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**Review Article**

# A comprehensive review of the latest Indian guidelines on adult immunization

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## ABSTRACT

This review consolidates the most recent guidelines on adult immunization issued by the Association of Physicians of India (API) in 2024. The guidelines underscore the importance of immunization in adults, particularly considering the growing geriatric population, projected to make 20% of the population by 2050. Key recommendations include the administration of vaccines for influenza, pneumococcus, hepatitis B and herpes zoster, with specific emphasis on high-risk groups such as healthcare workers, the elderly and individuals with chronic conditions. Additionally, the guidelines highlight the necessity of COVID-19 vaccinations and boosters, considering the emergence of new variants. The API guidelines provide a detailed framework for vaccination schedules, prioritizing clarity and practical implementation for healthcare providers managing patients with multiple co-morbidities. By offering a consolidated and evidence-based approach, these guidelines aim to enhance vaccination coverage and protect against vaccine-preventable diseases in the adult population.

**Keywords:** API guidelines, Adult immunization, COVID-19 booster, Hepatitis B vaccine, Herpes zoster vaccine, Influenza vaccine, Public health, Pneumococcal vaccine

## INTRODUCTION

The World Health Assembly, supported by countries and partners, has endorsed the Immunization Agenda 2030 (IA2030), a new global vision and strategy to tackle immunization challenges over the next decade and save over 50 million lives. IA2030 envisions a world where everyone, regardless of location or age, benefits fully from vaccines to enhance health and well-being. It aims to preserve the progress made in immunization, recover from COVID-19 disruptions and achieve greater outcomes by ensuring no one is left behind at any stage of life or in any circumstance.[1]

India has a well-established Universal Immunization program since 1985 which aims to immunize 2.7 crores newborns with all primary doses and 10 crores children between 1 to 5 years of age with booster doses. It is one of the biggest vaccination campaigns in the world, with two major milestones being elimination of polio and neonatal tetanus.[2] As of 2022, 33% of the individuals are still suffering from infectious diseases out of the total ailing population in India.

Unlike other low- and middle-income countries, infectious diseases remain prevalent while non-communicable diseases (NCDs) are also on the rise, resulting in a dual burden of diseases on households. The average monthly out-of-pocket expenditure per patient for infectious diseases is INR 881.56 for inpatient care and INR 1,156.34 for outpatient care.[3] Vaccine-preventable diseases (VPDs) continue to impose a significant economic and clinical burden on individuals and healthcare providers. In the United States, the annual cost of treating adult VPDs is estimated to be nearly $27 billion. This burden is unevenly distributed, with certain at-risk subpopulations facing a higher burden than the general population.

These groups include individuals with greater exposure risks to VPDs or those at risk of severe clinical outcomes due to existing comorbidities.[4] In India, 95% of the deaths related to VPD occur in adults. A study by Singhal V et al, has revealed that though healthcare workers are at a very high risk of acquiring the infection but only 50% have received a shot of hepatitis-B in Delhi. Pneumonia and meningitis were identified as the most prevalent clinical conditions, making up 39% and 24.3% of total invasive pneumococcal disease (IPD) cases, respectively. Additionally, the highest fatality rates for IPD were associated with pneumococcal septicaemia with an unspecified infection focus, pneumonia and meningitis. The most common serotypes were 1, 3, 5, 19F, 8, 14, 23F, 4, 19A and 6B, which together represented 54.9% of IPD cases. This highlights the necessity for including the 13-valent pneumococcal conjugate vaccine (PCV13) to ensure comprehensive coverage of all prevalent serotypes and provide adequate protection in the country.[5]

Currently, HPV-related cancers account for 7.5% of all cancers. The incidence of HPV-related cancers is projected to rise to 121,302 by 2025. Implementing effective prevention and control measures, such as HPV vaccination and increased screening, could help reduce this burden.[6]

A 2024 report by the Office of Health Economics (OHE) analysed the economic and societal value of adult vaccination programs in ten countries. This study found that adult vaccines can return up to 19 times their initial investment due to reduction in future health costs.[7] Vaccination is not only a cost-effective approach to improving lives but also an accessible one.

Although the true burden of VPD in India is not well established, the topic of adult immunization programmes remains under discussed. Adult Immunization Programmes needs to be in conversation particularly because of the proven results by vaccines in prevention of infectious diseases, waning immunity of adults as the age progresses, serious health complications of VPDs and the demographic shift which increases older population age group due to increased life expectancy

Due to the above reasons, Associations of Physicians of India (API) formulated an Indian Consensus Guidelines by harmonizing different Indian medical societies and formulating a document which is consistent and clearly guides health professionals and public on adult immunization. This mini review aims to capture the essential elements of the guidelines and provide an easy to refer document for a healthcare professional's use.

