Review of: "Consequences of Neglecting Epidemiology by Global Polio Eradication Initiative"

Norbert Hirschhorn

Potential competing interests: No potential competing interests to declare.

Professor T Jacob John has been the Cassandra of poliomyelitis eradication for decades. He has been consistent in his historical, social, virological, and epidemiological appraisal of how we got to the point of where some three decades and twenty five billion dollars have been spent chasing eradication of the virus.

I urge everyone reading (and reviewing) Professor John's latest contribution to buy and read, “Polio. The Eradication Imbroglio. The Malady and its Remedy” (T Jacob John & Dhanya Dharmapalan, Notion Press, India, 2021).

To summarize briefly:

The success of smallpox eradication led global health giants (WHO, Unicef, Rotary International, later Gates Foundation) to consider which disease would come next. Measles was an obvious candidate and a vehicle, WHO's Expanded Program on Immunization (EPI), was in full swing. However, the Global Polio Eradication Initiative (GPEI) established by the World Health Assembly in 1988, chose polio. (Perhaps Rotary International's efforts in the Philippines from 1976 and an immediate source of funding tilted the choice.) A decision was made early on to use the live, attenuated oral polio vaccine (OPV) developed by Albert Sabin over the inactivated poliovirus vaccine (IPV) developed by Jonas Salk. ("The Eradication Imbroglio…" recounts the bitter political and public relations fight between Sabin and Salk and their advocates.)

At first consideration, OPV seemed the logical choice of which vaccine to use. It was based on Sabin's belief that poliovirus was spread primarily by the fecal-oral route and thus mass vaccination with OPV would passively immunize unvaccinated children. This hasn't happened. Professor John has provided much evidence that the poliovirus is, in fact, spread by the respiratory route.

It was also assumed, against early clinical and virological evidence, that OPV would be benign. Nature's nasty trick was to allow reversion of OPV2 to virulence, causing clinical poliomyelitis with transmission. It was also thought that OPV would be cheaper, more easily administered by lightly trained health workers without using needles, and thus more acceptable to families. In fact, the opposite has occurred: many doses in mass campaigns over decades have been needed to create immunity to the disease, leading to resistance by families and mischief by religious and political “influencers”. (Multiple doses of OPV are needed in a number of countries where competing intestinal viruses, and diminished immune response caused by measles and malnutrition are likely causes.)

It is alarming how rapidly vaccine-derived OPV can spread globally, now found in waste water in several countries,

including Great Britain and the USA.

Those who study immunology have shown that OPV induces a better immune response within the intestine than IPV (it also promotes circulating antibodies). This argument ignores the epidemiological fact that IPV has greater vaccine efficacy than OPV, and thus a surer way to stop transmission of the virus, as pointed out in the paper under review.

To be fair, in the three decades of GPEI, “wild poliovirus cases have decreased by over 99% since 1988, from an estimated 350 000 cases in more than 125 endemic countries then to 175reported cases in 2019. Wild poliovirus [WPV] cases have decreased by over 99% since 1988 – today, two countries remain endemic for wild poliovirus”, https://www.who.int/health-topics/poliomyelitis#tab=tab_1 WPV strains 2 and 3 have been eradicated. A serious argument may be made that the “opportunity cost” was and continues to be too high, especially when what is needed is a robust, sustained, routine immunization program in the context of primary health care.

Here we have to stop and ask whether the goal is eradicate poliomyelitis as a disease, or to eradicate the virus, both wild and vaccine-derived. Under-immunization threatens both attempts. https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(22)01875-X/fulltext . See also Professor John's and Dr. Dharmapalan's earlier paper, https://www.qeios.com/read/2VCB2P.

It is time to bring IPV back into the global effort, especially when combined with other vaccine-preventable diseases.