The Story of Polio elimination in India

Interview with Dr. T Jacob John

Dr. T Jacob John, an alumnus of the Christian Medical College (CMC), Vellore, qualified as a pediatrician in 1961. After completing his MBBS in Trivandrum, he came over to do his DCH (Diploma in Child Health) in CMC Vellore, followed by MRCP in Edinburgh. In the following years, he specialized in pediatric infectious diseases covering laboratory Virology and Microbiology in the USA before returning to India to resume work in CMC Vellore. He was the chief of the Virology service of CMC from 1967 till 1995. He also functioned as the chief of the National HIV/AIDS Reference Centre for 10 years and as chief of the Advanced Research in Virology for 15 years. His discovery of the problem of OPV failure in India led to the pioneering of the “Pulse Polio” programme in India that has led to the elimination of the wild polio virus in the country. He developed a monkey model of polio and showed the entry of the Sabin virus in the monkey spinal cord. He led the CMC Virology team that was the first to identify HIV infection in India in 1986. Though he retired a long time ago, he continues his crusade against scourges like Polio, Measles, HIV and Tuberculosis and is the chairman, member or an advisor to national committees and international organizations like the WHO. Dr. T Jacob John embodies the ‘spirit of inquiry’ that leads to scientific discovery and innovation ultimately leading to healing and alleviation of human suffering due to disease.

CMI: Tell us the story behind the polio vaccine in India and the elimination of polio.

Ok I’ll take the story back to the early 1960’s, when you could come to the paediatric ward on any day and you would see at least one case of polio – a child was well one day, the next day couldn’t walk – crippled for life. The then professor & head of the dept., late Dr. John Webb began importing oral polio vaccine from UK and introduced it into our immunisation clinic. Simultaneously, or perhaps a year later, the Bombay Municipal Corporation because of the huge numbers of cases of polio, also began importing distributing free oral polio vaccine. This was in 1964-65 period when I was in US, sent from Dept. of Child Health for training in infectious diseases. In 1966, I came back from my study leave & my schedule was like this - every morning up to lunch-time, I worked in paediatrics, and after lunch-time I worked in research, in the virology laboratory which was a nested unit in the Dept. of Paediatrics. In early 1967, I saw a little girl in the OPD, three years old, who had developed clinical poliomyelitis. The story began with her.

CMI: Do you remember her name?

I don’t remember her name, but I have been telling everybody - Lakshmi. She had typical polio like paralysis with a history of 3 doses of OPV given in our clinic. I took the case to Dr. Malathi Jadhav, the unit chief, presented the case to her and said, “It is strange that this child has had 3 doses of OPV yet developed polio.” Her initial suggestion was that the immunization history must be wrong. So we double
checked with the mother and it was also documented in the outpatient records, that she had received 3 doses of OPV. So the history of three doses was validated. Then Dr. Malathi’s suggestion was very interesting – she said this could not be polio, but was a polio-like illness. **In the available information at that time, in journals and books, there had never been anybody who said that 3 doses of OPV do not protect a child from polio.**

So although there was no particular need to diagnose poliomyelitis by virology, in this particular case, I had to prove that it was polio. So I collected a stool sample, inoculated it into cell cultures that we had, and lo & behold, the culture grew polio virus. It was type -3 polio virus. **There was a problem here.** There were no recurrent infections and the child was otherwise healthy, so there was no reason to think of immune deficiency. Because of this case I informed all my colleagues that I was willing to do a virology culture free of charge in all cases of suspected poliomyelitis. In this way, during one year I collected 4 children with three dose vaccine failure, with culture proven polio – and it so happened that all of them had type – 3 virus. So here, we had, for the first time in the world’s understanding of polio, uncovered a problem, that in Vellore, the type -3 component of the trivalent vaccine was not working well.

