Ask the Experts: Update on Trends and Challenges in Vaccine Recommendations and Program Implementation for Adults in the Ambulatory Care Setting

Presented as a Live Webinar
Tuesday, April 5, 2016
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On-demand Activity
Live webinar recorded and archived to be watched at your convenience
Available after May 16, 2016

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Activity Overview

This activity will focus on current issues related to improving adult immunization in the ambulatory care setting. The faculty will address the key issues and provide practice pearls for physicians and pharmacists.

The content for this activity is based on questions and comments from participants at a recent educational symposium on this topic. Time for additional questions from the webinar audience will be provided at the end of the presentation.

Learning Objectives

At the conclusion of this application-based educational activity, participants should be able to

- Describe data available for the 2015-16 influenza season and future vaccination implications.
- Evaluate frequent questions regarding vaccine recommendations and program implementation.
- Discuss updates from the Centers for Disease Control and Prevention for 2015 vaccine recommendations.
- Outline strategies to optimize vaccination rates in the adult population.

Continuing Education Accreditation

The American Society of Health-System Pharmacists is accredited by the Accreditation Council for Pharmacy Education as a provider of continuing pharmacy education. This activity provides 1.0 hours (0.10 CEUs – no partial credit for pharmacists) of continuing pharmacy education credit.

Live Activity ACPE #: 0204-0000-16-445-L01-P
On-Demand Activity ACPE #: 0204-0000-16-445-H01-P

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The American Society of Health-System Pharmacists designates this live activity for a maximum of 1.0 AMA PRA Category 1 Credits™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

Webinar Information

Visit www.cemiday.com/15-immunization/ate to find:

- Webinar registration link
- Group viewing information and technical requirements
- CE webinar processing information
Ask the Experts: Update on Trends and Challenges in Vaccine Recommendations and Program Implementation for Adults in the Ambulatory Care Setting

Activity Faculty

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Division of Pharmacotherapy and Experimental Therapeutics
UNC Eshelman School of Pharmacy
University of North Carolina
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Dennis M. Williams, Pharm.D., BCPS, AE-C, FASHP, FCCP, FAPhA, is Associate Professor and Vice Chair for Professional Education and Practice in the Division of Pharmacotherapy and Experimental Therapeutics at the University of North Carolina (UNC) Eshelman School of Pharmacy in Chapel Hill, North Carolina. He is also a clinical specialist at UNC Hospitals.

Dr. Williams earned his Bachelor of Science in pharmacy and Doctor of Pharmacy degrees at the University of Kentucky in Lexington. He is a board-certified pharmacotherapy specialist, as well as a certified asthma educator. He has received fellow recognition from the American Society of Health-System Pharmacists, American College of Clinical Pharmacy, and American Pharmacists Association.

Dr. Williams focuses his practice, teaching, and research on the management of patients with pulmonary and infectious diseases. He is a member of the National Asthma Education and Prevention Program Coordinating Committee of the National Heart, Lung, and Blood Institute and several other boards.

Dr. Williams has published research papers and book chapters in the area of pulmonary diseases and infectious diseases, and he regularly speaks on these topics at national and international professional programs. He has trained thousands of pharmacists and students about pulmonary, infectious disease, and immunization sciences, as well as practice considerations related to these topics.
Ask the Experts: Update on Trends and Challenges in Vaccine Recommendations and Program Implementation for Adults in the Ambulatory Care Setting

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Dr. Weber received his Bachelor of Arts from Wesleyan University, his Medical Degree (M.D.) from the University of California, San Diego, a Master of Public Health (M.P.H.) from Harvard University, and completed his medicine residency and infectious disease fellowship at Massachusetts General Hospital. He is Board-Certified in Internal Medicine, Infectious Disease, Critical Care Medicine, and Preventive Medicine. He is a fellow of the Infectious Diseases Society of America (FIDSA) and fellow of the Society for Healthcare Epidemiology of America (FSHEA).

