

Vaccinations for Older Patients

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Objectives

- Incorporate current CDC guidelines into your practice
- Identify and vaccinate high risk patients
- Discuss vaccine myths with patients and other providers

Introduction

Immunization is the process whereby a person is made immune or resistant to an infectious disease.

Vaccines stimulate immune system to protect the person against subsequent infection or disease.

Source: World Health Organization, 2016

Types of Vaccines

- Attenuated
 - An infectious agent altered to become harmless or less virulent.
 - Small risk of acquiring the disease
 - Should be avoided if immunocompromised
 - May induce more permanent immunity

Sources: www.vaccines.gov

Types of Vaccines

- Inactivated
 - Pathogen is destroyed by heat, chemicals or radiation
 - Stimulate a weaker immune response
 - May require a booster
 - Examples: Influenza, Hepatitis A and B

Sources: www.vaccines.gov

Types of Vaccines

- Toxoids
 - Used to induce immunity against toxins produced by pathogens
 - Toxins inactivated with formalin to render harmless
 - Examples: Diphtheria and tetanus

Sources: www.vaccines.gov

Types of Vaccines

Live

- Influenza (intranasal)
- Herpes zoster
- MMR
- Varicella

Inactivated

- Influenza (IM)
- Diphtheria, tetanus, pertussis
 - (Diphtheria/tetanus: toxoids)
- Haemophilus influenza type B
- Hepatitis A
- Hepatitis B
- Meningococcal
- Pneumococcal

Vaccination Response

- Vaccination type (attenuated vs inactivated)
- Interval between doses or number of doses
- Age
- Genetic background

Special Populations

- Severely immunocompromised patients
 - Active malignancy, alcoholics, HIV
 - Should not receive live vaccines
- Immunosuppressive therapy
 - Prednisone ≥ 20 mg daily for at least 2 weeks
 - Wait 1 month before administering live vaccines
 - Tumor necrosis factor alpha inhibitors

Source: National Center for Immunization and Respiratory Diseases

Special Populations

- Vaccinate before starting immune Tx
 - Examples: TNF alpha inhibitors (Humira, Remacade, Enbrel), methotrexate, AZA
- Live vaccinations may cause disease in compromised patients
- Inactivated vaccines may not stimulate immunity in compromised patients

Source: US Pharmacist

Community Immunity

- Commonly known as 'herd immunity'
- A critical portion of the population is immunized against a contagious disease
- Disease reservoir is reduced or eliminated
- Unvaccinated people benefit from contained contagion

Source: The National Institute of Allergy and Infectious Diseases (NIAID)

Community Immunity

- R_0 (R naught) is the number of people predicted to become infected by one person
- R_0 for influenza is about 1.5 – 2.0
- R_0 for pertussis is about 15
- R_0 is the basis for calculating threshold

Community Immunity

Disease	R0	Threshold (%)
Mumps	4-7	75–86
Polio	5-7	80–86
Smallpox	5-7	80–85
Diphtheria	6-7	85
Rubella	6-7	83–85
Pertussis	12-17	92–94
Measles	12-18	83–94

Vaccination Recommendations

- CDC (Centers for Disease Control and Prevention)
 - Publishes schedules from recommendations made by
 - ACIP – Advisory Committee on Immunization Practices
 - Committee on Infectious Disease of the American Academy of Pediatrics
 - American Academy of Family Physicians

Contraindications

Anaphylactic Allergy to:	Avoid these Vaccines:
Eggs	Influenza (all except Flublok)
Gelatin	Varicella, MMR, Zostavax
Neomycin	MMR, Polio, Varicella, Zostavax
Aspirin	LAIV, Varicella: Reye's syndrome

Contraindications

Figure 2. Vaccines that might be indicated for adults based on medical and other indications¹