Around this time, towards the end of ’67, Dr. John Webb was returning to Vellore, back from furlough in the UK. The man sitting next to him in the flight happened to be Charles Cockburn, the medical officer of Virology in the WHO. It just so happened that they sat next to each other. He told Webb, “There seems to be a small problem in two places (Kenya & Singapore) - antibody response to trivalent OPV is sub-optimal, not as good as in western countries. I am sure this is because the vaccine gets heated in tropical countries and so the antibody response is not good. I want someone to give vaccine that is not heat–damaged & then measure the antibody response in a tropical country. Do you know of anyone?” Webb mentioned my name and Cockburn wrote to me asking me if I would be interested in doing some studies on measuring immune response. I agreed. In 1968 May, since I was involved in this study, I was invited to a round – table conference in Helsinki, with Albert Sabin & other experts in polio. I narrated my experience and Sabin asserted that it was probably high levels of maternal antibody in the tropics due to repeated infections, that was inhibiting immunity due to the vaccine. So he suggested not giving the vaccine below 1yr of age but rather after one year, when maternal antibodies are completely gone. He felt it would work better that way. I countered this by saying that in Vellore, 50% of polio cases were below 12 months of age, if maternal antibody was protecting these babies, they would not get polio. So there had to be some other explanation.

So we did a study and it showed very low antibody response to type 3 & also type 1 virus components, but good antibody response to the type 2 component, in Vellore. So there are now two pieces of evidence, clinical vaccine failure and primary vaccine failure. (If you give the recommended number of vaccine doses and there is a breakthrough infection, it is called **clinical vaccine failure** and if the disease is because the immune response was absent or inadequate.)
inadequate, we call it **primary vaccine failure**. If a child got immunised, and subsequently lost immunity and then got disease – that would be **secondary vaccine failure**. Whooping cough is well known for secondary vaccine failure.) Primary vaccine failure or clinical vaccine failure was unheard of for polio. So clinical vaccine failure and low antibody response – put these two together, we had a phenomenon of sub – optimal vaccine response.

Our immediate goal was to somehow overcome this problem. So we went back to our study results. When we stacked up the antibody response to doses 1, 2, and 3, for all three virus types, there was a beautiful phenomenon immediately obvious – there was a step – wise increase in the immune response to sequential doses. The second step was identical to the first step in arithmetic proportion. If 100 children had one dose and if 30 (i.e. 30%) responded to that one dose, only 70 are left. Out of seventy, 30% respond to the 2nd dose. Out of the remaining, 30% responded to the 3rd dose. (This was the first time this phenomenon of arithmetic proportionality was actually detected). So we could now predict what would happen if you gave 5 doses. (Five doses, because there were 5 contacts in the EPI – BCG at birth, 3 doses of DPT & measles at 9 months.) The predicted and the measured values (in field testing) of antibody response to 5 doses absolutely coincided. So our prediction was proven to be true. Still, with 5 doses, we were not reaching even the 2 dose results in the US.

**CMI: You mean the immune response is different in the US when compared to India?**

Very different (for trivalent OPV). In the US, by the time you give two doses, virtually 99% children are immune to type 1, 2, 3 viruses and after three doses, virtually 100% are immune - nobody has ever developed polio after 3 doses. Here we have vaccine failure after three doses. Five doses was an improvement but not necessarily a final answer to the problem. So we looked at enhancing the content of the polio vaccine 10 times. We did not get a tenfold improvement in immune response – only a marginal improvement. We simultaneously looked at giving monovalent vaccine separately for types 1, 2 and 3. This was published in 1976. For monovalent type 1 & 3, per dose, the response rate was 3 times higher than that of type 1 & 3 in the trivalent vaccine. So now we had a better answer – monovalent vaccine. But monovalent vaccine is not suitable for the national programme, since you have to juggle with three vaccines; so monovalent was not the answer for routine immunisation. (However, this study became of critical value in 1995, when monovalent OPV 1 and 3 were licensed in India.)

I had yet another an idea. OPV is an infectious vaccine - it infects the GI tract and then the body mounts an immune response. If you get ‘infection’ you get an immune response. The problem here seemed to be in the ‘infection’ step. It was not that Indian children get infected and have an immune response deficiency. If you inject a vaccine, the body has no escape, cells have to confront the antigen. So I studied the response to the injected inactivated poliovirus vaccine, IPV, known as Salk vaccine. The result was excellent. On the other hand, in the gut, the antigen can be ignored (for example, by innate immunity).

The controversy is alive because people still say that it is immune response deficiency in the tropics. I keep telling them it is ‘infection resistance’ in the gut – better protection against non-pathogenic viruses like vaccine rotavirus and OPV. It is not that children in tropics are less immunocompetent. Last
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month, I was told by some experts in Washington that they agreed with me. The crux is innate immunity. Innate immunity gobbles up 95% of all infectious agents and only 5% is taken to the immunocompetent cells. (These figures are just for illustration, not measured.) Innate immunity system somehow discriminates between pathogens and non-pathogens. So I hypothesise that in the tropics, our gut innate immune system is hyper-alert on account, perhaps, of repeated infections, and is ignoring OPV. Laboratory evidence for this is slowly emerging in other laboratories.

