Immunization Update: Pneumonia Vaccines

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What Do We Know?

- An estimated 40,000 to 50,000 adults die each year from vaccine-preventable diseases in the United States.
- The direct health-care costs associated with these diseases in adults is approximately $10 billion annually.
Challenge to Immunization:

- **Immunosenescence**
  - Decline in immune function that occurs with aging
  - Multiple parts of the adaptive immune system become dysregulated
  - Is has effects of vaccine responses
  - May be driven by chronic infections such as CMV along with age
Vaccination and the aging immune system

Lymphocytes
- Naive cell number
- Ag repertoire
- CD4+ cognate function
- B-cell and T-cell effector responses
- Expansion of memory CD8+ cells
- Homing
- Antibody affinity and isotype switching

CD4+ T cells

CD8+ T cells

Lymph node

Macrophages
- Number
- Skewing to M1
- Phagocytosis
- MHC presentation

Dendritic cells
- Antigen uptake
- Migration to LNs
- MHC I/II expression
- No of Langerhans

DCs

Antigen

Young

Old

Inflammation

↓ Inflammation

↓ Macrophages

↓ Skewing to M1

↑ Phagocytosis

↑ MHC presentation

↑ Antigen uptake

↑ Migration to LNs

↑ MHC I/II expression

↑ No of Langerhans

↑ Number

↓ Skewing to M1

↓ Phagocytosis

↓ MHC presentation

↓ Antigen uptake

↓ Migration to LNs

↓ MHC I/II expression

↓ No of Langerhans

↑ Number

↓ Skewing to M1

↓ Phagocytosis

↓ MHC presentation

↑ Antigen uptake

↑ Migration to LNs

↑ MHC I/II expression

↑ No of Langerhans
# 2016 Recommended Immunizations for Adults: By Health Condition

If you have this health condition, talk to your healthcare professional about these vaccines.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Flu</th>
<th>Td/Tdap</th>
<th>Shingles</th>
<th>Pneumococcal</th>
<th>Meningococcal</th>
<th>MMR</th>
<th>HPV</th>
<th>Chickenpox</th>
<th>Hepatitis A</th>
<th>Hepatitis B</th>
<th>Hib</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pregnancy</td>
<td></td>
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<td></td>
<td>PCV13</td>
<td>MenACWY or MPSV4</td>
<td>MenB</td>
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<td>Weakened Immune System</td>
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<td>HIV: CD4 count less than 200</td>
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<td>HIV: CD4 count 200 or greater</td>
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<td>Kidney disease or poor kidney function</td>
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<tr>
<td>Asplenia (if you do not have a spleen or if it does not work well)</td>
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<td>Heart disease, Chronic lung disease, Chronic alcoholism</td>
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<td>Diabetes (Type 1 or Type 2)</td>
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<td>Chronic Liver Disease</td>
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</table>

**More Information:**
- You should get flu vaccine every year.
- You should get a Td booster every 10 years. You also need 1 dose of Tdap vaccine. Women should get Tdap vaccine during every pregnancy.
- You should get shingles vaccine if you are age 60 years or older, even if you have had shingles before.
- You should get 1 dose of PCV13 and at least 1 dose of PPSV23 depending on your age and health condition.
- You should get this vaccine if you did not get it when you were a child.
- You should get Hib vaccine if you do not have a spleen, have sickle cell disease, or received a bone marrow transplant.

For more information, call 1-800-CDC-INFO (1-800-232-4636) or visit www.cdc.gov/vaccines.
Is it Worthwhile to Vaccinate?

Although there is no immunization that is 100% effective in preventing the relevant disease, immunizations are effective in the majority of cases.

- The 23-valent vaccine containing pneumococcal capsular polysaccharide is estimated to be approximately 50% effective in preventing pneumonia & this increases with PCV-13 added.

