

# Vaccination in India - Is a New Dawn Coming?

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**Abstract:** While India has achieved much in its vaccination program, especially its much feted Oral Polio Vaccine program, it continues to have challenges in increasing the coverage of its population, largely due healthcare infrastructure and awareness. This paper will briefly look at the history of vaccination, the success of the OPV (pulse polio) campaign, then progress to discuss the performance of the Intensified Mission Indradhanush (IMI) campaign which aims to address the “vaccine deficit” In India at an accelerated pace. Finally, the paper seeks to compare the highly successful pulse polio campaign with the IMI2.0.

**Keywords:** vaccination, healthcare, Mission Indradhanush, oral polio

## 1. A brief history of vaccination in India

The smallpox vaccine was brought to India by the British in 1802. The progress of vaccination in India was accelerated by the genius of Dr Haffkine, who came to test the cholera vaccine in India. In 1896, in response to a plague epidemic, Dr Haffkine developed the plague vaccine in India in 1897. The Influenza Pandemic (Spanish Flu) of 1914-1917 wrecked havoc and is reported to have killed nearly 17 million people in India. Caused by H1N1 influenza virus, this pandemic was underreported in its times despite being the deadliest pandemic in human history, possibly to avoid impacting the morale of the troops at battle in WW1. Post independence in 1955-56, Tuberculosis (TB) was seen as the key target for the government and the BCG vaccine was widely administered as a cure. A multiyear efficacy study done in Tamil Nadu showed that the BCG vaccine did not provide significant protection against TB. Subsequently BCG was administered to children under the age of one and not as a cure for TB. In the 60s, smallpox gained endemic proportion. Globally there was a push to eradicate smallpox and India played its part. In 1975, India reported its last case, a significant achievement as India had the highest number of smallpox cases in the world. In 1980 the world was declared free of smallpox. (Lahariya, 2014).

Encouraged by the success of smallpox eradication, the government launched the Expanded Immunization Program (EPI), later renamed the Universal Immunization Program focussing on BCG, OPV, DPT and later Tetanus Toxoid, targeting 80% coverage in infancy. 42 years later in 2020, that target still proves elusive, a massive indictment of the speed of execution over this period which will be commented on this paper subsequently. But first it is important to discuss the success of the OPV campaign (christened the pulse polio campaign) and apply some of the learnings to the refreshed vaccination drive by the government of India.

### 1.1 Pulse polio Initiative (PPI)

Polio or poliomyelitis, is a highly infectious viral disease caused by the three distinct strains of the polio virus, usually infecting children under the age of 5. The disease is usually water borne, usually spread by faecal contamination from infected people. There is no cure for polio and it attacks the nervous system leading to paralysis in 1% of the cases. Unsanitary conditions can lead to increase in incidence

given its usually water borne. In 1988 WHO launched the Global Polio Eradication Initiative - an immunization program to eliminate poliomyelitis by vaccinating all children below the age of five against the polio virus across the world. In India too 1985 the Universal Immunization Program (UIP) was launched to cover all districts of the country. The basis tenet of the worldwide polio campaign was that of 100% coverage. Till mid 1990s polio was endemic in India with 200, 000 to 400, 000 cases annually. Although WPV Type 2 was eradicated in 1999, the other two types were eradicated by 2011 and India was declared polio free in 2014.

### 1.2 The polio success story

India's success in OPV eradication is to be applauded. The Global Polio Eradication Initiative (GPEI) considered India as the most difficult battle against polio given the logistical challenges, the lack of hygiene in urban centres and the sheer numbers especially in the underserved areas. Further the per dose efficacy of OPV is estimated to be 50% in the US and only 21% in India. Hence three to four doses were insufficient for Indian conditions, repeated vaccination was necessary to stamp this the infection, adding to the burden of work (Thacker et al., 2016). In 1994, India accounted for 60% of all Polio cases in the world and recorded its last patient in 2011. This eradication is cited by the UN as the greatest success of public health initiatives across the world in the last decade. There were several identifiable reasons for this success.

- The first and perhaps the most important reason was the resolve of the government with a single rallying point - to get rid of the disease. It is important to note that the PM was directly involved in driving the initiative and monitored this closely, which mattered immensely to the success of the program.
- Secondly, substantial funding was required to reach remote parts of rural India, needing a cold chain to be able to transport it repeatedly. The government poured in money and India self funded this battle almost entirely.
- Thirdly emotive messaging that was used to unite various stakeholders behind a identified enemy was a key success factor. Polio was (and is) a highly visible disease across India and a battle against such a visible enemy carried a certain emotional weight.

