CONTROVERSY

Polio eradication and ethical issues

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Yash Paul's paper (1) raises several technical questions about polio eradication. The ethical issues are implicit, but must be made explicit. Although disease control decisions are based on epidemiologic and economic considerations, any intervention involving people has ethical implications.

In 1978 the Government of India decided to use oral polio vaccine (OPV) to control polio, occurring then at the average rate of 500 cases per day (2). The primary vaccination schedule was three doses in infancy. The prevailing popular belief (based on theory, not evidence) was that vaccine viruses would spread in the community, immunise unvaccinated children, induce high herd effect, and control polio rapidly. The alternate choice, the injectable polio vaccine (IPV), marginally more expensive, was believed to protect only the vaccinated. Thus, OPV was (erroneously) considered the better 'public health' vaccine.

Most of the questions raised in the paper had been answered many years ago – identifying low vaccine efficacy (70 per cent for three doses of OPV) as the reason for frequent vaccine failure (3, 4); the need for 10 doses per child for 99 per cent protection (5); the advantages and high efficacy of IPV (6, 7); and the high 'force of transmission' of wild polioviruses and the low herd effect of OPV (8, 9). In the West, vaccine-associated paralytic poliomyelitis (VAPP) in vaccine-recipients and contacts had been identified. Its frequency was generally low, but with geographic variations. Clearly IPV was ideal (safe and effective) for the individual. OPV was erratic and unsafe.

Here lies the ethical problem that had been ignored by the silent majority, including Yash Paul, for decades. The government chose OPV for public health, and refused to license IPV to avoid 'competition'. As it turned out, the putative public health advantages of OPV did not materialise. The burden of disease did not decline for 10 years. Even those with the best interests of children did not understand this twist in policy –epidemiologically subtle but ethically unsound. The lesson is: what is not in the best interests of the individual cannot be in the best interests of the community. OPV could be justified only as an interim measure, provided polio was controlled quickly by its efficient use (10).

When the polio eradication programme was established, history was repeated. Pulse vaccination with OPV (or national and sub-national immunisation days, NID, SNID) had been shown to improve the herd effect; it also provided an opportunity to give repeated doses to the same children.

From 1988 (when the declaration to eradicate polio was signed) to 1995-96 (when India began eradication efforts), the price of IPV had risen. Anticipating the future need, the National Mission on Immunisation recommended indigenous (public sector) manufacture of IPV. After much progress was achieved, the government decided to close the project. Today, the number of VAPP cases exceeds wild virus polio and ethics has once again come to the forefront. As all rich countries want only IPV, the price has become so high that it is unaffordable for public health in India. All those who ignored ethics and scientific evidence in the past (including Yash Paul), have realised their mistakes when it is too late to correct them.

Imagine choosing between an attractive but cheap boat and an older but slightly more expensive boat to cross the sea. Against local knowledge that the old boat was fast and fuel-efficient, the visitors, experts at sea, hired the former. After covering more than half the distance, the boat is found to be leaking badly, moving slowly, and consuming too much fuel. The arrival date has already been missed by a wide margin. What should be the next move? To go back and hire the efficient boat or somehow to complete the voyage in the leaky boat? Passengers can protest loudly, but achieve nothing except create ill will.

A second lesson: technical failure is why ethics is highlighted, whereas ethics should have guided intervention in the first place. Indeed, the (neglected) ethical duty of the government is to give free care, rehabilitation and compensation to all children affected by VAPP.

In times of war all citizens must remain united. Dissension must be put aside to win the war against wild polioviruses, which is our immediate collective responsibility. I do not share Yash Paul's pessimism about the eradication of wild polioviruses. The need of the hour is to plan the future tactics of completing and concluding polio eradication. We must not simply wait for others to go ahead and then to find fault in hindsight. The road map after eliminating wild polioviruses is what we must discuss (11). OPV must be stopped soon after the elimination of wild viruses, as it will be unjustified to cause VAPP when natural polio will not occur.

Both technical and management deficiencies have delayed the interruption of wild polioviruses in some 20 plus districts, mostly in Uttar Pradesh and Bihar. The low efficacy and poor herd effect of OPV at the achieved coverage levels did not match the high force of wild virus transmission. Yet, if the question is whether

wild viruses can be eradicated by the tactical use of OPV, the answer is 'yes'. To achieve that, near 100 per cent coverage with an average of 10 doses per child will be required. Where the vaccination infrastructure is weak, this is best achieved through repeated pulse vaccination campaigns. The current use of monovalent OPV will accelerate the build-up of immunity, partly overcoming low efficacy of trivalent OPV. The setback in Tamil Nadu, Karnataka and Andhra in 2003 was clearly by imported wild viruses. Their efficient elimination attests to the advantages of a robust routine immunisation system and the feasibility of eliminating wild viruses with concerted overuse of OPV. We do not have the time to wait for the infrastructure to improve in order for polio to be eradicated

IPV should have been licensed in India long ago, but its limited use in a few immunocompromised children would not have accelerated the elimination of wild viruses. For that purpose high (greater than 80 per cent) coverage with at least two, ideally three, doses, should have been achieved. This in turn demanded a strong immunisation infrastructure. Had we used IPV in routine immunisation (combined with the DPT vaccine) and used OPV in pulses, perhaps we could have achieved eradication more efficiently. Had we achieved greater than 90 per cent coverage with IPV, perhaps polio could have been eradicated without additional efforts. But history cannot be changed, only the future can be redesigned.

Stopping OPV after eliminating wild viruses is an ethical necessity. But, epidemiologically it is unsafe to do so, for fear of the emergence of circulating vaccine-derived polioviruses (cVDPV) with regained neurovirulence and transmissibility, mimicking wild polioviruses (12). Here lies the dilemma of the future. Eradication can be complete only when it is safe to stop vaccination altogether. I believe that IPV will have to be manufactured in India (to make it affordable in the quantities needed) and used to cover the withdrawal period of OPV, to prevent the emergence of cVDPV (11, 12). Only after vaccine viruses are eliminated should we consider polio eradication complete. Let us hope that the mistakes of history will not be repeated.

Note: *There are several errors in Yash Paul's paper. The term cVDPV (or vaccine derived wild-like, VDWL, virus) denotes vaccine virus with >1% acquired genetic divergence from Sabin original, due to long (>1 year) circulation (11). 'Recipient VAPP' is due to primary vaccine virus infection, not VDWL virus. Today no one except Yash Paul would consider a child 'fully immunised' with three doses of OPV. Ten doses are needed for immunity in 99% of children. Only children with congenital B cell defects have the risk of chronic vaccine virus infection – not children with other forms of immune compromise. Chronic infection has not been documented with wild polioviruses. The Assistant Commissioner (Immunisation) has no role in licensing a vaccine – that is the function of the Drugs Controller General of India. The Indian Academy of Pediatrics has no* locus standi *in getting a vaccine licensed. The vaccine manufacturer or marketer alone can apply for a vaccine license for marketing. WHO is a UN organization without executive powers in member countries. National policies are made and implemented by countries, not WHO, which has no executive powers.*

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Note: The opinions expressed here are personal and not of the organisations with which I am associated.

UNESCO draft declaration on ethics, human rights and research

The United Nations Educational, Scientific and Cultural Organization (UNESCO) has issued a draft declaration that it says will be the first ever to commit governments to take a position on the ethical and human rights dilemmas raised by modern research.

The draft declaration will be submitted for approval by all 192 UNESCO member states in October. It is available on the internet at http://portal.unesco.org/shs/en/ev.php-URL_ID=1883&URL_DO=DO_TOPIC&URL_SECTION=201.html