

Principles of Immunization

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Learning Objectives

- Differentiate between live attenuated and inactivated vaccines
- Provide immunization recommendations to an adult patient based on current immunization schedules
- Describe procedures for management of vaccine reactions

Definitions

- Immunization / vaccination
- Immunity
 - Protection against infectious disease
 - 2 types
 - Active immunity
 - Passive immunity

Centers for Disease Control and Prevention. Epidemiology and Prevention of Vaccine-Preventable Diseases. Atkinson W, Hamborsky J, McIntyre L, Wolfe S, eds. 10th ed. 2nd printing. Washington DC: Public Health Foundation, 2008.

Active Immunity

- Stimulation of immune system to produce antigen-specific antibodies and cellular immunity
- Protection usually permanent
- Examples
 - Natural disease
 - Vaccination

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Passive Immunity

- Transfer of antibody produced by one human or animal to another
- Temporary protection
- Examples
 - Mother-to-infant
 - Administration of antibodies

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Classification of Vaccines

- Live attenuated
- Inactivated
 - Whole cell
 - Fractional
 - Pure Polysaccharide
 - Conjugated Polysaccharide

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Live Attenuated Vaccines

- Produced by modification of wild virus or bacteria
- Has ability to replicate and produce immunity
- Usually does not cause disease
- Effective with one dose (except oral live attenuated vaccines)
- Can cause severe or fatal reactions

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Inactivated Vaccines

- Produced by growing then inactivating virus or bacteria with heat or chemicals
- Are not alive, therefore, cannot replicate!!
- Require multiple doses and “boosters”
- Immune response is humoral

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Immunization Schedule

- Published by the Advisory Committee on Immunization Practices (ACIP)
- Available at www.cdc.gov/vaccines

Recommended Adult Immunization Schedule

Note: These recommendations must be read with the footnote that follow.

Figure 1. Recommended adult immunization schedule, by vaccine and age group United States, October 2007 – September 2008

VACCINE	AGE GROUP	10–19 years	50–64 years	≥65 years
Tetanus, diphtheria, pertussis (Td/Tdap) ^{1,*}			1 dose Td booster every 10 yrs	
		Substitute 1 dose of Tdap for Td		
Human papillomavirus (HPV) ^{2,*}		3 doses Females 0, 2, 6 mos		
Measles, mumps, rubella (MMR) ^{3,*}		1 or 2 doses	1 dose	
Varicella ^{4,*}		2 doses (0, 4–8 wks)		
Influenza ^{5,*}		1 dose annually		
Pneumococcal polysaccharide ^{6,7}		1–2 doses		1 dose
Hepatitis A ^{8,*}		2 doses (0, 6–12 mos or 0, 6–18 mos)		
Hepatitis B ^{9,*}		3 doses (0, 1–2, 4–6 mos)		
Meningococcal ^{10,*}		1 or more doses		
Zoster ¹¹			1 dose	

Antibody + Vaccine

- Given live vaccine first wait at least 2 weeks before giving antibody
- Given antibody first waiting interval depends on concentrations of antibody given
- Inactivated viruses not affected by circulating antibody

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Simultaneous Administration of Vaccines

- Strongly encouraged
 - Exceptions: yellow fever and cholera
- Vaccines associated with local or systemic reactions should be given on separate occasions if feasible

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Non-Simultaneous Administration of Vaccines

- Live injected vaccines separate by 4 weeks
- Cholera and yellow fever separate by 3 weeks
- Others: no minimal interval

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Interval Between Doses of Same Vaccine

- Doses of a vaccine too close together may reduce effectiveness of vaccine
- Increasing dosing interval of multi-dose vaccine does not affect the effectiveness of the vaccine

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Vaccine Reactions

- Localized
- Psychological fright
- Anaphylaxis

www.immunize.org

Localized Reactions

Symptoms	Management
Soreness, redness, itching, swelling	<ul style="list-style-type: none"> •Cold compress •Analgesic •Antipruritic
Slight bleeding	Adhesive compress
Continuous bleeding	<ul style="list-style-type: none"> •Thick layer of gauze •Maintain pressure •Raise bleeding injection site above heart level

www.immunize.org

Psychological Fright

Symptoms	Management
Fright before injection is given	Have patient sit or lie down for the vaccination
Extreme paleness, sweating, coldness of hands and feet, nausea, light-headedness, dizziness, weakness, visual disturbances	<ul style="list-style-type: none"> •Have patient lie flat or sit with head between knees for several minutes •Loosen clothing •Apply cool, damp cloth to face and neck

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Anaphylactic Reactions

Signs / Symptoms	Management
<ul style="list-style-type: none"> •Generalized itching •Erythema •Urticaria •Angioedema •Bronchospasm •Shortness of breath •Shock •Abdominal cramping •Cardiovascular collapse 	<ul style="list-style-type: none"> •Call 911 •Notify on-call physician •Administer epinephrine intramuscularly •Administer diphenhydramine orally or intramuscularly •Monitor patient •Record all vitals and medication administration

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Adult Immunization Training
Principles of Vaccination

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