His research interests include the epidemiology of healthcare-associated infections, new and emerging infectious diseases, control of drug resistant pathogens, immunization practices (especially of healthcare personnel), zoonotic diseases, and epidemiology of tuberculosis. He is the Society for Healthcare Epidemiology of America (SHEA) representative to the Advisory Committee of Immunization Practices (ACIP) and has also served on several working groups of the ACIP.

Dr. Weber has published more than 200 scientific papers in the peer-reviewed literature. In addition he has published 4 monographs and more than 200 book chapters, editorials, and short papers. He serves as Associate Editor for Infection Control and Hospital Epidemiology (ICHE).
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- David J. Weber, M.D., M.P.H., FIDSA, FSHEA declares he is a speaker and consultant for Merck and Pfizer, Inc.
- All other planners report no financial relationships relevant to this activity.
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Disclosures

- Dennis Williams reports that his spouse is employed by, and owns stock in, GSK which is a company that produces vaccine products
- David Weber reports that he represents the Society of Healthcare Epidemiology of America (SHEA) on the Advisory Committee on Immunization Practices (ACIP), and that he serves as a consultant and on the Speakers’ Bureau for Merck and Pfizer

Objectives

- Describe data available for the 2015-16 influenza season and future vaccination implications
- Evaluate frequent questions regarding vaccine recommendations and program implementation
- Discuss updates from the Centers for Disease Control and Prevention for 2015 vaccine recommendations
- Outline strategies to optimize vaccination rates in the adult population

What has the 2015-2016 influenza season looked like to date?

See page 16 for enlarged view
Case Scenario #1

MK is a 29 year old woman who asks to be vaccinated against influenza. She is healthy and has a 4 month old daughter who she is breastfeeding. What influenza vaccine product is she a candidate for?

Which vaccine product(s) is (are) appropriate for MK?

a. Live attenuated intranasal vaccine (quadrivalent)
b. Inactivated intramuscular influenza vaccine (trivalent)
c. Inactivated intramuscular influenza vaccine (quadrivalent)
d. Inactivated intradermal influenza vaccine (trivalent)
e. Any of the above
What is expected for the 2016-17 Influenza season?

Current Influenza Vaccines
- Vaccine recommendations
  - All persons over the age of 6 months annually unless contraindicated
  - Specifically recommended for HCP
- Available vaccines (contain 2 type A strains and 1 or 2 type B strains)
  - Inactivated IM (IIV3, standard): Ages ≥6 months
  - Intranasal Live, cold-adapted (LAIV4, 2007): Ages 2-49 years
  - High-dose (HD, 2009): Ages ≥65 years
  - Intradermal (ID, 2011): Ages 18-64 years
  - Quadrivalent vaccine (IIV4, 2013): Ages ≥6 months
  - Cell based (IIV3, 2013): Ages ≥18 years
  - Recombinant vaccine (RIV3, 2013): Ages ≥18 years
- No preference for any vaccine (follow FDA label for age and indications)

ACIP RECOMMENDATIONS: INFLUENZA VACCINES, 2016-17
- No major change in recommendations anticipated
- Optimally vaccination should occur before onset of influenza activity in the community; healthcare personnel (HCP) should offer vaccination by end of October, if possible
- No preference among vaccines (follow manufacturer’s recommendations on age and indications)
- RIV, which does not contain any egg protein, may be administered to persons aged ≥18 years with egg allergy of any severity; IIV may be used with additional safety measures for persons with hives-only allergy to eggs (recommendations for immunization of persons allergic to eggs will be less restrictive; new algorithm pending)
- HCP who care for severely immunocompromised persons who require care in a protected environment should receive IIV or RIV; HCP who receive LAIV should avoid providing care for severely immunosuppressed persons for 7 days after vaccination

Hopes for a Universal Influenza Vaccine
- Continues to progress in development (for Influenza A strains)
- May provide multiple years of immunity
- Can reduce production costs
- Can improve global vaccine supply and reduce potential for shortages
- May allow for faster production during epidemics

What are current issues and considerations regarding influenza vaccine for health care personnel?