So how do we overcome this problem? IPV was the obvious choice but it was not licensed in India and WHO had a policy of exclusive use of OPV in India. So, we had to innovate to improve response to OPV. There is a well known phenomenon: every disease outbreak is followed by a lull of very low disease frequency. This is a shadow period after the outbreak, because an outbreak creates a very high population immunity. The outbreak ‘consumes’ (or exhausts) the susceptible children. Only new additions to the population can keep the cycle of infection going. You have to wait until susceptible children accumulate for the infection to continue circulating. To mimic this cycle with OPV, we created an ‘outbreak’ of OPV infections. That would dramatically decrease the number of susceptible (non-immune) children and retard the speed of circulation of the natural (wild) polioviruses which in turn would reduce the incidence of polio. So we designed something called cluster vaccination. Don’t vaccinate by age – but vaccinate everybody below 5 years simultaneously. This was done with Dr. Abraham Joseph of Community Health Department, in one of his villages.

It was a small war that started in Vellore. It then spread over to the entire Tamil Nadu and across India. Thanks to this relentless battle, the nation has been free of the dreaded polio for a year now. Two institutions - the Christian Medical College Hospital and the Rotary International played a significant role in pioneering the drive against polio about 30 years back. – Indian Express, March 4th 2012

CMI: Was this the Pulse Polio programme?

Yes, later on I changed the name to “pulse” because cluster immunization does not quite capture the philosophy of repetitive pulsing. We found that the immune response in the village was far superior to what we would have achieved by taking individual children and giving them the vaccine. That itself was unexpected, but very encouraging. Now, how did we apply this knowledge?

We did a very simple but seminal experiment. We did a continuous case count of all children in Vellore town developing polio through a networking of CMC, Govt. hospital and a private Siddha specialist in paralysis, over two years. We now had an accurate incidence data. There was no month without polio; the average number was 4.2 cases per month i.e, 48-50 cases per year in Vellore town alone.

Then in 1981, October, November and December we did a pulse campaign through the Rotary club. Publicity was through a ‘polio walk’ – from Katpadi station to Scudder Hall – children and adults with placards wearing T-shirts inscribed ‘walk for those who cannot walk’. With this awareness creation in the city, we gave OPV pulses in 16 centers (all children below 5) – Oct, Nov and Dec. Lo and behold, from Jan to September the next year – for nine consecutive months, zero case of polio in Vellore. There were just 3 cases in the entire year following this campaign – in the 10th, 11th and 12th months. We repeated 3-dose pulsing for one more year - again no polio in the entire town for 9 months. The necessary quantity of OPV was generously donated by Save The Children (UK), courtesy Dr Peter Poore).

Why October, November and December?

We chose these months for pulse immunization because
we had found some indication of better immune response during the cool months of the year – for some reason. We don’t know why. It is a strange phenomenon. When India adopted pulse immunization in the second half of 1990s, we chose these cool months for the same reason.

So we maintained Vellore town almost without polio for 2 consecutive years. Then catastrophe struck: the municipal health officer (Late Dr Rajasekhara Pandian) who helped us with all this was punished with transfer because “campaign immunization” was against national policy.

**CMI: Just for that?**

Yes, just for that. In other words, the government was not appreciating what we were doing. Instead, they were still finding fault with us for little things. This is a strange phenomenon in India. This happened again and again in the initial days. You show something good – people look at some minor procedural something. Anyway, we did not lose time, since in 1984 we had a bigger mandate from the Indian Council of Medical Research, to take charge of immunization in the entire North Arcot district (later bifurcated into Vellore and Thiruvannamalai districts) and we controlled polio in the entire district, population 5 million. This is how it all began.

**CMI: Why is the OPV given at 6, 10 and 14 weeks?**

Since most of our cases were very young children, (in fact we had cases starting from 5 months onwards), I began pushing the idea that we should start EPI (Expanded Programme of Immunisation) at 6 wks instead of 2 months. – 6,10,14 weeks – 3 doses, so by the time the child is susceptible to polio, you have already given 3 doses. That is one of the reasons why WHO changed the schedule of EPI from 2,3,4 months to 6,10,14 wks – only for the sake of polio. We then succeeded to get a dose at birth approved by WHO – so children would get 4 doses before reaching 4 months of age.

