

Editorial

Who benefits from global certification of polio eradication?

Only two decades ago, 500 to 1000 children were developing polio every day in India¹. The unfortunate victims were predominantly infants and children in families with low income, little or no education and poor understanding and access to prophylactic immunization programmes. A friend described them as the most innocent of innocent individuals, who became disabled due to the sins of omission and of commission of the government health system. These un-numbered un-named infants, who would have been paralysed but for the eradication efforts, are the real beneficiaries of this huge project thrust upon or taken on willy-nilly by the system.

We owe much to the leadership of the World Health Organisation (WHO) for having spearheaded this enormous global effort. It was made possible by the visionary initiative of the Rotary International and the co-operation of the United Nations International Children's Emergency Fund and the US Centres for Disease Control and Prevention. Some US \$ 3 billion dollars have already been spent globally by these international agencies in partnership; developing countries together would have spent perhaps an equal amount; and volunteers have absorbed the huge cost of their time and resources. The US \$ 3 billion dollars came from the richest of the rich in the world, and we salute them for their generosity. Their money is well spent, for the benefit of the poorest of the poor, bringing equity in benefit to all children of the world, a game in which all sides win. In India the governments and staff at central, state and *panchayati* levels as well as the Indian Academy of Pediatrics, other health professional organizations, medical practitioners from public and private sectors and literally millions of Rotary and other volunteers have worked hard over the last nearly one decade to bring down the incidence of polio to near zero level. Now we wait for finishing the remaining task in India so that the South East Asian Region could be certified free of wild poliovirus transmission three years later.

The WHO Region of the Americas, Western Pacific Region and European Region have already been certified free of indigenous wild poliovirus. Hopefully the remaining polio-endemic Regions also - African and Eastern Mediterranean - will be so certified in the near future, perhaps by 2008. Each Region has its own 'Regional Certification Commission (RCC)' that will certify the absence of indigenous wild poliovirus. The importation of wild virus from another yet uncertified region does not jeopardize the certified status, if its transmission is contained soon. In the past, the RCCs had not taken the laboratory containment of wild poliovirus into account for certification, but it is not clear if the ground rule will be altered for the remaining Regions².

The 'Global Commission for the Certification of the Eradication of Poliomyelitis (GCC)' will oversee polio eradication certification activities at the global level². According to the GCC, global eradication is defined as "the eradication of all wild polioviruses; the occurrence of poliomyelitis caused by vaccine viruses will not invalidate certification²". Therefore what the GCC intends to certify is the eradication of only wild viruses². The GCC has requested the WHO to develop a separate process to verify the absence of circulating vaccine-derived polioviruses in the post-certification era². This state of affairs leaves much to be desired.

The world has only one precedent to go by, namely the certification of smallpox eradication. The message to the world was that vaccination was no longer necessary once eradication was certified, for there was no more fear of natural smallpox virus transmission. Countries were left to their own timing to stop vaccination. Based on this experience and relevant scientific theories, the authoritative definition of eradication of any infectious disease is the "permanent reduction to zero of the worldwide incidence of infection caused by a specific agent as

a result of deliberate efforts; intervention measures are no longer needed³". Thus, the message from the certification of the global eradication of poliomyelitis by the GCC ought to be that further intervention, polio immunization in other words, will no longer be necessary. Anything short of this endpoint for global certification by the GCC will not be helpful for developing countries like India to decide on discontinuing immunization.

When the sixth and last of the WHO Regions will be certified that indigenous wild poliovirus infection has been eliminated, there will be no country from where it could be imported to any other virus-free country. In other words, the last Regional certification heralds the global absence of wild virus transmission. A separate process of re-certifying all Regions will not only be unnecessary but also liable for misinterpretation. The meaningful global certification should be the clear signal that polio immunization may be discontinued without risk not only for countries that stop immunization but also for the those that may wish to continue immunization. Moreover, the rich paid for polio eradication partly on the promise of perpetual profit from discontinuing polio immunization and the world owes them that much in gratitude. Any country that decides to discontinue polio immunization will share in this economic saving, for win-win equity among the poor and the rich. What are the pre-requisites for such certification?

Vaccinia virus is a heterologous species from smallpox virus, and neither did it cause smallpox nor did it spread (for all practical purposes) from person to person. Oral poliovirus vaccine, on the contrary, is not completely avirulent, but causes vaccine-associated paralytic polio (VAPP) that is indistinguishable from wild-virus polio in its incubation period, severity, clinical manifestations, pathology and case fatality. The viruses are also transmissible person-to-person. Such transmission results in nucleotide substitutions tending to take the progeny towards the wild phenotype in neurovirulence and transmissibility. In Egypt, such a vaccine-derived virus regained all characteristics of the wild virus, including efficient growth at high temperature, after

uninterrupted circulation for about 10 yr⁴. Anticipating such problems it has been proposed that true eradication of polioviruses should be defined as zero incidence of infection with wild and vaccine viruses⁵. In short, what the world needs from the GCC is certification after all risks from wild and vaccine virus infection are removed. If GCC will not do this, then who else should certify eradication to usher in an era when polio vaccination can be safely stopped?

The pre-requisites for such meaningful global certification of the eradication of infectious polioviruses include: (i) the last Region certified free of wild virus; (ii) early discontinuation of oral polio vaccination in every country; (iii) continued surveillance for a sufficient length of period for any surviving chain of transmission of vaccine-derived virus; (iv) interruption of such chains if detected; and (v) the thoughtful decisions of the GCC to ensure laboratory containment in all Regions.

If wild viruses could be eradicated, certainly it should be easier to eradicate vaccine viruses that are less efficient in transmission and continued circulation. USA and Canada in North America and France and Germany in Europe have already shown the world the proof of principle of the elimination of vaccine-virus infection. My intention here is not to prescribe how to achieve the true global eradication, but rather to point out the urgency to do it. If it cannot be achieved without introducing inactivated poliovirus vaccine, so be it. The WHO and all partners, global, regional and national, must lose no time to re-think the ground rules and tactics for achieving and certifying the zero incidence of poliovirus infection everywhere. That will be a monumental global public health achievement and could well be the most prominent feather in WHO's cap.

T. Jacob John

Member

Editorial Board of IJMR

e-mail: vlr_tjjohn@sancharnet.in

References

1. Basu RN. Magnitude of problem of poliomyelitis in India. *Indian Pediatr* 1981; 18 : 507-11.
2. Smith SJ, Leke R, Adams A, Tangerman RH. Certification of polio eradication: process and lessons learned. *Bull World Health Organ* 2004; 82 : 24-30.
3. Ottesen EA, Dowdle WR, Fenner F, Habermehl KO, John TJ, Koch MA, *et al.* How is eradication to be defined and what are the biological criteria? In: Dowdle WR, Hopkins DR, editors. *The eradication of infectious diseases, A Dahlem Workshop Report*. Chichester: John Wiley & Sons; 1998 p. 47-60.
4. Kew OM, Wright PF, Agol VI, Delpeyroux F, Shimizu H, Nathanson N, *et al.* Circulating vaccine-derived polioviruses: current state of knowledge. *Bull World Health Organ* 2004; 82 : 16-23.
5. John TJ. Can we eradicate poliomyelitis? In: Sachdev HPS, Choudhury P, editors. *Frontiers in pediatrics*. New Delhi: Jaypee Brothers; 1996 p. 76-90.