Case Scenario #2
Lucy T. is a 32 year old nurse working in a general pediatrics clinic in your health system. Your institution has a mandatory influenza vaccine policy. She requests LAIV, but is told by the nursing director that she has to receive the inactivated intramuscular vaccine. Is this correct?
- a. Yes
- b. No
Influenza Vaccine Rates for Healthcare Personnel, 2010-Present


Influenza Vaccine Rates for HCP, 2014-15, Based on Requirement


Influenza Vaccines for HCP

- All HCP should receive an influenza vaccine each year unless there is a medical contraindication
- HCP can receive any influenza vaccine for which they meet age recommendations and indications
- CDC has no preference among influenza vaccines
- HCP who receive LAIV should not work in a “protected environment” (i.e., BMTU) for 7 days
- Key decisions
  - Whether to use trivalent vaccine (IIV3) or quadrivalent vaccine (IIV4)
  - Whether to use high-dose vaccine for HCP ≥65 years of age
- Best method to achieve high compliance is make job status conditional on receipt of vaccine

BMTU = bone marrow transplant unit

Can you clarify the role for the use of various pneumococcal vaccine products?

Case Scenario #3

LZ is a 62 year old man, newly diagnosed with chronic obstructive pulmonary disease (COPD). Which of the following pneumococcal vaccine strategies is appropriate at this time?

a. Pneumococcal polysaccharide vaccine (PPSV 23) only
b. Pneumococcal conjugate vaccine (PCV 13) only
c. Pneumococcal polysaccharide vaccine (PPSV 23) now, then pneumococcal conjugate vaccine (PCV 13) in one year
d. Pneumococcal conjugate vaccine (PCV 13) now, then pneumococcal polysaccharide vaccine (PPSV 23) in one year

Pneumococcal Vaccine for Adults 19-64 years old Select Conditions and Risks

Chronic Heart Disease (excluding hypertension), Chronic Lung Disease (including COPD, emphysema, asthma), Diabetes, Alcoholism, and Cigarette Smoking, Residents of long term or nursing home facilities

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**National Immunization Rates and Goals**

<table>
<thead>
<tr>
<th></th>
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<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Pneumococcal</td>
<td>High Risk Persons, ages 19 to 64 years</td>
<td>20.0% (20.1%)</td>
<td>60%</td>
</tr>
<tr>
<td>Pneumococcal</td>
<td>age ≥ 65 years</td>
<td>59.9% (62.3%)</td>
<td>90%</td>
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<tr>
<td>Tdap</td>
<td>Ages 19 to 64 years</td>
<td>15.6% (12.5%)</td>
<td>N/A</td>
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<tr>
<td>Hepatitis B</td>
<td>Health Care Workers</td>
<td>63.8%</td>
<td>90%</td>
</tr>
<tr>
<td>Hepatitis B</td>
<td>Diabetes, ages 19 to 59 years</td>
<td>28.6% (26.9%)</td>
<td>N/A</td>
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<tr>
<td>Herpes Zoster</td>
<td>age ≥ 60 years</td>
<td>20.1% (15.8%)</td>
<td>30%</td>
</tr>
</tbody>
</table>


**Available Pneumococcal Vaccines**

- 23-valent pneumococcal polysaccharide vaccine (PPSV23)
  - Polysaccharide-based vaccine, indicated for
  - Individuals age 65 years and older
  - Individuals with asthma or smokers ages 19 and older
  - Individuals with selected chronic diseases (including immunocompromising conditions), ages 2 to 64 years
- 13-valent pneumococcal conjugate vaccine (PCV13) (12 strains overlap with PPSV 23)
  - Protein conjugate-based vaccine, indicated for
  - Primary series for children younger than 2 years
  - Individuals age 65 years and older
  - Individuals with selected immunocompromising conditions, ages 6 to 64 years

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**CDC Pneumococcal Vaccine Recommendations for Adults, ages > 19 years**

* FNH recommendations also include children, ages 6 through 18 years; both PCV 13 and PPSV 23 are universally indicated, ages 65 and older

