

Polio vaccines and polio immunization in the pre-eradication era: a brief summary of the WHO position paper published 4 June 2010

The WHO Position Paper on polio vaccines that is published in the Weekly Epidemiological Record 4 June 2010 supersedes the previous (2003) position paper on introducing inactivated poliovirus vaccine (IPV) into countries already using oral poliovirus vaccine (OPV). A subsequent position paper will replace the 2006 paper on using IPV after cessation of use of OPV. The current paper covers routine polio immunization during the pre-eradication era, particularly in developing countries. This paper also provides links to literature lists and to grading tables that assess the scientific strength of some key conclusions.

Poliomyelitis (polio) is an acute communicable disease of humans caused by poliovirus serotypes 1, 2 or 3. In the pre-vaccine era, (i.e. before 1960) virtually all children became infected. In <1% of those infected, virus replicates in anterior horn cells of the spinal cord resulting in acute flaccid paralysis (AFP), commonly with persistent sequelae. The case-fatality rate among paralytic cases is 2% - 20%, but higher with bulbar involvement.

In 1955, inactivated polio vaccine (IPV, Salk's vaccine) was introduced, and in the early 1960s also the oral polio vaccines (OPV, Sabin's vaccine). OPV became part of the Expanded Programme on Immunization (EPI) in 1974, and in 1988 the mainstay of World Health Assembly's resolve to eradicate polio globally. Wild-strain polio viruses (WPVs) are now eliminated from 3 of 6 WHO Regions, and in the remaining regions the number of polio cases is reduced by 99%. WPV type-2 has not been detected worldwide since 1999. At the beginning of the new millennium, WPV persisted primarily in parts of Afghanistan, India, Nigeria and Pakistan.

However, during the period 2003-2009, there were 133 WPV importation events in 29 previous polio-free countries leading to 60 outbreaks and 2193 polio cases. By May 2010, 109 (83%) of these events have been controlled. However, outbreaks following 24 importation events in 13 countries are still active.

Both OPV and IPV are safe and efficacious vaccines that induce long-lasting protection against paralytic polio in at least 80-90% of the vaccinees. However, vaccine-associated paralytic poliomyelitis (VAPP) occurs in approximately 4 cases per 1 000 000 birth cohort/year in countries using OPV. Also, OPV-viruses can acquire the neurovirulence and transmissibility characteristics of WPV. Circulating vaccine-derived poliovirus (cVDPV) can cause polio cases and outbreaks. Furthermore, chronic viral shedding of virulent OPV-derived viruses is reported in a few cases of rare immunodeficiencies (iVDPV).

The risk of VAPP, cVDPV, and iVDPV has led a number of countries to change from the relatively cheap OPV to the parenteral, more costly IPV or to sequential schedules of 1-2 doses of IPV followed by ≥ 2 doses of OPV. IPV is likely to prevent VAPP and OPV strengthens the mucosal immunity.

In the current position paper, WHO underlines that all children worldwide should be immunized against polio, and every country should seek to achieve and maintain high levels of coverage with polio vaccine. When defining national policy on polio immunization the potential for WPV importation and transmission are crucial factors to be considered. Advice is offered on the choice vaccine (OPV or IPV) based on a graded risk assessment, as illustrated in Figure 1: In countries with a high or moderate risk of importation and transmission of poliovirus, OPV including a birth dose, is the recommended choice. IPV alone may be considered an alternative to OPV alone (or an IPV-OPV sequential schedule) only in countries that have the lowest risk of both WPV importation and WPV transmission. Recommendations are offered also for primary immunization schedules and for vaccination of travellers to and from endemic areas.