VACCINE	INDICATION	Pregnancy	Immuno-compromising conditions (excluding human immunodeficiency virus (HIV) ^{a,b,c,d})	HIV infection (CD4+ T lymphocyte count ^{e,f,g,h})	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 deficiencies) ^{i,j,k}	Chronic liver disease	Diabetes	Healthcare personnel
Influenza ^{1,2}		1 dose IV annually		< 200 cells/μl	≥ 200 cells/μl	1 dose IV annually					1 dose IV or 1 dose annually
Tetanus, diphtheria, pertussis (Td/Tdap) ^{1,2}		Substitute 1-time dose of Tdap for Td booster; then boost with Td every 10 yrs									
Varicella ^{4,5}		Contraindicated				2 doses					
Human papillomavirus (HPV) Female ^{1,2}		3 doses through age 26 yrs				3 doses through age 26 yrs					
Human papillomavirus (HPV) Male ^{1,2}		3 doses through age 26 yrs				3 doses through age 21 yrs					
Zoster ⁴		Contraindicated				1 dose					
Measles, mumps, rubella (MMR) ^{1,2}		Contraindicated				1 or 2 doses					
Pneumococcal 13-valent conjugate (PCV13) ^{1,2}						1 dose					
Pneumococcal polysaccharide (PPSV23) ^{3,4,5}						1 or 2 doses					
Meningococcal ^{1,2}						1 or more doses					
Hepatitis A ^{1,2}						2 doses					
Hepatitis B ^{1,2}						3 doses					
Haemophilus influenzae type b (Hib) ^{8,9}		post BCG recipients only				1 or 3 doses					

^a Currently by the Vaccine Injury Compensation Program. ^b For all persons in this category who meet the age requirements and who lack documentation of vaccination or have no evidence of previous infection. ^c Zoster vaccine recommended regardless of prior episode of zoster. ^d Recommended if some other risk factor is present (e.g., on the basis of medical, occupational, lifestyle, or other indications). ^e No recommendation.

These schedules indicate the recommended age groups and medical indications for which administration of currently licensed vaccines is commonly indicated for adults ages 19 years and older, as of January 1, 2014. For all vaccines being recommended on the Adult Immunization Schedule, a vaccine series does not need to be restarted, regardless of the time that has elapsed between doses. Licensed combination vaccines may be used whenever any components of the combination are indicated and when the vaccine's other components are not contraindicated. For detailed recommendations on all vaccines, including those used primarily for travelers or that are issued during the year, consult the manufacturers' package inserts and the complete statements from the Advisory Committee on Immunization Practices (www.cdc.gov/acip/recommendations.html). 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.



Adult Immunization Schedule

Recommended Adult Immunization Schedule—United States - 2015
 Note: These recommendations must be read with the footnotes that follow containing number of doses, intervals between doses, and other important information.

Figure 1. Recommended adult immunization schedule, by vaccine and age group¹

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

¹Covered 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, a booster vaccine is 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 indicators).

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 or by telephone, 800-822-7967.

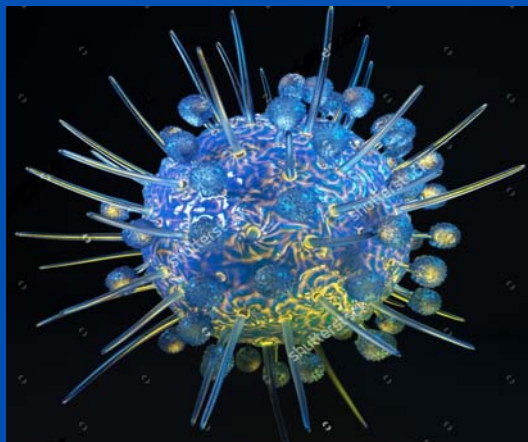
Information on how to file a Vaccine Injury Compensation Program claim is available at www.hrsa.gov/vaccinecompensation or by telephone, 800-338-2382. To file a claim for vaccine injury, contact the U.S. Court of Federal Claims, 717 Madison Place, N.W., Washington, D.C. 20005; telephone, 202-357-4400.

Additional information about the vaccines in this schedule, extent of available data, and contraindications for vaccination is also available at 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).

