INFLUENZA UPDATE:
2013-2014
Lawrence D. Frenkel, MD, FAAP
(aka Larry)

THE ANNUAL INFLUENZA EPIDEMICS CAUSED BY NEW STRAINS REMAIN A HUGE CHALLENGE FOR ALL OF US
Issues

- Is egg allergy a real contraindication?
- What should we know about the live flu vaccine?
- What are the mandates regarding flu immunization in NJ?
- What is the anticipated VFC timing for vaccine release for this season?

Egg Allergy and Influenza Immunization

- True anaphylaxis (severe bronchospasm, cardiac dysfunction, hypotension, etc.) to eggs is rare
- Thus egg anaphylaxis remains a contraindication for vaccine administration with current preparations; although the federal VIS sheet notes that "serious reactions" remain a contraindication
- Other manifestations of egg allergy (rhinitis, coughing, rash, urticaria, diarrhea, etc., are no longer contraindications but are precautions
Egg Allergy and Influenza Immunization (cont’d)

- A specialist can evaluate an individual for egg allergy with skin tests and a blood test for egg specific IgE, specifically ovalbumin.
- Newer Flu vaccines (recombinant and cell culture) may turn out to be safely used in patients with egg anaphylaxis because they will NOT contain cross reactive egg antigens.

Influenza Administration Precautions in Egg Allergic Individuals

- For anyone with a documented egg allergy, flu vaccine should be administered in a setting where anaphylaxis can be recognized and appropriately treated.
- Patients should be kept under observation for 30 minutes after immunization.
- The safety profile of influenza vaccine, even in egg allergic individuals, is excellent and the significant benefit of immunization almost always exceeds the minimal risk.
Influenza Vaccination of People with Egg Allergy

References:
1. MMWR August 17, 2012; 61:613-618
2. Kelso, John M. Annals of Allergy, Asthma and Immunology. 2013, 110:397-401

Why a LIVE Nasal Vaccine?*

- Designed to provide a more natural response and improve patient acceptance
- Provides for both humoral and cell mediated responses
- Provides protection in the external (mucosal) immune compartment and systemically
- Cold adapted, temperature sensitive, attenuated vaccine provides safety
- Improved protection: against both non-drifted and antigenically different strains

*Approved and recommended for healthy children 2 to 18 years of age
### Unresolved Issues with Inactivated and Live Vaccines

- Data for children and adults are different; LAIV seems to be somewhat more efficacious in children.
- Data for Influenza A and B are different; LAIV seems to be less efficacious for B strains than TIV.
- Use of live vaccine in 6 to 12 months old children continues to be studied.

### Unresolved Issues with Inactivated and Live Vaccines (cont’d)

- Use of live vaccine in elderly remains to be studied.
- Effect of live vaccine on the provocation of wheezing (particularly in young children) continues to be studied.
- Immunocompromised recipients may not respond as well to LAIV.
Efficacy of TIV vs. LAIV*

- METHODS: The effectiveness of 2 currently available influenza vaccines LAIV and TIV in preventing influenza-like illness (ILI) was compared among 41,670 US military members (aged 18-49 years) during 3 consecutive influenza seasons (2006-2009). ILI, influenza, and pneumonia events post-vaccination were compared.

- CONCLUSIONS: Between 2006 and 2009, TIV and LAIV had similar effectiveness in preventing ILI and influenza/pneumonia events among healthy adults.

*Large well conducted recent study
Clinical Infectious Diseases 2013,56:11-17 56(1):11-

RATE OF INFLUENZA LIKE ILLNESS IN HEALTHY ADULT RECRUITS PER 1000 PERSON SEASONS

<table>
<thead>
<tr>
<th></th>
<th>Matched strains</th>
<th>Unmatched strains</th>
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<tbody>
<tr>
<td>LAIV</td>
<td>139</td>
<td>150</td>
</tr>
<tr>
<td>TIV</td>
<td>127</td>
<td>165</td>
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</tbody>
</table>

RESULTS:
Phase III Trial*: 2004-05  
Children 6-36 months old  
Efficacy of Cold Attenuated Influenza Vaccine –  
Trivalent vs. Trivalent Inactivated Influenza Vaccine

<table>
<thead>
<tr>
<th>Influenza Attack Rate (%)</th>
<th>% Relative Reduction**</th>
<th>p-value</th>
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</thead>
<tbody>
<tr>
<td>TIV</td>
<td>CAIV-T</td>
<td></td>
</tr>
<tr>
<td>Any strain</td>
<td>8.6</td>
<td>3.9</td>
</tr>
<tr>
<td>Matched strain</td>
<td>2.4</td>
<td>1.4</td>
</tr>
<tr>
<td>Mismatched strain</td>
<td>6.2</td>
<td>2.6</td>
</tr>
</tbody>
</table>

**Symptomatic, virologically confirmed influenza disease

Lineage Mismatch and Vaccine Effectiveness

- Responses of LAIV against heterologous A strains are more protective than is the case with TIV
- Responses of both TIV and LAIV against the heterologous B virus are significantly reduced in all age groups and do not reach seroprotective levels in human volunteers1,2