**CMI: What is Inactivated Polio Vaccine (IPV)? What is the virus used in IPV and how is it different from OPV?**

IPV contains killed polio viruses – all three types. It is a killed trivalent vaccine. Sabin viruses (OPV) are attenuated or weakened (reduced virulence) viruses, derived from natural or wild polioviruses. When a person is infected by the wild virus, thereafter he/she is immune and protected from polio disease when exposed to infection. OPV mimics nature, and if a child is infected with vaccine virus, he/she becomes immune against that type of wild poliovirus. OPV contains live polio viruses given by mouth to infect the child with attenuated viruses.

Let us look at IPV. There is excellent antibody response to IPV – just as in the West. There is no difference between the West and the tropics in immunogenicity with IPV, unlike with OPV. But how do you prove that this immunogenicity will result in polio prevention? We did an experiment in RUHSA in 1980. The entire population was divided into 2 equal groups. One half got the usual routine immunization (DPT). The other half got the DPT + IPV combination. (OPV was not recommended in the rural population by the national programme at that time). The result - hundred percent polio prevention.
CMI: With just IPV?

Yes. It was 17 cases in control population versus 0 in study population – statistically highly significant. There was no need to even test statistical significance. After the study was over RUHSA wouldn’t give up IPV. Even when OPV became national policy, they continued to give IPV. IPV was not part of the national policy – but they maintained the community on IPV, without polio. The rest of the country continued to have polio even with 3-dose OPV immunisation. The point is that IPV was found to be far superior to OPV in the community for controlling polio.

OPV has another problem that we realized in the early 80’s (from literature) -- that it occasionally caused polio in the vaccinated child. It is called vaccine associated paralytic polio (VAPP). IPV is 100% safe in this respect.

CMI: But it is costly?

Yes it is costlier. In those days it was 5 times costlier than OPV. Now it is 20 times costlier. This is because it is marketed mainly in the rich countries. IPV was developed first – licensed in the USA in 1955 and OPV in 1962. A few countries had never switched from IPV to OPV and they had eliminated polio without experiencing VAPP. France had allowed both vaccines but IPV use increased and OPV use came down; in 1987 OPV was abandoned in France.

CMI: Tell us something about vaccine associated polio.

By 1990s I found something very disturbing in the early history of the introduction of OPV in the USA. Soon after US switched from IPV to OPV, vaccine associated paralytic polio (VAPP) cases were recognized. They found cases in vaccinated children and close contacts of vaccinated children. That is no surprise as we know vaccine viruses can be transmitted to close contacts of vaccinated children.

Then there were a few cases of children who developed polio with no history of vaccination and no contact with those who had been vaccinated. Yet their polioviruses were vaccine-derived. Public health people called it “community acquired VAPP” So that to me meant that vaccine viruses can not only spread from vaccinated children to contact children but also circulate in the community. That was a signal that meant OPV could be unsafe for the community. However, they did not switch back to IPV, justifying VAPP by saying that OPV was more cost-effective. (I believe the real reason was that the same public health leaders who switched from IPV to OPV had to admit their error for switching back to IPV. People in high positions do not ordinarily admit mistakes!)

We had shown in Vellore, using a monkey model that it takes 10,000 times larger dose of attenuated virus to cause intestinal infection compared to the wild virus. Attenuation means not just low neurovirulence but also low gut infectivity and therefore transmissibility. The loss and regaining of neurovirulence are well known as determined by genetic mutations. What we realized by 1990s was that infectivity and transmissibility were also reduced by attenuation, suggesting they are also genetically determined. If neurovirulence is reversible (to explain VAPP), is not transmissibility also reversible? If one virus lineage reverses with both properties we have wild-like poliovirus emerging from vaccine virus. The virus causing community acquired vaccine-virus caused polio

Vaccine associated paralytic poliomyelitis (VAPP) – Paralytic form of poliomyelitis, related to the vaccine strain, in individuals who have been vaccinated. It is a rare but serious adverse effect.
in the US was probably vaccine virus that had reverted to its wild type in both properties. This is a very dangerous situation and I raised the alarm - OPV cannot be the weapon for polio eradication. And OPV cannot eradicate polio since vaccine viruses themselves can circulate and cause polio. Obviously OPV is incompatible with true polio eradication.

