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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.
Session 1

Why Adult Immunization Matters

L.J Tan, MS, PhD
Immunization Action Coalition
Chief Strategy Officer
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\(^1\)
  - 80%–90% of deaths among adults 65 years and older\(^2\)

- **Invasive pneumococcal disease (IPD)**\(^3\)
  - 33,900 total cases/3,700 total deaths in 2013
  - 91% of IPD and nearly all IPD deaths among adults

- **Pertussis in 2014**\(^4\)
  - ~24,000 cases
  - >5,000 among adults 20 years of age and older

- **Hepatitis B**\(^5\)
  - 3,050 acute cases reported in 2013
  - ~19,800 estimated

- **Zoster**\(^6\)
  - ~1 million cases of zoster annually U.S.

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Influenza Costs Lives and Money

• Direct medical costs in U.S.: ~$10.4 billion
• Add in loss of work and life: ~$87 billion
• Vaccination (41% in 2013–14) prevented:
  – 7 million+ illnesses
  – 3 million+ medically-attended illnesses
  – 90,000+ hospitalizations

• Reed, et al. Estimated Influenza Illnesses and Hospitalizations Averted by Vaccination — United States, 2013–14 Influenza Season *MMWR* 2014:63(49);1151-1154.
Cost Burden of 4 Adult Vaccine-Preventable Diseases to the U.S. (65 years and older)

<table>
<thead>
<tr>
<th>Disease</th>
<th>Est. Cases</th>
<th>Est. Medical Cost (per case)</th>
<th>Est. Indirect Cost (per case)</th>
<th>Est. Total Cost (per case)</th>
<th>Est. Total Medical Cost (millions)</th>
<th>Est. Total Indirect Cost (millions)</th>
<th>Est. Total Cost (millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Influenza</td>
<td>4,019,759</td>
<td>$1867</td>
<td>$201</td>
<td>$2068</td>
<td>$7503.3</td>
<td>$809.5</td>
<td>$8312.8</td>
</tr>
<tr>
<td>Pneumococcal</td>
<td>440,187</td>
<td></td>
<td></td>
<td></td>
<td>$3572.2</td>
<td>$214.9</td>
<td>$3787.1</td>
</tr>
<tr>
<td>Bacteremia</td>
<td>19,960</td>
<td>$25,181</td>
<td>$879</td>
<td>$26,060</td>
<td>$502.6</td>
<td>$17.6</td>
<td>$520.2</td>
</tr>
<tr>
<td>Meningitis</td>
<td>1278</td>
<td>$32,803</td>
<td>$879</td>
<td>$33,682</td>
<td>$41.9</td>
<td>$1.1</td>
<td>$43.0</td>
</tr>
<tr>
<td>NPP (inpatient)</td>
<td>187,982</td>
<td>$15,221</td>
<td>$641</td>
<td>$15,862</td>
<td>$2861.3</td>
<td>$120.4</td>
<td>$2981.7</td>
</tr>
<tr>
<td>NPP (outpatient)</td>
<td>230,968</td>
<td>$721</td>
<td>$328</td>
<td>$1049</td>
<td>$166.4</td>
<td>$75.8</td>
<td>$242.2</td>
</tr>
<tr>
<td>Zoster</td>
<td>555,989</td>
<td>$2354</td>
<td>$3074</td>
<td>$5427</td>
<td>$1308.5</td>
<td>$1708.9</td>
<td>$3017.4</td>
</tr>
<tr>
<td>Pertussis</td>
<td>207,241</td>
<td>$432</td>
<td>$593</td>
<td>$1026</td>
<td>$89.6</td>
<td>$122.9</td>
<td>$212.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>5,223,176</strong></td>
<td></td>
<td></td>
<td><strong>$12,473.7</strong></td>
<td><strong>$2856.2</strong></td>
<td></td>
<td><strong>$15,329.9</strong></td>
</tr>
</tbody>
</table>

NPP is non-bacteremic pneumococcal pneumonia caused by S. pneumoniae. ‘NPP inpatient’ refers to cases of NPP that require hospitalization where as ‘NPP outpatient’ refers to cases of NPP that do not require hospitalization.

~$15 billion annually – based on zoster, pneumococcal disease, influenza, and pertussis
Recommended Adult Vaccines

• Important for optimizing health, protecting persons vaccinated and others
  – Example: Vaccination against influenza and pertussis reduces the risk for the person vaccinated and also prevents the person from spreading these diseases
Recommended Adult Vaccines (cont.)

www.cdc.gov/vaccines/schedules/hcp/adult.html
### Recommended Adult Vaccines (cont.)

