Session 1: Why Adult Immunization Matters
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Public Health – Seattle & King County
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Disclosure

The Immunization Action Coalition has been responsible for all aspects of content development for the enclosed presentation and all other assets supporting the *Take a Stand™* program. Any questions should be directed to the Immunization Action Coalition.

Pfizer is supporting this initiative because it provides focus on the importance of adult immunization. Pfizer has had no role in the creation of content for this presentation or other assets supporting the *Take a Stand™* program workshops and therefore accepts no responsibility for the content.
Outline

• Review the burden of adult vaccine-preventable diseases in the United States
• Review adult vaccination coverage in the United States
• Discuss the changing environment for adult immunization
The Burden of Adult Vaccine-Preventable Diseases
Burden of Vaccine-Preventable Disease Among U.S. Adults

• Influenza
  – 3,000 to 49,000 total influenza-related deaths per year\(^1\)
  – Majority of hospitalizations and 80%–90% of deaths occur among adults 65 years and older\(^2\)
  – Estimated 55,000 to 431,000 influenza-associated hospitalizations (mean: 226,000) annually

1. MMWR. 010;59(33): 1057-1062.
2. MMWR 2013 2013 / 62(RR07);1-43
Influenza Costs

- Direct medical costs in U.S.: ~$10.4 billion
- Add in loss of work and life: ~$87 billion

Burden of Vaccine-Preventable Disease Among U.S. Adults

- **Invasive pneumococcal disease (IPD)**
  - 28,000 total cases and 2,900 total deaths in 2014
  - 91% of IPD and nearly all IPD deaths among adults
  - All adults ≥ 65 years are at increased risk for IPD, as are persons of any age with immunosuppressive conditions
    - cancer, HIV/AIDS, diabetes, alcoholism, chronic heart, lung, liver, and kidney disease; and, tobacco smokers.
  - Annual (pre-PCV13) direct and indirect costs are estimated to total $3.7 billion and $1.8 billion, respectively (Weycker. Vaccine 2010)

Epidemiology of Invasive Pneumococcal Disease Among High-Risk Adults Since the Introduction of Pneumococcal Conjugate Vaccine for Children

Riyadh D. Muhammad,1,a Reena Oza-Frank,2 Elizabeth Zell,1 Ruth Link-Gelles,1 K. M. Venkat Narayan,2 William Schaffner,3 Ann Thomas,4 Catherine Lexau,5 Nancy M. Bennett,6 Monica M. Farley,7 Lee H. Harrison,8 Arthur Reingold,9 James Hadler,10 Bernard Beall,1 Keith P. Klugman,2 and Matthew R. Moore1

1Respiratory Diseases Branch, Centers for Disease Control and Prevention, 2Hubert Department of Global Health, Rollins School of Public Health, Emory University, Atlanta, Georgia; 3Department of Preventive Medicine, Vanderbilt University School of Medicine, Nashville, Tennessee; 4Oregon Public Health Division, Portland; 5Minnesota Department of Health, St. Paul; 6University of Rochester School of Medicine and Dentistry, New York; 7Emory University and the Atlanta VA Medical Center, Atlanta, Georgia; 8Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland; 9University of California, Berkeley; and 10Connecticut Emerging Infections Program, Yale University, New Haven

Background. Certain chronic diseases increase risk for invasive pneumococcal disease (IPD) and are indications for receipt of 23-valent pneumococcal polysaccharide vaccine (PPV23). Since the pediatric introduction of 7-valent pneumococcal conjugate vaccine (PCV7) in 2000, incidence of IPD among adults has declined. The relative magnitude of these indirect effects among persons with and without PPV23 indications is unknown.

Methods. We evaluated IPD incidence among adults with and without PPV23 indications using population- and laboratory-based data collected during 1998–2009 and estimates of the denominator populations with PPV23 indications from the National Health Interview Survey. We compared rates before and after PCV7 use by age, race, PPV23 indication, and serotype.

