

# **Adult Vaccinations**

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### Learning Objectives



- 1. Explain how vaccines work
- 2. Understand the different vaccinepreventable disease states
- 3. List and explain the different types of vaccines
- 4. Be able to differentiate between side effects vs. true allergy
- 5. Discuss the recent updates in adult vaccinations

# Vaccinations & Immunity

- Mimic the course of natural infection without infecting the individual
- Induces
  - Humoral (antibody-mediated) Immunity
  - Cell-mediated Immunity
- Generates pool of memory T & B cells specific to vaccine antigen







#### The Immune Response to Vaccination: Acute Phase and Long-term Protection

- Acute Phase Response
  - Immune system triggered to recognize and respond to the pathogen
  - · Leads to an initial phase where mild side effects (fever, muscle aches) occur
  - This is an indication that the body is building immunity
- Long-Term Protection:
  - Vaccines create "immune memory" through memory B and T cells
    - Counter future to the pathogen. exposures
  - Provides long-lasting protection, reducing the risk of severe illness if exposed



Adult Vaccinations



#### **Immunity & Vaccines Explained**





### **Physiology of Vaccinations**



#### Vaccines contain weakened or inactive parts of a particular organism (antigen) that trigger immune response within the body



### **Different Types of Vaccines**

A CONT	Inactivated vaccines
<b>R</b>	Live vaccines
ğ	mRNA vaccines
8	Subunit recombinant polysaccharide & conjugate vaccines





#### **Vaccination Reduces Risk of Severe Outcomes**

- Reduced Disease Risk
  - Vaccinated individuals experience lower rates of hospitalizations
  - CDC: Influenza vaccine reduces flu-related
     hospitalizations by approximately 40-60% each year
- Protection for Vulnerable Populations
  - Herd immunity
  - Vaccination not only protects individuals but also indirectly protects the community
  - Protects those who may not respond well to vaccines





### **Inactivated Vaccines**

- Use killed version of the virus
- May need several doses (booster shots) to sustain effect
- Do NOT replicate since they are killed
- May contain adjuvants increases immune response
- Examples: Hepatitis A, Influenza





# **Live Vaccines**

- Use weakened form of the virus
- Must replicate to work
- Mimic natural infection
- Strong, long-lasting immune response





### **mRNA Vaccines**

- Teach cells how to make a protein
- Immune cells recognize the protein and trigger a response
- Example: COVID-19





#### Subunit, Recombinant, Polysaccharide & Conjugate Vaccines

- Use specific pieces of the virus to trigger an immune response
- Strong immune response that's targeted to key parts of the virus
- Example: Hepatitis B, pneumonia, shingles





### **Toxoid Vaccines**

- Use a toxin made by the virus that causes a disease
- Creates immunity targeted to the toxin
- May need booster shots
- Example: Diphtheria, Tetanus





#### **Route of Administration of Vaccinations**



#### Adult Vaccinations



### **Vaccination Schedule**

CDC Centers for Disease Contro CDC 24/7: Saving Lives, Protecting Peop	I and Prevention Search Q							
Immunization Schedules								
Schedules Home $>$ For Parents & Adults								
✿ Schedules Home For Health Care Providers +	dules Home The Adult Vaccine Assessment Tool							
Español (Spanish)   Print For Parents & Adults –								
Schedule for Infants and Children (birth-6 years)	The Advisory Committee on Immunization Practices (ACIP) met on October 23-24, 2025. ACIP voted to approve the Recommended Child and Adolescent Immunization Schedule, United States, 2025, and the Recommended Adult							
Schedule for Preteens and Teens (7 years – 18 years)	Immunization Schedule, United States, 2025. The information on this page is being updated to reflect the 2025 immunization schedules. For more information, please see <u>ACIP Recent Meeting Recommendations</u> .							
The Adult Vaccine Assessment Tool	What Vaccines							
Resources for Adults	do <b>You</b> need?							
Related Links	Adults need vaccines tool Answer a few quick questions to find out which vaccines you may need.							

#### **Adult Vaccinations**



# **Side Effect vs. Allergy**

#### Side Effect

- Inactivated Vaccines
  - Can produce reactions at the injection site; may be with or without a fever
- Live-attenuated Vaccines
  - Can produce a mild form of the natural illness
- False Allergy
  - Fever & GI upset

#### **True Allergy**

- Itching, erythema, hives, symptoms progressing towards anaphylaxis
- Occurs within minutes to hours
- Serious allergic reactions are RARE!





