

## VACCINATION RECOMMENDATIONS IN GERIATRIC POPULATION

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### Abstract:

Vaccinations have been an underused modality of preventive medicine. As India heads towards becoming a developed nation, with the rise in life expectancy the mortality rates have declined. Currently the estimated geriatric population in India is 8%, by 2026 the estimated geriatric population is projected at 12.17%. So the focus is now on morbidity rates. Vaccination holds great potential in protecting the geriatric population from life threatening illness and also at the same time reduce the burden on the medical services. Immunosenescence is often a major burden in geriatrics making immunization of extreme importance. It is the most effective protection against many common life threatening diseases in the geriatric population. The greatest hurdle to providing vaccination programs in a developing country is incomplete patient education and financial limitations. Hence, medical societies around the world need to promote education of geriatric population of the benefits of vaccinations.

### Introduction

The immune system of a healthy individual produces antibodies against infection. The vaccine contains a milder form of antigen which when introduced into the host immune system stimulates production of antibodies specific to those antigens. This process helps the body to produce defense mechanisms to an infection before it encounters it in nature. The host body is then immune to the infective etiology of the disease. Therefore, protecting the healthy individual from the onset of an infection. The vaccine would help geriatric population and protect them from infections and hence, they would require less medical attention and would be healthier.

The Centers for Disease Control and Prevention has recommended the aging geriatric population to take precautions and take vaccinations against the following diseases.

- Influenza (Flu) Vaccine
- Tetanus, Diphtheria, Pertussis Vaccine
- Zoster (Shingles) Vaccine
- Pneumococcal Vaccine
- Meningococcal Vaccine
- Varicella (Chickenpox) Vaccine
- Hepatitis A Vaccine
- Hepatitis B Vaccine
- Haemophilus Influenzae type b Vaccine

### Recommended Adult Immunization Schedule:

VACCINE ▼	AGE GROUP ▶	19-21 years	22-26 years	27-49 years	50-59 years	60-64 years	≥ 65 years
Influenza <sup>2,3</sup>		1 dose annually					
Tetanus, diphtheria, pertussis (Td/Tdap) <sup>3</sup>		Substitute 1-time dose of Tdap for Td booster; then boost with Td every 10 yrs					
Varicella <sup>4</sup>		2 doses					
Human papillomavirus (HPV) Female <sup>5</sup>		3 doses					
Human papillomavirus (HPV) Male <sup>5</sup>		3 doses					
Zoster <sup>6</sup>						1 dose	
Measles, mumps, rubella (MMR) <sup>7</sup>		1 or 2 doses					
Pneumococcal 13-valent conjugate (PCV13) <sup>8</sup>		1-time dose					
Pneumococcal polysaccharide (PPSV23) <sup>8</sup>		1 or 2 doses					1 dose
Meningococcal <sup>9</sup>		1 or more doses					
Hepatitis A <sup>10</sup>		2 doses					
Hepatitis B <sup>11</sup>		3 doses					
Haemophilus influenzae type b (Hib) <sup>12</sup>		1 or 3 doses					

<sup>1</sup>Covered by the Vaccine Injury Compensation Program

- For all persons in this category who meet the age requirements and who lack documentation of vaccination or have no evidence of previous infection; zoster vaccine recommended regardless of prior episode of zoster
- Recommended if some other risk factor is present (e.g., on the basis of medical, occupational, lifestyle, or other indication)
- No recommendation

Report all clinically significant postvaccination reactions to the Vaccine Adverse Event Reporting System (VAERS). Reporting forms and instructions on filing a VAERS report are available at [www.vaers.hhs.gov](http://www.vaers.hhs.gov) or by telephone, 800-822-7967.

Information on how to file a Vaccine Injury Compensation Program claim is available at [www.hrsa.gov/vaccinecompensation](http://www.hrsa.gov/vaccinecompensation) or by telephone, 800-338-2382. To file a claim for vaccine injury, contact the U.S. Court of Federal Claims, 717 Madison Place, N.W., Washington, D.C. 20005; telephone, 202-357-6400.