<table>
<thead>
<tr>
<th>Vaccine group</th>
<th>Underlying medical condition</th>
<th>PCV13</th>
<th>PPSV23</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unimmunocompro</td>
<td>Chronic heart failure, Congestive heart failure</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Unimmunocompro</td>
<td>Chronic lung disease</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Unimmunocompro</td>
<td>Diabetes mellitus</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Unimmunocompro</td>
<td>End-stage renal disease</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Unimmunocompro</td>
<td>Human immunodeficiency disease</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Unimmunocompro</td>
<td>Immunocompromising conditions</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Unimmunocompro</td>
<td>Human immunodeficiency disease</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Unimmunocompro</td>
<td>Immunocompromising conditions</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

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**Pneumococcal Vaccines Caveats for Sequencing**

- PPSV23 indications are broader
  - When > 1 dose is indicated, interval between doses is 5 years
  - Some patients could receive up to 3 PPSV doses in a lifetime
- For individuals age 65 years and older
  - PCV13 first, followed by PPSV23 in 1 year
  - When PCV13 and PPSV23 indicated < 65 years
  - PCV13 first, followed by PPSV23 in 8 weeks

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**Meningococcal Vaccines**

- Meningococcal serogroups A, C, Y, W135 (MenACWY)
  - Polysaccharide (MPSV4)
  - MenB: Sanofi: Labeled for ages 2 and older
  - Conjugate (MCV4)
    - MenACWY-D: Menactra, Sanofi: Labeled for ages 9 months to 55 years
    - MenACWY-CRM: Meneo, Novartis: Labeled for 2 months to 55 years
    - HibMenCY-TT: Menhibria, GSK: Labeled for 6 weeks to 18 months (contains Hib)
- Meningococcal serogroup B vaccines (MenB)
  - Polysaccharide
    - MenB: Trumenba, Pfizer: Labeled for ages 10 to 25 years (3 dose series)
    - MenB: Bexsero, Novartis: Labeled for ages 10 to 25 years (2 dose series)
  - Hib: Haemophilus influenzae type B

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**See page 17 for enlarged view**

**How does the availability of a meningococcal B vaccine affect clinicians’ strategies regarding vaccination?**

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ACIP October 2015
Category B Recommendation

• A MenB vaccine series may be administered to adolescents and young adults aged 16–23 years to provide short-term protection against most strains of serogroup B meningococcal disease.
• The preferred age for MenB vaccination is 16–18 years and requires a 2 to 3 dose series.

Why is the meningococcal B recommendation category B for adolescents?

• Incidence of meningococcal disease decreasing
• Meningococcus serogroup B disease uncommon in adolescents and adults
• Duration of protection unknown
• However, outbreaks continue to occur
• Substantial morbidity and mortality from meningococcal disease

Summary of ACIP Recommendations for Meningococcal Vaccines

<table>
<thead>
<tr>
<th>Risk Group</th>
<th>MenACWY Revaccination</th>
<th>MenB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anatomic or functional asplenia</td>
<td>Yes (x2)</td>
<td>Yes</td>
</tr>
<tr>
<td>Complement deficiencies(^2)</td>
<td>Yes (x2)</td>
<td>Yes</td>
</tr>
<tr>
<td>Meningococcal outbreak(^4)</td>
<td>Yes (x1)</td>
<td>No</td>
</tr>
<tr>
<td>Microbiologists with exposure</td>
<td>Yes (x1)</td>
<td>Yes (x1)</td>
</tr>
<tr>
<td>Travel; hyperendemic/epidemic</td>
<td>Yes (x1)</td>
<td>No</td>
</tr>
<tr>
<td>Military recruits</td>
<td>Yes (x1)</td>
<td>No</td>
</tr>
<tr>
<td>1st year college students, ≥21 yrs</td>
<td>Yes (x1)</td>
<td>No</td>
</tr>
<tr>
<td>Ages 11–18(^5)</td>
<td>Yes (x2)</td>
<td>No</td>
</tr>
<tr>
<td>Ages 16-23 (Category B)(^6)</td>
<td>See above</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Yes (x1)</td>
<td>Yes (x1)</td>
</tr>
</tbody>
</table>

\(^2\) Deficiency of C3, C5-9, Properdin, Factor D, Factor H;
\(^4\) Outbreak, ≥3 cases, same serogroup in ≤2 mo, AR ≥10/100,000;
\(^5\) Continued exposure; preferred age dose 2, 11-12 with booster at 16;
\(^6\) preferred age is 10-18 yrs

I heard that there was a new herpes zoster vaccine in clinical trials. How is it different from the current herpes zoster vaccine?

