Adult Immunization Landscape

Carolyn B. Bridges, MD
Associate Director for Adult Immunization
Immunization Services Division
National Center for Immunization and Respiratory Diseases
Centers for Disease Control and Prevention

May 15, 2012

Disclaimer

- The findings and conclusions in this presentation have not been formally disseminated by CDC and should not be construed to represent any agency determination or policy
- I have no financial conflicts of interest
Burden of Disease in Adults

- **High burden of illness from infectious diseases among adults in the United States for which vaccines are available**
  - From 3,000 to about 49,000 influenza-related deaths per year
    - ~90% among adults 65 years and older
  - 9,419 cases of acute hepatitis B in 2009
  - 43,500 cases invasive pneumococcal disease (IPD) in 2009, including ~5,000 deaths
    - 85% of IPD and nearly all IPD deaths among adults
  - Over 27,000 reported cases of pertussis in US in 2010
    - 6,640 among adults, 4% of which are hospitalized
  - About 1 million cases of zoster annually U.S.

---

Adult Immunization Schedule

- **Published at least annually since 2002**
  - 2012 published early February 2012 in
    - Annals of Internal Medicine
    - MMWR

- **Adult Schedule approved by:**
  - American College of Physicians (ACP)
  - American Academy of Family Physicians (AAFP)
  - American College of Obstetrics and Gynecology
  - American College of Nurse-Midwives
  - Advisory Committee on Immunization Practices (ACIP) and CDC
### 2012 ACIP Adult Immunization Schedule, Age-Based Recommendations

**FIGURE 1. Recommended adult immunization schedule, by vaccine and age group**

<table>
<thead>
<tr>
<th>VACCINE</th>
<th>AGE GROUP</th>
<th>19-21 years</th>
<th>22-26 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>Influenza</td>
<td>1 dose annually</td>
<td>1 dose annually</td>
<td>1 dose annually</td>
<td>1 dose annually</td>
<td>1 dose annually</td>
<td>1 dose annually</td>
<td>1 dose annually</td>
</tr>
<tr>
<td>Tetanus, diphtheria, pertussis (Tdap)</td>
<td>Substitute 1 dose of Tdap for Td booster; then repeat with Tdap every 10 years</td>
<td>1 dose</td>
<td>1 dose</td>
<td>1 dose</td>
<td>1 dose</td>
<td>1 dose</td>
<td>1 dose</td>
</tr>
<tr>
<td>Varicella</td>
<td>1 dose</td>
<td>1 dose</td>
<td>1 dose</td>
<td>1 dose</td>
<td>1 dose</td>
<td>1 dose</td>
<td>1 dose</td>
</tr>
<tr>
<td>Human papillomavirus (HPV)</td>
<td>3 doses</td>
<td>3 doses</td>
<td>3 doses</td>
<td>3 doses</td>
<td>3 doses</td>
<td>3 doses</td>
<td>3 doses</td>
</tr>
<tr>
<td>Zoster</td>
<td>1 dose</td>
<td>1 dose</td>
<td>1 dose</td>
<td>1 dose</td>
<td>1 dose</td>
<td>1 dose</td>
<td>1 dose</td>
</tr>
<tr>
<td>Measles, mumps, rubella (MMR)</td>
<td>1 dose</td>
<td>1 dose</td>
<td>1 dose</td>
<td>1 dose</td>
<td>1 dose</td>
<td>1 dose</td>
<td>1 dose</td>
</tr>
<tr>
<td>Pneumococcal (polyvalent)</td>
<td>1 dose</td>
<td>1 dose</td>
<td>1 dose</td>
<td>1 dose</td>
<td>1 dose</td>
<td>1 dose</td>
<td>1 dose</td>
</tr>
<tr>
<td>Meningococcal</td>
<td>1 dose</td>
<td>1 dose</td>
<td>1 dose</td>
<td>1 dose</td>
<td>1 dose</td>
<td>1 dose</td>
<td>1 dose</td>
</tr>
<tr>
<td>Hepatitis A</td>
<td>2 doses</td>
<td>2 doses</td>
<td>2 doses</td>
<td>2 doses</td>
<td>2 doses</td>
<td>2 doses</td>
<td>2 doses</td>
</tr>
<tr>
<td>Hepatitis B</td>
<td>3 doses</td>
<td>3 doses</td>
<td>3 doses</td>
<td>3 doses</td>
<td>3 doses</td>
<td>3 doses</td>
<td>3 doses</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 documentation of vaccination or have no evidence of previous infection:

- Recommended if some other risk factor is present (e.g., on the basis of medical, occupational, lifestyle, or other indications)
- Recommended for some individuals with certain conditions, including: chronic liver disease, chronic alcoholism, diabetes, kidney failure, and other chronic diseases, or recent travel to countries affected by hepatitis B

### 2012 ACIP Adult Immunization Schedule: Medical, Occupational and Behavior-Based Recommendations

**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>IMMUNOCONTRASTING CONDITIONS</th>
<th>IMMUNOMODULATORY CONSIDERATIONS</th>
<th>RECOMMENDATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Influenza</td>
<td>1 dose TIV annually</td>
<td>1 dose TIV annually</td>
<td>1 dose TIV annually</td>
<td>1 dose TIV annually</td>
</tr>
<tr>
<td>Tetanus, diphtheria, pertussis (Tdap)</td>
<td>1 dose TIV annually</td>
<td>1 dose TIV annually</td>
<td>1 dose TIV annually</td>
<td>1 dose TIV annually</td>
</tr>
<tr>
<td>Varicella</td>
<td>1 dose TIV annually</td>
<td>1 dose TIV annually</td>
<td>1 dose TIV annually</td>
<td>1 dose TIV annually</td>
</tr>
<tr>
<td>Human papillomavirus (HPV)</td>
<td>3 doses through age 26 years</td>
<td>3 doses through age 26 years</td>
<td>3 doses through age 26 years</td>
<td>3 doses through age 26 years</td>
</tr>
<tr>
<td>Zoster</td>
<td>1 dose</td>
<td>1 dose</td>
<td>1 dose</td>
<td>1 dose</td>
</tr>
<tr>
<td>Measles, mumps, rubella (MMR)</td>
<td>1 dose</td>
<td>1 dose</td>
<td>1 dose</td>
<td>1 dose</td>
</tr>
<tr>
<td>Pneumococcal (polyvalent)</td>
<td>1 dose</td>
<td>1 dose</td>
<td>1 dose</td>
<td>1 dose</td>
</tr>
<tr>
<td>Meningococcal</td>
<td>1 dose</td>
<td>1 dose</td>
<td>1 dose</td>
<td>1 dose</td>
</tr>
<tr>
<td>Hepatitis A</td>
<td>Contraindicated</td>
<td>Contraindicated</td>
<td>Contraindicated</td>
<td>Contraindicated</td>
</tr>
<tr>
<td>Hepatitis B</td>
<td>Contraindicated</td>
<td>Contraindicated</td>
<td>Contraindicated</td>
<td>Contraindicated</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 documentation of vaccination or have no evidence of previous infection:

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

- **Major success of Vaccines for Children Program**
  - Few overall cases of VPD in children with highly effective vaccines and high vaccine coverage levels, generally >90%
    - Benefits adults as well through disease reduction
  - Vaccine requirements for school entry ensure high coverage
  - Medical home model for children

- **Vaccines for Children (VFC) plus 317 program provide vaccine for uninsured and underinsured children and vaccine program infrastructure**
  - Pediatric purchases on federal contracts in Dec 2010-Dec 2011: $3,535 billion [Vaccines for Children (VFC) plus 317 program funds]
  - Adult vaccine purchases: $44 million (317 only)

---

### Comparison of 20th Century Annual Morbidity and Current Morbidity: Vaccine-Preventable Diseases

<table>
<thead>
<tr>
<th>Disease</th>
<th>20th Century Annual Morbidity</th>
<th>2011 Reported Cases</th>
<th>Percent Decrease</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smallpox</td>
<td>29,005</td>
<td>0</td>
<td>100%</td>
</tr>
<tr>
<td>Diphtheria</td>
<td>21,053</td>
<td>0</td>
<td>100%</td>
</tr>
<tr>
<td>Measles</td>
<td>530,217</td>
<td>212</td>
<td>&gt; 99%</td>
</tr>
<tr>
<td>Mumps</td>
<td>162,344</td>
<td>370</td>
<td>&gt; 99%</td>
</tr>
<tr>
<td>Pertussis</td>
<td>200,752</td>
<td>15,216</td>
<td>92%</td>
</tr>
<tr>
<td>Polio (paralytic)</td>
<td>16,316</td>
<td>0</td>
<td>100%</td>
</tr>
<tr>
<td>Rubella</td>
<td>47,745</td>
<td>4</td>
<td>&gt; 99%</td>
</tr>
<tr>
<td>Congenital Rubella Syndrome</td>
<td>152</td>
<td>0</td>
<td>100%</td>
</tr>
<tr>
<td>Tetanus</td>
<td>580</td>
<td>9</td>
<td>98%</td>
</tr>
<tr>
<td><em>Haemophilus influenzae</em></td>
<td>20,000</td>
<td>8*</td>
<td>&gt; 99%</td>
</tr>
</tbody>
</table>

