Approaches to Adult Vaccination: Perspectives from PAHO

Immunization Conference
Augusta, Maine, USA
23 April 2012

Jon Kim Andrus, MD
Deputy Director, PAHO
Objectives

• Understand the role of adult immunization in global health, especially in terms of the transition from child to family immunization programs

• Define some key challenges in containing global VPD threats

• Understand specific issues relevant to the USA
Congenital Rubella Syndrome
High morbidity rationale for immunization interventions

Autistic boy

Spastic, deaf

Deaf-blind, retarded

Autistic
Vaccination Campaign Phases for the Elimination of Rubella and CRS

- **Post partum and post abortion vaccination (X 9 months)**

- **Captive population**
  - School
  - Institutional Labor
  - In transit populations and places of high circulation

- **House to house**
  - Rapid Coverage Monitoring

- **Additional Opportunity**

- **Verification of Coverage**

- **Social Communication and Mobilization**
  - Weekends

**Weeks**
1 2 3 4 5 6

- **Launching**
- **Central Day**
High Political Commitment and Participation

President launching campaign

Los 100 días bajo la lupa de Lima

<table>
<thead>
<tr>
<th>Nivel socioeconómico</th>
<th>Por sexo</th>
<th>Por edad</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>30</td>
<td>13</td>
<td>21</td>
</tr>
<tr>
<td>22</td>
<td>20</td>
<td>23</td>
</tr>
<tr>
<td>22</td>
<td>17</td>
<td>20</td>
</tr>
<tr>
<td>21</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>19</td>
<td>13</td>
<td>14</td>
</tr>
<tr>
<td>14</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td>13</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>8</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>6</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

La vacuna contra la rubéola

¿Qué es lo mejor?

La encuesta que preparó Apoyo en la capital del país, por encargo de América Televisión, muestra una evaluación positiva sobre la gestión de Alan García. Los programas de agua y vivienda son los mejores.
Rubella Vaccination Coverage in Selected Countries of the Americas, 1997-2006

Source: Country reports
Routine MCV1 Coverage, Measles-Rubella Elimination Campaigns and Confirmed Rubella Cases, Chile, 1997-2009*

- Catch-up, 1992
  - 9m-14 yrs
  - MCV (99%)
- MMR introduction: 1990
- Speed-up campaign
  - 19-29yr
  - Men only
  - MR 93%
- Follow-up campaign
  - 10-29yr
  - Women only
  - R 98%
- Follow-up campaign
  - 1-4yr
  - M 99%
- Follow-up campaign
  - 1-5yr
  - MR 93%

Confirmed cases

- 97: 4,500
- 98: 5,000
- 99: 4,000
- 00: 3,500
- 01: 3,000
- 02: 2,500
- 03: 2,000
- 04: 1,500
- 05: 1,000
- 06: 500
- 07: 0
- 08: 0
- 09: 0

Routine infant vaccination coverage (%)

- 100%
- 80%
- 60%
- 40%
- 20%
- 0%

Outbreaks in male populations!!!

*Data until EW 52/2009.
Source: Country reports to PAHO.
Figure 3. Surveillance strategy for measles/rubella cases

Stop the investigation

Health worker suspects measles or rubella

Suspected measles/rubella case

Adequate blood sample taken?

Epidemiological link to a lab confirmed case?

Positive serology for IgM antibodies by capture test?

Clinically confirmed

Laboratory confirmed

Discarded
On going support to strengthen measles/rubella surveillance system Indicators, Region of the Americas, 2007-2011

Source: Country reports to PAHO.
**Status of Measles Elimination, The Americas, 2001-2007**

- Importations cause limited outbreaks
- Genotypes do not continue

*Provisional data as of 24 February 2007.*

*Source:* Country reports to PAHO, Global Measles Laboratory.
Wild-type Rubella Virus Genotypes Detected in the Americas--1997 through 2008

Source: Reference LABS: CDC, Fio Cruz and countries

*Known or likely importation(s) from other countries.
Distribution of confirmed cases in Brazil, 2000 - 2011*

Source: SVS/MS

* Preliminary data EW 40/11

Source: Country reports
Rubella elimination and primary health care


Global Immunization Vision and Strategies (GIVS)

Disease reduction targets for Rotavirus, Pneumococcus

Assured supply of safe vaccines

Family Immunization

Partnerships

reaching more...

linking with others...