#### 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>Pregnancy</th>
<th>Immuno-compromising conditions (existing human immunodeficiency virus [HIV])</th>
<th>HIV infection CD4+ T lymphocyte count</th>
<th>Men who have sex with men (MSM)</th>
<th>Kidney failure, end-stage renal disease, receipt of hemodialysis</th>
<th>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>Diabetes</th>
<th>Healthcare personnel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Influenza</td>
<td>1 dose IV annually</td>
<td>1 dose IV or IM annually</td>
<td>1 dose IV annually</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>
<td></td>
</tr>
<tr>
<td>Tetanus, diphtheria, pertussis (Tdap)</td>
<td>1 dose Tdap and pregnancy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Varicella</td>
<td>Contraindicated</td>
<td></td>
<td></td>
<td>2 doses</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Human papillomavirus (HPV) Female*</td>
<td>3 doses through age 26 yrs</td>
<td></td>
<td></td>
<td>3 doses through age 26 yrs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Human papillomavirus (HPV) Male*</td>
<td>3 doses through age 26 yrs</td>
<td></td>
<td></td>
<td>3 doses through age 21 yrs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zoster*</td>
<td>Contraindicated</td>
<td></td>
<td></td>
<td>1 dose</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measles, mumps, rubella (MMR)*</td>
<td>Contraindicated</td>
<td></td>
<td></td>
<td>1 or 2 doses</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pneumococcal 13-valent conjugate (PCV13)*</td>
<td></td>
<td></td>
<td></td>
<td>1 dose</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pneumococcal polysaccharide (PPSV23)*</td>
<td></td>
<td></td>
<td></td>
<td>1 or 2 doses</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MeningococcalA*</td>
<td></td>
<td></td>
<td></td>
<td>1 or more doses</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hepatitis A*</td>
<td></td>
<td></td>
<td></td>
<td>2 doses</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hepatitis B*</td>
<td></td>
<td></td>
<td></td>
<td>3 doses</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Haemophilus influenzae type b (Hib)*</td>
<td>post-HSCT recipients only</td>
<td></td>
<td></td>
<td>Recommended if some other risk factor is present (e.g., on the basis of medical, occupational, lifestyle, or other indications)</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></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, booster 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, a vaccine series does not need to be reinitiated, 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 vaccine's 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/professionals/index.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)
Impact of Vaccination

• Vaccine effectiveness (VE) varies by vaccine type, the disease outcome, and the age or health of the person vaccinated
  – Zoster (shingles) VE: 51% against shingles, 66% against post-herpetic neuralgia (PHN), and almost 80% against most prolonged and extreme cases of PHN¹
  – PCV13 (pneumococcal conjugate vaccine) VE: 45% against vaccine-type pneumococcal pneumonia, and 75% against vaccine-type invasive pneumococcal disease among adults age ≥65 years²

Impact of Vaccination (cont.)

- **Influenza vaccine:** varies annually based on antigenic match and also age and health of person being vaccinated – about 60–70% in younger adults and about 30% in adults 65 years and older against medically-attended influenza with a good match<sup>1</sup>

- **Hepatitis B vaccine:** 90% effectiveness after completing a 3-dose series, though lower in persons with diabetes (e.g., 90% with diabetes and age <40 years, 80% with diabetes and 41–59 years, 65% if 60–69 years and <40% if 70 years or older<sup>2</sup>)

2. CDC. Use of hepatitis B vaccine for adults with diabetes mellitus. MMWR 2011;60:1709-1711.
Vaccination of Pregnant Women: Two-For-One

• **Influenza vaccination of pregnant women**
  – Reduce risk of influenza illness in pregnant women
  – Reduce risk of influenza illness, fevers and influenza hospitalizations in infants during first 6 months of life
  – Vaccinate with inactivated flu vaccine (not live vaccine) during pregnancy

• **Tdap vaccination of pregnant women**
  – Vaccinate in 3\textsuperscript{rd} trimester to transfer antibody to infant prior to birth
  – Prevents pertussis in mom and protects infant
  • Tdap vaccination during pregnancy estimated to be 93% effective in preventing pertussis in infants <2 months old

• **Pregnant women should NOT routinely receive any live vaccines** (e.g., live influenza vaccine, MMR, varicella or shingles vaccines)

1. CDC. MMWR 2014; 63(32); 691-697.
Yet, We Are Failing to Vaccinate our Adult Population!
Adult Immunization Coverage Rates, National Health Interview Surveys, 2010–2013

- Tetanus past 10y, age ≥65
- Tetanus past 10y, age 19-64
- Pneumococcal, age ≥65
- Pneumococcal, age 19-64 at high risk
- Zoster, age ≥60