- Bottom line, based on probabilistic modeling, use of PCV13 added to the current PPSV23 would prevent an estimated 12,000 cases of community acquired pneumonia over the lifetime of a single cohort of persons aged 65 years and older.
Pneumococcal vaccines

- Two products
  - PCV13  Prevnar 13  from Pfizer
  - PPSV23  PNEUMOVAX 23  from Merck
PPSV23
All Polysaccharide vaccine
T cell independent

Has 23 strains
Less immunogenic
Less memory
Less quality of abs

PCV13
Polysaccharide conjugated to CRM carrier protein
T helper dependent

Only 13 strains
More immunogenic
More memory
Higher quality abs
Pneumococcal Vaccine Timing for Adults

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

Two pneumococcal vaccines are recommended for adults:
- 13-valent pneumococcal conjugate vaccine (PCV13, Prevnar13®)
- 23-valent pneumococcal polysaccharide vaccine (PPSV23, Pneumovax®23)

PCV13 and PPSV23 should not be administered during the same office visit.

When both are indicated, PCV13 should be given before PPSV23 whenever possible.

If either vaccine is inadvertently given earlier than the recommended window, do not repeat the dose.

One dose of PCV13 is recommended for adults:
- 65 years or older who have not previously received PCV13.
- 19 years or older with certain medical conditions and who have not previously received PCV13. See Table 1 for specific guidance.

One dose of PPSV23 is recommended for adults:
- 65 years or older, regardless of previous history of vaccination with pneumococcal vaccines.
  - Once a dose of PPSV23 is given at age 65 years or older, no additional doses of PPSV23 should be administered.
- 19 through 64 years with certain medical conditions.
  - A second dose may be indicated depending on the medical condition. See Table 1 for specific guidance.

Pneumococcal vaccine timing for adults 65 years or older

For those who have not received any pneumococcal vaccines, or those with unknown vaccination history

PCV13 (at ≥ 65 years)
- At least 1 year apart for most immunocompetent adults
- At least 8 weeks apart for adults with certain medical conditions

PPSV23 (at ≥ 65 years)

For those who have previously received 1 dose of PPSV23 at ≥ 65 years and no doses of PCV13

PPSV23 (at ≥ 65 years)
- At least 1 year apart for all adults

PCV13 (at ≥ 65 years)
- Administer 1 dose of PCV13 at least 1 year after the dose of PPSV23 for all adults, regardless of medical conditions.

Administer 1 dose of PCV13.

Administer 1 dose of PPSV23 at least 1 year later for most immunocompetent adults or at least 8 weeks later for adults with immunocompromising conditions, cerebrospinal fluid leaks, or cochlear implants. See Table 1 for specific guidance.
For those who have previously received 1 dose of PPSV23 at $\geq 65$ years and no doses of PCV13

- Administer 1 dose of PCV13 **at least 1 year** after the dose of PPSV23 for all adults, regardless of medical conditions.
Outcomes associated with PPSV-23 and with PCV-13 in adults older than 65

<table>
<thead>
<tr>
<th>Study/Population</th>
<th>Endpoint</th>
<th>Efficacy - % reduction (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAPITA study 1:1 PCV-13 vs. placebo randomized controlled trial including 84,496 Adults older than 65 from the Netherlands</td>
<td>PCV-13-serotype Invasive Pneumococcal Disease</td>
<td>75 % (41 to 91)</td>
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<td>PCV-13-serotype Non-bacteremic Pneumonia</td>
<td>45 % (14 to 65)</td>
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<tr>
<td></td>
<td>Non bacteremic pneumonia with any strain</td>
<td>24 % (-5.7 to 45.8)</td>
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<tr>
<td></td>
<td>Death from pneumococcal pneumonia or Invasive Pneumococcal Disease</td>
<td>14.3 % (-198 to 76)</td>
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<tr>
<td>Cochrane meta-analysis of 18 randomized controlled trials involving 64,852 participants</td>
<td>Invasive Pneumococcal Disease</td>
<td>74 % (86 to 55)</td>
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<tr>
<td></td>
<td>Pneumonia, all causes; high income countries</td>
<td>Inconclusive</td>
</tr>
<tr>
<td></td>
<td>Pneumonia, all causes; low income countries</td>
<td>46 % (33 to 57)</td>
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<tr>
<td></td>
<td>Death due to pneumonia</td>
<td>29 % (-16 to 56)</td>
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</tbody>
</table>
To get key schedules

• General vaccine tables
  • Search “CDC adult vaccines”

• Pneumococcal vaccine information
  • Search “Pneumococcal Vaccine Timing for Adults”
What Do We Know About Current Immunization Rates?

