

# *Adult Immunization : The India Opportunity*

By:  
**Ankita Sharma**  
SIRU, Invest India

**Sakshi Goyal**  
**Shubhangi Prasad**  
**Apoorv Gandhi**  
Pharmaceuticals,  
Invest India

Art Direction:  
**Sanya Datt**  
Brand Communications,  
Invest India



# INTRODUCTION

The discovery of antibiotics in the early twentieth century and the eradication of smallpox in 1979 via vaccination were major breakthroughs in humanity's fight against infectious diseases. However, despite the huge beneficial impact of antibiotics, antibiotic resistance has become one of the greatest threats to global health. Further, the risk of infection has increased greatly with mutation, globalisation, and increased cross border travel. Therefore, infectious diseases continue to be a major worldwide public health problem and vaccine-preventable diseases (VPDs) affect many thousands of adults worldwide, resulting in high morbidity, mortality, and economic burden. Furthermore, unvaccinated adults can spread diseases to infants who have not yet been immunized

(e.g. pertussis). Therefore, improving adult vaccination coverage could have positive consequences for individuals, families, and communities. Adult vaccination could also help reduce healthcare costs, which is particularly important for economically disadvantaged groups.

Vaccinations are recommended throughout life to prevent infectious diseases and their sequelae. Vaccination of adults is very important given that >25% of mortality is due to infectious diseases<sup>1</sup>. Vaccines are recommended for adults on the basis of age, prior vaccinations, health conditions, lifestyle, occupation, and travel.