Millennium Development Goals 2015
Number of childhood vaccines routinely used in industrialized countries and in Latin America and the Caribbean, 1975-2010

- Measles, DPT, Poliomyelitis, BCG
- Varicella
- Hepatitis A
- Meningococcal
- Seasonal flu - 2006
- Rotavirus - 2006
- Pneumococcal - 2006
- Haemophilus Influenzae b
- Rubella
- Mumps
- Hepatitis B**
- Current GAP
  - HPV
  - Varicella
  - Hepatitis A
  - Meningococcal
Applying Success Factors to New Challenges
Example of HPV vaccine and cervical cancer

Cervical Cancer Disease Burden

- Taking advantage of new technologies while enhancing approaches to screening to reduce mortality of this disease of poverty
- Reducing the developing country uptake time lag >2 decades
- Expanding fiscal space

Source: IARC 2002 estimates

77,291 new cases each year
30,570 deaths each year

Source: IARC 2002 estimates
Tools for Economic Analysis

- Vaccine Intro Costs Tool
- Burden of Disease Tools
- Cost Effectiveness Studies HPV
- Cost Effectiveness Studies Influenza
- Cost Effectiveness Studies Rotavirus
- Cost Effectiveness Studies Pneumococcus

Costs → Health Gains → Economic Analysis
Rubella Elimination: Cost Savings

- Elimination of rubella and congenital rubella syndrome (CRS) costs 7% of what it would take the health systems of countries to care and provide rehabilitative services for babies born with CRS.

- Not all immunization interventions are cost-saving e.g. rotavirus vaccine at current prices.

Year of universal introduction of pneumo, rota and HPV vaccines in LAC countries and territories (updated Dic 2011).

<table>
<thead>
<tr>
<th>Year</th>
<th>Rotavirus</th>
<th>Pneumococcus</th>
<th>HPV</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>NA</td>
<td>EUA</td>
<td>NA</td>
</tr>
<tr>
<td>2002</td>
<td>NA</td>
<td>CAN</td>
<td>NA</td>
</tr>
<tr>
<td>2006</td>
<td>BRA, ELS, EUA, MEX, NIC, PAN, VEN</td>
<td>-</td>
<td>USA</td>
</tr>
<tr>
<td>2007</td>
<td>ECU</td>
<td>COR</td>
<td>BER, CAN</td>
</tr>
<tr>
<td>2008</td>
<td>BOL</td>
<td>MEX, URU, BER, GUY FRA</td>
<td>PAN</td>
</tr>
<tr>
<td>2009</td>
<td>COL, HON, PER, ISL. CAIMAN</td>
<td>PER, BAR, ISL. CAIMAN</td>
<td>-</td>
</tr>
<tr>
<td>2010</td>
<td>GUT, GUY, PAR</td>
<td>ARU, BRA, ECU, ELS, PAN, NIC</td>
<td>-</td>
</tr>
<tr>
<td>2011</td>
<td>-</td>
<td>HON, GUY, CHI, COL, CUR</td>
<td>PER, ARG</td>
</tr>
</tbody>
</table>

16 countries and territories 17 countries and 4 territories
Number of Countries with Seasonal Influenza Vaccination Programs in the Americas, 1975-2009

42 Countries
Risk of Virus Importations from Other Regions, including CRS Cases

~150 million tourists have arrived to the Americas in 2010, which is an increase of 6% compared with 2009.
World Youth Day concluded on August 21, in Madrid, Spain. This image illustrates the size of the event and the close proximity in which the participants were.
Epidemiological Alerts

• Mass-gathering events
  – Evidence of immunity to measles and rubella for international travelers.
  – Travelers should take notice of symptoms.
  – What to do if the traveler believes that they have measles or rubella.

