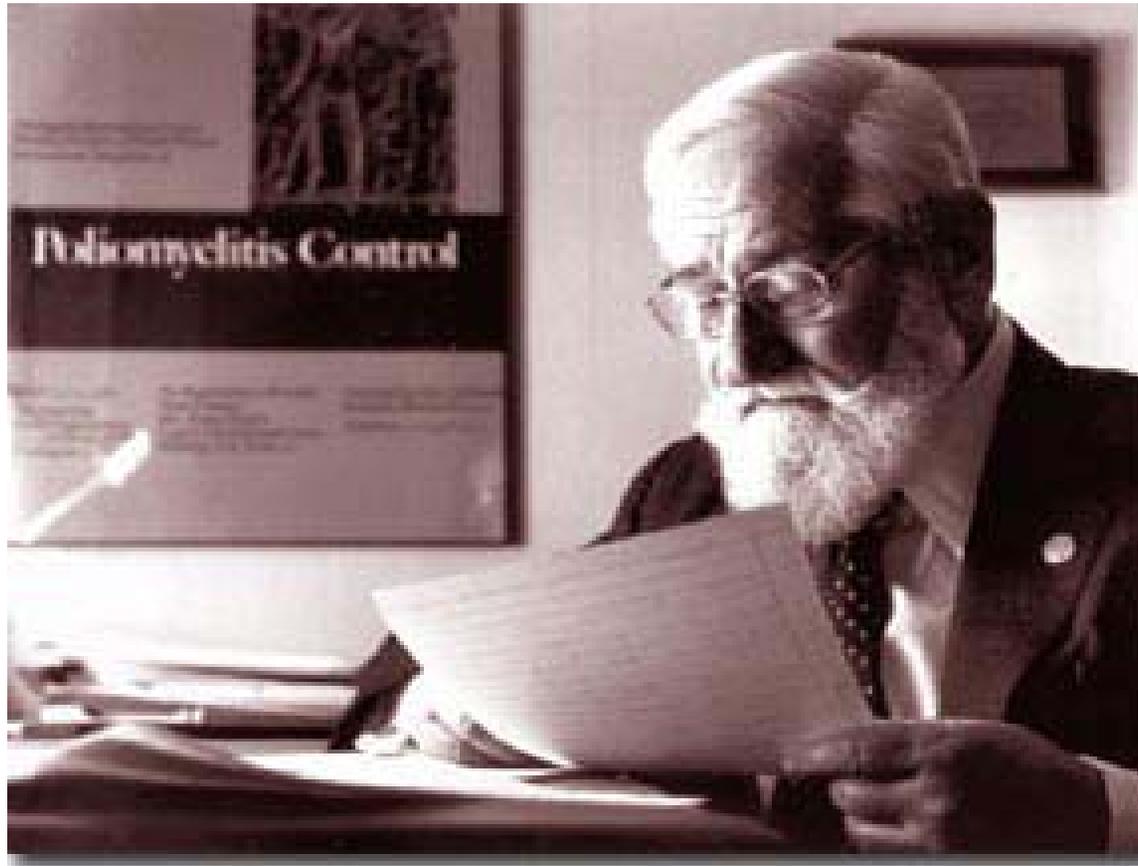
## Eradication of Poliomyelitis in the United States

Neal Nathanson

*From the Department of Microbiology, School of Medicine,  
University of Pennsylvania, Philadelphia, Pennsylvania*

Mass immunization with oral poliovirus vaccine (OPV) was begun in the United States in 1963, and the last natural outbreak of poliomyelitis occurred in 1972. Since immunization programs fail to reach the total population, eradication has been achieved in the presence of a residual susceptible population of at least 5070 (2-5 million children under the age of 15 years). It is proposed that the fade-out of wild polioviruses is explained by their disappearance during the winter, a low point in the yearly cycle of the virus. In the post-eradication era, the continued presence of millions of susceptible children and adults presents a constant potential hazard. Every effort should be made to maintain maximal levels of immunization with oral poliovirus vaccine and to prevent the reintroduction of wild polioviruses into the United States.