*Source: JAMA. 2007;298(18):2155-2163
†† Source: CDC. MMWR January 6, 2012;60(51):1762-1775. (provisional 2011 data)
* *Haemophilus influenzae* type b (Hib) < 5 years of age. An additional 14 cases of Hib are estimated to have occurred among the 237 reports of Hi (< 5 years of age) with unknown serotype.
### Comparison of Pre-Vaccine Era Estimated Annual Morbidity with Current Estimate: Vaccine-Preventable Diseases

<table>
<thead>
<tr>
<th>Disease</th>
<th>Pre-Vaccine Era Annual Estimate</th>
<th>2009 Estimate</th>
<th>Percent Decrease</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hepatitis A</td>
<td>117,333 †</td>
<td>8,493</td>
<td>93%</td>
</tr>
<tr>
<td>Hepatitis B (acute)</td>
<td>66,232 †</td>
<td>9,419</td>
<td>86%</td>
</tr>
<tr>
<td>Pneumococcus (invasive)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>all ages</td>
<td>63,067 †</td>
<td>44,000 †</td>
<td>30%</td>
</tr>
<tr>
<td>&lt; 5 years of age</td>
<td>16,069 †</td>
<td>4,700##</td>
<td>72%</td>
</tr>
<tr>
<td>Rotavirus (hospitalizations, &lt; 3 years of age)</td>
<td>62,500 †</td>
<td>28,125###</td>
<td>55%</td>
</tr>
<tr>
<td>Varicella</td>
<td>4,085,120 †</td>
<td>408,512</td>
<td>90%</td>
</tr>
</tbody>
</table>

† Source: JAMA. 2007;298(18):2155-2163
†† Source: CDC. MMWR. February 6, 2009 / 58(RR02):1-25
## Source: 2009 Active Bacterial Core surveillance
### Source: New Vaccine Surveillance Network (unpublished)

### Challenges for Vaccinating Adults

- Dispersed/diverse sources of medical care, with less emphasis on medical home and preventive care, in part due to competing priorities
- Adult vaccination less integral to adult medical practices
- Few settings in which vaccination of adults is “required” or routinely assessed
- No “Vaccines for Adults” program to provide vaccine for uninsured
  - Fewer formal relationships between adult providers and immunizations programs
- High out of pocket costs deterrent for patients and providers
  - Even for insured persons, e.g. costs for Medicare Part D vaccines (non-flu or pneumococcal vaccines)
- Vaccination of adults of substantial health benefit, but lower effectiveness especially in older adults and immune compromised
UPTAKE OF ADULT VACCINES IN THE UNITED STATES

Vaccination coverage for target groups by vaccine, age, and high-risk status, NHIS 2010*

**Coverage for vaccines recommended for older adults, NHIS 2010***

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Coverage %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Influenza (65+)</td>
<td>66.4% (CI 64.4 – 68.5)</td>
</tr>
<tr>
<td>Pneumococcal (ppv23) (65+)</td>
<td>59.7% (CI 58.0 – 61.4)</td>
</tr>
<tr>
<td>Zoster (60+)</td>
<td>14.4% (CI 13.7 – 16)**</td>
</tr>
</tbody>
</table>

** Statistically higher than 2009 coverage rates

---

**Seasonal Influenza Vaccination Coverage by Race/Ethnicity: 2008-09 -- 2010-11 Seasons, BRFSS and NIS**

<table>
<thead>
<tr>
<th>Group</th>
<th>2008-09 (%) 1</th>
<th>2009-10 (%) 2</th>
<th>2010-11 (%) 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Race/ethnicity (adults)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White, non-Hispanic</td>
<td>39.7</td>
<td>43.8</td>
<td>43.3</td>
</tr>
<tr>
<td>Black, non-Hispanic</td>
<td>26.8</td>
<td>31.3</td>
<td>34.9</td>
</tr>
<tr>
<td>Hispanic</td>
<td>25.6</td>
<td>30.6</td>
<td>32.4</td>
</tr>
<tr>
<td><strong>Race/ethnicity (children)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White, non-Hispanic</td>
<td>24.9</td>
<td>42.5</td>
<td>46.3</td>
</tr>
<tr>
<td>Black, non-Hispanic</td>
<td>20.0</td>
<td>35.5</td>
<td>47.9</td>
</tr>
<tr>
<td>Hispanic</td>
<td>18.4</td>
<td>43.9</td>
<td>55.3</td>
</tr>
</tbody>
</table>