# **Observation Period**



#### **Routine Vaccines**





### What is COVID-19?

- Coronavirus disease 2019 (COVID-19)
  - Disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)
  - Spreads through respiratory particles
- Stages of COVID-19:
  - Upper respiratory tract infection → shortness of breath & pneumonia → hyperinflammatory state → death or recovery
- Symptoms:
  - Fever or chills, cough, headache, loss of taste or smell, sore throat







### **COVID-19 Vaccine**

- Importance:
  - Protects against severe illness, hospitalization, and death from COVID-19.
  - Helps reduce the spread of the virus, contributing to community immunity.



# **COVID-19 Vaccine**

- Types of COVID Vaccines
  - mRNA vaccines Pfizer-BioNTech, Moderna
  - Viral vector vaccines Johnson & Johnson
  - Protein subunit vaccines Novavax
- COVID-19 Vaccine Data
  - Consistently demonstrated reduced rates of severe outcomes, including hospitalization and mortality, among vaccinated individuals compared to those unvaccinated











# **COVID-19 Vaccine Updates**

- Children 6 months 4 years:
  - Unvaccinated: Receive multidose initial series
     of 2024-2025 mRNA vaccine
  - Completed initial series: receive 1 dose of 2024-2025 mRNA vaccine
- People 5 64 years:
  - Receive 1 dose age appropriate 2024-2025
     vaccine





### **COVID-19 Vaccine Updates**

- People 65 years & Older
  - Receive 2 doses of 2024-2025 (Pfizer, Moderna or Novavax)
  - Unvaccinated Individuals
    - Receive 2 doses of Novavax
    - Third dose of any COVID-19 vaccine 2-6 months after second dose





### **COVID-19 Vaccine**

#### AN UPDATED COVID-19 VACCINE HELPS SAVE LIVES

Vaccinated people\* who received an updated COVID-19 vaccine were

#### 14X less likely to die

compared with those who received no vaccine

#### **3X less likely to die**

compared with those who received only the original COVID-19 vaccine(s)

#### People ages 12+ who got their last COVID-19 vaccine dose before September 2022 should get an updated vaccine

\* Completed the original COVID-19 vaccine primary series and/or original booster(s)

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### What is Influenza?

- Contagious respiratory illness
  - Caused by the influenza virus that infect the nose, throat, and sometimes the lungs.
  - Can lead to severe complications like pneumonia and bronchitis
  - Can result in hospitalization and death
  - Spreads through respiratory droplets
- Symptoms
  - Sudden onset of fever, dry cough, headache, muscle and joint pain, sore throat, runny nose



- Types of Flu Vaccines
  - Live-attenuated FluMist®
  - Inactivated Fluarix<sup>®</sup>, FluLaval<sup>®</sup>, Fluzone<sup>®</sup>,
     FluZone High-Dose<sup>®</sup>, Alfuria<sup>®</sup>, Fluad<sup>®</sup>, Flucelvax<sup>®</sup>
  - Recombinant Flublok<sup>®</sup>
- CDC estimates that flu vaccination reduces the risk of flu-related death in children and adults
- Vaccination reduces mortality rate by 15-20%!



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**Flublok**<sup>®</sup> Influenza Vaccine





- People younger than 65 years
  - One dose of inactivated, recombinant, or liveattenuated influenza vaccine
  - No preference for one over the other
    - Exception: people with immunosuppressive conditions may receive high-dose or adjuvant inactivated vaccines





- People 65 years and older
  - FluZone High-Dose<sup>®</sup>, Flublok<sup>®</sup>, or Fluad<sup>®</sup>
  - Found to be more effective than standard dose unadjuvanted influenza vaccines





- Why is the flu vaccine recommended annually?
  - Immune protection from vaccination declines over time
  - Influenza viruses are constantly changing
    - Composition of flu vaccine is reviewed annually, and vaccines are updated to protect against the viruses that research indicated will be most common during the upcoming flu season



- Considerations for egg-based allergy
  - Can receive any age-appropriate inactivated influenza vaccine, even if severe allergy symptoms
    - Administer in a medical setting under the supervision of a healthcare provider
  - Egg-free products: Flublok<sup>®</sup> and Flucelvax<sup>®</sup>
  - Do NOT administer live influenza vaccine (FluMist<sup>®</sup>)







- When should I get vaccinated?
  - September and October are optimal times
  - Ideally, everyone should be vaccinated by the end of October
  - Earlier vaccination can be associated with reduced protection against the flu infection, particularly in older adults