I have been saying this since 1993. Lo and behold, that became true and widely accepted much later. There was an outbreak of poliomyelitis caused by vaccine derived virus in Hispaniola island in the Caribbean. That is when the term ‘circulating vaccine-derived poliovirus’ was coined – the virus had to circulate widely to cause a polio outbreak.

In 2012, WHO accepted my long-standing advocacy that IPV will have to be introduced and OPV will have to be eventually discontinued to complete polio eradication. What I had been saying for 20 years was finally accepted by the global experts.

**CMI: So now the WHO’s policy is IPV?**

Yes IPV, not OPV for final polio eradication. However you cannot suddenly convert from OPV to IPV. You have to go through phases. Suppose you stop OPV in India now, polio due to vaccine-derived viruses may break out in huge outbursts in various places. So you have to add IPV without changing anything, so that vaccine viruses could be eradicated. That will be the first step towards the withdrawal of OPV. In 2015, all countries currently using OPV exclusively will have to introduce IPV, including India. This is the WHO policy.

**CMI: What is your suggestion for IPV?**

IPV is the vaccine of the future. To start with at least one dose is the current WHO policy. For children already immune due to OPV, one dose will boost both serum antibody levels and also intestinal immunity to reduce shedding of polioviruses in case the child gets infected.

As a prime boost vaccine, a minimum of 2 doses are necessary to induce protective immunity in children who have no prior immunity. And we had shown long time ago and it has been confirmed in Cuba – 14 weeks is ideal, to give the first dose. In 2015 there will be no change in OPV – continue OPV and build up IPV coverage. Then in probably April of 2016, if all goes well, the plan is to synchronously withdraw type 2 globally from OPV and give only types 1 and 3. In other words, trivalent to bivalent switch under IPV as an umbrella of immunity. This is an experiment to learn from – in future we will have to remove types 1 and 3 also. We can learn lessons from removing type 2 first.

Type 2 wild virus was eliminated in 1999. Type 2 does not cause much of vaccine associated polio. But globally, among the polio cases and outbreaks due to vaccine-derived polio viruses, over 85% was by type 2. So there is every justification to pull type 2 back. This is a global experiment. Eventually we will have to shift to exclusive use of IPV. This is the way forward.

**CMI: Officially polio is eradicated in India. What does that mean?**

Eradication is a global term. Elimination is a national term so if you remove polio from a country, it is called elimination.

So have we eliminated polio? Yes, we have eliminated wild virus polio in India. We continue to have vaccine induced polio in fair numbers. We assume it is about a 100 cases or more per year. Vaccine induced polio is not defined as poliomyelitis because it is not caused by wild polio virus. This is defined as vaccine reaction. The point is that everybody knew that this would happen and WHO’s vision was that once wild polio virus disappears, all polio will be vaccine induced polio. You stop OPV.
and even this will stop. I have been saying that this has to be done very cautiously because there would be chains of transmission of VDPVs in the community. Currently OPV immunization is interrupting them. We still need OPV to stop these chains of transmission of infection. The more you vaccinate, the more chains are killed.

**So you feel that OPV, at least the bivalent OPV should be continued along with IPV?**

Yes, as long as countries like Pakistan and Afghanistan have wild polio virus type 1 still circulating.

**CMI: Do you feel that the wild and vaccine derived polio can be eradicated and we won't need the vaccine anymore?**

The wild viruses have been eradicated globally with OPV, except in Pakistan, Afghanistan and Nigeria. Nigeria will probably get rid of wild polio this year. So wild viruses can be eradicated globally with OPV. European Countries achieved it with IPV. Globally vaccine viruses will also have to be eradicated. Eventually the goal is a world with no polio. To create that situation, and be sure, you should have 5 years of only IPV, detecting no polio virus of vaccine or wild origin anywhere. Only at that time can we consider stopping IPV.