Additional information about the vaccines in this schedule, extent of available data, and contraindications for vaccination is also available at [www.cdc.gov/vaccines](http://www.cdc.gov/vaccines) or from the CDC-INFO Contact Center at 800-CDC-INFO (800-232-4636) in English and Spanish, 8:00 a.m. - 8:00 p.m. Eastern Time, Monday - Friday, excluding holidays.

Use of trade names and commercial sources is for identification only and does not imply endorsement by the U.S. Department of Health and Human Services.

The recommendations in this schedule were approved by the Centers for Disease Control and Prevention's (CDC) Advisory Committee on Immunization Practices (ACIP), the American Academy of Family Physicians (AAFP), the American College of Physicians (ACP), American College of Obstetricians and Gynecologists (ACOG) and American College of Nurse-Midwives (ACNM).

AICP Recommended Adult Immunization Schedule, Centers for Disease Control and Prevention, 2015

### Influenza (FLU) Vaccine

The Vaccine is to be given either IM (Intra muscular) or ID (Intra Dermal). It is available as Inactivated Influenza Vaccine (IIV), Recombinant Influenza Vaccine (RIV) and Live Attenuated Influenza Vaccine (LAIV). It may be given standard IIV dose or high dose IIV (Fluzone High Dose) or RIV.

#### Schedule:

It is recommended to be given 1 dose a year in the fall or winter. If 2 or more of the following live virus vaccines are to be given - LAIV, MMR, Varicella Vaccine, HZV, and/or Yellow Fever. They should be given on the same day. If they are not, space them by at least 20 days.

#### Precautions:

- Moderate or severe acute illness.
- History of Guillain-Barré syndrome (GBS) within 6wks following previous influenza vaccination.
- For LAIV only: Chronic pulmonary (including asthma), cardio-vascular (except hypertension), renal, hepatic, neurologic, hematologic, or metabolic (including diabetes) disorders; immunosuppression (including that caused by medications or HIV).

#### Contraindications:

- Previous severe allergic reaction (e.g., anaphylaxis) to this vaccine, to any of its components, including egg protein. Adults with egg allergy of any severity may receive RIV or, adults who experience only hives with exposure to eggs may receive other IIV with additional safety precautions (i.e., observe patient for 30 minutes after receipt of vaccine for signs of a reaction).
- For LAIV only: pregnancy; immunosuppression; receipt of specific antivirals (i.e., amantadine, rimantadine, zanamivir, or oseltamivir) within the previous 48hrs. Avoid use of these antiviral drugs for 14d after vaccination.

### Tdap VACCINE

(Tetanus, Diphtheria, Pertussis)

This Vaccination is to be given only as IM (Intra Muscular). In geriatric population it is recommended to be given in adults who have not received Tdap and healthcare personnel of all ages.

#### Schedule:

For people who are unvaccinated or behind, complete the primary Td series (spaced at 0, 1 to 2m,

6 to 12m intervals); substitute a one-time dose of Tdap for one of the doses in the series, preferably the first.

- Give Td booster every 10yrs after the primary series has been completed.
- Tdap should be given regardless of interval since previous Td.

#### Precautions:

- Moderate or severe acute illness.
- Guillain-Barré syndrome within 6wks following previous dose of tetanus-toxoid-containing vaccine.
- History of arthus reaction following a prior dose of tetanus- or diphtheria toxoid-containing vaccine (including MCV4); defer vaccination until at least 10yrs have elapsed since the last tetanus toxoid-containing vaccine.
- For pertussis-containing vaccines only, progressive or unstable neurologic disorder, uncontrolled seizures, or progressive encephalopathy until a treatment regimen has been established and the condition has stabilized.

#### Contraindications:

Previous severe allergic reaction (e.g., anaphylaxis) to this vaccine or to any of its components. • For Tdap only, history of encephalopathy not attributable to an identifiable cause, within 7d following DTP/DTaP, or Tdap.

### Varicella (Chickenpox) Vaccine

This Vaccination is to be given SC (Sub Cutaneous) only. It is recommended to all adult population without evidence of immunity.

