Poliovirus vaccine: Commentary

J.-M. Olivé¹ & B. Aylward²

In 1984, a year before the initiative to eradicate poliomyelitis from the Americas was launched, the 1960 paper by Sabin et al. (1) was reprinted as a Landmark Article in the Journal of the American Medical Association. In 1999, as the world reaches towards the year 2000 goal of global poliomyelitis eradication, we once again draw attention to this important scientific publication, which is effectively "a perennial".

We take this opportunity to reflect on the scope of Dr Sabin’s wide-ranging vaccine research career. Not only did Sabin develop oral poliovirus vaccine (OPV); he also organized field trials of the vaccine, conducted studies to assess different strategies for using OPV, such as this classic report of a study in Toluca, Mexico; and he envisioned the ultimate use of his vaccine to achieve global eradication of all wild polioviruses. This far-sighted, in-depth vision of vaccination serves as an inspiration to today’s vaccine research community.

In their paper, Sabin et al. demonstrated the feasibility of using OPV to reduce rapidly poliovirus transmission in subtropical and tropical areas. Two strategies were recommended for OPV delivery that still form the basis for poliomyelitis eradication. First, Sabin et al. recommended “feeding trivalent [oral poliovirus] vaccine on two brief occasions at an interval of six to eight weeks to all children under 4 to 5 years”.

Today this strategy corresponds to the mass immunization campaigns known as “National Immunization Days” (NIDs). In 1998, NIDs were conducted in nearly all poliomyelitis-endemic countries worldwide. Second, Sabin et al. foresaw that “oncoming generations of children will have to be similarly vaccinated at the optimum time during the first 6 months of life...”. Routine early immunization with OPV is a strategy that has been advocated by WHO for more than 25 years.

During his career, Sabin remained cognizant of the need for well-managed national immunization programmes to reduce and eliminate vaccine-preventable infectious diseases, and he contributed other papers that further refined the basic strategies for poliomyelitis eradication. He stressed the importance of surveillance, rapid virus isolation, the role of genomic sequencing of the virus, and the necessity of door-to-door administration of OPV in certain environments (2-4).

In 1988, more than 100 countries were endemic for wild poliovirus. Today, the eradication of wild polioviruses from Brazil, Cambodia, China, El Salvador, Laos, People’s Democratic Republic, Mexico, Peru, Zimbabwe, and many other countries has demonstrated the feasibility of poliomyelitis eradication, under even the most difficult circumstances (5). By the end of 1998, wild polioviruses were essentially confined to South Asia and sub-Saharan Africa. With continued progress, it is anticipated that poliomyelitis will be eradicated by the end of the year 2000, or shortly thereafter.

Failure to eradicate poliomyelitis, due mainly to insufficient resources, would have serious consequences for the global public health community in general, and for immunization programmes in particular. Unfortunately, since 1990, when the 80% global coverage target was achieved by the Universal Childhood Immunization Initiative, there has been a decline in donor support for immunization services in the developing world. However, examples from around the world indicate that poliomyelitis eradication can reverse this trend. Eradication of poliomyelitis can strengthen country commitment to rebuilding enthusiasm for immunization, revitalizing national immunization programmes, and attracting vital financial support from donor partners. In this regard, the major donors to poliomyelitis eradication, which include Rotary International, UNICEF, and the governments of Australia, Canada, Denmark,

¹ Acting Coordinator, Expanded Programme on Immunization, Vaccines and Biologicals, World Health Organization, 1211 Geneva 27, Switzerland.
² Medical Officer, Expanded Programme on Immunization, World Health Organization, 1211 Geneva 27.
Germany, Japan, the United Kingdom, and the USA, should be commended. But this work is not yet complete. Globally, an additional US$ 600 million is urgently needed to complete the eradication task. It is hoped that the recent call from Dr Gro Harlem Brundtland, Director-General of WHO, for more international support to poliomyelitis eradication will be answered and that "...in 2010 we should be able to look back at the year 2000 and say that we reached the goal of eradicating polio"(6).

This would be a fitting tribute to Sabin, who was not only a great scientist, but also a great benefactor. He did not patent the "Sabin strains", but made them freely available to all vaccine producers capable of making effective use of them. In 1972, in an unprecedented gesture, Dr Sabin donated these strains to WHO to increase their availability in developing countries (7).

References