2010 Adult Immunization Update

Andrew Kroger, MD, MPH
National Center for Immunization and Respiratory Diseases

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May 20, 2010
Disclosures

No financial conflict or interest with the manufacturer of any product named during this course.
Disclosures

I will not discuss vaccine recommendations in an off-label manner.
I will not discuss unlicensed vaccines.
Objectives

After this presentation the learner will

1. Schedule the routinely recommended vaccines for their patient population

2. Share the most recent ACIP recommendations with their colleagues
Overview

2010 Adult Schedule
Pneumococcal polysaccharide vaccine recommendations
Meningococcal vaccine recommendations
MMR Criteria of Immunity
Zoster vaccine (Zos)
Health reform and adult vaccination
# Recommended Adult Immunization Schedule

**UNITED STATES - 2010**

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 group

<table>
<thead>
<tr>
<th>VACCINE</th>
<th>AGE GROUP</th>
<th>19–26 years</th>
<th>27–49 years</th>
<th>50–59 years</th>
<th>60–64 years</th>
<th>≥65 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetanus, diphtheria, pertussis (Td/Tdap)¹,*</td>
<td>Substitute 1-time dose of Tdap for Td booster; then boost with Td every 10 yrs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Human papillomavirus (HPV)²,*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Varicella³,*</td>
<td></td>
<td></td>
<td>2 doses</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zoster⁴</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 dose</td>
<td></td>
</tr>
<tr>
<td>Measles, mumps, rubella (MMR)⁵,*</td>
<td></td>
<td></td>
<td>1 or 2 doses</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Influenza⁶,*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 dose annually</td>
<td></td>
</tr>
<tr>
<td>Pneumococcal (polysaccharide)⁷,⁸</td>
<td></td>
<td></td>
<td>1 or 2 doses</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hepatitis A⁹,*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 doses</td>
<td></td>
</tr>
<tr>
<td>Hepatitis B¹⁰,*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 doses</td>
<td></td>
</tr>
<tr>
<td>Meningococcal¹¹,*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 or more doses</td>
<td></td>
</tr>
</tbody>
</table>

*Covered by the Vaccine Injury Compensation Program.

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*For all persons in this category who meet the age requirements and who lack evidence of immunity (e.g., lack documentation of vaccination or have no evidence of prior infection)

**Recommended if some other risk factor is present (e.g., on the basis of medical, occupational, lifestyle, or other indications)**

**No recommendation**
# Recommended Adult Immunization Schedule

**UNITED STATES - 2010**

Note: These recommendations must be read with the footnotes that follow containing number of doses, intervals between doses, and other important information.

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

<table>
<thead>
<tr>
<th>INDICATION</th>
<th>VACCINE</th>
<th>Pregnancy</th>
<th>Immuno-compromising conditions (excluding human immunodeficiency virus [HIV])</th>
<th>HIV infection (CD4+ T lymphocyte count)</th>
<th>Diabetes, heart disease, chronic lung disease, chronic alcoholism</th>
<th>Asplenia (including elective splenectomy and persistent complement component deficiencies)</th>
<th>Chronic liver disease</th>
<th>Kidney failure, end-stage renal disease, receipt of hemodialysis</th>
<th>Health-care personnel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Td</td>
<td>Tetanus, diphtheria, pertussis (Td/Tdap)¹,*</td>
<td>Td</td>
<td>Substitute 1-time dose of Tdap for Td booster; then boost with Td every 10 yrs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Td</td>
<td>Human papillomavirus (HPV)²,*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Td</td>
<td>Varicella³,*</td>
<td>Contraindicated</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Td</td>
<td>Zoster⁴</td>
<td>Contraindicated</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Td</td>
<td>Measles, mumps, rubella (MMR)⁵,*</td>
<td>Contraindicated</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Td</td>
<td>Influenza⁶,*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 dose TIV annually</td>
<td></td>
</tr>
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<td>Td</td>
<td>Pneumococcal (polysaccharide)⁷,⁸</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 or 2 doses</td>
<td></td>
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<td>3 doses</td>
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<td></td>
</tr>
</tbody>
</table>

*Covered by the Vaccine Injury Compensation Program.