## SUMMARY OF THE LATEST INDIAN CONSENSUS GUIDELINES BY API, 2024

The following Table 1 provides a summary of the Indian Consensus Guidelines by the Association of Physicians of India (API), offering recommendations for 25 vaccines targeting a range of infections and population groups. It serves as a comprehensive guide for healthcare professionals to ensure appropriate vaccination practices across different demographics.

**Table 1: Overview of the dosing schedule for different vaccines by API guidelines 2024.**

| Condition/ Vaccine | Vaccine type | Route of administration | Dose and schedule | Dose for special population (if applicable) | Age>50 years | Key consideration |
|---|---|---|---|---|---|---|
| **Anthrax** | Live attenuated | Intramuscular Injection (IM) | 2 doses, 0.5ml at least 4-8 weeks apart | | Not recommended | Post-exposure vaccination: Recommended within a few days to a few weeks of exposure.<br>• Incomplete vaccination: One dose<br>• Not vaccinated: Two doses |
| **Chikungunya** | Live attenuated | IM | 0.5 ml, 1 dose | | Not recommended | Not yet approved, available for clinical use in India. Contraindicated in immunocompromised conditions |
| **Cholera** | Killed whole cell (bivalent and monovalent) and Live attenuated | Oral | Different for different types | | Recommended | Not recommended for routine administration, only if travelling to endemic region. |
| **COVID-19** | Inactivated, recombinant, intranasal. | IM, intradermal, intranasal | Different for different types | | Recommended | At the time of pandemic or local epidemic situations: Routine, |

Continued.

| Condition/ Vaccine | Vaccine type | Route of administration | Dose and schedule | Dose for special population (if applicable) | Age>50 years | Key consideration |
|---|---|---|---|---|---|---|
| | | | | | | administration is strongly recommended for all, even during pregnancy – 2 doses – at least 4 weeks apart |
| **Diptheria, Pertussis and Tetanus (Tdap)** | Diphtheria and tetanus toxoids and acellular pertussis antigens | IM | 0.5 ml, 1 dose 10 yearlies | | Td: Recommended Tdap: Benefit Ratio Risk | History of allergic reaction, during each pregnancy, it is recommended to receive one dose of Tdap, preferably between the gestational weeks of 27 and 36. |
| **Haemophilus influenzae type b (Hib) infection** | Lyophilized killed, Conjugate Vaccine (capsular polysaccharide bound to carrier protein) | IM | 0.5 ml, 1 dose | For HSCT Recipients 3 doses at least 4 weeks apart | Recommended | |
| **Hepatitis A** | Inactivated Vaccine | IM | 0.5 ml, 2 doses, 6 months apart | | | Contraindicated during pregnancy. Travelers to high-risk areas: HepA-HepB can follow an accelerated schedule: 3 doses (0, 7, 21–30 days) with a booster at 12 months. Booster dose: Recommended between 6 months and 5 years after initial vaccination, ideally between 6 and 12 months. |
| **Hepatitis B** | Recombinant DNA or plasma-derived inactivated subunit vaccine | IM in the deltoids, avoid buttocks. | 1 ml, 3 doses at 0,1,6 months. | Every 5 years for HCPs and CKD patients or haemodialysis patients. 2 doses for chronic liver disease and alcoholism. | Recommended with additional risk | Contraindicated if allergic to yeast or history of allergic reaction. |
| **Human Papilloma Virus (HPV)** | Recombinant protein capsid liquid vaccine | IM | 1 ml, 2 or 3 doses at 0,1,6 months | | Age>46 years: recommended | There is currently no recommendation for HPV use in pregnancy. Consider delaying HPV until after pregnancy |
| **Influenza** | Inactivated and Live attenuated | IM (Inactivated) Intranasal (Live) | 0.5 ml, 1 dose, annually | | LAIV: not recommended | If other live vaccines are being given, they should be administered on the same day or spaced 28 days apart. |
| **Japanese Encephalitis** | Live attenuated, inactivated vaccine | SC | 0.5 ml: Live 2 doses at least 4 weeks apart: inactivated | | Benefit Risk Ratio | Contraindicated during pregnancy. Live vaccine shouldn't be given during epidemic season. |

Continued.