• Recommendations on awareness of immunization

• Entry points of the countries (i.e: airports)

• Strategic alliances with key stakeholders to maximize alert dissemination (airlines, travel agencies, etc.)
Confirmed measles cases in the Americas, 2011*

*Data as of EW 35/2011

Source: MESS and country report to PAHO/WHO

1 dot = 1 case

Note: Cases were imported, import-related or unknown.

Canada = 730
United States = 203
Panama = 4
Chile = 6
Brasil = 18
Dom. Rep = 1
French Departments = 20
Mexico = 3
Colombia = 4
Argentina = 3

>1000 cases
Measles Cases by Infection Origin
United States, 1995-2004

* As of October 30.

Source: CDC/NIP
### Number of import/imported related measles and rubella cases per country, The Americas – 2011*

<table>
<thead>
<tr>
<th>Country</th>
<th>MEASLES</th>
<th></th>
<th></th>
<th>RUBELLA</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Import</td>
<td>Import related</td>
<td>Unknown</td>
<td>Import</td>
<td>Import related</td>
<td>Unknown</td>
</tr>
<tr>
<td>Argentina</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brazil</td>
<td>7</td>
<td>8</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chile</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Canada**</td>
<td>13</td>
<td>23</td>
<td>694</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Colombia</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dominican Rep.</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ecuador</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Guadalupe***</td>
<td>7</td>
<td>5</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>French Guiana</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Martinique</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mexico</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Panama</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>United States</td>
<td>103</td>
<td>82</td>
<td>18</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>148</td>
<td>128</td>
<td>717</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

** It does not include clinical cases reported.

*** Five cases have been notified in the island of Saint Martin (1 import and 4 import-related).

*Data as of EW 35/2001*
3 importations: 1 from Asia (D9), 1 from Brazil (D4) with 2 secondary cases, and 1 from United States (D4) with 1 secondary case.

Data as of EW 35/2011
Source: Ministry of Health, Chile
Mass Gatherings and the Follow-up of International Contacts, 2010

Meeting of Walmart stakeholders in Fayetteville, AR
• Attendee from India arrives on 30 May 2010. Male, 29-years old, with ROD on 2 June, 2010
• Lab results confirm IgM+ for rubella with 2B virus identified.
• Over 15,000 people attended the conference.

Index case potentially in contact with 5,000-6,000 participants in corporate conference

FCH/IM sends alert to 10 countries with Walmart stores (on 14 June) and IHR/PAHO sends alert to all countries.

International contact tracing identified contacts in…
-CHI (126 individuals, including 3 pregnant women);
-COR (25 individuals); and
-HON (11 individuals)

No secondary cases identified after follow-up with contacts.
Measles Genotypes in Selected Latin American Countries, 2011

Data as of EW 34/2011

*Source*: Country reports to PAHO/WHO and CDC Global Measles Laboratory.
Countries with Yellow Fever Enzootic Areas

Yellow fever, 2005

Countries/areas where there is a risk of yellow fever transmission*

* Either yellow fever has been reported or disease in the past plus the presence of vectors and animal reservoirs create a potential risk of infection (considered to be endemic areas).

Source: ©WHO, 2004

http://www.who.int/ith/maps/yellowFever2004_en.gif
Transmission cycles of yellow fever in South America

Jungle YF

Urban YF

Hemagogus

Aedes aegypti
Urban cluster of yellow fever deaths, Paraguay, 2008

- A urban cluster of human YF, Asunción Metropolitan area*.
  - 10 deaths
  - Median of age: 24 years (11-39)
  - Female: 55%
  - Infestation Index by Ae. Aegypti: 23%

*Laurelty, Central Department
Social unrest in Asuncion due to vaccine shortage

Population vaccinated: 800,000 in Asuncion in 3 days
Adult Vaccine Preventable Diseases (VPD)

- Vaccinations needed throughout lifespan to reduce burden of VPD
- High burden of VPD remains among adults in the United States
  - 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 cases of pertussis reported in US in 2010
    - 6,640 among adults, 4% of which are hospitalized
  - About 1 million cases of zoster annually U.S.