Influenza



Influenza

- Influenza vaccine
 - Each contains antigens for 2 Type A and 1 or 2 Type B
 - Antigen selection based on recent outbreaks
 - Reduces risk by 90 % in healthy adults
 - Reduces risk in frail elderly by 30-40%
 - But 2-4 times morbidity and mortality

Influenza Vaccines Types

- IIV: Inactivated influenza vaccine
 - IIV3: Contains 2 type A and 1 Type B
 - IIV4: Contains 2 type A and 2 Type B
 - RIV3: Recombinant influenza vaccine, trivalent
 - FluBlok: no egg proteins, use with egg allergies

Influenza Vaccines Types

- IIV: High-dose inactivated influenza vaccine
 - Approved for people age 65 and older
 - Has four times the amount of antigen
 - Reported to be 25% more effective as prevention
 - CDC does not specifically recommend
 - Patients more likely to develop side effects
 - Fever, injection site pain

Influenza Vaccines Types

- LAIV: Live attenuated influenza vaccine
 - LAIV4: Flumist: Contains 2 Type A and 2 B
 - Not for use in immunocompromised patients
 - Not for use in moderate/severely ill patients
 - Approved for ages 2 – 49
 - CDC does not specifically recommend

Source: www.cdc.gov

Tetanus, Diphtheria, Pertussis

- Available in combination only
 - Td – tetanus toxoid, diphtheria toxoid
 - Tdap – tetanus and diphtheria toxoids with acellular pertussis
- Recommendations
 - Td – booster every 10 years
 - Tdap
 - One time dose to replace Td booster
 - For adults who have close contact with infants < 12 months old

Source: www.cdc.gov

Tetanus



Tetanus

- Caused by *Clostridium tetani*
- Spores are found in soil, dust, feces
- Disease caused by toxin
 - Binds in the CNS, blocks neurotransmitters which prevents muscle relaxation and causes tetany

Tetanus

- Presents with descending symptoms
 - Trismus (lockjaw), difficulty swallowing, muscle rigidity and spasms
- Symptoms persist for about one month
- Over 30% mortality
- Complications
 - Respiratory distress, bone fractures, pneumonia

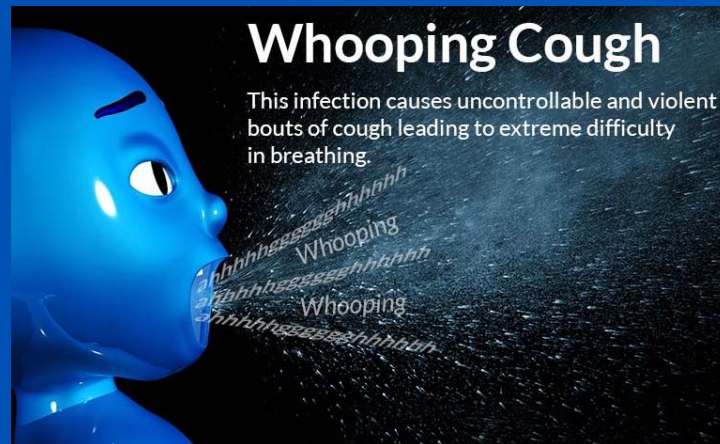
Diphtheria



Diphtheria

- Caused by *Corynebacterium diphtheriae*
- Can involve any mucous membrane
- Exudative pharyngitis is most common
 - Pulmonary obstruction due to pseudo membrane formation

Pertussis



Pertussis Vaccine

- Whole cell pertussis vaccine (DTwP)
 - Linked to acute encephalopathy and seizures
 - No longer available
- Acellular pertussis vaccine (DTaP, Tdap)
 - Developed due side effects of DTwP
 - Contains components of cell of the bacteria
 - Fewer AE with no reports of encephalopathy