#### What is Respiratory Syncytial Virus (RSV)?

#### Importance

- Causes acute respiratory infection during the fall and winter months
- In older adults or those with coexisting conditions, RSV infection can cause lower respiratory tract disease
- Can lead to exacerbation of underlying diseases, hospitalization and death
- Symptoms
  - Wheezing, cough, congestion, fever, runny nose



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### **Respiratory Syncytial Virus (RSV) Vaccine**

- Different types
  - Subunit Vaccines
    - Abrysvo<sup>®</sup> no adjuvant (66.7% effective in prevention)
    - Arexvy<sup>®</sup> contains adjuvant (82.6% effective in prevention)
  - New mRNA vaccine
    - mResvia<sup>®</sup> approved May 31st, 2024 (83.7% effective in prevention)
- Schedule
  - Single dose (in late summer or early fall)
  - Patients aged 75 or older
  - Patients aged 60-74 years: only if increased risk factors
    - Lung diseases, cardiovascular diseases, liver disorders, reside in nursing home, etc

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	<b>≥</b> Pfacer



#### **Respiratory Syncytial Virus (RSV) Vaccine**

#### • Efficacy & Safety of an mRNA-Based RSV Vaccine

- Study conducted in December of 2023
- Compared one-dose of mRNA vaccine to placebo (no vaccine) in adults 60 years of age or older
- No evident safety concerns with the vaccine and lower incidence of RSV-associated lower respiratory tract disease in the treatment group





### What is Pneumococcal Disease?

#### • Importance

- Streptococcus pneumoniae is the most common cause of pneumococcal disease in adults aged 50 years or older
- Can lead to invasive disease and death
- Spreads through respiratory secretions
- Symptoms:
  - Chest pain, cough, fever & chills, difficulty breathing





### **Pneumococcal Vaccine**

#### • Types of vaccines

- Pneumococcal conjugate vaccine
  - PCV13 (Prevnar 13®)
  - PCV15 (Vaxneuvance®)
  - PCV20 (Prevnar 20<sup>®</sup>)
  - PCV21 (Capvaxive 21<sup>®</sup>)
- Pneumococcal polysaccharide vaccine
  - PPSV23 (Pneumovax 23<sup>®</sup>)





### **Pneumococcal Vaccine**

- Vaccine Schedule
  - Adults <u>19-49 years with specific medical conditions</u>\* or

adults 50 years or older

- PCV20 x1 or PCV21 OR
- PCV15 x1 followed by PPSV23 x1 ≥12 months later

(or  $\geq$  8 weeks later if immunocompromised)

\*Medical conditions: cigarette smoking, diabetes, chronic heart, lung or liver disease, sickle cell disease, HIV infection, malignancy, chronic renal failure





#### Pneumococcal Vaccine Timing for Adults

Make sure your patients are up to date with pneumococcal vaccination.

#### Adults ≥50 years old Complete pneumococcal vaccine schedules

Prior vaccines	Option A	Option B	
None*	PCV20 or PCV21	PCV15 ≥1 year <sup>†</sup> PPSV231	
PPSV23 only at any age	≥1 year PCV20 or PCV21	≥1 year PCV15	
PCV13 only at any age	≥1 year PCV20 or PCV21		
PCV13 at any age & PPSV23 at <65 yrs	≥5 years PCV20 or PCV21	NO OF HON B	

\* Also applies to people who received PCV7 at any age and no other pneumococcal vaccines

1 If PPSV23 is not available, PCV20 or PCV21 may be used

<sup>+</sup> Consider minimum interval (8 weeks) for adults with an immunocompromising condition, cochlear implant, or cerebrospinal fluid leak (CSF) leak

<sup>§</sup> For adults with an immunocompromising condition, cochlear implant, or CSF leak, the minimum interval for PPSV23 is ≥8 weeks since last PCV13 dose and ≥5 years since last PPSV23 dose; for others, the minimum interval for PPSV23 is ≥1 year since last PCV13 dose and ≥5 years since last PPSV23 dose

#### Shared clinical decision-making for those who already completed the series with PCV13 and PPSV23

Prior vaccines	Share	d clinical decision-making option for adults ≥65 years old				
Complete series: PCV13 at any age & PPSV23 at ≥65 yrs	≥5 years PCV20 or PCV21	Together, with the patient, vaccine providers <b>may choose</b> to administer PCV20 or PCV21 to adults ≥65 years old who have already received PCV13 (but not PCV15, PCV20, or PCV21) at any age and PPSV23 at or after the age of 65 years old.				