## FACTORS DETERMINING THE USE OF VACCINES IN ADOLESCENTS AND ADULTS

Burden of disease in targeted population

Acceptance/awareness; both among medical professionals and the population

Efficacy and effectiveness of vaccine

Availability of other preventive measures

Safety of vaccine

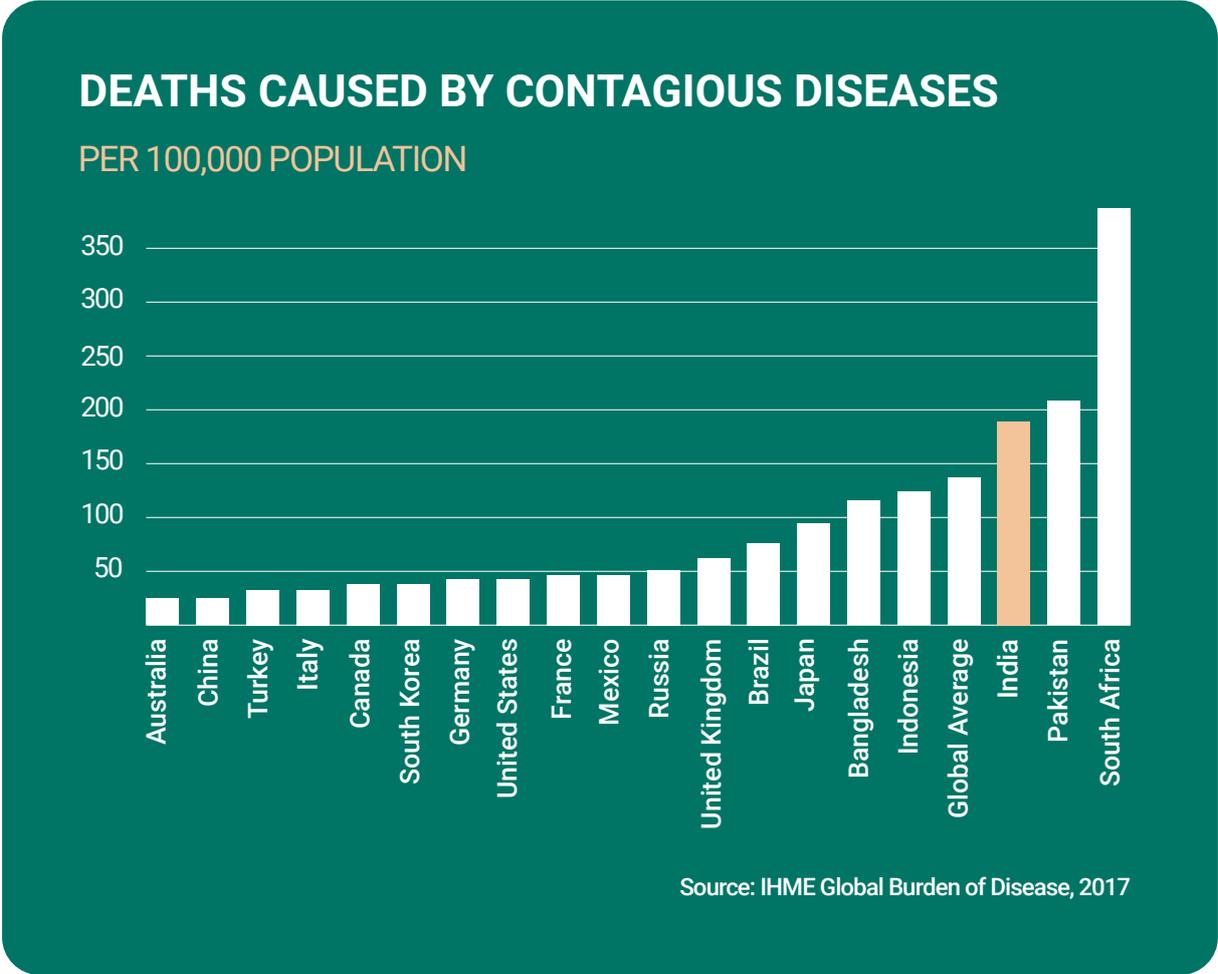
Supply of vaccines

Cost of vaccination

1. <https://pib.gov.in/PressReleaseDetailm.aspx?PRID=1592572>

There have been significant efforts to curb morbidity, mortality, and disability among adults particularly due to communicable diseases such as tetanus, diphtheria, pertussis, hepatitis A, hepatitis B, human papillomavirus, Japanese encephalitis,

measles, mumps, rubella, meningococcal, pneumococcus, typhoid, influenza, and chickenpox. Nevertheless, in a developing country like India, communicable diseases contribute to a large burden of morbidity, mortality, and disability.



# IMMUNIZATION IN INDIA

Immunization programme in India was introduced in 1978 as the 'Expanded Programme of Immunization' (EPI) by the Ministry of Health and Family Welfare, Government of India. In 1985, the programme was modified as 'Universal Immunization Programme' (UIP) to be implemented in a phased manner to cover all districts in the country by 1989-90. This was one of the largest health programmes in the world. Since the launch of National Rural Health Mission in 2005, Universal Immunization Programme has remained an integral part of it.

Through UIP, the Government of India provides vaccination free of cost against VPDs like diphtheria, pertussis, tetanus, polio, measles, severe form of childhood tuberculosis, hepatitis B, meningitis and pneumonia (Haemophilus influenzae type B infections), Japanese encephalitis (JE). In JE endemic districts newer vaccines such as rotavirus vaccine, IPV, adult JE vaccine, pneumococcal conjugate vaccine (PCV) and measles-rubella (MR) vaccine have been introduced within the UIP.

## UIP SCHEDULE

### For Infants

Vaccine	Due Age	Maximum Age
BCG	At birth till one year	At birth till one year
Hepatitis B – Birth Dose	At birth within 24 hours	At birth within 24 hours
OPV – 0	At birth	Within the first 15 days
OPV 1, 2 & 3	At 6 weeks, 10 weeks & 14 weeks	Till 5 years of age
Pentavalent 1, 2 & 3	At 6 weeks, 10 weeks & 14 weeks	1 year of age
fIPV 1 & 2	At 6 weeks & 14 weeks	1 year of age
RVV 1,2 & 3	At 6 weeks, 10 weeks & 14 weeks	1 year of age