## Fogarty International Scholar in Residence

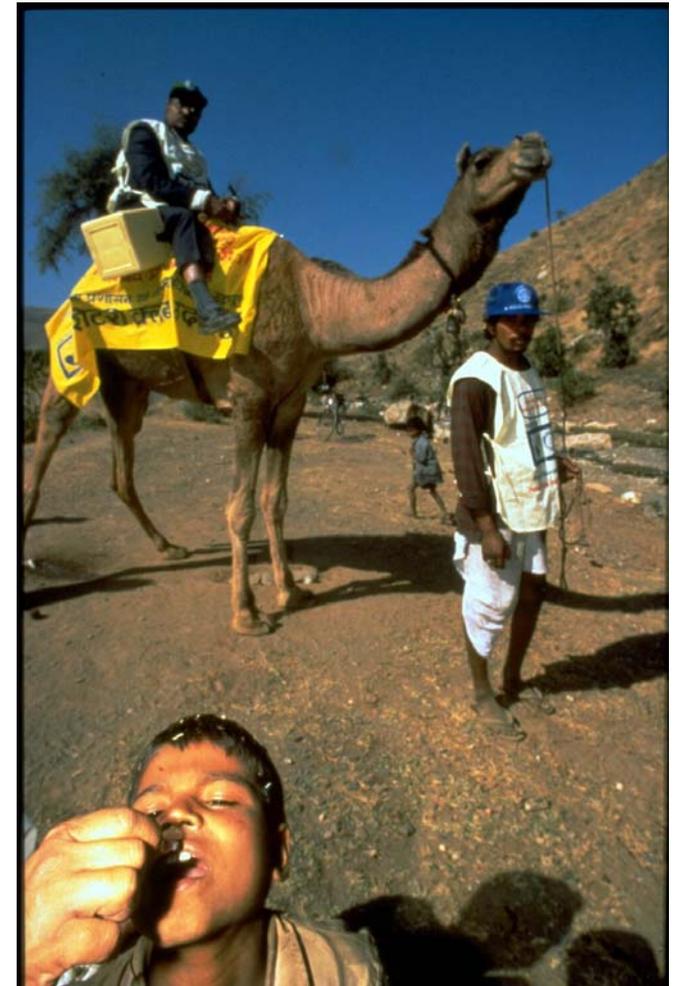


*Dr. Sabin at the National Institutes  
of Health, Ca. mid-1980's*

# CDC's role



The last known case of polio in the Americas occurred in Peru in 1991. *(WHO photo)*



Efforts were made to reach children in even the most remote locations during National Immunization Days. *(WHO photo)*



Bangladesh,  
Polio National  
Immunization  
Day.

*(WHO photo)*

# Definition of Eradication

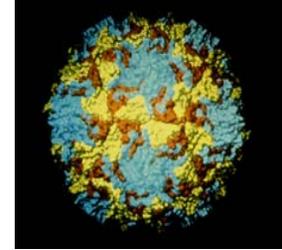
" The term eradication denotes the certified total absence of human cases, the absence of a reservoir for the organism in nature, and absolute containment of any infectious source. Eradication permits control interventions to stop or at least to be curtailed significantly. Finally, eradication is binary. Control levels can vary, but a disease is either certified as eradicated or not. "

Ref: M. Miller, S. Barrett, D.A. Henderson

*Disease Control Priorities Project, Chapter 62*



# Assess scientific basis of polio program

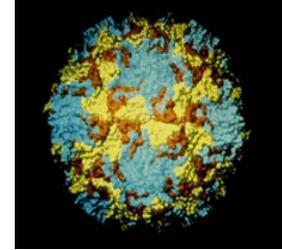


## Examine new science concerning:

- **The evolution in our understanding of the virus and its ecology**
- **A reassessment of our vaccines—OPV and IPV—and their future roles in the effort, pre-eradication and possibly beyond**
- **The strategies that have been rolled out to fight the disease in the most intransigent settings of the world and in populations that have raised incredible hurdles to control**



# Session 1



## Current status of the eradication program:

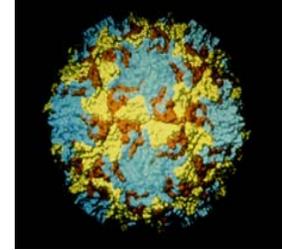
Bruce Aylward

World Health Organization



# Session 2

## Panel Questions



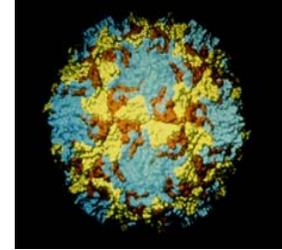
### Current challenges to the program:

1. **Why has the global polio eradication program not met its goals in the anticipated timeframe?**
2. **What were the roles of the following: speed and intensity of wild virus transmission, low efficacy and herd effect of oral polio vaccine, poor balance between "routine" & "supplementary" vaccinations**
3. **What should be done to ensure that program goals are met by 2010 (latest, if at all feasible)?**
4. **What is the vulnerability of African nations in terms of importations and consequent outbreaks? What sustainable systems should be established/strengthened to meet this challenge?**



# Session 3

## Panel Questions



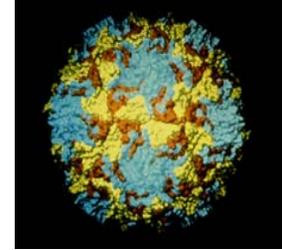
### OPV

1. **When is OPV efficacious and when is it not?**
2. **What is the reason for vaccine-associated poliomyelitis - vaccine reversion or increased host susceptibility?**
3. **Do evolved OPV derivatives (VDPVs) significantly differ phenotypically from wild polioviruses?**
4. **What is the nature of cryptic circulation of VDPV?**
5. **Under what conditions, and why, is OPV dangerous?**