0 10 20 30 40 50 60 70 80 90 100

Percent

Healthy People 2020 target

2013
2012
2011
2010
### Adults with Diabetes Who Received ≥3 Doses Hepatitis B Vaccine by Age, National Health Interview Surveys, 2010–2013

<table>
<thead>
<tr>
<th>Age Group</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥60 yrs</td>
<td>10.9</td>
<td>12.4</td>
<td>15.1</td>
<td>13.9</td>
</tr>
<tr>
<td>19-59 yrs</td>
<td>22.8</td>
<td>26.9</td>
<td>28.6</td>
<td>26.3</td>
</tr>
</tbody>
</table>

Percent
Improvements in Some Adult Vaccination Coverage Rates

HPV (≥1 dose), Women 19-26 yrs

Tdap, HCP 19-64 yrs

Coverage for zoster vaccine also increased 2011–2013 (16%→24%), though still below Healthy People 2020 target of 30%

Source: National Health Interview Surveys
But Most Adult Immunization Rates Still Low

- **HPV (≥1 dose), Women 19-26 yrs**: Increased in 2013 but long way to go
  - 2011: 10%, 2012: 15%, 2013: 30%

- **HPV (≥1 dose), Men 19-26 yrs**: Not improving, far below 90% HP2020 target
  - 2011: 2%, 2012: 2%, 2013: 3%

- **Tdap, HCP 19-64 yrs**: Improving but still only 38%
  - 2011: 10%, 2012: 15%, 2013: 30%

- **Hep B ≥3 doses, HCP ≥19 yrs**: Improving but still only 37%
  - 2011: 10%, 2012: 15%, 2013: 30%

Source: National Health Interview Surveys
## Influenza Vaccination Coverage Among U.S. Adults, Past Four Seasons*

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Persons ≥ 18 yrs</td>
<td>38.8</td>
<td>41.5</td>
<td>42.4</td>
<td>43.6</td>
</tr>
<tr>
<td>Persons 18-49 yrs, all</td>
<td>28.6</td>
<td>31.1</td>
<td>32.3</td>
<td>33.5</td>
</tr>
<tr>
<td>Persons 18-49 yrs, high risk</td>
<td>36.8</td>
<td>39.8</td>
<td>38.7</td>
<td>39.3</td>
</tr>
<tr>
<td>Persons 50-64 yrs</td>
<td>42.7</td>
<td>45.1</td>
<td>45.3</td>
<td>47.0</td>
</tr>
<tr>
<td>Persons ≥ 65 yrs</td>
<td>64.9</td>
<td>66.2</td>
<td>65.0</td>
<td>66.7</td>
</tr>
</tbody>
</table>

* Flu vaccination coverage estimates from the BRFSS survey were calculated using Kaplan-Meier survival analysis to determine the cumulative flu vaccination coverage (≥1 dose) July 2014 through May 2015 using monthly interview data collected September 2014 through June 2015. Only BRFSS data were used to estimate coverage for adults ≥18 years.

[www.cdc.gov/flu/fluvaxview/index.htm](http://www.cdc.gov/flu/fluvaxview/index.htm)
Ramifications Exist When We Fail to Vaccinate Adults...

• Beyond the impact to the health of the public, our ineffectiveness in immunizing adults:
  – Creates disincentive for manufacturers to enter the market
  – Leaves the chronically ill vulnerable
  – Creates disparities in access to care
    • Absence of commitment exacerbates existing barriers to immunization for those in the lower socio-economic strata and for racial and ethnic minorities
## Vaccination Disparities – National Health Interview Survey 2013*