Acellular Pertussis Vaccine

- Less effective than whole-cell vaccine
- Give one Tdap in place of tetanus booster
- Immunized patient may be carriers
- Recent resurgence in whooping cough
 - Possibly due to immunized carriers
 - Not having received adult booster (Tdap)
 - Unimmunized patients create reservoir of disease

Varicella – Chicken pox



Varicella – Shingles



Varicella Zoster

- Caused by varicella zoster virus
- Chicken pox is the primary infection
- Herpes zoster (“shingles”) – reactivation
- Highly contagious via respiratory transmission or contact

Varicella Vaccine

- Live attenuated vaccine
- Adult recommendation
 - US born after 1979 without evidence of vaccination or previous infection
 - Younger than 60 years old
 - Should receive two doses 4 - 8 weeks apart

Zoster Vaccine

- Identical to varicella vaccine but with ~15x higher titer
- Not to be given if previous varicella vaccination
- Vaccine group had 51% less episodes of zoster
- CDC recommends to adults 60 and over

Source: www.cdc.gov

Pneumococcal Vaccine



Pneumococcal Vaccine

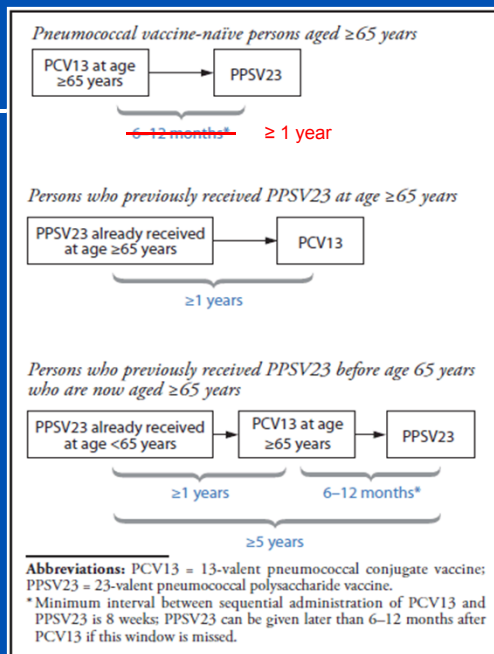
- *Streptococcus pneumoniae*
 - 90 known serotypes
 - Drug resistant strains are becoming more common – up to 30%
 - 23 serotypes account for 85-90% of invasive disease
 - 13 serotypes account for 61% of disease in younger patients

Pneumococcal Vaccine

- 23-valent pneumococcal polysaccharide vaccine
 - Pneumovax (PPSV23)
 - Indicated for adults > 50 and children > 2 years old
- 13-valent pneumococcal conjugate vaccine
 - Prevnar 13 (PCV13)
 - Approved 2/2010

Pneumococcal Vaccine

- Adults over 65



Pneumococcal Vaccine

- General Recommendations
 - All patients 65 or over – Prevnar 13 followed by Pneumovax 12 months later
 - Under age 65 - Pneumovax should be given only in any of the following conditions:
 - Smokers and nursing home residents
 - Chronic heart, lung, or liver disease
 - Alcoholism
 - Diabetes

Source: Recommended Adult Immunization Schedule, Footnote 8

Pneumococcal Vaccine

- Immunocompromised Recommendations
 - No previous – Prevnar 13 followed by Pneumovax in 8 weeks, booster in 5 years
 - Previous Pneumovax – Prevnar 13 in 1 year
 - Previous Prevnar 13 – Pneumovax in 8 weeks
 - Vaccinate at least 2 weeks before immunosuppressive therapy or splenectomy
 - Vaccinate newly diagnosed HIV patients early

Source: Recommended Adult Immunization Schedule, Footnote 8

Pneumococcal Vaccine

- Qualifications for immunocompromise:
 - All immunodeficiency and malignancy,
 - Transplant patients
 - Organ failure, including functional asplenia
 - Immunosuppressive therapy

Source: Recommended Adult Immunization Schedule, Footnote 8

Medicare Coverage

- Medicare Part B
 - Influenza, standard and high-dose
 - Prevnar 13 and Pneumovax
 - Tdap (if associated with an injury)
- Medicare Part D
 - Zoster vaccine
 - Tdap (preventive)