*Note: Evidence of immunity is defined as written documentation of 2 doses of varicella vaccine; a history of varicella disease or herpes zoster (shingles) based on healthcare-provider diagnosis; laboratory evidence of immunity or confirmation of disease.*

#### Schedule:

If individual is not immune. Then it is given in 2 doses where the 2<sup>nd</sup> dose is 4 – 8 weeks after the 1<sup>st</sup> dose. If the 2<sup>nd</sup> dose is delayed, do not give first dose. If 2 or more of the following live virus vaccines are to be given—LAIV, MMR, Var, HZV, and/or yellow fever—they should be given on the same day. If they are not, space them by at least 28d. May use as postexposure prophylaxis if given within 5d of exposure.

**Precautions:**

- Moderate or severe acute illness.
- If blood, plasma, and/or immune globulin (IG or VZIG) were given in past 11m, see ACIP's General Recommendations on Immunization\* regarding time to wait before vaccinating.
- Receipt of specific antivirals (i.e., acyclovir, famciclovir, or valacyclovir) 24hrs before vaccination, if possible; delay resumption of these antiviral drugs for 14d after vaccination.

**Contraindications:**

- Previous severe allergic reaction (e.g., anaphylaxis) anaphylactic reaction to this vaccine or to any of its components.
- Pregnancy or possibility of pregnancy within 4wks.
- People on long-term immunosuppressive therapy or who are immunocompromised because of malignancy and primary or acquired immunodeficiency, including HIV/ AIDS (although vaccination may be considered if CD4+ T-lymphocyte counts are greater than or equal to 200 cells).

**Hepatitis A Vaccine**

It is given only IM (Intra Muscular). It is recommended for People with chronic liver disease; injecting and non-injecting drug users; men who have sex with men; people who receive clotting-factor concentrates; people who work with HAV in lab settings; food handlers when health authorities or private employers determine vaccination to be appropriate.

Post Exposure, for people older than age 40 yrs with recent (within 2 weeks) exposure to HAV, immune globulin is preferred over HepA vaccine.

**Schedule:**

- Give 2 doses, spaced 6–18m apart (depending on brand).
- If dose #2 is delayed, do not repeat dose #1. Just give dose #2.

**Precautions:** Moderate or severe acute illness.

**Contraindication:** Previous severe allergic reaction (e.g. anaphylaxis) to this vaccine or to any of its components.

**Hepatitis B Vaccine**

This vaccination is to be given IM (Intra Muscular) only. It is recommended for people who are hemodialysis patients and those with renal disease that may result in dialysis; certain international travelers; and people with chronic liver disease.

**Note: Provide serologic screening for immigrants from endemic areas. If patient is chronically**

**infected, assure appropriate disease management. For sex partners and household contacts of HBsAg-positive people, provide serologic screening and administer initial dose of HepB vaccine at same visit.**

**Schedule:**

- Give 3 doses on a 0, 1, 6m schedule.
- Alternative timing options for vaccination include 0, 2, 4m; 0, 1, 4m; and 0, 1, 2, 12m.
- There must be at least 4wks between doses #1 and #2, and at least 8wks between doses #2 and #3. Overall, there must be at least 16wks between doses #1 and #3.
- Give adults on hemodialysis or with other immunocompromising conditions 1 dose of 40 µg/mL (Recombivax HB) at 0, 1, 6m or 2 doses of 20 µg/mL given simultaneously at 0, 1, 2, 6m.
- Schedule for those who have fallen behind: If the series is delayed between doses, DO NOT start the series over. Continue from where the schedule was interrupted.

**Precaution:** Moderate or severe acute illness

**Contraindication:** Previous severe allergic reaction (e.g. anaphylaxis) to this vaccine or to any of its components.

**Special Case:**

For Certain combination vaccinations (hepatitis A and B combination vaccine) for patients age 18yrs and older only: give 3 doses on a 0, 1, 6m schedule. There must be at least 4wks between doses #1 and #2, and at least 5m between doses #2 and #3. An alternative schedule can also be used at 0, 7d, 21–30d, and a booster at 12m.

