Vaccines and Adults: Our Collective Challenge

“A vaccine that sits on the shelf is useless” – Albert Sabin

Maria Lanzi, APN, MPH, Co-Chair, Adult Immunization Committee New Jersey Immunization Network
Objectives

• Understand the importance of vaccines across the adult lifespan in decreasing morbidity and mortality

• Identify the adult population most at risk for Vaccine Preventable Diseases (VPD)

• Identify the barriers and the solutions to increasing adult immunization rates
Courtesy  The Immunization Action Coalition; Immunize.org
Transmission

• Modes of Transmission
  – Contact
    • Direct (HBV, HPV)
    • Indirect (HAV, Polio)
    • Droplet (Bordetella pertussis, influenza virus, pneumococcus, meningococcus)
  – Non-Contact
    • Airborne (Rubeola virus (measles), varicella virus (chickenpox))
Influenza Pre-Vaccine

Courtesy of The Immunization Action Coalition; Immunize.org
“HERD IMMUNITY”

The higher the percentage of immune individuals in a population, the less likely a non-immune individual is to come into contact with the infectious agent.
How HERD Immunity Works

Absence of Herd Immunity

Presence of 50% Herd Immunity

+ = Infected Person
- = Uninfected Person
○ = Immunized person

Courtesy of Claire E. Lindberg, PhD
VACCINES

Greatest Public Health Achievement 20th Century

– Increase life expectancy
– Among the most safe and cost effective prevention
– For each birth cohort the CDC estimates that vaccination
  • Reduces direct health care costs by $14 billion
  • Saves $69 billion in societal costs
  • Prevent 20 million cases of diseases

Passive Means of Increasing Wellness
Aging Population

US population - 307 million
- 223 million: 72.7%: >=20
- 81 million: 26.4%: 45 to 64  
  - 21% have at least 2 chronic conditions
- 41.4 million: 13.3%: older than 65  
  - 80% have at least 1 chronic condition
  - 50% have at least 2 chronic conditions

Fastest growing age group is 65 and older with estimates by 2030 – 71 million (1 in 5 Americans)
Aging Population

Infectious diseases increase morbidity and mortality at baseline
  – VPD in these age groups can be devastating with prolonged sequelae

Multiple Chronic Conditions (MCC)
  – morbidity and mortality increases again
    • Increasing no. of chronic conditions directly increases risk
    • Obesity (BMI >=40)
  – significant and increasing burden
    • greater risk of poor day-to-day functioning
    • contributes to frailty and disability
FIGURE 1. Recommended adult immunization schedule, by vaccine and age group¹

These recommendations must be read with the footnotes that follow.

<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>1 dose annually</td>
<td></td>
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</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 yrs</td>
<td></td>
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</tr>
<tr>
<td>Varicella</td>
<td></td>
<td></td>
<td></td>
<td>2 doses</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Human papillomavirus (HPV) Female</td>
<td></td>
<td></td>
<td></td>
<td>3 doses</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Human papillomavirus (HPV) Male</td>
<td></td>
<td></td>
<td></td>
<td>3 doses</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zoster</td>
<td></td>
<td></td>
<td></td>
<td>1 dose</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measles, mumps, rubella (MMR)</td>
<td></td>
<td></td>
<td></td>
<td>1 or 2 doses</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>1 dose</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>
</tr>
<tr>
<td>Meningococcal</td>
<td></td>
<td></td>
<td></td>
<td>1 or more doses</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>
</tr>
<tr>
<td>Hepatitis B</td>
<td></td>
<td></td>
<td></td>
<td>3 doses</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; zoster vaccine recommended regardless of prior episode of zoster
- Recommended if some other risk factor is present (e.g., on the basis of medical, occupational, lifestyle, or other indication)
- No recommendation

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 or by telephone, 800-822-7967. Information on how to file a Vaccine Injury Compensation Program claim is available at 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, 202-357-6400. Additional information about the vaccines in this schedule, extent of available data, and contraindications for vaccination is also available at www.cdc.gov/vaccines or from the CDC-INFO Contact Center at 800-CDC-INFO (800-332-4636) 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's (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).
FIGURE 2. Recommended vaccinations Indicated for adults based on medical and other indications

