

WHATEVER HAPPENED TO **POLIO?**



- THE AMERICAN EPIDEMICS
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- POLIO TODAY



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## Two Vaccines

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Jonas Salk, 1990

### Sabin and Salk

While the large-scale **clinical trial** with Salk **vaccine** went ahead in 1954, Albert Sabin continued developing his live-**virus** vaccine. Like many researchers of the day, Sabin strongly disagreed with Salk's approach of using injected, "killed" virus. He believed that long-term immunity could only be achieved with a live, **attenuated**—or weakened—virus.

In the race to develop a safe and effective **polio** vaccine, accidents occurred with both types. In 1955, for instance, insufficiently killed virus in the vaccine from Cutter Laboratories in Berkeley, California, infected some 200 children; many were paralyzed and several died. But the global end to polio transmission would have been inconceivable without both the "killed" (Salk) and "live" (Sabin) vaccines. Neither Jonas Salk nor Albert Sabin patented their vaccines; they donated the rights as gifts to humanity.



 ENLARGE IMAGE



Left: Family with fifteen children lined up for oral polio vaccine, around 1963  
 Right: Albert Sabin of the University of Cincinnati feeding oral polio vaccine to a child, early 1960s *Courtesy of University of Cincinnati, Cincinnati Medical Heritage Center, Hauck Center for the Albert B. Sabin Archives*

### The Sabin Vaccine

An important feature of Sabin's oral polio vaccine was that immediately after vaccination, people shed weakened virus in their fecal waste. This boosted immunity for others in the community and gradually reduced the number of people susceptible to **poliomyelitis**.

Between 1963 and 1999, Sabin live vaccine largely replaced Salk killed vaccine everywhere in the world. However, because the live virus in the vaccine occasionally became strong enough to cause actual disease, Salk killed-type vaccine has replaced the live type in the United States.

**"I have studied the effects of our new lots of polio vaccine in 100 adult volunteers and during the next few days shall give it to my wife and 2 children as well as to our neighbors and their children."**

—Albert Sabin, 1957



 ENLARGE IMAGE

Oral polio vaccine used in the early 1960s, and sugar cubes (2004 vintage) on which the drops would be placed before feeding the vaccine to children

### Sabin and the Cold War

Because Salk vaccine was used so extensively in the United States, Sabin had to go overseas in the late 1950s to find people for his clinical trials, in the Belgian Congo and, on a massive scale, in the Soviet Union. An American was able to conduct an extensive polio vaccine trial in the Soviet Union at the height of the cold war because the fear of polio was stronger than political differences.

**“After getting satisfactory results of tests of your vaccine in 20,000 children we are going to prepare from your strains (1956) material for vaccination of 2ñ3 million people more, and after thorough laboratory tests of this vaccine, to use it in our country in 1959.”**

—*Dr. Mikhail Chumakov to Albert Sabin, letter of December 26, 1958*

In the first five months of 1959, ten million children in the Soviet Union received the Sabin oral vaccine. Albert Sabin received a medal in gratitude from the Russian government during the height of the cold war.

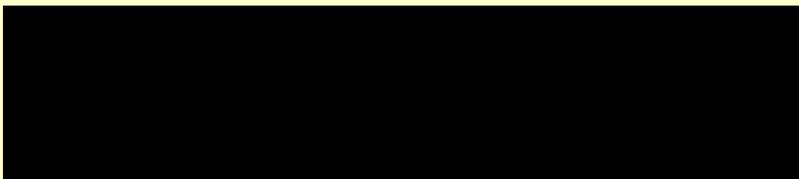


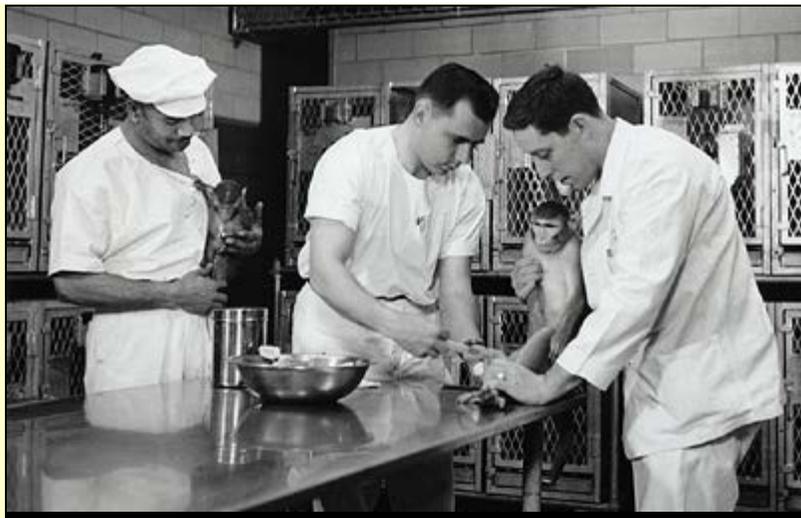
Left: Albert Sabin with Dr. Victor Zhdanov, Soviet deputy minister of health, 1958  
*Courtesy of Heloisa Sabin*

Right: Albert Sabin's medal, box and vial of Russian oral vaccine, matchbox advertising the vaccine campaign, two photographs of Sabin with Russian scientists, 1956-1958 *Medal courtesy of University of Cincinnati, Cincinnati Medical Heritage Center, Academic Information Technology and Libraries; other items courtesy of Heloisa Sabin*

### Killed or Live Vaccine?

Albert Sabin and other researchers, including John Enders and Hilary Koprowski, had argued that long-term immunity to polio could only be achieved with a live though greatly weakened virus, and that it must follow the same route of infection as **wild-type** poliovirus—through the mouth, and infecting intestinal tissue. Weakening the virus required passing it through a succession of animals—rats, mice, or monkeys. This allowed it to become more virulent for these hosts, and less so for humans. Hilary Koprowski carried out the first successful trial of weakened virus vaccine in February 1950.





Rhesus monkeys in laboratory, 1956 *Courtesy of March of Dimes*

### TOUGH CHOICES

#### **Medical Miracles Are Complicated**

Although the scientific method of hypothesis formulation, testing, and verification is straightforward, even the most spectacular achievements involve complicated issues and tough choices. The scientists who raced toward effective polio vaccines tested their work on prisoners, institutionalized children, and tens of thousands of monkeys, as well as on themselves and their family members. They believed they were serving the greater good of society and of science.

- More than 100,000 monkeys were killed in the course of developing the polio vaccines.
- One rhesus monkey, when killed, supplied sixty-five doses of vaccine.

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