| Condition/ Vaccine | Vaccine type | Route of administration | Dose and schedule | Dose for special population (if applicable) | Age>50 years | Key consideration |
|---|---|---|---|---|---|---|
| **Measles, Mumps and Rubella** | Live attenuated vaccine | SC | 0.5 ml, 2 doses 4 weeks apart | 1-2 doses depending on chronic conditions | Not recommended | Contraindicated during pregnancy. If other live vaccines are being given, they should be administered on the same day or spaced 28 days apart. |
| **Meningococcal Disease** | Conjugate Vaccine, Purified bacterial capsular polysaccharide (PBCP) | SC (PBCP)<br>IM (conjugate) | 0.5 ml, 1 dose | | With additional risk | Adults can receive pneumococcal vaccines (any PCV13 or PPSV23) with herpes zoster vaccines, seasonal influenza vaccines etc. at the same time if required. |
| **Pneumococcal Disease** | Pneumococcal Polysaccharide Vaccine (PPSV), Pneumococcal conjugate vaccine (PCV) | IM/SC (PPSV)<br>IM (PCV) | PCV 13: 0.5 ml<br>PPSV- 0.5 ml. 1 dose PCV13 followed by PPSV23 1 year later. | Above 50 years: PCV 13 followed by PPSV23, 1 year later.<br>• At-risk: PCV 13 followed by PPSV23, 1 year later<br>• High-risk: PCV 13 followed by PPSV23, 8 weeks later | Recommendation | PCV15 and PCV20 are recommended for adults (Once Approved & Available)<br>• Above 50 years: 1 dose of PCV20 only or PCV 15 followed by PPSV23 1 year later<br>• At-risk: 1 dose of PCV20 only or PCV 15 followed by PPSV23 1 year later<br>• High-risk: 1 dose of PCV20 only or PCV 15 followed by PPSV23 8 weeks later |
| **Poliomyelitis** | Live attenuated, inactivated vaccine | Oral (OPV)<br>IM (IPV) | IPV: 0.5 ml, OPV: 2 drops. 3 doses 0,1 and 6-12 months. | | Not recommended | Contraindicated during pregnancy.<br>Previously vaccinated: one lifetime booster dose of IPV. |
| **Rabies** | Concentrated, purified cell culture & embryonated egg-based vaccine | IM, Intradermal | 0.5 ml PVRV 1ml HDCV or PCEC.<br>For pre-exposure 3 doses at 0, 7 & 21 – 28 days<br>For post-exposure 4 doses 0, 3, 7 and between 14 – 28 days<br>For Elderly post-exposure 5 doses at day 0, 3, 7, 14 and 28 | | Recommended | Contraindicated in history of allergic reaction egg allergy, pregnancy and lactation, immunocompromised. |
| **Respiratory Syncytial Virus** | Recombinant Vaccine with or without adjuvant | IM | 0.5 ml, 1 dose | | Recommended | Contraindicated in history of allergic reaction egg allergy, immunocompromised. For pregnant person at 32 weeks 0 days through 36 weeks and 6 |

Continued.

| Condition/ Vaccine | Vaccine type | Route of administration | Dose and schedule | Dose for special population (if applicable) | Age>50 years | Key consideration |
|---|---|---|---|---|---|---|
| | | | | | | days gestation at risk of RSV infection - Only Recombinant Vaccine without Adjuvant should be used<br>Not yet approved for clinical use in India |
| **Typhoid** | Inactivated, polysaccharides, conjugate, live. Conjugate should always be preferred. | IM<br>Oral (live) | 0.5 ml, booster: 2-3 years | 3-7 years in endemic set up | Benefit Risk Ratio | During pregnancy, weight the benefit vs risk and DO NOT use live vaccine during pregnancy. |
| **Shingles (Herpes Zoster)** | Recombinant zoster vaccine | SC (deltoid and anterolateral thigh area) | 0.5 ml 2 doses (2-6 months apart) | | Recommended | Routinely recommended for all people above 50 years of age: 2 doses 2-6 months apart (minimum gap 4 weeks)<br>• Recommended in patients with immune compromising conditions including HIV: 2 doses 2-6 months apart (minimum gap 4 weeks) |

## INDIAN CONSENSUS RECOMMENDATIONS BY API

The guidelines make recommendations for various at-risk populations, like healthcare professionals, adults with chronic conditions, recipients and donors of hematopoietic stem cell transplant, HIV and cancer patients. The following levels of recommendations were made.

### *Vital recommendations*

These are vaccines critical for public health, targeting diseases with high morbidity and mortality rates. They emphasize universal coverage to achieve herd immunity.

### *Essential recommendations*

These vaccines focus on controlling diseases with moderate to high burdens. They prioritize targeted vaccination strategies to reduce disease impact effectively.