**Zoster (Shingles) Vaccine**

This Vaccine is to be given SC (Subcutaneous) only. It is recommended for People age 60yrs and older.

**Note: Do not test people age 60yrs or older for varicella immunity prior to zoster vaccination. Persons born in the U.S. prior to 1980 can be presumed to be immune to varicella for the purpose of zoster vaccination, regardless of their recollection of having had chickenpox.**

**Schedule:**

- Give 1-time dose if unvaccinated, regardless of previous history of herpes zoster (shingles) or chickenpox.
- If 2 or more of the following live virus vaccines are to be given—MMR, Var, HZV, and/or yellow fever—they should be given on the same day. If they are not, space them by at least 28d.

**Precautions:**

- Moderate or severe acute illness.
- Receipt of specific antivirals (i.e., acyclovir, famciclovir, or valacyclovir) 24hrs before vaccination, if possible; delay resumption of these antiviral drugs for 14d after vaccination.

**Contraindications:**

- Previous severe allergic reaction (e.g., anaphylaxis) to any component of zoster vaccine.
- Primary cellular or acquired immunodeficiency.

**Hib (Haemophilus influenza) type b VACCINE**

This Vaccine is to be given IM (Intra Muscular) only. It is not routinely recommended for healthy adults. Those adults at highest risk of serious Hib disease include people who 1) have anatomic or functional asplenia, 2) are undergoing an elective splenectomy, or 3) are recipients of hematopoietic stem cell transplant (HSCT).

**Schedule:**

- Give 1 dose of any Hib conjugate vaccine to adults in categories 1 or 2 (see 2nd bullet in column to left) if no history of previous Hib vaccine.
- For HSCT patients, regardless of Hib vaccination history, give 3 doses, at least 4wks apart, and beginning 6 – 12m after transplant.

**Precautions:** Moderate or severe acute illness.

**Contraindication:** Previous severe allergic reaction (e.g., anaphylaxis) to this vaccine or to any of its components.

**Pneumococcal Conjugate (Pcv13)/ Pneumococcal Polysaccharide (Ppsv23)**

PCV13 is to be given IM (Intramuscular only). While PPSV23 can be given both IM (Intra Muscular) and SC (Subcutaneous). It is recommended that all people age 65yrs or older should receive

- 1-time dose of PCV13 (if previously unvaccinated) and 1 dose of PPSV23. People younger than age 65 years should receive
- 1-time dose of PCV13 and 1st dose of PPSV23 if they have functional or anatomic asplenia, immunocompromising condition (see below), CSF leaks, or are a candidate for or recipient of a cochlear implant,
- 2nd dose of PPSV23 if at highest risk of serious pneumococcal infection, including those who - Have anatomic or functional asplenia, including sickle cell disease, immunocompromising condition, including

HIV infection, leukemia, lymphoma, Hodgkin's disease, multiple myeloma, generalized malignancy, chronic renal failure, or nephrotic syndrome and/or receiving immunosuppressive chemotherapy (including high-dose corticosteroids). Have received an organ or bone marrow transplant.

**Schedule:** Give PCV13 and/ or PPSV23 if unvaccinated or if previous vaccination history is unknown.

For healthy people age 65 years and older, give PCV13 first followed by PPSV23 in 6–12m. When both PCV13 and PPSV23 are indicated, give PCV13 first followed by PPSV23 in 6 – 12m. If previously vaccinated with PPSV, give PCV13 at least 12m after PPSV23. For people at highest risk of serious pneumococcal infection, if not previously vaccinated with PPSV23, give PCV13 first, followed by PPSV23 in 8wks. Give another dose of PPSV23 to people - Age 65yrs and older if 1st dose was given prior to age 65yrs and 5yrs have elapsed since previous dose of PPSV.

**Precaution:** Moderate or severe acute illness.

**Contraindication:** Previous severe allergic reaction (e.g., anaphylaxis) to this vaccine, including (for PCV13) to any diphtheria toxoid-containing vaccine, or to any of its components.

Meningococcal Conjugate Vaccine (Menacwy)/ Meningococcal Polysaccharide Vaccine (Mpsv4) MenACWY is to be given IM (Intramuscular) only and MPSV4 be given SC (Subcutaneous) only.