1. BRFSS estimates, (19 states for children; 43 states plus DC for adults) online at: [http://www.cdc.gov/mmwr/PDF/wk/mm5439.pdf](http://www.cdc.gov/mmwr/PDF/wk/mm5439.pdf) and CDC, unpublished
2. BRFSS and NHFS estimates, 2009-10; BRFSS and NIS estimates, 2010-11, both years for 50 states plus DC for children, 43 states plus DC for adults. In press, MMWR, June 10, 2011
Influenza Vaccination Coverage Among Adults 18-64 Years who Reported Selected Chronic Conditions, BRFSS 2007–2011

317 Annual Report, December 2010

- **Separate coalition for adults:**
  - 17 (27.4%) Yes
  - 45 (72.6%) No

- **Of those without a separate coalition for adults,**
  - 29 of 44 (65.9%) indicate that their state/grantee coalitions address adult issues
  - 15 of 44 (34.1%) have no separate coalition for adults and their state/grantee coalitions do not address adult issues (AL, AR, FL, Guam, KY, ME, MO, MT, N. Mariana Islands, NM, NY, SD, TN, VT, Virgin Islands)
  - 1 no response
States with a Designated Adult Immunization Coordinator

- Marshall Islands
- N. Mariana Islands
- Palau
- Virgin Islands
- Guam
- Puerto Rico

Full-time Designated Adult Immunization Coordinator (n= 23)

Part-time Designated Adult Immunization Coordinator (n= 21)

No Designated Adult Immunization Coordinator (n= 18)

Source: 2010 – Annual Progress Report; Section V. Adult Activities (http://www2a.cdc.gov/nip/irar/grantee/qryAdult2010.asp)

Adult Vaccination Opportunities

- Affordable Care Act expected to reduce the number of adults uninsured for vaccines
  - Assuming insurance pays for vaccine for insured, then available 317 funds might be used to purchase vaccine for uninsured adults

- Medicare and Medicaid include coverage of vaccines for adults
  - Copayments can be a significant cost for vaccines covered by Medicare Part D covered vaccines such as Tdap and Zoster vaccines

- Increased access to vaccines at workplaces and retail locations like pharmacies and grocery stores
CDC and 317 Program Changes to Increase Attention to Vaccination of Adults

- **Expand State-level data on vaccination rates among adults**
  - Currently, state-level data only for influenza and pneumococcal vaccines
  - In 2013, will have 3-year rotation of Tdap, Zoster Vaccination and place of influenza vaccination questions on BRFSS
  - Will provide more “information for action”

- **Enhancing communications and economic analyses evidence-base to increase effective communications with adult providers and public**

- **Increase involvement/engagement of public health immunizations programs in adult immunization**
  - 2013-2017 five-year 317 program cooperative agreement will require grantees to address lagging vaccine coverage in children, adolescents and adults
Immunization Information Systems (IIS), Interoperability with Electronic Health Records (EHR), and Meaningful Use

- IIS (i.e. Registries) with increasing links to EHRs and increasing use of EHRs in clinical practice
- In 2010, among 56 US state and large city immunization grantees
  - 49 had lifetime IIS (compared to 46 in 2009)
  - 4 included children only (5 in 2009)
  - 3 did not have IIS or were in a transition year (5 in 2009)
  - 19% of grantee adult populations estimated to be included in IIS in 2010
- IIS in most grantee jurisdictions include pharmacists and other non-medical office-based providers

Summary

- Burden of vaccine preventable diseases remains high with lagging coverage for adult vaccines
- Public health resources for adult vaccination currently limited, but recent improvements to increase focus on adult immunization
- Multi-sector efforts needed to support provision of existing vaccines and develop better platform for new and improved vaccines in pipeline
Acknowledgements

Lynda Anderson           Pengjun Lu
Helen Ding               Tammy Santibanez
Gary Euler               Abigail Shefer
Susan Farrall            Jim Singleton
Amparo Gonzalez-Feliciano Ray Strikas
Stacie Greby             Walter Williams
Erin Kennedy             LaDora Woods
Megan Lindley

For more information please contact Centers for Disease Control and Prevention

1600 Clifton Road NE, Atlanta, GA 30333
Telephone, 1-800-CDC-INFO (232-4636)/TTY: 1-888-232-6348
E-mail: cdcinfo@cdc.gov    Web: www.cdc.gov