For all persons in this category who meet the age requirements and who lack evidence of immunity (e.g., lack documentation of vaccination or have no evidence of prior infection) Recommended if some other risk factor is present (e.g., on the basis of medical, occupational, lifestyle, or other indications) No recommendation
Streptococcus pneumoniae

Gram-positive bacteria

90 known serotypes

Polysaccharide capsule important virulence factor

Type-specific antibody is protective
Pneumococcal Disease

Second most common cause of vaccine-preventable death in the U.S. (after influenza)

Major clinical syndromes include pneumonia, bacteremia, and meningitis
Pneumococcal Polysaccharide Vaccine

Not effective in children younger than 2 years

60%-70% against invasive disease

Less effective in preventing pneumococcal pneumonia
Pneumococcal Polysaccharide Vaccine (PPSV) Recommendations

Adults 65 years and older
Persons 19 years and older with asthma
Persons 19 years and older who are current cigarette smokers
Persons 2 years and older with chronic illness
anatomic or functional asplenia
immunocompromised (disease, chemotherapy, steroids)
HIV infection
environments or settings with increased risk
Asthma is an independent risk-factor for invasive pneumococcal disease. The risk among persons with asthma was at least double that among controls.
ACIP recommendations for use of PPSV23, October 2008

• Asthma is an independent risk factor for invasive pneumococcal disease.
• The ACIP recommends that asthma should be included among the chronic pulmonary diseases (such as COPD and emphysema) that are indications for PPSV23 in adults aged 19 through 64 years.
• Wording of the revised recommendation: “Persons aged 19 through 64 years who have asthma should receive a single dose of PPSV23.”
Why are persons with asthma at increased risk for pneumococcal disease?

• Persons with asthma may have
  – disrupted physical barrier of the airway lining
  – increased mucous production
  – alterations in immune response

• Asthma medications (corticosteroids) may suppress the immune system

Hartert T. J Allergy Clin Immunol 2008
Association of cigarette smoking and IPD

**Table 4. Independent Risk Factors for Invasive Pneumococcal Disease among Immunocompetent Adults 18 to 64 Years Old.**

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>ODDS RATIO (95% CI)*</th>
<th>P VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoking status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current smoker</td>
<td>4.1 (2.4–7.3)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Former smoker</td>
<td>1.1 (0.5–2.2)</td>
<td>0.91</td>
</tr>
<tr>
<td>Passive exposure to smoke</td>
<td>2.5 (1.2–5.1)</td>
<td>0.01</td>
</tr>
<tr>
<td>Never smoked and no passive exposure to smoke</td>
<td>1.0</td>
<td></td>
</tr>
</tbody>
</table>

Strongest independent risk-factor in immunocompetent, non-elderly adults\(^1\)
- Adjusted population attributable risk: 51%
- Dose response relations

Association also subsequently confirmed in immunocompromised groups\(^2,3\)

Why are cigarette smokers at increased risk of IPD?

- Cigarette smoke
  - impairs mucociliary clearance in the respiratory tract
  - disrupts respiratory epithelium
  - enhances bacterial attachment
- Smokers may have
  - more frequent (viral) respiratory infections
  - higher rates of pneumococcal colonization
  - lower immunoglobulin levels?

Pneumococcal Polysaccharide Vaccine Revaccination

Routine revaccination of immunocompetent persons is not recommended

Revaccination recommended for persons 2 years of age or older who are at highest risk of serious pneumococcal infection

Single revaccination dose at least 5 years after the first dose

MMWR 1997;46(RR-8):1-24

SAFER • HEALTHIER • PEOPLE™
Pneumococcal Polysaccharide Vaccine
Candidates for Revaccination

Persons $\geq 2$ years of age with:

- functional or anatomic asplenia
- immunosuppression
- transplant
- chronic renal failure
- nephrotic syndrome

Persons vaccinated at $< 65$ years of age

MMWR 1997;46(RR-8):1-24
Meningococcal Disease
Clinical Features

Incubation period 3-4 days (range 2-10 days)

Meningitis: Abrupt onset of fever, meningeal symptoms,

Meningococccemia: bloodstream infection, fever, rash, hypotension, organ failure

Fatality rate 9%-12%; up to 40% in meningococccemia
Meningococcal Disease

SAFER • HEALTHIER • PEOPLE™

Meningococcal Disease, 1998
Incidence by Age Group

Rate per 100,000 population

Age group (years)

<1 1-4 5-14 15-24 25-39 40-64 65+

U.S. Rate
Routinely recommended for:

- All children at 11-18 years of age
- All college freshmen living in a dormitory
- Other persons 2 through 55 years of age at increased risk of invasive meningococcal disease

*MMWR* 2007;56(No. 31):794-5.
Meningococcal Vaccine Recommendations

Recommended for persons at increased risk of meningococcal disease:

- Microbiologists who are routinely exposed to isolates of *N. meningitidis*(isolates)
- Military recruits
- Persons who travel to and U.S. citizens who reside in countries in which *N. meningitidis* is hyperendemic or epidemic
- Persistent complement component deficiency
- Functional or anatomic asplenia