While India did well in the first decade of this campaign and saw success across the country, two of India's poorest, largest and most densely populated states, UP and Bihar, with nearly 750,000 births a month proved to be difficult to solve. The fact that these states were often flooded made it even more difficult to access for health workers and also increased the spread of this water borne disease. It was clear to the government that the virus had to be rooted from these underserved areas as well to prevent further spread to all parts of India. Traditional methods and traditional speed would not work.

- First the government and UNICEF started an extensive public campaign with the most prominent celebrities to raise the decibel levels of the campaign.
- A transit strategy was adopted to catch migrant labour at the transit points such as stations, bus stops, shops etc as a large part of this population was involved in daily labour and hence mobile through the day.
- Remote areas prone to flooding for this water borne disease proved to be the final challenge, missing nearly 20% of the children. So local health workers were mobilized and stay quarters were made in these areas for these health workers to stay in these areas especially in the monsoon season. These workers could then serve their community by periodically knocking on every door even in the monsoons (Goldberg, 2018).
- Finally, community trust was the probably the most fundamental winning point. 2.3 million health workers including anganwadis (women running basic rural healthcare) were mobilized to ensure that the administering of the OPV was done door to door, in a timely manner with a high level of trust due to community linkages. This trust also helped dispel myths about the ill effects of the disease and built resilience in the program implementation.

The sheer complexity and size of this exercise makes this one of the largest and most important public health challenges that has been won in the last few decades.

Of course there is a contrarian view that this resolve of the government stemmed from a desire to fulfil an international commitment, as much as it was driven to solve the problem itself. In other words, a fear of international opprobrium lent energy to the efforts. My view is that while this was certainly a factor for the government's motivation, it was not the driver force for the movement, certainly not for the 2.3 million health workers who gave it their all. A movement which lasted for a decade and tackled the most difficult logistical challenges is no longer just a government movement, it's a people's movement, a "Jan andolan" in its true sense. It was a feeling of common good or community good, which drove the movement forward not international opprobrium. Another criticism is that India has many health priorities and the cost of OPV administration was too large, money should have been spent in other priorities first. I would concede that there were other pressing priorities as well but the bigger picture is that this program demonstrated that with resolve and the right focus, public health initiatives in India can make a real difference to people's lives. 2.3 million vaccinators who visited 200 million households and vaccinated nearly 170 million children multiple times with

OPV (John et al., 2013) against all odds is a task of rare inspiration and must be feted, whatever the costs.

In 2011 after India declared eradication of polio it also reported 13.35/100000 cases of Non-polio acute flaccid paralysis (NPAFP), well above acceptable levels of 1-2/100,000, where regression analysis indicated a simple association rather than a causal relationship. Nonetheless this resulted in a reduction in the aggressive dosage being administered in the enthusiasm of the eradication drive. NPAFP has declined significantly since this reduction in dosage (Dhiman et al., 2018).

### 1.3 Mission Indradhanush (MI) and Intensified Mission Indradhanush (IMI)

The Indian Ministry of Health and Family Welfare recognized the scope of India's immunization challenge with nearly 30 million infants and an equal number of pregnant women annually and focussed on a program christened MI whose aim was to increase vaccination coverage by 5% every year against vaccine preventable diseases. This program ran between 2015-17 and increased the percentage of children receiving full immunization by 6.7% cumulatively. In 2017 IMI was launched, building on the platform of MI but with greater sense of urgency. IMI2.0 is the next evolution launched in 2019, where the focus is to administer 4 months of immunization with 7 days every month, excluding the regular immunization days. The focus is to reach out to tribal, urban and underserved areas. The end goal of IMI2.0 (2019) was to accelerate vaccination and achieve a goal of 90% full immunization by 2022, a goal which the PM communicated to each Chief Minister. As per NFHS survey, immunization was 50.5% in segments with poorer or more marginalised populations and 62% for India as a whole. This saw a significant increase of 18.5% in underserved IMI districts to an impressive 69% (Gurnani et al., 2018). India's audacious goal, set by the PM to reach 90% full immunization coverage by 2022 still seems a big stretch, but we have come forward a long way.