PCV 1, 2 & PCV Booster	At 6 weeks, 14 weeks & 9 months	1 year of age
MCV 1/MR 1	At 9 completed months – 12 months	5 years of age
Japanese Encephalitis-1	At 9 months – 12 months	15 years of age
Vitamin A (1st dose)	At 9 months	5 years of age

### For Children and Adolescents

Vaccine	Due Age	Maximum Age
DPT Booster 01	16-24 months	7 years of age
MCV 2/ MR 2	16-24 months	5 years of age
OPV Booster	16-24 months	5 years
Japanese Encephalitis-2	16-24 months	till 15 years of age
Vitamin A (2nd to 9th dose)	At 16 months. Then one does every 6 months	Up to the age of 5 years
DPT Booster-2	5-6 years	1 year of age
7 years of age	10 years & 16 years	16 years

### For Pregnant Women

Vaccine	Due Age
TT-1	Early in pregnancy
TT-2	4 weeks after TT-1
TT-Booster	If pregnancy occurs within three years of last pregnancy and two TT doses were received.

*BCG: Bacillus Calmette-Guerin; DPT: diphtheria-pertussis-tetanus; fIPV: fractional-dose IPV; JE: Japanese Encephalitis; OPV: oral polio vaccine; PCV: Pneumococcal conjugate vaccine; RVV: Rotavirus vaccine, TT: tetanus toxoid*

## MISSION INDRADHANUSH<sup>2</sup>

To strengthen and re-energise the programme and achieve full immunization coverage for all children and pregnant women at a rapid pace, the Government of India launched Mission Indradhanush in December 2014. It aims to ensure full immunization with all available vaccines for children up to two years of age and pregnant women. The government has identified 201 high focus districts across 28 states in the country that have the highest

number of partially immunized and unimmunized children.

Earlier the increase in full immunization coverage was 1 per cent per year which has increased to 6.7 per cent per year through the first two phases of Mission Indradhanush. Four phases of Mission Indradhanush have been conducted till August 2017 and more than 2.53 crore children and 68 lakh pregnant women have been vaccinated.

## INTENSIFIED MISSION INDRADHANUSH (IMI)<sup>3</sup>

To further intensify the immunization programme, Prime Minister Narendra Modi launched the IMI on 8 October 2017. Through this programme, the Government of India aims to reach each and every child up to two years of age and all those pregnant women who have been left uncovered under the routine immunization programme/UIP. The focus of the special drive was to improve immunization coverage in select districts and cities to ensure full immunization to more than 90 per cent by December 2018.

in 173 districts (121 districts and 17 cities in 16 states and 52 districts in 8 northeastern states) every month between October 2017 and January 2018. IMI has covered low performing areas in the selected districts (high priority districts) and urban areas. Special attention was given to unserved/low coverage pockets in sub-centre and urban slums with migratory populations. The focus was also on the urban settlements and cities identified under the National Urban Health Mission (NUHM).

Under IMI, 4 consecutive immunization rounds were conducted for seven days



- [https://www.nhp.gov.in/mission-indradhanush1\\_pg#~:text=Immunization%20Programme%20in%20India%20was,Family%20Welfare%2C%20Government%20of%20India.&text=Despite%20being%20operational%20for%20many,first%20year%20of%20their%20life](https://www.nhp.gov.in/mission-indradhanush1_pg#~:text=Immunization%20Programme%20in%20India%20was,Family%20Welfare%2C%20Government%20of%20India.&text=Despite%20being%20operational%20for%20many,first%20year%20of%20their%20life)
- [https://www.nhp.gov.in/mission-indradhanush1\\_pg#~:text=Immunization%20Programme%20in%20India%20was,Family%20Welfare%2C%20Government%20of%20India.&text=Despite%20being%20operational%20for%20many,first%20year%20of%20their%20life](https://www.nhp.gov.in/mission-indradhanush1_pg#~:text=Immunization%20Programme%20in%20India%20was,Family%20Welfare%2C%20Government%20of%20India.&text=Despite%20being%20operational%20for%20many,first%20year%20of%20their%20life)