2. Huang et al. Vaccine 2011
3. 2009 NNDSS
4. Thompson AJPH 2009
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
Pneumococcal Disease

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

• Major clinical syndromes include pneumonia, bacteremia, and meningitis

CDC’s Pink Book on VPDs 2008
Pneumococcal Polysaccharide Vaccine
Missed Opportunities

• >65% of patients with severe pneumococcal disease had been hospitalized within preceding 3-5 years yet few had received vaccine

• May be administered simultaneously with influenza vaccine

CDC’s Pink Book on VPDs 2008
# 2012 ACIP Adult Immunization Schedule, Age-Based Recommendations

**FIGURE 1. Recommended adult immunization schedule, by vaccine and age group** — United States, 2012

<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></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tetanus, diphtheria, pertussis (Td/Tdap)*</td>
<td></td>
<td></td>
<td></td>
<td>Substitute 1-time dose of Tdap for Td booster; then boost with Td every 10 years</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Varicella*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 doses</td>
</tr>
<tr>
<td>Human papillomavirus (HPV)* Female</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 doses</td>
</tr>
<tr>
<td>Human papillomavirus (HPV)* Male</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 doses</td>
</tr>
<tr>
<td>Zoster*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 dose</td>
</tr>
<tr>
<td>Measles, mumps, rubella (MMR)*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 or 2 doses</td>
<td></td>
<td>1 or 2 doses</td>
</tr>
<tr>
<td>Pneumococcal (polysaccharide)*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 or 2 doses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meningococcal*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 or more doses</td>
</tr>
<tr>
<td>Hepatitis A*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 doses</td>
</tr>
<tr>
<td>Hepatitis B*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></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)
- Tdap recommended for ≥65 if contact with <12 month old child. Either Td or Tdap can be used if no infant contact

No recommendation
2012 ACIP Adult Immunization Schedule, Age-Based Recommendations

![Table and Figure](image)

*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)
- Tdap recommended for ≥65 if contact with <12 month old child. Either Td or Tdap can be used if no infant contact

---

*Figure 1. Recommended adult immunization schedule, by vaccine and age group—United States, 2012*
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 indications¹ — United States, 2012