<table>
<thead>
<tr>
<th>VACCINE</th>
<th>INDICATION</th>
<th>Pregnancy</th>
<th>Immune-compromising conditions (excluding human immunodeficiency virus [HIV])</th>
<th>HIV infection CD4+ T lymphocyte count (&lt; 200 cells/μL)</th>
<th>≥ 200 cells/μL</th>
<th>Men who have sex with men (MSM)</th>
<th>Chronic liver disease</th>
<th>Kidney failure, end-stage renal disease, receipt of hemodialysis</th>
<th>Diabetes</th>
<th>Healthcare personnel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Influenza</td>
<td>2doses</td>
<td>1 dose ILV annually</td>
<td>Substitute 1-time dose of Tdap for Td booster; then boost with Td every 10 yrs</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Tetanus, diphtheria, pertussis (Td/Tdap)</td>
<td>Contraindicated</td>
<td>2 doses</td>
<td></td>
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<td></td>
<td></td>
</tr>
<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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<td></td>
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<td></td>
<td></td>
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</tr>
<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></td>
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<td></td>
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<tr>
<td>Zoster</td>
<td>Contraindicated</td>
<td>1 dose</td>
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<td>1 or 2 doses</td>
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<td></td>
<td>3 doses</td>
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*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.

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

No recommendation

These schedules indicate the recommended age groups and medical indications for which administration of currently licensed vaccines is commonly indicated for adults ages 19 years and older, as of January 1, 2013. For all vaccines being recommended on the Adult Immunization Schedule, a vaccine series does not need to 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 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/pubs/acip-recs.htm). 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.
Current CDC Adult Immunization Recommendations

1. Influenza
2. Pneumococcal
3. Herpes Zoster
4. Hepatitis B
5. HPV
6. Tetanus/Diphtheria/Pertussis
7. Hepatitis A
8. Measles/Mumps/Rubella
9. Varicella
10. Meningococcal
Health Care Personnel (HCP)

Hepatitis B

MMR

Varicella

Pertussis

Healthy People 2020 Goals

* Influenza
  * Adults < Age 65 & pregnant women 80%
  * Adults > Age 65, institutionalized adults 90%
  * Healthcare Professionals 90%

* Pneumococcal
  * Adults Age 65; institutionalized adults 90%
  * High Risk Adults < 65 60%

* Herpes Zoster
  * Adults > Age 60 30%
  * HBV (for HCP) 90%
  * HPV (for females) 80%

CDC: Healthy People 2020, Immunization and Infectious Diseases
**Influenza**

**Seasonal Influenza Impact**
- Average ~ 23,607 deaths - ~ 90% occurs in >= 65
- > 200,000 hospitalizations – ~50% in >=65
- Increased outpatient visits and worker absenteeism
- Increased risk: >50yo; pregnant women; chronic illness; residents of long term care facilities

**Vaccine**
- everyone over 6 months of age
- Give inactive vaccine for pregnant women in any trimester
- Vaccinate all HCP against influenza

IIV3, IIV3 high dose, IIV4 ,RIV3, LAIV

MMWR September 20, 2013/62 (RR07); 1-43: Prevention and Control of Seasonal Influenza with Vaccines
Pneumococcal Disease

In those aged >= 50 years old
- ~1 million cases each year
- ~350,000 hospitalizations
- 5 to 7% mortality rate

Invasive Pneumococcal Disease Annually
- ~ 90% of cases are adults; ~ 50% >=65
- ~12,000 pneumococcal bacteremia - 20% mortality rate (60% mortality rate in 65 and older)
- ~3,000 pneumococcal meningitis - 30% mortality rate (80 % case fatality in 65 and older)

Total direct & indirect costs: ~$7.5 billion per year


National Foundation for Infectious Diseases: Vaccine Preventable Diseases & Infections: Pneumococcal Disease
Pneumococcal Vaccines

Pneumococcal Polysaccharide Vaccine (PPSV23)

- All adults >=65
- >=19 with certain risk factors
  - CVD (not HTN), pulmonary disease/asthma, DM, alcoholism, cirrhosis, CSF leak, cochlear implant, smoker, immunocompromised

Pneumococcal Conjugate Vaccine (PCV 13)

- Conjugated w/diphtheria
- >=19 with certain risk factors
  - anatomic or functional asplenia (incl. sickle cell disease), immunocompromised, cochlear implant, CSF leaks
Influenza & Pneumococcal