## INTENSIFIED MISSION INDRADHANUSH (IMI) 2.0

To boost the routine immunization coverage in the country, Government of India has introduced IMI 2.0 to ensure reaching the unreached with all available vaccines and accelerate the coverage of children and pregnant women in the identified districts and blocks from December 2019-March 2020 and achieve the Sustainable Development Goal of ending preventable child deaths by 2030. The IMI 2.0 aims to achieve targets of full immunization coverage in 272 districts in 27 States and at block level (652 blocks) in Uttar Pradesh and Bihar among hard-to-reach and tribal populations.<sup>4</sup>

Several ministries, including the Ministry of Women and Child Development, Panchayati Raj,

Ministry of Urban Development, Ministry of Youth Affairs and others have come together to make the mission a resounding success and support the central government in ensuring the benefits of vaccines reach the last mile.

India is the second most populous country in the world, with nearly 1.4 billion people, accounting for approximately 18 per cent of the world population. It has been estimated that up to 63 million people in India are pushed into poverty by health expenses each year.<sup>5</sup> Further, while 15 per cent of households faced significant health costs in 2004–05, this rose to 18 per cent in 2011–12.<sup>6</sup>

### ADULT VACCINATION IN INDIA IS BASED ON THE GUIDELINES GIVEN BY THE FOLLOWING:



World Health Organization (WHO)

GERIATRIC SOCIETY OF INDIA  
DEDICATED TO THE CARE OF SENIOR CITIZENS  
Incorporated Under the Societies Registration Act of 1860

Geriatric Society of India

Advisory Committee on Immunization Practices (ACIP)

Advisory Committee on Immunization Practices (ACIP)



Centers for Disease Control and Prevention (CDC)



Association of Physicians of India – Expert panel



Research Society for Study of Diabetes in India



Indian Society of Nephrology



Indian Medical Association (IMA)

4. [https://www.nhp.gov.in/mission-indradhanush1\\_pg#:~:text=Immunization%20Programme%20in%20India%20was,Family%20Welfare%2C%20Government%20of%20India.&text=Despite%20being%20operational%20for%20many,first%20year%20of%20their%20life](https://www.nhp.gov.in/mission-indradhanush1_pg#:~:text=Immunization%20Programme%20in%20India%20was,Family%20Welfare%2C%20Government%20of%20India.&text=Despite%20being%20operational%20for%20many,first%20year%20of%20their%20life)

5. [https://cddep.org/blog/posts/63\\_million\\_indians\\_are\\_pushed\\_poverty\\_health\\_expenses\\_each\\_year\\_and\\_drugs\\_are\\_chief\\_cause/#:~:text=Media%20Coverage,63%20million%20Indians%20are%20pushed%20into%20poverty%20by%20health%20expenses,drugs%20are%20the%20chief%20cause&text=Each%20year%2C%20some%20150%20million,of%20them%20live%20in%20India](https://cddep.org/blog/posts/63_million_indians_are_pushed_poverty_health_expenses_each_year_and_drugs_are_chief_cause/#:~:text=Media%20Coverage,63%20million%20Indians%20are%20pushed%20into%20poverty%20by%20health%20expenses,drugs%20are%20the%20chief%20cause&text=Each%20year%2C%20some%20150%20million,of%20them%20live%20in%20India)

6. [https://cddep.org/blog/posts/63\\_million\\_indians\\_are\\_pushed\\_poverty\\_health\\_expenses\\_each\\_year\\_and\\_drugs\\_are\\_chief\\_cause/#:~:text=Media%20Coverage,63%20million%20Indians%20are%20pushed%20into%20poverty%20by%20health%20expenses,drugs%20are%20the%20chief%20cause&text=Each%20year%2C%20some%20150%20million,of%20them%20live%20in%20India](https://cddep.org/blog/posts/63_million_indians_are_pushed_poverty_health_expenses_each_year_and_drugs_are_chief_cause/#:~:text=Media%20Coverage,63%20million%20Indians%20are%20pushed%20into%20poverty%20by%20health%20expenses,drugs%20are%20the%20chief%20cause&text=Each%20year%2C%20some%20150%20million,of%20them%20live%20in%20India)