• The rate of influenza and pneumococcal vaccine among older adults across all races and ethnicities was approximately 60%.

• This is in contrast to the Healthy People 2020 adult goal of achieving immunization rates that are significantly higher across all areas (e.g., 90% for flu and pneumonia).

• Take a look at your facility staff: http://mhcc.maryland.gov/consumerinfo/longtermcare/Nursing_Home/Users/VaccinationRatesNH.aspx?id=03065&county=Baltimore
Begin to Fix this ...Individually and with Colleagues

• Immunizations are particularly important for health care workers

• This issue is particularly important in long-term care facilities and hospitals.

“Hi! I’m the Flu! Do you have a couple of weeks free?”
Overcoming the Challenges: Become a Champion

• Take on the challenge
Take on the Challenge

• Step I. Be or identify a champion
• Step II. Gather and prepare your team
• Step III. Establish your individual setting barriers/challenges
• Step IV. Establish solutions
• Step V. Make it happen
I. Be A Champion

• Commitment & Leadership
• Human & Fiscal Resources
• Aligned Incentives
• Motivation
• Provider/Practice/Patients
• Information Systems & Reporting
• Ongoing Demonstrated Success
• National or State Recognition
Identifying A Champion

-Tricks of the trade to identify the best champion: The three list approach.
    *Take volunteers
    *Get names from administrators
    *Ask staff to make nominations

-Utilize the person who is on all three lists
II. Gather and Prepare Your Team

- Other team members: might be office staff; DON; AL manager etc.
Work of the Champion and Team: Assess Patients/Residents

• What to assess:
  • Adult vaccination status

• When to assess:
  • At EVERY encounter

• How to assess:
  • HALO Checklist
  • Summary of Recommendations for the Big 5 Adult Immunizations
  • Adult Immunization Record
  • Appointment Reminder Card
  • Annual Wellness Visit

• Who will assess:
  • ALL staff have a role in assessing
  • Skills Checklist for Immunization
  • Strategies for Increasing Coverage Rates
Team Role in Assessment

• Consider what’s currently in place in your practice:
  – What does your team/staff currently do to assess vaccination status?
  – What can you do to get staff buy-in to increase vaccination rates and affect their role in achieving that goal?
  – What processes can be put into place so that staff understands their role?

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Health factors</th>
<th>Age factors</th>
<th>Lifestyle factors</th>
<th>Occupational or other factors</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Pregnant</td>
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<td></td>
<td>Certain chronic diseases</td>
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<td>Immune-compromised</td>
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<td>(including HIV)</td>
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<td>History of STD</td>
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<td>Aspergillosis</td>
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<td>Occult neoplasm</td>
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<td>Acetaminophen</td>
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<td>HepB</td>
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<tr>
<td>Influenza</td>
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<tr>
<td>PCV13</td>
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<tr>
<td>PPSY22</td>
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<td>Tdap</td>
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<td>Zoster</td>
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</tbody>
</table>

ADMINISTER OR REFER

• What
  – The needed vaccination or referral to appropriate provider

• When
  – During the office visit/home care encounter: NOW

• How – what works best in your setting
  – Administering Vaccines: Dose, Route, Site & Needle Size
  – Guide to Contraindications & Precautions to Commonly Used Vaccines
  – Standing Orders
  – Emergency Response Worksheet
  – Vaccine Finder Health Map
  – Vaccine Information Statements
  – Safe Storage & Handling of Vaccines

• Who
  – Champions, physicians, nurse practitioners, nurses, pharmacists ??others
UGH! I HATE SHOTS!
III. Establish Your Barriers

• What does your practice/setting need most to be ready to successfully administer vaccinations or refer to a local provider?

• What is currently getting in the way of addressing vaccinations and providing them or assuring that they are provided?

• How can you remove those obstacles?
Brainstorming

- Make a list of challenges/solutions to implementing a vaccine program
- Group ideas into themes and develop the Affinity Diagram
- Develop the Interrelationship Diagraphs and establish the strongest driver.

Figure 1
Affinity Diagram

Figure 2
Interrelationship Diagraph
Review Drivers and Ways to Overcome the Challenge

- Knowledge
- Beliefs
- Staffing
- Resources
- Family resistance
- Caring
- Perceptions of time
Is one driver the education of staff?