Herpes Zoster and HZ Vaccine

• 30% lifetime risk for episode
  – Age-associated, with greatest risk ≥60 years
  – 1 million cases annually in U.S.
• Current vaccine reduces risk of shingles episode by 51% and of postherpetic neuralgia (PHN) by 66.5%
  – Severity of zoster and PHN episodes also lessened
• Declining protection against shingles with age, but PHN protection is preserved

New Herpes Zoster Vaccine (HZ/su) in Development

• An inactivated vaccine with an adjuvant (AS01\(_b\))
  – Adjuvant not approved in U.S.
• Refrigeration required
• Administered in a two dose series (2 months apart)
New Herpes Zoster Vaccine (HZ/su)

• Efficacy against preventing HZ episodes was 97% in subjects over 50 years of age
  – Effect was durable with increasing age
• Duration of protection estimated at 3.2 years
• Solicited or unsolicited ADRs were 84.4%
  – 17% were Grade 3 (prevented normal everyday activities)
• Ongoing investigations in immunocompromised patients

How should I make decisions about vaccine requirements for an immunocompromised patient?

Case Scenario #4
Planned Immunosuppression

• Betty P. is a 59 year old Caucasian woman who has end-stage renal disease (ESRD) secondary to poorly controlled type 2 diabetes. She attends dialysis 3 times a week.
• She is currently treated with metformin and insulin, and is undergoing evaluation for a kidney transplant.
• A consult is requested regarding appropriate vaccinations to consider based on this plan.

Case Scenario #4
Planned Immunosuppression

• Ms. P’s record indicates that she received the pneumococcal vaccine (PPSV23) five years prior, a Td booster 4 years ago, and the hepatitis B vaccine series 2 years ago prior to beginning dialysis.
• She received the 2014-15 influenza vaccine in January 2015.

Case Scenario #4
Planned Immunosuppression

Which of following is accurate regarding the role of herpes zoster vaccine in this patient?

a. She should receive the varicella vaccine first, then the zoster vaccine in 30 days
b. She should not receive this vaccine based on her conditions
c. She should receive this vaccine at least 6 months after transplant
d. She should receive this vaccine at least 4 weeks prior to transplant

Case Scenario #4
Planned Immunosuppression

• Based on her planned kidney transplant, Ms. P should receive the following prior to transplant if possible:
  – Inactivated influenza vaccine
  – Tdap
  – PCV 13, followed by PPSV 23 in 8 weeks
  – Herpes Zoster vaccine at least 4 weeks prior to transplant
• Consult CDC and IDSA guidelines for recommendations

IDSA=Infectious Diseases Society of America
Considerations in Providing Vaccines to Immunocompromised Patients

- Provide vaccines as early in the course of disease as possible
- Vaccines provided prior to immunosuppression result in immunologic memory (except for stem cell transplantation) and do NOT require revaccination
- Adhere to recommended storage, dose, schedule, and method of administration
- Corticosteroid therapy NOT a contraindication to live virus vaccine:
  - Short term (i.e., <14 days)
  - Low to moderate dose (<20 mg prednisone or equivalent per day)
  - Long-term, alternative-day therapy with short-acting preparations
  - Maintenance physiologic doses (replacement therapy)
  - Topical (eye or skin), inhaled, or by intraarticular, bursal, or tendon injection
- All inactivated vaccines can be administered safely regardless of immune compromise (killed whole cell, recombinant, subunit, toxoid, polysaccharide)
- Live vaccines should NOT be administered for at least 3 months after immunosuppressive therapy
- Patients vaccinated within 14 days before starting immunosuppressive therapy should be considered unimmunized and should be revaccinated at least 3 months after therapy is discontinued if immune competence has been restored

Other Vaccine Related Recommendations Concerning Immunocompromised Patients

- Household contacts and other close contacts of persons with altered immunocompetence may receive ALL age-appropriate vaccines, with the exception of smallpox.
- MMR, varicella, live attenuated influenza vaccine (LAIV), and rotavirus may be administered to close contacts when indicated
  - If recipient of varicella vaccine develops a rash, direct contact with susceptible contacts should be avoided until rash resolves
  - Household members should wash their hands after changing the diaper of an infant who has received rotavirus vaccine

Can you discuss current information about emerging infectious diseases (e.g., Ebola and Zika viruses) and how they are managed?