## 2. Conclusions

### Assessment of IMI and comparison with the Pulse Polio campaign:

- The focus from both the respective Prime Ministers over an extended period of time on vaccination is a great boost to the IMI program and in this respect IMI and pulse polio share common ground.
- The focus on wide mobilization in both schemes is a key factor. IMI2.0 has 12 non health ministries mobilized to help with the scheme, i.e. it is a shared goal of several ministries and in that respect too it is similar to the execution of the pulse polio campaign.
- A key difference is that data management is significantly improved with GPS/Aadhar and AI assisting the efforts of the health workers in identifying the pockets of population that are most neglected, tracking vaccination administration and stocks of vaccine.
- One of the key differences is the messaging and the visibility of these two. Whereas Pulse polio was a highly visible and publicly endorsed program, that is less. So the

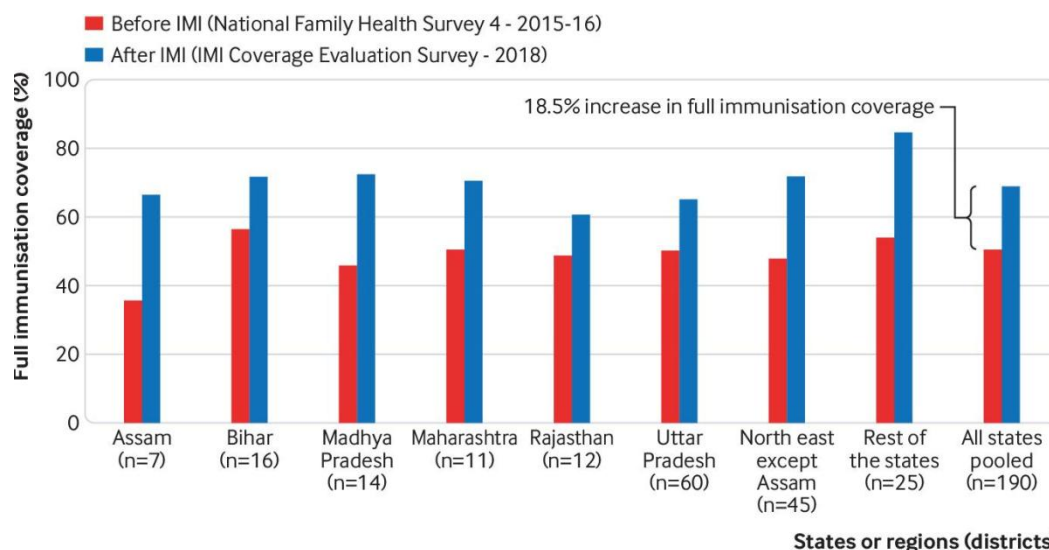
case with IMI. The goal of 90% coverage fails to evoke messaging, it would be preferable in my opinion to state that “no child will go without vaccination”, the message of inclusion, repeated multiple times like in pulse polio is required to energize the millions of health workers and administrative staff who will need to be motivated if this goal has to be met.

- Often health care resources are unbalanced, too many in one area and too few in others. This needs to be with peoples’ movement, a “Jan Andolan”, much like the pulse polio campaign and hence it is necessary that the health workers who will ultimately determine the long term success of this initiative, are well taken care of and well distributed in underserved areas. An analogy can be drawn with the pulse polio campaign when stay arrangements were made for health workers in the monsoons in remote, flood prone and difficult to access areas of Bihar and UP. Similar out of the box thinking will be required to meet the objectives of IMI2.0.

In conclusion, IMI2.0 is an ambitious and bold plan to address vaccine preventable disease and deserves our full support. The primary execution deficiencies seem to be

- The lack of visibility which the program does need, both to raise trust and awareness levels with the people and to motivate health workers with an enhanced sense of purpose and
- The lack of availability of health personnel in underserved areas needs to be addressed.

While these are difficult challenges and will need both resolve and funding, IMI 2.0 brings hope that it can change the face of vaccine preventable diseases in India, finally fulfilling the promise of basic healthcare to all of its children. Perhaps a new dawn is indeed coming.



Intensified Mission Indradhanush Ministry [Gurnani V et al **BMJ**]. Proportion of children aged 12-23 months fully immunized in 190 Intensified Mission Indradhanush (IMI) districts, by state or region before and after IMI.

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