<table>
<thead>
<tr>
<th>Vaccination Group</th>
<th>% Vaccinated Whites</th>
<th>Disparity, Blacks</th>
<th>Disparity, Hispanics</th>
<th>Disparity, Asians</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pneumo, HR 19–64 yrs</td>
<td>22.3</td>
<td>-1.1</td>
<td>-4.4</td>
<td>-11.3</td>
</tr>
<tr>
<td>Pneumo, ≥65 yrs</td>
<td>63.6</td>
<td>-14.9</td>
<td>-24.4</td>
<td>-18.3</td>
</tr>
<tr>
<td>Tetanus, 19–49 yrs</td>
<td>69.0</td>
<td>-14.9</td>
<td>-16.5</td>
<td>-16.3</td>
</tr>
<tr>
<td>Tetanus, 50–64 yrs</td>
<td>67.3</td>
<td>-12.9</td>
<td>-12.3</td>
<td>-13.9</td>
</tr>
<tr>
<td>Tetanus, ≥65 yrs</td>
<td>59.6</td>
<td>-19.3</td>
<td>-14.3</td>
<td>-16.8</td>
</tr>
<tr>
<td>Tdap, ≥19 yrs</td>
<td>19.7</td>
<td>-7.1</td>
<td>-9.5</td>
<td>-4.2</td>
</tr>
<tr>
<td>Tdap, 19–64 yrs</td>
<td>21.6</td>
<td>-8</td>
<td>-11.1</td>
<td>-5.4</td>
</tr>
<tr>
<td>Tdap, ≥65 yrs</td>
<td>13.0</td>
<td>-6.5</td>
<td>-5.7</td>
<td>-1.9</td>
</tr>
<tr>
<td>HepA, 19–49 yrs</td>
<td>12.6</td>
<td>-1.6</td>
<td>-2</td>
<td>+3.5</td>
</tr>
<tr>
<td>HepB, 19–49 yrs</td>
<td>35.2</td>
<td>-4.7</td>
<td>-11.5</td>
<td>+4.1</td>
</tr>
<tr>
<td>Herpes Zoster, ≥60 yrs</td>
<td>27.4</td>
<td>-16.7</td>
<td>-17.9</td>
<td>-4.8</td>
</tr>
<tr>
<td>HPV, Females 19–26 yrs</td>
<td>41.7</td>
<td>-11.1</td>
<td>-11.4</td>
<td>-21.9</td>
</tr>
<tr>
<td>Tdap, HCP ≥19 yrs</td>
<td>39.9</td>
<td>-7.7</td>
<td>-10.4</td>
<td>-7.2</td>
</tr>
<tr>
<td>HepB, HCP ≥19 yrs</td>
<td>62.9</td>
<td>-4</td>
<td>-8.9</td>
<td>+6.1</td>
</tr>
</tbody>
</table>

*Williams, W.W., et al. 2015. MMWR 64(04);95-102
Other Ramifications Exist

“By failing to prepare, we are preparing to fail”
- Benjamin Franklin

• Leaves us vulnerable during times of crisis when the ability to reach 250 million adults with vaccines/medications is crucial
  – Pandemic influenza

• Our failure to successfully immunize adults in healthy times predicts our failure to immunize them in times of crisis...
Factors Associated with Low Vaccination Among Adults

• **Patient factors**
  – May not have regular health care provider or only see specialists
  – Inconvenient access, competing social and economic demands
  – Many adults 18–64 years of age still unaware of ACA vaccination coverage, and many still remain uninsured

• **Provider factors**
  – Many other health issues compete with preventive services
  – Lack of provider recommendation
  – Lack of effective reminders to offer vaccinations

• **System factors**
  – Fewer requirements for vaccination (e.g., by employers)
  – State regulations differ on who can vaccinate and what vaccines are allowed (e.g., pharmacists, visiting nurse associations)

• **Complex adult vaccine schedule**
Some Adult Immunization Facts

• **Challenges**
  - Vaccine coverage among adults is unacceptably low
  - Limited patient awareness about need for vaccines among adults
  - Adult vaccinations less integrated into clinical practice

• **Opportunities**
  - Most patients willing to get vaccinated when recommended by medical providers
  - Primary care providers believe that immunizations are an important part of the services they provide to patients
  - Systematic offering (e.g., through standing orders) and recommendations from clinicians result in higher uptake
## US Community Services Task Force: Healthcare Provider- or 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>
</tr>
<tr>
<td>Provider assessment and feedback</td>
<td>Recommended (Strong evidence)</td>
</tr>
<tr>
<td>Standing orders</td>
<td>Recommended (Strong evidence)</td>
</tr>
<tr>
<td>Provider education when used alone</td>
<td>Insufficient evidence</td>
</tr>
<tr>
<td>Health care-based interventions when implemented in combination</td>
<td>Recommended (Strong evidence)</td>
</tr>
</tbody>
</table>

[www.thecommunityguide.org/vaccines/universally/index.html](www.thecommunityguide.org/vaccines/universally/index.html)
## 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

New Standards for Adult Immunization Practice*

• Stresses that all providers, including those who don’t provide vaccine services, have a role in ensuring patients are up to date on vaccines

• Acknowledges that:
  – 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

* www.izsummitpartners.org/adult-immunization-standards
New Standards for Adult Immunization Practice (cont.)

• 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

- Substantial burden of disease in adults for which vaccines are available
- Vaccination rates low among adults in U.S.
- New Standards for Adult Immunization Practice emphasize the importance of assessing need for vaccines and providing vaccinations
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
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!