PHARMACISTS AS ADVOCATES FOR THE ANNUAL INFLUENZA VACCINE

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Educational Objectives
At the completion of this activity, the participant will be able to:
• Apply current recommendations from the Advisory Committee on Immunization Practices (2016-2017) regarding influenza vaccinations for various patient populations
• Differentiate between the various types of influenza vaccinations on the market
• Explore the role of the pharmacist in administering influenza vaccines and in increasing awareness regarding the importance of obtaining yearly influenza vaccine

Understanding Immunizations
• Vaccines are among the most cost-effective clinical preventive services
• Childhood immunization programs provide a very high return on investment. For example, for each birth cohort, society:
  - Saves 33,000 lives
  - Prevents 14 million cases of disease
  - Reduces direct health care costs by $9.9 billion
  - Saves $33.4 billion in indirect costs


Approximately 42,000 adults and 300 children in the United States die each year from vaccine-preventable diseases!*

*This includes influenza, but does not include deaths due to 2009 H1N1


What is this?
Influenza

• A contagious respiratory illness
• Possible symptoms
  - Fever, cough, sore throat, muscle or body aches, fatigue
• Complications
  - Pneumonia, exacerbation of pulmonary and cardiac conditions


Influenza Virus

A/California/7/2009(H1N1)

Type/Origin/Strain/Year/Virus Subtype


Influenza Associated Pediatric Mortality


What’s New With Influenza?


Healthy People 2020 Objectives


<table>
<thead>
<tr>
<th>Category</th>
<th>2020 Goal (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase the percentage of children aged 6 months through 17 years who are vaccinated annually against seasonal influenza</td>
<td>70</td>
</tr>
<tr>
<td>Increase the percentage of adults aged 18 and older who are vaccinated annually against seasonal influenza</td>
<td>70</td>
</tr>
<tr>
<td>Increase the percentage of health care personnel who are vaccinated annually against seasonal influenza</td>
<td>90</td>
</tr>
</tbody>
</table>

2015 Influenza Vaccination Rates Over the Past 12 months

• Children 6 months to 17 years: 49.6%
• Adults 18 to 49 years: 31.7%
• Adults 50 to 64 years: 48.1%
• Adults 65 years and over: 69.1%

Immunization Schedule:
Children and Adolescents Aged 18 Years and Younger

Recommended Immunization Schedule for Children and Adolescents Aged 18 Years or Younger – United States 2017

Vaccines that Might be Indicated for Children and Adolescents Aged 18 Years or Younger Based on Medical Infections

Immunization Schedule:
Adults 19 Years or Older
### Recommended Immunization Schedules for Adults Aged 19 or Older by Age Groups – United States 2017

<table>
<thead>
<tr>
<th>Recommended Immunization Schedule</th>
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</table>

### Recommended Immunization Schedules for Adults Aged 19 or Older by Medical Condition and Other Indications – United States 2017

<table>
<thead>
<tr>
<th>Recommended Immunization Schedule</th>
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</table>

### Footnotes: Recommended immunization schedule

1. All persons aged 6 months or older who do not previously have a hepatitis B vaccine
2. Measles, mumps, and rubella virus vaccinations
3. Pneumococcal conjugate vaccine
4. Tetanus and diphtheria toxoids and pertussis vaccine
5. Human papillomavirus vaccines
6. Influenza vaccine
7. Meningococcal conjugate vaccine
8. Pneumococcal vaccine
9. Varicella vaccine
10. Hepatitis A vaccine
11. Hepatitis B vaccine
12. Malaria vaccine
13. Typhoid vaccine

Influenza Recommendations

- Routine annual influenza vaccination is recommended for all persons aged ≥ 6 months who do not have contraindications.

Types of Vaccines and Routes of Administration 2016-2017

- Inactivated influenza vaccine (IIV)
  - Egg based and cell culture-based quadrivalent inactivated influenza vaccines (IIV4)
  - Available in intramuscular (IIV3 or IIV4), intradermal (IIV4), or high dose (IIV3)
  - Adjuvanted quadrivalent inactivated influenza vaccine (allV)
  - For people who are 18 through 64 years old, a jet injector can be used for delivery of one particular flu vaccine

- Live attenuated influenza vaccine (LAIV4)
  - Available in intranasal

- Recombinant hemagglutinin influenza vaccine (RIV3)
  - Available as intramuscular