## PREVALENCE/INCIDENCE OF VACCINE PREVENTABLE DISEASES (VPDs) IN INDIA

Disease	Incidence/Prevalence
<b>Influenza</b>	Between 2015 and 2019, 126906 H1N1 cases and 7865 deaths were reported
<b>Pneumococcal disease</b>	As per a recent study, out of 374 adult invasive pneumococcal disease (IPD) cases: <ul style="list-style-type: none"> <li>• Pneumonia: 146 patients (39%)</li> <li>• Meningitis: 91 patients (24.3%)</li> <li>• Septicemia: 69 patients (18.4%)</li> </ul>
<b>Hepatitis</b>	In a study, among 599,605 cases tested for hepatitis A, 44,663 cases were found to be positive.  India has >37 million HBV carriers.
<b>Measles and rubella</b>	55,399 cases of measles and 1066 cases of rubella (all age groups)
<b>Typhoid</b>	120/100,000 population-years in adults older than 15 years.

## RECOMMENDED VACCINES FOR ALL HEALTHY ADULTS IN INDIA ARE AS FOLLOWS:<sup>7</sup>

Influenza (>19 years onwards)

Pneumococcal (>50 years)

Pneumococcal conjugate vaccine 13-valent

Pneumococcal polysaccharide vaccine 23-valent

Human papillomavirus (15–45 years)

Herpes zoster (>60 years)

DPT (diphtheria, pertussis, and tetanus) (19 years onwards)

MMR (measles, mumps, and rubella) (19–60 years old)

7. <https://www.ijoem.com/article.asp?issn=0973-2284;year=2020;volume=24;issue=1;spage=3;epage=15;aulast=Koul#ref53>

# IMPEDIMENTS IN IMPLEMENTING ADULT IMMUNIZATION IN INDIA

- Currently, there is a lack of robust epidemiological data and capacity to collect and analyse such data that can provide information on the actual burden of communicable diseases as well as the coverage.
- One of the major challenges of implementing adult vaccination programs is lack of knowledge and awareness among the general population regarding the role of vaccines in preventing diseases.
- There is vaccine hesitancy among people due to the safety debates surrounding vaccines. It is believed that vaccines come with side effects and hence people are generally averse to taking them.
- There is a lack of infrastructure to facilitate large-scale vaccination programs in India. To administer vaccines to the adult population- dedicated vaccination centres along with dedicated teams will have to be established to ensure vaccine delivery as well as monitor the vaccination status of adults.
- Need for capacity-building and strengthening of institutions involved in the process of immunization in India.
- Vaccines also tend to serve as a huge financial burden on the public health system and hence there is a need for additional financial assistance to be provided towards policy and programs for adult vaccination.
- The infrastructure and means of the public health system find it difficult to reach healthy adults. For example: for Japanese encephalitis vaccination programme in India, hardly 50 per cent of the adults in the affected districts came to get the vaccine dosage.

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## INTERNATIONAL GOOD PRACTICES



### Taiwan

- Taiwan operates a free of cost, 24-hour hotline number for all queries related to vaccines. This service deals with disease reporting, communicable disease consultation, prevention policy promotion and control measure education to the public all through the year.<sup>8</sup>
- Taiwan has a mass vaccination campaign in place for seasonal influenza. This is administered annually that helps in eradicating the impact of seasonal influenza as well as it serves as a drill for mass vaccination programs in case a pandemic occurs.<sup>9</sup>

8. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6129648/>  
9. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6129648/>