Source: Journal of the American Geriatric Society, 2015

Vaccine Information Statements

- Required under the National Childhood Vaccine Injury Act
- “All health care providers...shall, prior to administration of each dose of the vaccine, provide a copy to keep of the relevant current edition...”
- www.cdc.gov/vaccines/pubs/vis

Vaccine Information Statements

- The medical record must include:
 - The edition date of the VIS
 - The date it was provided to the patient
 - Name, address, and title of person administering the vaccine
 - Date of administration
 - Vaccine manufacturer and lot number

Source: www.cdc.gov/vis

MYTHS About Vaccines

- “Aluminum leads to dementia and neurologic diseases”
 - Used in some vaccines to improve the immune response for over 70 years
 - Quickly eliminated
 - More aluminum is absorbed through food, drink, and antacids than vaccines

Source: www.chop.edu; www.nap.edu; www.cdc.gov

MYTHS About Vaccines

- “Formaldehyde causes blindness, encephalopathy, seizures, leukemia”
 - Used to detoxify toxins
 - Used to inactivate viral vaccines
 - Miniscule amount in vaccine is safe

Source: www.chop.edu; www.cdc.gov

MYTHS About Vaccines

- “The pneumonia shot doesn’t work”
 - General misconception that the vaccine prevents all pneumonia
 - Providers need be clear regarding the purpose
 - 60 – 70% effective in preventing pneumococcal pneumonia

Source: www.cdc.gov

MYTHS About Vaccines

- “The flu shot doesn’t work”
 - Age and comorbidities can be a factor
 - Consider high-dose vaccine if appropriate
 - Depends on the strains of virus in the vaccine
 - Vaccine will provide at least some protection in either situation

Source: www.cdc.gov; www.chop.edu; www.adultvaccination.org;

MYTHS About Vaccines

- “I can get the flu from the vaccine”
 - Inactivated influenza vaccine does not contain any live virus
 - It is incapable of causing the flu
 - Muscle aches and low-grade fever can occur
 - Preemptively recommend acetaminophen or NSAIDs

Source: www.cdc.gov; www.vaccineinformation.org; www.chop.edu;

Provider MYTHS

- “You have to wait at least 5 years between Td and Tdap vaccines”
 - There is no minimum interval between these vaccines
 - Could be given together if necessary

Source: www.cdc.gov; www.immunize.org;

Provider MYTHS

- “You can only give one vaccine per visit”
 - There is not established limit
 - All recommended vaccines should be administered during the same visit
 - Live vaccines can be given together OR separated by 4 weeks
 - Inactivated vaccines can be given together or at any interval

Source: www.cdc.gov; www.immunize.org;

Provider MYTHS

- “You can’t give vaccines to ill patients”
 - Vaccines can be given during mild acute illness with a fever
 - Vaccines can be given during a course of antibiotics

Source: www.cdc.gov; www.immunize.org;

Provider MYTHS

- “You need to check vitals prior to vaccination”
 - ACIP does not recommend checking vitals before vaccination
 - Mild illness and fever is not a reason to withhold administration
 - Can increase visit time unnecessarily

Source: www.cdc.gov; www.immunize.org;

Resources

- American Geriatric Society – www.jags.com
- British Society of Rheumatology – www.rheumatology.oxfordjournals.org
- CDC - www.cdc.gov/vaccines/
- Immunization Action Coalition - www.immunize.org/
- Morbidity and Mortality Weekly Report - www.cdc.gov/mmwr/
- National Foundation for Infectious Diseases - www.nfid.org/
- National Network for Immunization Information - www.immunizationinfo.org/
- Natural News - www.naturalnews.com
- US Pharmacist – www.uspharmacist.org
- Vaccine Adverse Event Reporting System - vaers.hhs.gov/
- WebMD – www.webmd.com

Questions