Influenza Vaccines 2016-2017

<table>
<thead>
<tr>
<th>Trade Name</th>
<th>Vaccine Type</th>
<th>Age Indications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Afluria</td>
<td>IIV3, IIV4</td>
<td>&gt; 9 years, &gt; 18 years</td>
</tr>
<tr>
<td>Fluarix</td>
<td>IIV4</td>
<td>&gt; 3 years</td>
</tr>
<tr>
<td>Flucelvax</td>
<td>ccIIV4</td>
<td>&gt; 4 years</td>
</tr>
<tr>
<td>FluLaval</td>
<td>IIV4</td>
<td>&gt; 6 months</td>
</tr>
<tr>
<td>Fluvirin</td>
<td>IIV3</td>
<td>&gt; 4 years</td>
</tr>
<tr>
<td>Fluzone 0.25 prefilled</td>
<td>IIV4</td>
<td>6-35 months</td>
</tr>
<tr>
<td>Fluzone 0.5 mL single dose</td>
<td>IIV4</td>
<td>6-35 months</td>
</tr>
<tr>
<td>Fluzone 5.0 mL multidose</td>
<td>IIV4</td>
<td>&gt; 65 years</td>
</tr>
<tr>
<td>Fluzone intradermal</td>
<td>IIV4</td>
<td>&gt; 65 years</td>
</tr>
<tr>
<td>Fluad</td>
<td>aIIV3</td>
<td>&gt; 65 years</td>
</tr>
<tr>
<td>FluBlok</td>
<td>RIV3</td>
<td>&gt; 18 years</td>
</tr>
<tr>
<td>FluMist</td>
<td>LAIV4</td>
<td>2-49 years</td>
</tr>
</tbody>
</table>

aIIV3 = adjuvanted inactivated influenza vaccine, CC=cell culture based, IIV3 = inactivated influenza vaccine, trivalent; IIV fourth = inactivated influenza vaccine, quadrivalent; RIV = recombinant influenza vaccine; LAIV = live attenuated influenza vaccine.


Intramuscular Dosing Recommendations

- 6 months up to and including 8 years of age
  - 2 doses if never been previously immunized with seasonal influenza vaccine (spaced 4 weeks apart minimum interval)
  - 1 dose only if previously immunized with seasonal influenza vaccine
- 9 years of age and older
  - 1 dose
  - Dosing
    - 6 months to 35 months (0.25 mL)
    - ≥ 36 months (0.5 mL)

16-2017 Strain

- A/California/7/2009 (H1N1) pdm09-like virus,
- A/Hong Kong/4801/2014 (H3N2)-like virus
- B/Brisbane/60/2008-like virus (B/Victoria lineage)
- Four component vaccines include B/Phuket/3073/2013-like virus (B/Yamagata lineage)


Intradermal Quadrivalent Influenza Vaccine

- Novel microinjection system works by depositing vaccine antigen into dermal layer of skin
- IIV4
  - Administered as a single 0.1 mL injection by the intradermal route
  - Indicated for adults 18 through 64 years of age

**IIIV High-Dose**

- Contains 4 times the amount of influenza virus antigen compared to other inactive influenza vaccines
- Indicated for patients age ≥65 years
- No preference expressed by ACIP for any IIIV for use in persons aged ≥65 years

**Vaccine Compared With IIIV in Elderly Adults**

- 31,989 participants ≥ 65 years of age
- Trial spanned over 2 influenza seasons - 2011-2012 and 2012-2013
- Participants randomized 1:1 to receive 1 dose of IIIV high-dose vaccine or IIIV vaccine and followed for illness until the end of each season
- Primary objective
  - To compare the clinical efficacy of IIIV high-dose vaccine to that of IIIV vaccine in adults ≥ 65 years of age

**High-dose Vaccine Compared With Standard Dose IIIV in Elderly Adults**

- Relative efficacy of IIIV high-dose vaccine compared with IIIV 2 years combined
  - Relative vaccine efficacy: efficacy of IIIV high-dose vaccine compared with IIIV 24.2%
  - 95% confidence interval was 9.7 to 36.5
  - Pre-specified lower limit required by FDA to demonstrate superior clinical benefit ≥ 9.1%

**Medicare Data from 2012 to 2013**

- Retrospective cohort study of U.S. Medicare beneficiaries
- Received high-dose or standard-dose inactivated influenza vaccines
- August 2012 and January 2013
- More than 929,000 recipients of high-dose vaccine and 1.6 million recipients of standard-dose vaccine
- Results indicate that the high-dose vaccine was:
  - 22% more effective than the standard-dose vaccine for the prevention of probable influenza infections
  - 22% more effective for the prevention of influenza-related hospital admissions

**Adjuvanted Inactivated Influenza Vaccine**

- Standard-dose, three-component (trivalent) inactivated influenza vaccine that contains an adjuvant, MF59
- MF59 is an oil-in-water emulsion of squalene oil
- Indicated for patients aged ≥ 65 years
- New for 2016-2017 season
- No head-to-head trials with influenza high-dose
- No preference expressed by ACIP for any IIIV for use in persons aged ≥ 65 years