It is recommended to people with anatomic or functional asplenia or persistent complement component deficiency and people who travel to or reside in countries in which meningococcal disease is hyperendemic or epidemic.

**Schedule:**

Give 1 initial dose to all other adults with risk factors (see 2nd–4th bullets in column to left).

Give booster doses every 5yrs to adults with continuing risk (see the 1st–3rd bullets in column to left).

MenACWY is preferred over MPSV4 for people age 55yrs and younger. For people age 56yrs and older who have received MenACWY previously, use MenACWY. For all others, give 1 dose of MPSV4.

**Precaution:**

Moderate or severe acute illness.

**Contraindication:**

Previous severe allergic reaction (e.g., anaphylaxis) to this vaccine or to any of its components.

Vaccination Indications in Co-Morbidities:

Vaccines that might be indicated for adults based on medical and other indications<sup>1</sup>

VACCINE ▼	INDICATION ►	Pregnancy	Immuno-compromising conditions (excluding human immunodeficiency virus [HIV]) <sup>4,6,7,8,13</sup>	HIV infection CD4+ T lymphocyte count <sup>4,6,7,8,13</sup>		Men who have sex with men (MSM)	Kidney failure, end-stage renal disease, receipt of hemodialysis	Heart disease, chronic lung disease, chronic alcoholism	Asplenia (including elective splenectomy and persistent complement component deficiencies) <sup>8,12</sup>	Chronic liver disease	Diabetes	Healthcare personnel
				< 200 cells/µL	≥ 200 cells/µL							
Influenza <sup>2,3</sup>			1 dose IIV annually			1 dose IIV or LAV annually						1 dose IIV or LAV annually
Tetanus, diphtheria, pertussis (Td/Tdap) <sup>4,5</sup>		1 dose Tdap each pregnancy	Substitute 1-time dose of Tdap for Td booster; then boost with Td every 10 yrs									
Varicella <sup>4,6</sup>			Contraindicated									2 doses
Human papillomavirus (HPV) Female <sup>4,5</sup>			3 doses through age 26 yrs									3 doses through age 26 yrs
Human papillomavirus (HPV) Male <sup>4,5</sup>			3 doses through age 26 yrs									3 doses through age 21 yrs
Zoster <sup>6</sup>			Contraindicated									1 dose
Measles, mumps, rubella (MMR) <sup>1,7</sup>			Contraindicated									1 or 2 doses
Pneumococcal 13-valent conjugate (PCV13) <sup>4,8</sup>							1 dose					
Pneumococcal polysaccharide (PPSV23) <sup>8</sup>							1 or 2 doses					
Meningococcal <sup>9</sup>							1 or more doses					
Hepatitis A <sup>10</sup>							2 doses					
Hepatitis B <sup>11</sup>							3 doses					
<i>Haemophilus influenzae</i> type b (Hib) <sup>12</sup>			post-HSCT recipients only				1 or 3 doses					

<sup>1</sup>Covered by the Vaccine Injury Compensation Program  
  For all persons in this category who meet the age requirements and who lack documentation of vaccination or have no evidence of previous infection; zoster vaccine recommended regardless of prior episode of zoster  
  Recommended if some other risk factor is present (e.g., on the basis of medical, occupational, lifestyle, or other indications)  
  No recommendation

ACIP Recommended Adult Immunization Schedule, Centers for Disease Control and Prevention, 2015

Recommended Immunization Practices:

- Try to obtain patient immunization history with history of medical, neurological and hypersensitivity reactions.
- Educate patient on vaccine preventable diseases and clear all misconceptions with the patient and family.
- Provide clear documentation of vaccinations.

3. Belmin J. Improving the vaccination coverage of geriatric populations. *J Comp Pathol.* 2010 Jan;142 Suppl 1:S125-8. doi: 10.1016/j.jcpa.2009.10.019. Epub 2009 Dec 4.
4. Advisory Committee for Immunization Practices (ACIP), U.S. Department of Health. Centers for Disease Control and Prevention.

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