Ebola Virus

- Filovirus: enveloped, non-segmented, negative-stranded RNA virus
- Prototype virus for Viral Hemorrhagic Fever
- Associated with greater than 20 previous outbreaks
- Majority of cases in Sierra Leone, Liberia and Guinea
- 28,608 total cases, 15,219 laboratory confirmed, and 11,305 deaths


Zika Virus

- Transmitted by Aedes aegypti mosquitoes
  - Also carry yellow fever, dengue, and chikungunya viruses
- Infected patients may present with rash, fever, arthralgias, and myalgias
- Conjunctivitis can be a distinguishing symptom from other viruses
- Incubation period is few days to weeks
- Local transmission in U.S. not yet documented, but cases reported in Puerto Rico, Virgin Islands, and American Samoa


Ebola Virus

- Common symptoms include elevated body temperature or subjective fever or symptoms, including severe headache, fatigue, muscle pain, vomiting, diarrhea, abdominal pain, or unexplained hemorrhage
- With suspected cases, standard contact and droplet precautions, and elaborate personal protective equipment are required
- Treatment is largely supportive including intravenous fluids and electrolyte replacement
- Experimental vaccines are under development and in clinical trials

Zika Virus

- Possible association between Zika and microcephaly in newborns is not entirely clear
- International travelers should take measures to reduce risk for mosquito bites
- For individuals with symptoms or diagnosis of Zika:
  - Women should wait at least 8 weeks after their symptoms first appeared before trying to get pregnant
  - Men should wait at least 6 months after their symptoms first appeared to have unprotected sex
- No vaccine or medications are available for treatment

Vaccine Evidence

- Prevention of disease with vaccines represents one of the most cost-effective strategies in medicine
- Recommended vaccines have an excellent cost-benefit ratio
- Health care personnel can have a positive impact on health outcomes by advocating and educating about vaccines

Characteristic of the Ideal Vaccine

- Potent (one vaccine dose required for immunity)
- Long-lived immunity generated (no need for boosters)
- Protects against infection
- Correlate of immunity known
- Correlate of immunity can be easily measured
- Not affected by circulating immunity
- Inexpensive to produce
- Oral (IM or SC administration not required)
- Stable at room temperature
- Long shelf life
- Safe: Few or no systemic side effects and safe for pregnant women

Comprehensive Strategies for Addressing Emerging Infectious Risks: EBOLA, MERS, AND ZIKA

- Define the epidemiology: Geographic range, at risk population, mechanisms of transmission, incubation period, communicable period, attack rate, frequency of illness and hospitalizations, and mortality
- Describe the clinical syndrome
- Develop diagnostic test (goal = highly sensitive and specific) – weeks to months (key to controlling spread)
- Develop control methods
- Protect healthcare personnel from acquiring infection
- Develop specific therapy (i.e., antimicrobials) – months to years
- Develop vaccines - multiple years

Strategies and Outcomes for Vaccines

- Prevent colonization
  - Conjugate vaccines for H. influenzae, meningoccci, pneumococci
- Prevention infection (pre-exposure)
  - Live-attenuated polio vaccine
  - Inhaled influenza vaccine
- Prevent disease (pre-exposure)
  - Hepatitis A and B, tetanus, measles, mumps, rabies, rubella, others
- Prevent disease (post-exposure)
  - Measles, varicella, smallpox, hepatitis A & B, tetanus, rabies
- Reduce severity
  - Influenza, pneumococcal, varicella

Strategies and Outcomes for Vaccines

- Prevent reactivation
  - Zoster
- Provide herd protection
  - Measles, mumps, rubella, varicella, polio, pneumococcal, others
- Disease elimination (Incidence of 0 in a selected area)
  - Polio (America), measles (US)
- Disease eradication (Worldwide eradication)
  - Smallpox, type 2 polio virus
- Reduce incidence of infections due to multidrug-resistant (MDR) pathogens
  - Influenza, pneumococcal, varicella/zoster
- Prevent cancer
  - Hepatitis B (liver), HPV (cervical, vaginal, vulvar, oral?)