## Japan

- Japan has made rubella vaccines available to all males between the ages of 39-56, free of cost till 2022 amidst a breakdown of the disease. Rubella posed as an imminent threat in Japan in 2018 and therefore the government made the vaccine available to men who weren't vaccinated under public health programs.<sup>10</sup>
- Influenza vaccination is provided in Japan to adults above the age of 65 and for adults between the ages of 60-64 with specific chronic illness of certain degree.<sup>11</sup>
- The Japanese government introduced a subsidy for 23-valent polysaccharide pneumococcal vaccine through a 5 year national routine vaccination program for older adults.<sup>12</sup>



## Hong Kong

- The Hong Kong government offers free of cost or subsidised influenza vaccine and pneumococcal vaccine to eligible Hong Kong residents.<sup>13</sup>
- Additionally, influenza & (limited) pneumococcal vaccination for staff/residents of elderly homes & residential care homes for people with disabilities is also provided for by the Hong Kong government.<sup>14</sup>



## United Kingdom (UK)

- In the UK, the JCVI (Joint Committee on Vaccination and Immunisation) is responsible for making recommendations to the UK government regarding what vaccines should be introduced and administered to which section of the population. They consider the burden of disease in the UK, safety and efficacy of the vaccine and cost effectiveness as well as the impact of introducing a new vaccine.
- There is a network of Immunisation Coordinators who ensure effective implementation of new policies on vaccine delivery. All immunisation changes are updated on the UK government's dedicated immunisation page.
- The immunisation schedule of the UK is constantly revised according to the introduction and availability of new vaccines in the market, depending upon certain outbreaks and/or as and when there is more evidence about the impact of these outbreaks. A system of national surveillance is in place for all vaccine preventable diseases in the UK in order to examine the coverage of vaccines and its safety as well as its impact on the burden of diseases.

10. <https://www.japantimes.co.jp/news/2018/12/11/national/science-health/japan-offer-men-aged-39-56-free-rubella-vaccinations-three-years-combat-outbreak/>

11. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6612174/>

12. <https://www.sciencedirect.com/science/article/pii/S1341321X19303800>

13. <https://www.chp.gov.hk/en/features/46107.html>

14. <https://www.chp.gov.hk/en/features/46377.html?f=13>

# HOW ADULT IMMUNIZATION PROGRAMS CAN BE IMPLEMENTED IN INDIA: RECOMMENDATIONS

## PART 1

### STRATEGIES FOR REACHING OUT TO ADULTS

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**BUILDING PUBLIC AWARENESS IS PERTINENT TO INCREASE THE DEMAND FOR ADULT VACCINATION**

The need of the hour is to build awareness and educate people about why adult vaccination is important. It is imperative to educate the adults with its benefits, as well as to break the stigmas and misconceptions surrounding the ill-effects attached with taking vaccines.

**THERE NEEDS TO BE A WELL- DEFINED SYSTEM TO ADMINISTER THE VACCINES TO ADULTS**

It is challenging for the public health system to reach healthy adults so there is a need for an organized system that can reach them. Doctors can accommodate routine vaccination practices while providing their services, employers can also encourage vaccination status and tie-up with hospitals and make routine vaccination as a part of their healthcare plan.

**APPROPRIATE FINANCING CHANNELS & MECHANISMS NEED TO BE IN PLACE IN ORDER TO ENSURE AVAILABILITY AND DELIVERY OF VACCINES TO ADULTS**

Public health agencies need to ensure that enough capacity exists to produce and deliver vaccines to healthy adults. Since this will be a huge cost burden as well, regular financing will be required. Eligible and trained pharmacists can also be included in the system to impart vaccines.

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## SUPPORT FOR RESEARCH AND DEVELOPMENT ACTIVITIES

Identification of which are the important vaccines and to which age groups they should be administered is an important step in building an adult vaccination policy. Furthermore, more research should be encouraged to ensure that the adults have access to not only the vaccines available in the market but also are aware of the upcoming vaccines, in case of new diseases that may occur or new vaccines that may be developed for previously existing diseases as well. Research and development for vaccines therefore should be incentivised.