# What is Shingles?

- Viral infection that causes an outbreak of painful rashes on the skin
- Occurs when varicella-zoster virus (VZV), which causes chickenpox, reactivates in the body
- Can lead to long-term nerve pain called postherpetic neuralgia (PHN)
- Symptoms:
  - Rash on one side of the body, fever, chills, stomach upset







# **Shingles Vaccine**

- Types
  - Shingrix<sup>®</sup> (recombinant zoster vaccine) is the preferred vaccine for older adults
- Scheduling
  - Two doses are recommended, given 2 to 6 months apart
  - Recommended for adults aged 50 and older, regardless of prior shingles infection or vaccination



#### What is Tetanus, Diphtheria, and Pertussis (Tdap)?

#### • Tetanus (lockjaw)

- Serious illness that causes convulsions and severe muscle spasms that can be strong enough to cause bone fractures of the spine
- Bacteria found in soil and can enter the body through cuts and scratches
- Diphtheria
  - Serious illness that can cause breathing difficulties, heart problems, nerve damage, pneumonia, and even death
- Pertussis (whooping cough)
  - Severe spells of coughing that can interfere with breathing
- Diphtheria & Pertussis
  - Spread through respiratory droplets



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#### **Tetanus, Diphtheria, and Pertussis (Tdap) Vaccine**

- Types
  - Tdap vaccine is a booster shot that protects against all three diseases: tetanus, diphtheria, and pertussis (whooping cough)
- Scheduling
  - Adults should receive a Tdap booster every 10 years.
  - Pregnant women are recommended to get a Tdap booster during each pregnancy, ideally between 27- and 36weeks gestation.





### **Vaccines for Special Populations**

#### **Older Adults**

- Influenza: Annual flu vaccine
- **Pneumococcal:** Depending on health history
- Shingles: Aged 50 and older
- Tdap: Every 10 years
- RSV: Aged 75 & older

#### **Pregnant Women**

- Tdap: Recommended during each pregnancy
- Influenza: Safe to receive during
  - any trimester
- COVID-19: Protect both mother and baby

#### **Chronic Health Conditions**

- **Diabetes:** Influenza, pneumococcal, hepatitis B
- Heart Disease: Influenza
   and pneumococcal vaccines
- Chronic Lung Disease: Influenza and pneumococcal vaccines



### **Vaccines for Special Populations**

#### Immunocompromised Individuals

- COVID-19: Updated vaccines and boosters based on vaccine status
- Influenza: Annual flu vaccine
- Pneumococcal: May need additional doses
- Hepatitis A/B & Meningococcal: Depending on specific immunocompromising conditions

#### Travelers



- Hepatitis A and B: Depending on destination and activities
- Typhoid & Meningococcal: If traveling to certain regions
- Yellow Fever: Required for certain countries
- **Rabies:** Pre-exposure vaccination for highrisk activities



#### Historical Comparison of Morbidity, Mortality, & Hospitalizations for Vaccine-Preventable Diseases

Vaccine-Preventable Disease	Post-Vaccine (% Reduction)	
	Cases (Year)	Deaths
Invasive Pneumococcal Disease	Not Available	25.4%
Tetanus	92.9%	99.2%
Diphtheria	100%	100%
Pertussis	92.2%	99.3%





### **Broader Health Benefits of Vaccinations**

- Vaccination offers both immediate protection and long-term health benefits
  - Lower the risk of complications like heart attacks after flu
  - May reduce the risk of neurodegenerative conditions such as dementia





#### **Broader Health Benefits of Vaccinations**

- Acute Myocardial Infarction Risk Post-Influenza Infection
  - A New England Journal of Medicine study found that influenza infection increases the risk of heart attack sixfold in the week following infection
  - Flu vaccination can prevent such severe complications
- Herpes Zoster (Shingles) Vaccine and Dementia
  - A systematic review and meta-analysis found that people who received the shingles vaccine had a statistically significant lower risk of developing dementia compared to those who did not
  - Suggests that vaccination against herpes zoster may <u>reduce</u> dementia risk





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### Conclusion

- Vaccination Importance
  - Staying up to date with vaccinations is crucial for public health
  - Timely vaccinations help prevent serious illnesses and complications
- Call to Action
  - Engage with healthcare providers about your vaccination status
  - Stay informed on the latest recommendations
  - Encourage friends and family to prioritize their vaccinations





# Thank you.

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