HPV = human papillomavirus

Thank you and now we welcome your questions!
### Influenza Vaccine Effectiveness (VE) Estimates, 2005-16

<table>
<thead>
<tr>
<th>Influenza Season</th>
<th>Reference</th>
<th>Study Site(s)</th>
<th>No. of Patients</th>
<th>Adjusted Overall VE (%)</th>
<th>95% CI</th>
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<tr>
<td>2004-05</td>
<td>Belongia 2009</td>
<td>WI</td>
<td>762</td>
<td>10</td>
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<tr>
<td>2005-06</td>
<td>Belongia 2009</td>
<td>WI</td>
<td>346</td>
<td>21</td>
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<td>2006-07</td>
<td>Belongia 2009</td>
<td>WI</td>
<td>871</td>
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<td>2007-08</td>
<td>Belongia 2011</td>
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<td>2009-10</td>
<td>Griffin 2011</td>
<td>WI, MI, NY, TN</td>
<td>4757</td>
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<td>2010-11</td>
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<td>2011-12</td>
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<td>WI, MI, PA, TX, WA</td>
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<td>2012-13</td>
<td>McLean 2014</td>
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<td>2013-14</td>
<td>Unpublished</td>
<td>WI, MI, PA, TX, WA</td>
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<td>51</td>
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<td>2014-15</td>
<td>ACP presentation, Flannery</td>
<td>WI, MI, PA, TX, WA</td>
<td>4913</td>
<td>19</td>
<td>7, 29</td>
</tr>
</tbody>
</table>

2015-16 CDC Feb 24, 2016  59


### CDC Pneumococcal Vaccine Recommendations for Adults, ages > 19 years*

<table>
<thead>
<tr>
<th>Risk group</th>
<th>Underlying medical condition</th>
<th>PCV13</th>
<th>PPSV23</th>
<th>Revaccination 5 yrs after first dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immunocompetent persons</td>
<td>Chronic heart disease</td>
<td>Recommended</td>
<td>Recommended</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Chronic lung disease</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Diabetes mellitus</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cerebrospinal fluid leak</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cochlear implant</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Alcoholism</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Chronic liver disease, cirrhosis</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cigarette smoking</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Persons with functional or anatomic asplenia</td>
<td>Sickle cell disease/other hemoglobinopathy</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Congenital or acquired asplenia</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Immunocompromised persons</td>
<td>Congenital or acquired immunodeficiency</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Human immunodeficiency virus infection</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Chronic renal failure</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Nephrotic syndrome</td>
<td>✓</td>
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<td>✓</td>
</tr>
<tr>
<td></td>
<td>Leukemia</td>
<td>✓</td>
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<td>✓</td>
</tr>
<tr>
<td></td>
<td>Lymphoma</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Hodgkin disease</td>
<td>✓</td>
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<td>✓</td>
</tr>
<tr>
<td></td>
<td>Generalized malignancy</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Idiopathic immunosuppression</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Solid organ transplant</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Multiple myeloma</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

* PCV recommendations also include children, ages 6 through 18 years; Both PCV 13 and PPSV 23 are universally indicated, ages 65 and older

CDC. www.cdc.gov/vaccines/vpd-vac/pneumo/vac-PCV13-adults.htm

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## Summary of ACIP Recommendations for Meningococcal Vaccines