- Knowledge doesn’t change behavior but it is an important first step
- Different approaches
  - Traditional inservice?
  - Short training; 5 minute stories and tidbits of success stories
  - Capture the moment training
  - Written resources
Establish Solutions
IV. Establish Solutions

- **EX: Knowledge…Teach staff how to document and report immunizations**
- **What**
  - The vaccination or the referral, providing a VIS, and any adverse events
- **When**
  - Immediately following vaccination or referral; in case of adverse events, as soon as they occur
- **How**
  - Documentation & Record Keeping Requirements: Adult Immunizations
  - List of State Immunization Information Systems
  - Adult Vaccination Tracker & Guide
  - Use the Vaccine Finder Health Map to find vaccine providers in your area: http://www.vaccines.gov/more_info/features/healthmapvaccinefinder.html
  - Reminder Cards
- **Who**
  - The practitioner who vaccinated or referred
DOCUMENT: RECORD KEEPING, and REPORTING Requirements

• Provide current VIS to patients
• Document 5 facts:
  – Date of vaccination
  – Vaccine manufacturer & lot number
  – Name, address, signature & title of vaccinator
  – Edition of the VIS given to the patient
  – Date the VIS was given to the patient
• Report to VAERS
• Track patient’s personal vaccination records with your state’s Immunization Information System
Use established resources or build them for EHR systems
V. Making it Happen

• Staff Motivational Tricks of the Trade
• Think about ways to facilitate sustainability in your practice/setting
• How can you keep the focus on vaccinations?
Staff Motivation & Successful Implementation

- Use a Social Ecological Model Approach
- Use Self-efficacy Based Interventions at the Interpersonal Level
Making it Happen

1. Performance: Review and reinforce successful completion of giving vaccines; setting up systems
2. Verbal encouragement: Education/positive reinforcement
3. Role modeling—your interest, focus and discussion with patients. YOUR follow up with staff on how vaccinations are progressing.
4. Physiological feedback—make it fun, easy, not more work and not stressful/or painful for staff...or for patients.
Verbal Encouragement: Measuring Your Progress and Letting Staff Know
Measuring Your Progress

- Individually identify measures that support tracking progress
- What do you already have in place?
- Is the EMR going to help?
## Resources

<table>
<thead>
<tr>
<th>Organization</th>
<th>Website/Link</th>
</tr>
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<tbody>
<tr>
<td>Association of Immunization Managers</td>
<td><a href="http://www.immunizationmanagers.org/index.phtml">http://www.immunizationmanagers.org/index.phtml</a></td>
</tr>
<tr>
<td>Centers for Disease Control and Prevention National Immunization Program</td>
<td><a href="http://www.cdc.gov/nip/">www.cdc.gov/nip/</a></td>
</tr>
<tr>
<td>Immunization Action Coalition</td>
<td><a href="http://www.immunize.org">www.immunize.org</a></td>
</tr>
<tr>
<td>Listing of state and local coalitions</td>
<td><a href="http://www.izcoalitions.org">http://www.izcoalitions.org</a></td>
</tr>
<tr>
<td>Immunization Gateway: Your Vaccine Fact-Finder</td>
<td><a href="http://www.immunofacts.com">www.immunofacts.com</a></td>
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<tr>
<td>Infectious Diseases Society of America</td>
<td><a href="http://www.idsociety.org">www.idsociety.org</a></td>
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<tr>
<td>List of adult immunization outreach materials by state/territory</td>
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<tr>
<td>National Coalition for Adult Immunization</td>
<td><a href="http://www.nfid.org/ncai">www.nfid.org/ncai</a></td>
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<tr>
<td>National Foundation for Infectious Diseases</td>
<td><a href="http://www.nfid.org">www.nfid.org</a></td>
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<tr>
<td>National Network for Immunization Information</td>
<td><a href="http://www.immunizationinfo.org">www.immunizationinfo.org</a></td>
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<tr>
<td>CDC’s Vaccine Information System Webpage</td>
<td><a href="http://www.cdc.gov/vaccines/pubs/vis/default.htm">http://www.cdc.gov/vaccines/pubs/vis/default.htm</a></td>
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