*MMWR* 2005; 54(RR-7);1-21
“Meningitis Belt”
Meningococcal Conjugate Vaccine (MCV)
Menactra® (sanofi pasteur)
Quadrivalent polysaccharide vaccine (A, C, Y, W-135) conjugated to diphtheria toxoid
Administered by intramuscular injection
Single dose vials do not contain a preservative
Meningococcal Conjugate Vaccine (Menactra)

Approved only for persons 2 through 55 years of age

Persons 56 years and older at increased risk should receive the meningococcal POLYSACCHARIDE vaccine

Meningococcal vaccine is not routinely recommended for persons 2-10 years of age who are not in a high risk group
Licensed by Novartis: Menveo
Approved 11 through 55 years
No preference between Menveo or Menactra (but only Menactra can be given 2-10 years of age)
MCV Revaccination Recommendations

Persons who remain at risk for meningococcal meningitis should receive a revaccination dose at a five year interval.

Children through age 18 years who received their first dose of MCV or MPSV at ages 2 through 6 years and remain at increased risk for meningococcal disease should receive an additional dose of MCV (Menactra) 3 years after their first dose.
MCV Revaccination Recommendations

High-risk persons who should be revaccinated with MCV:

- persistent complement component deficiency
- anatomic or functional asplenia
- frequent travelers to or persons living in areas with high rates of meningococcal disease
MCV Revaccination Recommendations

MCV revaccination recommendation does NOT apply to children whose only risk factor is living in on-campus housing.
Measles-Mumps-Rubella Vaccine
Measles-Mumps-Rubella Vaccine

At least one dose recommended routinely for susceptible adults born after 1956
Measles/Mumps Criteria of Immunity

Birth before 1957
Laboratory evidence of immunity (disease or vaccination)
Documentation of vaccination
Rubella Criteria of Immunity

Birth before 1957*

Laboratory evidence of immunity (disease or vaccination)

Documentation of vaccination

* Males only
Measles-Mumps-Rubella Vaccine

A second dose recommended for

- Health-care providers
- International travelers
- Persons who may have received inactivated vaccine (vaccinated between 1963-1967)
- Secondary-school students
Susceptible health-care providers born before 1957 should receive MMR if there is an outbreak of measles, mumps, or rubella in the health-care facility.

Vaccination should be considered regardless of an outbreak.
Single Antigen MMR

As of 2009 Merck no longer produces single antigen measles, mumps or rubella vaccine for distribution

Only MMR is available

Unknown if single antigen products will be available in the future

MMRV expected to be available later in 2009
Measles Vaccine and Autism

Association first hypothesized* in 1998 by Andrew Wakefield, a British gastroenterologist

Parents noticed that symptoms of autism often followed administration of MMR by days, weeks, or months

Multiple population-based studies have not found an association

*Wakefield advocated either not giving measles vaccine at all or giving the vaccines as separate shots rather than combined MMR
Vaccines and Autism

On May 18, 2004, the Institute of Medicine released the findings of its 8th and final vaccine safety review.

Evidence favors rejection of an association between either thimerosal or MMR vaccine and autism spectrum disorder.

Research funds should be focused on genetic and environmental causes.
Studies of Autism and MMR Vaccine


*partial listing of representative studies*
Shingles (Herpes Zoster)
Zoster

Generally associated with normal aging and with anything that causes reduced immunocompetence

Lifetime risk of 30% in the United States

Estimated 500,000-1 million cases of zoster diagnosed annually in the U.S
Zoster: Complications

Post-herpetic neuralgia
Pain that lasts after rash clears, sometime up to a year
Occurs in 20 percent of shingles cases
Herpes Zoster Vaccine Trial

36,716 persons 60+ years of age followed for 3 years after vaccination

Efficacy –

51.3% fewer episodes of HZ
Less severe illnesses
66.5% less postherpetic neuralgia

No significant safety issues identified
Zoster Vaccine

Zostavax by Merck
Licensed May 2006
Live attenuated vaccine
Indicated for prevention of zoster and post-herpetic neuralgia
Zoster Vaccine

Indicated for persons 60 years old and older

Indicated for persons with current varicella immunity based on disease

Indicated regardless of a history of zoster

One dose, 0.6 cc subcutaneous injection
Health-care Reform and Adult Vaccination

HR3590 – Patient Protection and Affordable Care Act

Authorizes the purchase of vaccines recommended for adults

Provides grants to states for adult vaccination

Evaluation of Medicare Part D
Thank You

Hotline: 800.CDC.INFO

Email: nipinfo@cdc.gov

Website: www.cdc.gov/vaccines