Results. The proportion of adult IPD cases with PPV23 indications increased from 51% before to 61% after PCV7 introduction (P < .0001). PCV7-serotype IPD declined among all race, age, and PPV23 indication strata,
Rates of IPD caused by PCV7 serotypes and additional serotypes in PCV13, adults ≥65 years, 1998–2009

Moore, IDSA, 2009
Burden of Vaccine-Preventable Disease Among U.S. Adults: Herpes zoster (Shingles)

• ≅1 million new cases of zoster in the U.S. annually.
• About 1 in 3 persons will develop zoster during their lifetime.
• Post-herpetic neuralgia may persist for months or even years, and it is often refractory to treatment.
• Annual medical care cost of treating zoster cases in the US is estimated at $1.1 billion (Yawn. Mayo Clin Proc. 2009)
Burden of Vaccine-Preventable Disease Among U.S. Adults: Herpes zoster (Shingles)

*Per 1,000 person-years.
†Defined as ≥30 days of pain.
Rate of HZ-Related Hospitalization by Age: Connecticut, 1986-1995

74% of HZ-related hospitalizations in persons ≥60 years

Source: Lin 2000
Cumulative Number of PHN* Cases by Vaccination Strategy

* PHN = moderate to severe pain lasting >90 days
Ortega-Sanchez. ACIP OCT 2013
Burden of Vaccine-preventable Disease Among U.S. Adults

• Pertussis
  – ~24,000 cases reported in 2004, >5,000 among adults 20 years of age and older
  – Estimates from three prospective studies suggest the number of cases of symptomatic pertussis among adults aged 19--64 years could range from 299,000 to 626,000 cases annually in the United States

• Hepatitis B
  – 3,050 acute cases reported in 2013 (~19,800 estimated)

MMWR 2006 / 55(RR17)
www.cdc.gov/hepatitis/statistics/201c3surveillance/commentary.htm#hepatitisB
### Recommended Adult Vaccines

**Recommended Adult Immunization Schedule—United States - 2015**

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>19-21 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>
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</thead>
<tbody>
<tr>
<td><strong>Influenza</strong></td>
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<td><strong>Tetanus, diphtheria, pertussis (Td/Tdap)</strong></td>
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<td><strong>Varicella</strong></td>
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<td><strong>Human papillomavirus (HPV) Female</strong></td>
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<td><strong>Human papillomavirus (HPV) Male</strong></td>
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<td><strong>Zoster</strong></td>
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<td><strong>Measles, mumps, rubella (MMR)</strong></td>
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<td><strong>Pneumococcal 13-valent conjugate (PCV13)</strong></td>
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<td><strong>Pneumococcal polysaccharide (PPSV23)</strong></td>
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<td><strong>Meningococcal</strong></td>
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<td><strong>Hepatitis A</strong></td>
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<td><strong>Hepatitis B</strong></td>
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<td><strong>Haemophilus influenzae type b (Hib)</strong></td>
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</tbody>
</table>

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**For all persons in this category who meet the age requirements and who lack documentation of vaccination or have no evidence of previous infections: zoster vaccine recommended regardless of prior episodes of zoster.**

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Report all clinically significant postvaccination reactions to the Vaccine Adverse Event Reporting System (VAERS). Reporting forms and instructions on filing a VAERS report are available at [www.vaers.hhs.gov](http://www.vaers.hhs.gov) or by telephone, 800-822-7967.

Information on how to file a Vaccine Injury Compensation Program claim is available at [www.hrsa.gov/vaccinecompensation](http://www.hrsa.gov/vaccinecompensation) or by telephone, 800-338-2382. To file a claim for vaccine injury, contact the U.S. Court of Federal Claims, 717 Madison Place, N.W., Washington, D.C. 20005; telephone, 202-505-4400.

Additional information about the vaccines in this schedule; extent of available data; and contraindications for vaccination is also available at [www.cdc.gov/vaccines](http://www.cdc.gov/vaccines) or from the CDC-INFO Contact Center at 800-232-4636 in English and Spanish, 8:00 a.m. - 8:00 p.m. Eastern Time, Monday - Friday, excluding holidays.

Use of trade names and commercial sources is for identification only and does not imply endorsement by the U.S. Department of Health and Human Services.