<table>
<thead>
<tr>
<th>INDICATION</th>
<th>VACCINE</th>
<th>Pregnant</th>
<th>Immunocompromising conditions (excluding human immunodeficiency virus [HIV])¹,³,⁷,¹⁴</th>
<th>HIV Infection¹,²,⁷,¹³</th>
<th>CD4³⁺ T lymphocyte count</th>
<th>Men who have sex with men (MSM)</th>
<th>Heart disease, chronic lung disease, chronic alcoholism</th>
<th>Asplenia¹³ (including elective splenectomy and persistent complement deficiencies)</th>
<th>Chronic liver disease</th>
<th>Diabetes, kidney failure, end-stage renal disease, receipt of hemodialysis</th>
<th>Healthcare personnel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Influenza²,⁹</td>
<td></td>
<td>1 dose TIV annually</td>
<td></td>
<td>1 dose TIV annually</td>
<td>1 dose TIV annually</td>
<td>1 dose TIV annually</td>
<td></td>
<td></td>
<td></td>
<td>1 dose TIV or LAV annually</td>
<td></td>
</tr>
<tr>
<td>Tetanus, diphtheria, pertussis (Td/Tdap)³,⁹</td>
<td></td>
<td></td>
<td>Substitute 1-time dose of Tdap for Td booster; then boost with Td every 10 years</td>
<td></td>
<td></td>
<td>1 dose TIV annually</td>
<td></td>
<td></td>
<td></td>
<td>1 dose TIV or LAV annually</td>
<td></td>
</tr>
<tr>
<td>Varicella⁴,⁶</td>
<td></td>
<td>Contraindicated</td>
<td></td>
<td>2 doses</td>
<td></td>
<td>2 doses</td>
<td></td>
<td></td>
<td></td>
<td>2 doses</td>
<td></td>
</tr>
<tr>
<td>Human papillomavirus (HPV)³,⁶ Female</td>
<td></td>
<td>3 doses through age 26 years</td>
<td></td>
<td>3 doses through age 26 years</td>
<td></td>
<td>3 doses through age 26 years</td>
<td></td>
<td></td>
<td></td>
<td>3 doses through age 26 years</td>
<td></td>
</tr>
<tr>
<td>Human papillomavirus (HPV)³,⁶ Male</td>
<td></td>
<td>3 doses through age 26 years</td>
<td></td>
<td>3 doses through age 21 years</td>
<td></td>
<td>3 doses through age 21 years</td>
<td></td>
<td></td>
<td></td>
<td>3 doses through age 21 years</td>
<td></td>
</tr>
<tr>
<td>Zoster⁶</td>
<td></td>
<td>Contraindicated</td>
<td></td>
<td>1 dose</td>
<td></td>
<td>1 dose</td>
<td></td>
<td></td>
<td></td>
<td>1 dose</td>
<td></td>
</tr>
<tr>
<td>Measles, mumps, rubella²,⁶</td>
<td></td>
<td>Contraindicated</td>
<td></td>
<td>1 or 2 doses</td>
<td></td>
<td>1 or 2 doses</td>
<td></td>
<td></td>
<td></td>
<td>1 or 2 doses</td>
<td></td>
</tr>
<tr>
<td>Pneumococcal (polysaccharide)⁹</td>
<td></td>
<td>1 or 2 doses</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 or 2 doses</td>
<td></td>
</tr>
<tr>
<td>Meningococcal¹⁰</td>
<td></td>
<td>1 or more doses</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 or more doses</td>
<td></td>
</tr>
<tr>
<td>Hepatitis A¹¹,¹²</td>
<td></td>
<td>2 doses</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 doses</td>
<td></td>
</tr>
<tr>
<td>Hepatitis B¹²,¹²</td>
<td></td>
<td>3 doses</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 doses</td>
<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 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)

Contraindicated

No recommendation
### 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 indications¹ — United States, 2012**

<table>
<thead>
<tr>
<th>VACCINE ▼</th>
<th>INDICATION</th>
<th>Immunocompromising conditions (excluding human immunodeficiency virus [HIV])[^1][^2][^3][^4][^14]</th>
<th>HIV infection[^1][^2][^3][^14], CD4[^4] T lymphocyte count</th>
<th>Men who have sex with men (MSM)</th>
<th>Heart disease, chronic lung disease, chronic alcoholism</th>
<th>Asplenia[^13] (including elective splenectomy and persistent complement component deficiencies)</th>
<th>Chronic liver disease</th>
<th>Diabetes, kidney failure, end-stage renal disease, receipt of hemodialysis</th>
<th>Healthcare personnel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Influenza[^2][^4]</td>
<td>Pregnancy</td>
<td>1 dose TIV annually</td>
<td>1 dose TIV annually</td>
<td>1 dose TIV annually</td>
<td>1 dose TIV or LAV annually</td>
<td>1 dose TIV annually</td>
<td>1 dose TIV or LAV annually</td>
<td>1 dose TIV or LAV annually</td>
<td>1 dose TIV or LAV annually</td>
</tr>
<tr>
<td>Tetanus, diphtheria, pertussis (Td/Tdap)</td>
<td>Substitute 1-time dose of Tdap for Td booster; then boost with Td every 10 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Varicella[^4][^6]</td>
<td>Contraindicated</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Human papillomavirus (HPV)[^3][^6] Female</td>
<td>3 doses through age 26 years</td>
<td></td>
<td></td>
<td></td>
<td>3 doses through age 26 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Human papillomavirus (HPV)[^5][^6] Male</td>
<td>3 doses through age 26 years</td>
<td></td>
<td></td>
<td></td>
<td>3 doses through age 21 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zoster[^6]</td>
<td>Contraindicated</td>
<td></td>
<td></td>
<td></td>
<td>1 dose</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measles, mumps, rubella[^2]</td>
<td>Contraindicated</td>
<td></td>
<td></td>
<td></td>
<td>1 or 2 doses</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pneumococcal (polysaccharide)[^9]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meningococcal[^15][^*]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hepatitis A[^11][^2][^*]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hepatitis B[^12][^*]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Covered by the Vaccine Injury Compensation Program