**CMI: How did the time you spent in the US influence your work?**

My stint in the USA taught me the skills of clinical and laboratory diagnosis of infections, but more importantly to be self-confident and self-reliant. Because I was trained in the US, I learnt that your experiments remain incomplete until they are published. In India people believe knowledge is nirvana. Publishing was not a part of Indian medical college culture at that time. The general attitude was - why publish? Some leaders in CMC had the idea that publication is self promotion that goes against humility, it shows a streak of arrogance. I countered that by saying our team leader, Jesus, was a preacher – preaching & teaching. So if you don’t teach you are not a good Christian. To teach, means you research and publish. Today as I go to many places in India and abroad and I come across people who tell me that I am their guru. “But I have never seen you”, I told one of them. He replied, “But I have learned a lot by reading what you have written”. Publishing your work is therefore not against CMC ethos as some have suggested – I would say publishing is a must for CMC.

Also, my theological understanding of Jesus’ command to “Go heal” includes “Go prevent” also. “Go heal” in the 20th century meant to heal & prevent.

**CMI: What made you come back to India and work here?**

A deliberate and conscious decision. The temptations overseas were great – the salaries, the positions offered. If I had been born in a rich country, staying in US would be fantastic. But having been born in a country like India with so many problems and you know that you can contribute a small bit to address these problems, how can you think of living in the US? You have to come back and do something here. The least that you do unto my brothers, you do unto me.

**CMI: How important was it that you were in CMC?**

I think the whole credit goes to CMC. To be productive I had
to have an institution that gave academic freedom and challenges. One example, the first case of HIV in India was detected by us in CMC in 1986. The next year, there was a meeting in Delhi, arranged by Valsan Thambu. Someone asked me, “Why did you look for HIV?” I said something like: “I take it as my religious duty to mitigate future human disease.” There was pin-drop silence for two minutes. Valsan later told me that it was a powerful statement of witness.

CMC began universal hepatitis B screening of blood before transfusion in 1972 -- first in the developing world barring Taiwan. In 1986 I wanted HIV screening to be added. Initially though, there was resistance to HIV screening. We were told to prove that there was indeed a risk of transmission. When this was proved, unfortunately by someone getting AIDS from transfusion in our hospital, in 1988, we started universal screening.

It was only in CMC that doctors were willing to do surgeries on patients infected with HIV. Large corporate hospitals used to send patients to CMC under some pretext, for this reason.

CMI: So CMC was the first hospital in India to operate on HIV infected patients?

Absolutely. Not many know about this, very few sing about this. We were even admitting patients in general wards. But it did not start this way. The first AIDS patient was admitted in October 1986. He was an American in a Jubba-pyjama, here in India on a visit, with extensive Kaposi’s Sarcoma.

He was admitted in a room in the then R ward. The person serving food would yell “FOOD”, push the plate across the floor, close the door and run away. So I had to take classes immediately for the junior doctors, nurses and class 4 workers. The next day, during rounds, I sat on the patient’s bed, put my left arm around his shoulder and talked to the junior doctors. This electrified the group. Attitudes changed after that. I knew and had to show that HIV did not spread by touch. But would I do this with Ebola – absolutely no. However, will you treat him like a human being – yes.

The story of Polio is only one part of the bigger story of CMC’s contribution to the development of India, only one ingredient among many that have contributed to nation building.

The continuing polio challenge

Extract from editorial of ‘The Hindu’- Nov 12th 2014

Polio has bounced back with a vengeance in Pakistan. Compared with 53 cases reported during the period January to September last year and 54 in 2012, there have been 174 cases during the corresponding period this year. With a sharp spike in the numbers, Pakistan has turned into a bigger polio reservoir, accounting for 80 per cent of the world’s cases. The Taliban militants’ role in preventing nearly a quarter of a million children in North Waziristan from being vaccinated against polio over the last two years has marked a severe setback to the country. There is a monumental task ahead for the polio programme in Pakistan as no province is free of the disease; even cities such as Karachi and Lahore have recorded a few cases this year.

“The polio programme [in Pakistan] is a disaster. It continues to flounder hopelessly, as its virus flourishes,” notes a recent report of the Independent Monitoring Board. Pakistan should also explore the option of giving at least two polio shots to children in addition to the oral polio drops. The double-vaccination strategy can greatly boost immunity and reduce the number of oral drops campaigns needed. With the Pakistan virus paralysing children in Afghanistan, Syria and Iraq, the possibility of it emerging in India is real. India, which has been polio-free for over three years, cannot lower its guard till such time as polio is eliminated from Pakistan, Afghanistan and Nigeria, the three polio-endemic countries.