### *Desirable recommendations*

These vaccines offer additional health benefits and may require individual risk assessment and careful consideration of factors like cost-effectiveness.

Indian consensus recommendations for healthcare professionals, chronic conditions, recipients of hematopoietic stem cell transplant (HSCT), HIV/ immunocompromised individuals, pregnancy and recipients and donors for solid organ transplant is depicted in Figure 1 and 2.


**Figure 1: Indian consensus recommendations for healthcare professionals and chronic conditions.**


**Figure 2: Indian consensus recommendations for recipients of hematopoietic stem cell transplant (HSCT), HIV/ immunocompromised individuals, pregnancy and recipients and donors for solid organ transplant.**

HSCT: hematopoietic stem cell transplant; HIV: human immunodeficiency virus.

## DISCUSSION

Vaccination has long been recognized as one of the most effective public health interventions, significantly reducing morbidity and mortality associated with infectious diseases. While childhood immunization programs have been successfully implemented worldwide, adult immunization remains an underemphasized area, particularly in low- and middle-income countries like India. There is a compelling need to shift focus toward adult vaccination to address the persistent and emerging threats posed by vaccine-preventable diseases (VPDs).

The exact burden of VPDs in India is not known but is necessary to explore to further strengthen the evidence supporting the need for adult immunization. A systematic review of cost-effectiveness studies on adult vaccination in the U.S. and Canada revealed cost savings (cost benefits) of 56% for influenza, 31% for pneumococcal and 23% for tetanus-diphtheria-pertussis vaccinations.[8] Similarly it could also improve the health outcomes in India by affecting direct and indirect costs.

In a study on adult vaccination from a tertiary hospital in western India, it was observed that among adults in need of adult vaccination, only 56% were advised vaccination by doctors and among those advised vaccination for influenza, tetanus and pneumococcal pneumonia, only 22%, 77% and 6% were actually vaccinated, respectively.

Over the course of a year at the Adult Vaccination Center, AIIMS, Jodhpur, it was observed that an adult vaccine was predominantly administered for post-exposure prophylaxis. Of the total adults vaccinated, 42% received TT vaccines and 20% were given anti-rabies vaccines. The remaining individuals were vaccinated for pre-exposure purposes, with vaccines for yellow fever (15%), hepatitis B (8%), pneumococcal disease (7%), typhoid (3%) and influenza (1%). Additionally, 4% received vaccines for meningococcal disease, hepatitis A, varicella and OPV.[8]

A systematic review identified unique reasons limited to India for COVID-19 vaccine booster hesitancy among adult, including beliefs that COVID-19 no longer exists, residing in rural areas and a lack of awareness of others testing positive for COVID-19. These findings reflect the diverse levels of literacy and demographic characteristics of the Indian population.[9] In a 2022 study in India among healthcare professionals and their family, approximately one-third of the participants expressed vaccine hesitancy, citing the absence of national guidelines for adult immunization as a key factor.

Among the subgroup of individuals who had never been vaccinated in adulthood (n=158), prevalent reasons for refusing vaccines included concerns about potential side effects (51.41%), limited awareness regarding vaccines (49.46%) and the unavailability of official national guidelines (32.97%).[10] The new API guidelines aims to resolve these problems. To improve adult immunization coverage, comprehensive public health campaigns could be used to educate adults on vaccination benefits and dispel myths using media, social networks and community engagement. Training and incentivizing healthcare providers to recommend and administer vaccines may also be helpful. Increasing vaccination sites at pharmacies, hospitals and workplaces, along with developing and disseminating national guidelines and leveraging technology for reminders, may enhance adherence.

The introduction of new vaccines for Respiratory Syncytial Virus (RSV) and Pneumococcal infections (PCV 20) is expected to raise awareness and recognition of the need for adult immunization. These advancements highlight the ongoing efforts to protect adult populations from VPDs and underscore the importance of continuous evaluation and implementation of effective vaccination strategies. By using evidence-based communication and targeted awareness campaigns, it is possible to enhance the acceptance and uptake of adult vaccines, ultimately reducing the burden of VPDs in India.

## CONCLUSION

Addressing the need for adult immunization in India requires a coordinated effort involving policymakers, healthcare providers, community leaders and the public. Implementing the API's consensus guidelines on adult immunization is crucial to achieving this goal. These

guidelines provide a comprehensive framework for vaccination across various infections and population groups, ensuring that adults receive the necessary protection against vaccine-preventable diseases (VPDs). By following these recommendations, we can reduce the incidence and burden of VPDs, leading to significant improvements in public health.

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