[^1]: For all persons in this category who meet the age requirements and who lack documentation of vaccination or have no evidence of previous infection

[^2]: Recommended if some other risk factor is present (e.g., on the basis of medical, occupational, lifestyle, or other indications)

[^3]: Contraindicated

[^4]: No recommendation
Adult Highlights (1)

• Tdap once to all persons age 19 years and older; then Td every 10 yrs
• Varicella 2 doses for all adults if non-immune and not previously vaccinated (anyone born before 1980 essentially immune)
• Zoster 1 dose at 60 years regardless of shingles or varicella history
• HPV until 26 years for females; until 21 for all males, 22-26 for high risk males
Adult Highlights (2)

• Influenza yearly for all 6 months and older

• Pneumo 19-64 years if high risk conditions (e.g. renal failure, asplenic, immunocompromized).

• Pneumo for all at age 65 years (or 5 years after prior dose)

• HB vaccine for high risk – now includes those with diabetes
Immunization
Contraindications

• Pregnancy, known immunodeficiency, HIV infection with CD4 <200 for live vaccines: varicella, MMR, zoster vaccines, live attenuated flu vaccine

• Other chronic medical conditions (asthma, DM, CHD, CKD): live attenuated influenza vaccine
# U.S. Influenza Vaccine Coverage 2007-2011, BRFSS

<table>
<thead>
<tr>
<th>Flu season</th>
<th>07/08</th>
<th>08/09</th>
<th>09/10</th>
<th>10/11</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥18 years</td>
<td>37.2</td>
<td>40.2</td>
<td>40.4</td>
<td>40.5</td>
</tr>
<tr>
<td>±95% CI</td>
<td>0.4</td>
<td>0.6</td>
<td>0.4</td>
<td>0.4</td>
</tr>
<tr>
<td>18–64 years</td>
<td>30.5</td>
<td>33.4</td>
<td>34.4</td>
<td>34.8</td>
</tr>
<tr>
<td>±95% CI</td>
<td>0.6</td>
<td>0.6</td>
<td>0.4</td>
<td>0.6</td>
</tr>
<tr>
<td>18–64 high-risk</td>
<td>44.3</td>
<td>47.9</td>
<td>46.2</td>
<td>46.7</td>
</tr>
<tr>
<td>±95% CI</td>
<td>1.4</td>
<td>1.4</td>
<td>1.0</td>
<td>1.4</td>
</tr>
<tr>
<td>18–49 years</td>
<td>25.4</td>
<td>28.2</td>
<td>29.9</td>
<td>30.5</td>
</tr>
<tr>
<td>±95% CI</td>
<td>0.6</td>
<td>0.8</td>
<td>0.5</td>
<td>0.6</td>
</tr>
<tr>
<td>18–49 high-risk</td>
<td>35.7</td>
<td>38.7</td>
<td>38.2</td>
<td>39.0</td>
</tr>
<tr>
<td>±95% CI</td>
<td>2.2</td>
<td>2.0</td>
<td>1.3</td>
<td>2.2</td>
</tr>
<tr>
<td>&gt;65 years</td>
<td>71.8</td>
<td>73.6</td>
<td>69.6</td>
<td>66.6</td>
</tr>
<tr>
<td>±95% CI</td>
<td>0.8</td>
<td>0.6</td>
<td>0.6</td>
<td>0.6</td>
</tr>
</tbody>
</table>
Seasonal Influenza Vaccination Coverage by Race/Ethnicity: 2008-09 -- 2010-11 Seasons, BRFSS and NIS