# Session 4

## Panel Questions



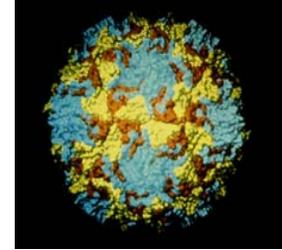
### IPV

1. How can IPV contribute to the control of disease in developing countries with high force of poliovirus infection?
2. Will IPV-induced immunity reduce gastrointestinal excretion and transmission of live polioviruses sufficient to contribute to herd immunity?
3. Can we develop a protocol to test the hypothesis that IPV will reduce circulation of polioviruses in a region where wild poliovirus and cVDPV are risks?
4. Can IPV be produced and distributed to developing nations in a cost-effective manner?
5. Do we need a new IPV (e.g., from Sabin strains)?



# Session 5

## Panel Questions



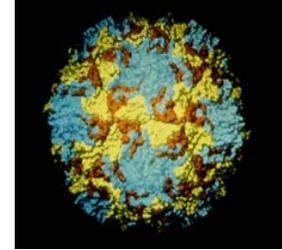
### Risk/Benefit Assessments

- 1. What is the role of risk/benefit analysis in the conduct of an effort as complex as polio eradication?**
- 2. What are key areas in which we need to improve the data sets upon which decisions are made?**
  - With regard to achieving cessation of wild type virus circulation?**
  - With regard to sustaining the absence of circulating poliovirus once eradication is achieved?**
  - With regard to understanding the biology and neurotrophic potential of enteroviruses other than polio?**



# Session 6

## Panel Questions



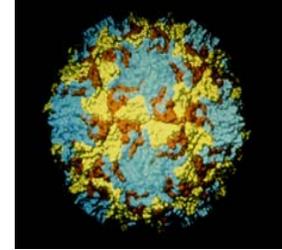
### Current and Future Immunization Policy Considerations

1. **What are the most critical global polio challenges in the post eradication era?**
2. **What are the post-eradication global polio vaccine/immunization policy options?**
3. **What are the international strategies and processes leading to adoption of global post eradication vaccine/immunization policies?**
4. **Is the proposed post-eradication risk management plan appropriate to minimize poliovirus facility-associated risks?**
5. **What contingency plans are essential to respond to re-emerging wild or vaccine-derived polioviruses in the post-eradication era?**



# Session 7

## Panel Questions



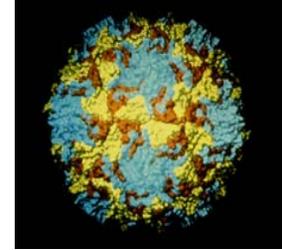
### Current research activities:

1. Does an improved live polio vaccine have a future?
2. Sabin IPV : do the benefits outweigh challenges and justify expense?
3. IPV from alternative strains: what are the surrogate efficacy markers?
4. IPV in developing countries: besides logistics and cost, are there other issues?
5. Shall we invest efforts in creation of entirely new vaccines and adjuvants?
6. Drug development: are there realistic non-capsid drug targets?



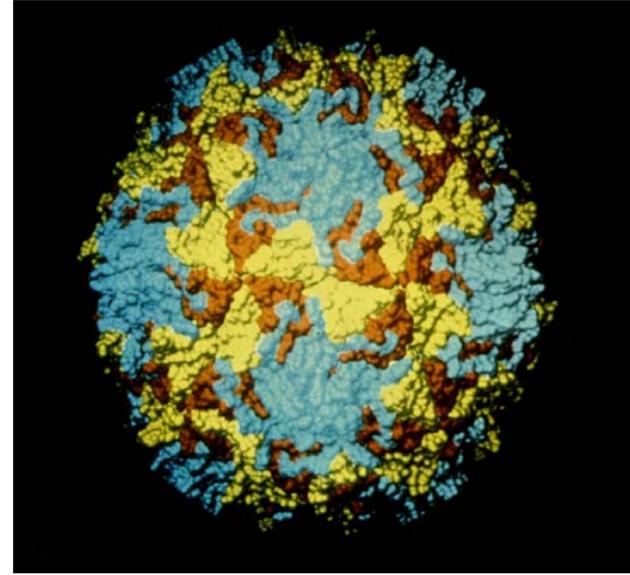
# Session 8

## Panel Questions



### Future Directions:

1. **What should be our goal--eradication of virus or eradication of disease?**
2. **Can we ever discontinue immunization against polioviruses? If/when eradication is achieved, can it be sustained without continued universal immunization?**
3. **If the plan is to discontinue OPV, should this be simultaneous global cessation or individual country options?**
4. **What should be the role of IPV pre- and/or post-eradication and do we need a new type of IPV?**
5. **What are the requirements for containment and emergency preparedness under the different scenarios of post-eradication strategies?**



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