The recommendations in this schedule were approved by the Centers for Disease Control and Prevention (CDC) Advisory Committee on Immunization Practices (ACIP), the American Academy of Family Physicians (AAFP), the American College of Physicians (ACP), American College of Obstetricians and Gynecologists (ACOG), and American College of Nurse-Midwives (ACNM).

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[www.cdc.gov/vaccines/schedules/hcp/adult.html](http://www.cdc.gov/vaccines/schedules/hcp/adult.html)
## Recommended Adult Vaccines

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

<table>
<thead>
<tr>
<th>VACCINE</th>
<th>INDICATION</th>
<th>IMMUNOCOMPROMISING CONDITIONS (EXCLUDING HUMAN IMMUNODEFICIENCY VIRUS (HIV))</th>
<th>HIV INFECTION CD4+ T LYMPHOCYTE COUNTS</th>
<th>MEN WHO HAVE SEX WITH MEN (MSM)</th>
<th>CHRONIC RENAL DISEASE, RECIPIENT OF HEMODIALYSIS</th>
<th>HEART DISEASE, CHRONIC LUNG DISEASE, CHRONIC ALCOHOLISM</th>
<th>ARTHRITIS (INCLUDING ELDERLY)</th>
<th>CHRONIC LIVER DISEASE</th>
<th>DIABETES</th>
<th>HEALTHCARE PERSONNEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Influenza</td>
<td>1 dose IIV annually</td>
<td>1 dose IIV or IIV annually</td>
<td>1 dose IIV annually</td>
<td>1 dose IIV or IIV annually</td>
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<tr>
<td>Tetanus, diphtheria, pertussis (Td/Tdap)</td>
<td>1 dose Tdap annually</td>
<td>Substitute 1-time dose of Tdap for Td booster; then boost with Td every 10 yrs</td>
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<tr>
<td>Varicella</td>
<td>Contraindicated</td>
<td>2 doses</td>
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<td>1 dose</td>
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<tr>
<td>Human papillomavirus (HPV) Female</td>
<td>3 doses through age 26 yrs</td>
<td>3 doses through age 26 yrs</td>
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<tr>
<td>Human papillomavirus (HPV) Male</td>
<td>3 doses through age 26 yrs</td>
<td>3 doses through age 21 yrs</td>
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<td>Zoster</td>
<td>Contraindicated</td>
<td>1 dose</td>
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<tr>
<td>Measles, mumps, rubella (MMR)</td>
<td>Contraindicated</td>
<td>1 or 2 doses</td>
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<td>Pneumococcal 13-valent conjugate (PCV13)</td>
<td>1 dose</td>
<td>1 dose</td>
<td>1 or 2 doses</td>
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<td>Pneumococcal polysaccharide (PPSV23)</td>
<td>1 or 2 doses</td>
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<td>Meningococcal</td>
<td>1 or more doses</td>
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<td>Hepatitis A</td>
<td>2 doses</td>
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<tr>
<td>Hepatitis B</td>
<td>3 doses</td>
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<tr>
<td>Haemophilus influenza type b (HiB)</td>
<td>1 or 3 doses</td>
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</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: Zoster vaccine recommended regardless of prior episode of zoster.

These schedules indicate the recommended age groups and medical indications for which administration of currently licensed vaccines is commonly recommended for adults ages 19 years and older, as of February 1, 2015. For all vaccines being recommended on the Adult Immunization Schedule, no dose need be restarted, regardless of the time that has elapsed between doses. Licensed combination vaccines may be used whenever any components of the combination are indicated and when the vaccines other components are not contraindicated. For detailed recommendations on all vaccines, including those used primarily for travelers or that are issued during the year, consult the manufacturers' package inserts and the complete statements from the Advisory Committee on Immunization Practices (www.cdc.gov/vaccines/hcp/policy-recommendations.html). Use of trade names and commercial sources is for identification only and does not imply endorsement by the U.S. Department of Health and Human Services.