8th leading cause of death overall

5th leading cause of death in the older adult

Estimated overall annual costs: > $40 billion

Both are preventable with vaccines
## Influenza
### 2012 – 2013

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Goal</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;=18 years</td>
<td>80%</td>
<td>41.5%</td>
</tr>
<tr>
<td>18-49 years</td>
<td></td>
<td>31.1%</td>
</tr>
<tr>
<td>18-64 years</td>
<td></td>
<td>35.7%</td>
</tr>
<tr>
<td>50-64 years</td>
<td></td>
<td>45.1%</td>
</tr>
<tr>
<td>&gt;=65 years</td>
<td>90%</td>
<td>66.2%</td>
</tr>
<tr>
<td>Pregnant women</td>
<td>80%</td>
<td>50.5%</td>
</tr>
<tr>
<td>High risk/institutionalized adults</td>
<td>90%</td>
<td>39.8%</td>
</tr>
<tr>
<td>18-49 years</td>
<td></td>
<td>39.8%</td>
</tr>
<tr>
<td>18-64 years</td>
<td></td>
<td>47.0%</td>
</tr>
</tbody>
</table>

## Influenza
### 2012 - 2013

<table>
<thead>
<tr>
<th>Health Care Personnel (HCP)</th>
<th>Goal</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>90%</td>
<td>66.9%</td>
</tr>
<tr>
<td>Physicians:</td>
<td></td>
<td>92.3%</td>
</tr>
<tr>
<td>NP/PA:</td>
<td></td>
<td>88.5%</td>
</tr>
<tr>
<td>Nurses:</td>
<td></td>
<td>84.8%</td>
</tr>
<tr>
<td>All other:</td>
<td></td>
<td>66.7%</td>
</tr>
</tbody>
</table>

MMWR: September 27, 2013/62(38);781-786: Influenza Vaccination Coverage Among Health-Care Personnel – US 2012-2013 Influenza Season
# Pneumococcal 2011 data

<table>
<thead>
<tr>
<th>Category</th>
<th>Goal</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>High risk adults &lt;65,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adults age &gt;= 65:</td>
<td>60%</td>
<td>20.1%</td>
</tr>
<tr>
<td>Institutionalized Adults:</td>
<td>90%</td>
<td>62.3%</td>
</tr>
</tbody>
</table>

CDC. MMWR February 1, 2013/62(04);66-72; Non-influenza Vaccination Coverage Among Adults – United States 2011
Herpes Zoster

Annually: 1 million adult cases of shingles each year

- Lifetime risk: 30%
- 50% of people who live until age 85

Post-herpetic neuralgia occurs in 20% of cases

- can be very severe and last a year or more
- highest risk in persons > 60 years of age

Vaccine: recommended for >=60

(FDA approved for >=50)

<table>
<thead>
<tr>
<th>Herpes Zoster</th>
<th>Goal</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>age &gt;= 60</td>
<td>30%</td>
<td>15.8%</td>
</tr>
</tbody>
</table>

CDC.MMWR February 1, 2013/62(04);66-72; Non-influenza Vaccination Coverage Among Adults – United States 2011
Hepatitis B Virus (HBV)

Incurable; Chronic HBV infection: ~1.4 million Americans

~ 5,000 HBV related deaths annually

HBV related health and productivity costs: $700 million

Vaccine: 3 shot series: safe, effective, available since 1980’s

2011: DM: < 60 vaccinate; > 60 clinician’s discretion

<table>
<thead>
<tr>
<th>Goal</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>HCP overall</td>
<td>90%</td>
</tr>
</tbody>
</table>

Adults aged 19-49 not at high risk: 35.9%
Diabetics aged 19-59: 26.9%
Diabetics >=60 years: 12.4%

CDC. MMWR February 1, 2013/62(04);66-72; Non-influenza Vaccination Coverage Among Adults – United States 2011
Human Papillomavirus (HPV)

20 million 15-49 currently infected
6.2 million new cases each year: most occur in teenage years

<table>
<thead>
<tr>
<th></th>
<th>Goal</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Women aged 19-26 &gt;=1 dose:</td>
<td>80%</td>
<td>29.5%</td>
</tr>
<tr>
<td>Men aged 19-26 &gt;=1 dose:</td>
<td></td>
<td>02.1%</td>
</tr>
</tbody>
</table>