## PART 2

### POLICY MEASURES

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India as a country is more sensitive towards vaccines for children in comparison to adults. There is a certain sense of hesitancy and in some cases complacency amongst adults, especially adolescents, when it comes to vaccination and vaccine preventable diseases. Sensitisation programs and policies can be taken up to help remove vaccine hesitancy. Similar sensitisation programs would also be required for the health workers of the country, to acquaint them with the kind of impact adult vaccines can have in saving people from repeated hospital visits.

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Adequate and innovative funding mechanism. Funding schemes and programs can be launched to help startups and companies developing adult vaccines and innovative dispersal mechanisms. This will provide stimulus to the industry to innovate in this segment.

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Dedicated policy towards adult immunization to create a defined infrastructure and a systematic process. India is a populous country and a systematic process and defined infrastructure need to be set up to make adult vaccination processes convenient. Pharmacists and local pharmacy staff can be trained to dispense vaccines to adults, to ease the access to vaccination to all.

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Adoption of new technologies such as AI – to decide which vaccines are required in each region. India is a diverse nation with varied geography. Varied disease profiles accompany varied geographies; hence it is important to provide the required vaccine in a particular region. AI and other technologies can be utilised to analyse the disease profiles, demographics, geographical factors, and other relevant factors to decide which vaccine is most required in that region.

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Introduction of dedicated package under Ayushman Bharat scheme. Leveraging the existing infrastructure for Ayushman Bharat Scheme, a dedicated package for adult vaccination can be introduced. This will lead to preventive immunization and in turn help reduce the repeated visits to the hospitals and hence reduce the long-term treatment costs.

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In today's world data backed decisions are of utmost priority to ensure the optimality and efficiency of decisions. In order to ensure that the adult vaccinations programs create the maximum impact, credible data on disease burden of the country would be required to analyze the kind of vaccines required and in which region.

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AMR (Anti-microbial Resistance) is also an important aspect which should be considered for universal health programs.

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Similar program can be launched under the Mission Indradhanush, which is already providing vaccines to pregnant women. The scope of the initiative can be broadened to include other vaccines for adults as well.

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Phased but focused approach towards universal adult immunisation is the need of the hour. Identifying groups which are more vulnerable (example, elderly) and prioritising them when forming policies. The program can be started even at a very small scale. Starting with the elderly under state care or including vaccines under the Ministry of Health's program for the elderly. Another approach can be prioritising groups with comorbidities. People with lung diseases, diabetes etc are more vulnerable to infectious disease than normal healthy adults, so such groups can be prioritised. Another step can be prioritizing special cases, for eg. National Aids control program (NACO). The HIV positive patients who are extremely immuno-compromised, can be included for adult immunization under the purview of NACO.

# CONCLUSION

This report focuses on the need for adult immunization in India and why it is the need of the hour, especially in light of the Covid-19 pandemic. The existing policies with regards to immunization practices have been discussed along with the recommendations by various organisations on how these can be implemented to reach out to adults in India as well. Furthermore, this report addresses the various impediments that have hindered the development of an adult immunization programme in India. Some of the best practices from across the world have been stated and can be used as examples to build a comprehensive policy in the context of India. The report's focal point is to provide an overview of the current ecosystem and probable recommendations on how a comprehensive adult immunization programme can be implemented in

India. This is discussed in a two-part approach wherein the strategies to reach healthy adults are discussed as well as the policy measures that could be taken into account while devising a national adult vaccination guideline.

As the world regains its feet after Covid-19, there is likely to be an emphasis on recalibration of public health strategies towards immunization, especially in the context of preventive healthcare. Most global technology-centered firms are likely to build on the growing consumer appetite on adult immunization in the context of post Covid-19 safety and care. With cutting-edge biotechnology at its core, this space is likely to emerge as the most profitable for investors, with a massive potential in terms of returns on investment and social welfare.





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