[www.cdc.gov/vaccines/schedules/hcp/adult.html](www.cdc.gov/vaccines/schedules/hcp/adult.html)
Effectiveness: *Influenza vaccine*

Adjusted vaccine effectiveness estimates for influenza seasons from 2005-2015 range from 10%-60%  

CDC. MMWR 2013;62(RR-7):1 Medically-attended disease with good vaccine match  
http://www.cdc.gov/flu/professionals/vaccination/effectiveness-studies.htm
Estimated Influenza Illnesses and Hospitalizations Averted by Influenza Vaccination – U.S. 2010-11 through 2014-Influenza Seasons

- 1.7 – 7.8 million fewer illnesses
- 800,000 – 3.6 million fewer medically attended illnesses
- 34,000-114,000 fewer hospitalizations

MMWR December 13, 2013 / 62(49);997-1000
CONCLUSIONS AND RELEVANCE: In a meta-analysis of RCTs, the use of influenza vaccine was associated with a lower risk of major adverse cardiovascular events. The greatest treatment effect was seen among the highest-risk patients with more active coronary disease. A large, adequately powered, multicenter trial is warranted to address these findings and assess individual cardiovascular end points.
Effectiveness: *Pneumococcal Vaccine* (Against Vaccine-Type Strains in Immunocompetent Adults ≥65 yrs)

Effectiveness: **Zoster vaccine**

![Graph showing effectiveness of the zoster vaccine for Shingles, PHN, and Severe PHN.](https://example.com/graph.png)

Oxman. NEJM 2005;352:2271

PHN, post-herpetic neuralgia
Effectiveness: *Hepatitis B vaccine*

![Bar chart showing effectiveness of Hepatitis B vaccine by age group for diabetic patients.](Image)

CDC. MMWR 2011;60:1709

Pregnant Women: *Two-for-one protection*

www.porticostory.org/content/BLOG/BLOG.asp
How are we doing?
Influenza Vaccine Coverage Among US Adults: 2014-15

People 18 – 64 yrs account for over half of the U.S. population but have the lowest vaccination rates (33% during 2014-2015).

National Immunization Survey-Flu (NIS-Flu) BRFSS
Pneumococcal Vaccine Coverage Among US Adults, National Health Interview Survey, 2013

% Vaccinated

19-64 HR

65+

Population (Age in years)
Hepatitis B Vaccine Coverage Among US Adults
National Health Interview Survey (3+ doses), 2013
Tdap Vaccine Coverage Among US Adults*
National Health Interview Survey, 2013

* Vaccinated since 2005

19-64 Population (Age in years)

% Vaccinated

Total
White
Black
Hispanic
Asian
Infant in home

* Vaccinated since 2005
Zoster Vaccine Coverage Among US Adults
National Health Interview Survey, 2008-2013

National Immunization Survey (NIS), 2007; National Health Interview Survey (NHIS), 2008-2013
### US Adult Immunization Coverage: Disparities

<table>
<thead>
<tr>
<th>Vaccination, Group (yrs)</th>
<th>Percent Coverage and Difference</th>
<th>Disparity from Coverage in Whites</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Whites</td>
<td>Blacks</td>
</tr>
<tr>
<td>Tetanus, ≥65</td>
<td>59.6</td>
<td>-19.3</td>
</tr>
<tr>
<td>Tetanus, 19–49</td>
<td>69.0</td>
<td>-14.9</td>
</tr>
<tr>
<td>Pneumo, ≥65</td>
<td>63.6</td>
<td>-14.9</td>
</tr>
<tr>
<td>Zoster, ≥60</td>
<td>27.4</td>
<td>-16.7</td>
</tr>
<tr>
<td>HPV, females 19–26</td>
<td>41.7</td>
<td>-11.1</td>
</tr>
</tbody>
</table>
How are we doing?
Results of Failure to Vaccinate Adults

- Preventable morbidity and mortality
- Unnecessary personal and societal costs
- Perpetuates disparities in immunization coverage
  - Absence of commitment exacerbates existing barriers to immunization for those in the lower socio-economic strata and for racial and ethnic minorities
- Creates disincentive for manufacturers to enter the market
What factors contribute to low adult immunization coverage?