Vaccine: Females and Males up to age 26
3 dose series

CDC. MMWR February 1, 2013/62(04);66-72; Non-influenza Vaccination Coverage Among Adults – United States 2011
Pertussis

Pertussis: in 2012: 42,000 US cases, reported

– the most since 1955, 18 people died, most of them infants
  > 50% of cases – adults,

– Reservoir for pertussis
  • Transmit disease to infants and the frail
    – health care providers

Tdap specific (data from 2011)

  19-64: 12.5%

  HCP: 26.8%

Hepatitis A

~15% of people with hepatitis A require hospitalization
Adults with hepatitis A lose an average of one month of work

2011 Vaccine coverage

Age 19-49: 12.5%

International Travel:
  • high endemic areas: 20.1%
  • low endemic areas: 08.4%

Chronic Liver Conditions: 17.1%

CDC.MMWR February 1, 2013/62(04);66-72; Non-influenza Vaccination Coverage Among Adults – United States 2011
WHY ARE WE FAILING?

Lack of Awareness and Education (Clinician and Public)

- Incomplete Vaccination
- Waning Immunity
- Increasing International Travel
  “only a plane ride away”
  - Immigrants, including international adoptions
  - Refugees
  - Short Term Transit, including students (MMR)
Awareness and Education

Provider recommendation has a strong effect on patient acceptance of vaccination

- Unwavering endorsement of vaccines
- Evidence based information
  - Counter negative attitudes
  - Dispel any misconceptions
  - Discourage misdirected behaviors

CDC. Strategies to Increase Vaccination Rates
Awareness and Education

Incorporate ACIP recommended vaccines across timeline

Use a variety of strategies to help improve vaccination coverage

- Standing Orders
- Recall Methods
- Annual Wellness Visits
- Pre-Travel Visits

CDC: Strategies To Increase Vaccination Rates
WHY ARE WE FAILING?

Inaccurate Documentation
  – Multiple sites to obtain vaccines
  – Lack of coordination and sharing of consistent and comprehensive documentation of immunizations throughout lifespan
    • Impact on Continuity of Care
  – Lack of adult vaccine registry

Pocket Cards, Electronic Methods
WHY ARE WE FAILING?

Payment Issues
Patient out of pocket costs depends on the vaccine and plan
  – Varying insurance coverage rates
  – Out of pocket costs
Payment Issues

Medicare part B (no cost sharing)
  – Influenza, pneumococcal and HBV (high risk)

Medicare part D (variable cost sharing)
  – All other vaccines recommended for those >65
  – Payment is set by patient’s participating prescription drug plan (currently 1500 plans)
Future: Affordable Care Act

Any preventive service, including vaccination, received in a hospital outpatient setting is to be paid for at 100%

• Still issue with private insurers and providers’ offices

Annual Wellness Visits

• Incorporates ACIP recommended vaccines

Medical Home/Neighborhood

• Patient Centered Care
• Increases integration among providers

Immunization Action Coalition: immunize.org/cat.d/S8020 (11/12)
Our Collective Challenge

Sometimes seems daunting and overwhelming

“The Race to Vaccinate“
The Race to Vaccinate

December 1924, Nome, Alaska
  – Population 10,000
  – 1 physician, 4 nurses
  – Sore throats/tonsillitis

January, 1925
  – Dr. Welch recognizes: outbreak diphtheria “strangling angel of children”
  – 6 children dead, 20 infected
  – quarantine issued; available antitoxin: exhausted or expired
  – January 22\textsuperscript{nd}, Calls goes out to locate closest large supply:
    • Anchorage 674 miles away
The Race to Vaccinate

“The Great Race of Mercy”

January 27, 1925
- antitoxin is picked up

February 2, 1925
- reached Nome: 5 days, 7 hours (normally 15 – 20 days)
- Not one vial of antitoxin was broken

February 21, 1925
- Quarantine lifted
Summary

Assess: know what vaccines are needed and when to give them - know the valid contraindications

Communicate: educate your patients & community – on the safety and importance of vaccines

Availability: Seize every opportunity to vaccinate

Document: Help patients keep track of their vaccines

Partner: Patient/community centered approaches

Get Vaccinated Yourself!

Thank You

“Let me tell you the secret that has led me to my goal. My strength lies solely in my tenacity.”

Louis Pasteur

Communication

Collaboration

Success