<table>
<thead>
<tr>
<th>Group</th>
<th>2008-09 (%)</th>
<th>2009-10 (%)</th>
<th>2010-11 (%)</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><strong>43.3</strong></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><strong>55.3</strong></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/mm5839.pdf](http://www.cdc.gov/mmwr/PDF/wk/mm5839.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
### Meta-Analysis of Interventions to Increase Use of Adult Immunization

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Odds Ratio*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organizational change (e.g., standing orders, separate clinics devoted to prevention)</td>
<td>16.0</td>
</tr>
<tr>
<td>Provider reminder</td>
<td>3.8</td>
</tr>
<tr>
<td>Provider education</td>
<td>3.2</td>
</tr>
<tr>
<td>Patient financial incentive</td>
<td>3.4</td>
</tr>
<tr>
<td>Patient reminder</td>
<td>2.5</td>
</tr>
<tr>
<td>Patient education</td>
<td>1.3</td>
</tr>
</tbody>
</table>

*Compared to usual care or control group, adjusted for all remaining interventions

Vacina contra influenza em idosos (≥ 60 anos de idade) por Unidade Federada, Brasil, 2009*

Fonte: pni.datasus.gov.br (dados sujeitos a alterações)
* dados em março de 2009
Travelers' Health

Hot off the press! Explore Travel Health with the new 2012 Yellow Book!

See Travelers' Health site FAQ and Useful Links.

## Travelers' Health Topics

### Destinations
Health information for travel to over 200 international destinations

### Vaccinations
General information about vaccinations for travel

### Diseases
Diseases related to travel, including malaria and yellow fever

### Illness & Injury Abroad
Prepare for your trip

### New! Yellow Book 2012
Travel health reference, includes updates to the online edition

### Find a Clinic
Locate a travel health specialist or yellow fever vaccination clinic

### Stay Healthy & Safe
Insect protection, safe food & water, survival guide.

### New! Resources & Training
Training; journals & articles; domestic & international partners

## Travel Notices

### Please Note
Travel Notice Definitions

### Outbreaks
- **Updated** Rabies in Bali, Indonesia  
  March 20, 2012
- **Updated** Dengue in Tropics & Subtropics  
  March 15, 2012
- **Cholera in Haiti**  
  January 09, 2012
- **Cholera in the Dominican Republic**  
  December 15, 2011

### In the News
- **Updated** Polio, Global Status  
  March 22, 2012
- **New!** African Trypanosomiasis in Kenya  
  March 12, 2012
- **Polio Outbreak in China**  
  February 14, 2012

## Contact Us:

- Centers for Disease Control and Prevention  
  1600 Clifton Rd  
  Atlanta, GA 30333
- 800-CDC-INFO (800-232-4636)  
  TTY: (888) 232-6227

New Hours of Operation  
8am-3pm ET/Mon - Fri  
Closed Holidays

Malaria Case Management Hotline  
Health care providers needing assistance with the diagnosis or management of suspected cases of malaria, may call the CDC Malaria Hotline:  
770-488-7788 or to
Objectives

• Understand the role of adult immunization in global health, especially in terms of the transition from child to family immunization programs

• Define some key challenges in containing global VPD threats

• Understand specific issues relevant to the USA
Acknowledgements

Barbara Juaregui
Cuauhtemoc Ruiz Matus
Carlos Castillo Solorzano
Ana Maria Bispo

www.paho.org/immunization
Acknowledgements

Carolyn Bridges
Lynda Anderson, CDC
Helen Ding, CDC
Gary Euler, CDC
Susan Farrall, CDC
Stacie Greby, CDC
Erin Kennedy, CDC
Megan Lindley, CDC

Pengjun Lu, CDC
Tammy Santibanez, CDC
Abigail Shefer, CDC
Jim Singleton, CDC
Ray Strikas, CDC
Walter Williams, CDC
LaDora Woods, CDC

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