<table>
<thead>
<tr>
<th>Risk Group</th>
<th>MenACWY</th>
<th>Revaccination MenACWY</th>
<th>MenB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anatomic or functional asplenia</td>
<td>Yes (x2)</td>
<td>Yes (5 yr)</td>
<td>Yes</td>
</tr>
<tr>
<td>Complement deficiencies¹</td>
<td>Yes (x2)</td>
<td>Yes (5 yr)</td>
<td>Yes</td>
</tr>
<tr>
<td>Meningococcal outbreak²</td>
<td>Yes (x1)</td>
<td>No</td>
<td>Yes (x1)</td>
</tr>
<tr>
<td>Microbiologists with exposure</td>
<td>Yes (x1)</td>
<td>Yes (5 yr)³</td>
<td>Yes (x1)</td>
</tr>
<tr>
<td>Travel; hyperendemic/epidemic</td>
<td>Yes (x1)</td>
<td>Yes (5 yr)</td>
<td>No</td>
</tr>
<tr>
<td>Military recruits</td>
<td>Yes (x1)</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>1st year college students, ≤21 yrs</td>
<td>Yes (x1)</td>
<td>No</td>
<td>See below</td>
</tr>
<tr>
<td>Ages 11-18⁴</td>
<td>Yes (x2)</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Ages 16-23 (Category B)⁵</td>
<td>See above</td>
<td>No</td>
<td>Yes (x1)</td>
</tr>
</tbody>
</table>

¹Deficiency of C3, C5-9, Properdin, Factor D, Factor H; ²Outbreak, ≥3 cases, same serogroup in ≤3 mo, AR ≥10/100,000; ³Continued exposure; ⁴preferred age dose 1, 11-12 with booster at 16; ⁵preferred age is 16-18 yrs
Self-assessment Questions

These questions will be discussed during the activity. Record the answers here for your future reference.

Case Scenario #1

MK is a 29 year old woman who asks to be vaccinated against influenza. She is healthy and has a 4 month old daughter who she is breastfeeding. What influenza vaccine product is she a candidate for?

1. Which vaccine product(s) is (are) appropriate for MK?
   a. Live attenuated intranasal vaccine (quadrivalent).
   b. Inactivated intramuscular influenza vaccine (trivalent).
   c. Inactivated intramuscular influenza vaccine (quadrivalent).
   d. Inactivated intradermal influenza vaccine (trivalent).
   e. Any of the above.

Case Scenario #2

Lucy T. is a 32 year old nurse working in a general pediatrics clinic in your health system. Your institution has a mandatory influenza vaccine policy. She requests LAIV, but is told by the nursing director that she has to receive the inactivated intramuscular vaccine. Is this correct?

a. Yes.
b. No.

Case Scenario #3

LZ is a 62 year old man, newly diagnosed with chronic obstructive pulmonary disease (COPD). Which of the following pneumococcal vaccine strategies is appropriate at this time?

a. Pneumococcal polysaccharide vaccine (PPSV 23) only.
b. Pneumococcal conjugate vaccine (PCV 13) only.
c. Pneumococcal polysaccharide vaccine (PPSV 23) now, then pneumococcal conjugate vaccine (PCV 13) in one year.
d. Pneumococcal conjugate vaccine (PCV 13) now, then pneumococcal polysaccharide vaccine (PPSV 23) in one year.

Case Scenario #4 - Planned Immunosuppression

Betty P. is a 59 year old Caucasian woman who has end-stage renal disease (ESRD) secondary to poorly controlled type 2 diabetes. She attends dialysis 3 times a week.

- She is currently treated with metformin and insulin, and is undergoing evaluation for a kidney transplant.
- A consult is requested regarding appropriate vaccinations to consider based on this plan.
- Ms. P.’s record indicates that she received the pneumococcal vaccine (PPSV23) five years prior, a Td booster 4 years ago, and the hepatitis B vaccine series 2 years ago prior to beginning dialysis.
• She received the 2014-15 influenza vaccine in January 2015.

4. Which of following is accurate regarding the role of herpes zoster vaccine in this patient?
   a. She should receive the varicella vaccine first, then the zoster vaccine in 30 days.
   b. She should not receive this vaccine based on her conditions.
   c. She should receive this vaccine at least 6 months after transplant.
   d. She should receive this vaccine at least 4 weeks prior to transplant.