**Influenza Vaccine with Jet Injector Device**

- On August 14, 2014, the FDA approved use of one jet injector device
- 0.5 mL needle-free jet injector can be used in people 18 through 64 years of age
- Delivers an injectable liquid medication/vaccine by means of a narrow, precise fluid stream injection, which penetrates the skin in about 1/10 of a second
- Spring-operated, requiring no external power source
- Enhanced design features such as convenient one-hand jet syringe attachment, enhanced visibility, a smooth easy trigger force and no touch syringe ejection

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**References**

**Intranasal Influenza Vaccine**
- Live vaccine
- For inhalation only
- Indicated for healthy patients aged 2 to 49 years old
- Passing the virus is rare
- Avoid in pregnancy

**LAIV Preferential Recommendation**
- CDC’s Advisory Committee on Immunization Practices (ACIP) voted that live attenuated influenza vaccine (LAIV), also known as the “nasal spray” flu vaccine, should **not** be used during the 2016-2017 flu season

**Recombinant Hemagglutinin Influenza Vaccine**
- Trivalent influenza vaccine
- Approved for use in adults 18 years and older
- Produced differently and has a slightly shorter shelf-life than most influenza vaccines
- Contains no egg

**Egg Allergy**
- Recommendations for influenza vaccination of persons with egg allergy have been modified, including:
  - Removal of the recommendation that egg-allergic recipients should be observed for 30 minutes post vaccination
  - A recommendation that persons with a history of severe allergic reaction to egg (i.e., any symptom other than hives) should be vaccinated in an inpatient or outpatient medical setting (including but not necessarily limited to hospitals, clinics, health departments, and physician offices), under the supervision of a health care provider who is able to recognize and manage severe allergic conditions

**Differences Between Vaccines**

<table>
<thead>
<tr>
<th>Vaccine Type</th>
<th>Live or Inactivated</th>
<th>Age Indication</th>
<th>Administer with Other Chronic Diseases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inactivated Influenza Vaccine</td>
<td>Inactivated</td>
<td>&gt; 6 months depending on manufacturer</td>
<td>Yes</td>
</tr>
<tr>
<td>High-dose Inactivated Influenza Vaccine</td>
<td>Inactivated</td>
<td>&gt; 65 years</td>
<td>Yes</td>
</tr>
<tr>
<td>Adjuvanted Inactivated Influenza Vaccine</td>
<td>Inactivated</td>
<td>&gt; 65 years</td>
<td>Yes</td>
</tr>
<tr>
<td>Recombinant Hemagglutinin Influenza Vaccine</td>
<td>Inactivated</td>
<td>&gt; 18 years</td>
<td>Yes</td>
</tr>
<tr>
<td>Live-attenuated Influenza Vaccine</td>
<td>Live</td>
<td>2-49 years</td>
<td>No</td>
</tr>
</tbody>
</table>

**Contraindications to IIV Administration**

- **Contraindications**
  - Severe (life-threatening) allergies
    - To eggs*
    - To any vaccine component
    - To a previous dose of influenza vaccine
- **Precautions**
  - Patients suffering from moderate or severe acute illness (with or without fever)
  - History of Guillain-Barré syndrome

* In package inserts only

Factors Contributing to Unvaccinated Status

- Concern regarding adverse effects
- Lack of concern about significance of illness
- Felling impervious to influenza
- Lack of provider directive


Reasons to Not Receive Vaccination


Community Pharmacist Administered Influenza Program

- 1502 surveys collected post vaccination
- 46% of participants stated convenience and accessibility were key factors in determining patient satisfaction
- 25% did not obtain annual vaccines, and 47% were classified as being at high risk for influenza complications


Role of the Pharmacist

- Increasing patient education about vaccines
- Expanding immunization services with standing orders
- Reminder and recall interventions
- Report to state immunization information systems
- Increasing provider education to avoid missed opportunities
- Reducing out-of-pocket costs for adults for other vaccines
- Expanding access


Conclusion

- Pharmacists are in a unique position to identify high-risk patients
- Pharmacists can improve adherence to immunization schedules by educating patients
- Pharmacists can assess adherence and identify barriers that may prevent patients from obtaining appropriate immunizations
- Pharmacists can help increase awareness regarding the importance of obtaining yearly influenza vaccine
Continuing Professional Development Tips for Immunizations

• Reflect on additional knowledge and stay up-to-date to appropriately care for patients
• Ask patients about vaccination history
• Discuss barriers for vaccination with both physicians and patients

Additional Resources

• Review the websites below and stay current on information
  – Center for Disease Control and Prevention
    • https://www.cdc.gov/vaccines/default.htm
  – Immunization Action Coalition
    • http://immunize.org/
  – American Pharmacists Association Immunization Center
    • www.pharmacist.com/immunization-center
  – Morbidity and Mortality Weekly Report (MMWR)
    • www.cdc.gov/mmwr