- Patient Factors
- HCP Office Factors
- System Factors
Causes of Low Vaccination Rates Among Adults

• Patient factors
  – Access: No medical home; only see specialists
  – Inconvenient: competing social and economic demands
  – Lack of awareness of recommendations/importance/risk
  – Cost

• Provider factors
  – Competing priorities; treatment over preventive services
  – Failure to routinely assess for needed vaccinations
  – Failure to make strong recommendation
  – Lack of incentives

• System factors
  – Lack of mandate/requirements for adult immunization
  – Lack of adult immunization information systems and CDS
  – No national adult immunization program

• Complex adult vaccine schedule
US Childhood Vaccine Coverage Levels are High

• Successful US national childhood vaccination program
  – Coordinated by public health, publically-supported
  – Achieved high vaccine coverage levels and dramatic reduction and in some cases elimination of serious infectious diseases of children

• In contrast, adult immunization rates remain embarrassingly low
  – Many features of our successful pediatric immunization program can and should be applied to the problem of under-immunization in adults
### US Guide to Community Preventive Services: Healthcare Provider and System-Based Strategies

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Status of Task Force Review</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provider reminder systems when used alone</td>
<td>Recommended (Strong evidence)</td>
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<tr>
<td>Provider assessment &amp; feedback</td>
<td>Recommended (Strong evidence)</td>
</tr>
<tr>
<td>Standing orders</td>
<td>Recommended (Strong evidence)</td>
</tr>
<tr>
<td>Health care-based interventions implemented in combination</td>
<td>Recommended (Strong evidence)</td>
</tr>
<tr>
<td>Provider education used alone</td>
<td>Insufficient evidence</td>
</tr>
</tbody>
</table>

[www.thecommunityguide.org/vaccines/universally/index.html](http://www.thecommunityguide.org/vaccines/universally/index.html)
How can my office vaccinate more adults?
## Meta-Analysis of Interventions to Increase Use of Adult Immunization

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Odds Ratio*</th>
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<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>
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<tr>
<td>Patient financial incentive</td>
<td>3.4</td>
</tr>
<tr>
<td>Patient reminder</td>
<td>2.5</td>
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<tr>
<td>Patient education</td>
<td>1.3</td>
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</tbody>
</table>

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

New Standards for Adult Immunization Practice (NVAC)

• All providers, including those who don’t provide vaccine services, have a role in ensuring patients are up to date on vaccines
  – Adult patients may see many different health care providers, some of whom do not stock some or all vaccines
  – Adults may get vaccinated in a medical home, at work, or retail setting

• Aim is to avoid missed opportunities and keep adult patients protected from vaccine-preventable diseases

Public Health Reports Mar-Apr 2014
http://www.publiehealthreports.org/issueopen.cfm?articleID=3145
New Standards for Adult Immunization Practice (NVAC)

• Calls to action for health care professionals
  – **Assess** immunization status of all patients in every clinical encounter.
  – **Strongly recommend** vaccines that patients need.
  – **Administer** needed vaccines or refer to a provider who can immunize.
  – **Document** vaccines given to patients, including entering them into immunization registries when available.

www.publichealthreports.org/issueopen.cfm?articleID=3145
Conclusions

- Vaccine–preventable diseases cause a substantial burden of illness and cost in adults. Vaccination rates low among adults in U.S.

- NVAC Standards for Adult Immunization Practice provides strategies for improving adult immunization coverage.
Conclusions (cont.)

• U.S. Community Services Task Force highlights the use of systems-based interventions to improve immunization rates, including the implementation of standing orders

• Many tools and resources available to:
  – Educate patients on the importance of vaccination
  – *Take A Stand™*: first of its kind national initiative to assist practices to implement vaccination standing orders
IAC Resources

• Take A Stand™
  – www.standingorders.org

• Read IAC publications
  – www.immunize.org/publications

• Visit IAC websites
  – www.immunize.org
  – www.vaccineinformation.org
  – www.izsummitpartners.org

• Stay ahead of the game!
  Subscribe to IAC weekly updates
  – www.immunize.org/subscribe
THANK YOU!