Lineage Mismatch and Vaccine Effectiveness (cont'd)

- Limited protection would be expected with TIV or LAIV when the vaccine and circulating strains are from different influenza B lineages3,4
- For example, in 2006-2007 in Canada,
  - VE against the opposite B lineage was 19% (!) (95% CI; -112% to 69%)
  - VE against a matched H1N1 strain was 92% (95% CI, 40% to 91%)5


B-lineage Mismatch in 6 of the Past 12 Seasons

<table>
<thead>
<tr>
<th>Season</th>
<th>% B</th>
<th>% Yamagata</th>
<th>% Victoria</th>
<th>Vaccine</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000–2001</td>
<td>46</td>
<td>100</td>
<td>0</td>
<td>Yamagata</td>
</tr>
<tr>
<td>2001–2002</td>
<td>13</td>
<td>23</td>
<td>77</td>
<td>Yamagata</td>
</tr>
<tr>
<td>2002–2003</td>
<td>43</td>
<td>0.4</td>
<td>99.6</td>
<td>Victoria</td>
</tr>
<tr>
<td>2003–2004</td>
<td>1</td>
<td>93</td>
<td>7</td>
<td>Victoria</td>
</tr>
<tr>
<td>2004–2005</td>
<td>25</td>
<td>74</td>
<td>26</td>
<td>Yamagata</td>
</tr>
<tr>
<td>2005–2006</td>
<td>19</td>
<td>22</td>
<td>78</td>
<td>Yamagata</td>
</tr>
<tr>
<td>2006–2007</td>
<td>21</td>
<td>24</td>
<td>77</td>
<td>Victoria</td>
</tr>
<tr>
<td>2007–2008</td>
<td>29</td>
<td>98</td>
<td>2</td>
<td>Victoria</td>
</tr>
<tr>
<td>2008–2009</td>
<td>33</td>
<td>17</td>
<td>83</td>
<td>Yamagata</td>
</tr>
<tr>
<td>2009–2010</td>
<td>0.2</td>
<td>12</td>
<td>88</td>
<td>Victoria</td>
</tr>
<tr>
<td>2010–2011</td>
<td>30</td>
<td>6</td>
<td>94</td>
<td>Victoria</td>
</tr>
<tr>
<td>2011–2012</td>
<td>14</td>
<td>51</td>
<td>49</td>
<td>Victoria</td>
</tr>
</tbody>
</table>

Red indicates B-lineage mismatch between vaccine strain and predominant circulating strain

Influenza Vaccines — United States, 2013–14 Season*

<table>
<thead>
<tr>
<th>VACCINE</th>
<th>TRADE NAME</th>
<th>MANUFACTURER</th>
<th>AGE INDICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>TIV</td>
<td>AFLURIA      *</td>
<td>CSL LIMITED</td>
<td>&gt; 9 YEARS</td>
</tr>
<tr>
<td></td>
<td>FLUARIX</td>
<td>GSK</td>
<td>&gt; 3 YEARS</td>
</tr>
<tr>
<td></td>
<td>FLUCELVAX</td>
<td>NOVARTIS</td>
<td>&gt; 18 YEARS</td>
</tr>
<tr>
<td></td>
<td>FLUVIRIN      *</td>
<td>NOVARTIS</td>
<td>&gt; 4 YEARS</td>
</tr>
<tr>
<td></td>
<td>FLUZONE       *</td>
<td>SANOFI</td>
<td>&gt; 6 MONTHS, 6 - 35 MONTHS, &gt;/= 36 MONTHS</td>
</tr>
<tr>
<td>QIV</td>
<td>FLUARIX       *</td>
<td>GSK</td>
<td>&gt; 3 YEARS</td>
</tr>
<tr>
<td></td>
<td>FLUZONE</td>
<td>SANOFI</td>
<td>6 - 35 MONTHS, &gt; 36 MONTHS</td>
</tr>
<tr>
<td>RECOMBINANT</td>
<td>FLUBLOK</td>
<td>PROTEIN SCIENCES</td>
<td>18 - 49 YEARS</td>
</tr>
<tr>
<td>TIV</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIVE</td>
<td>FLUMIST       *</td>
<td>MEDIMMUNE</td>
<td>2 - 49 YEARS</td>
</tr>
<tr>
<td>QUADRIVALENT</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

* AVAILABLE FROM NJ VFC PROGRAM

Evolution of Public Health Laws Concerning Vaccination

- **1905**: *Jacobson v Massachusetts* establishes rights of states to pass and enforce vaccination laws¹
- **1910**: First philosophical exemption law is passed²
- **1922**: Supreme Court finds school immunization laws constitutional¹
- **1970s**: Immunization laws are strengthened and strongly enforced¹
- **2013**: School immunization laws vary among states³
  - 50 states permit medical exemptions
  - 48 states permit religious exemptions
  - 19 states permit personal belief exemptions (PBEs)

INFLUENZA IMMUNIZATION MANDATES IN NJ

- N.J.A.C. 8:57-4 was passed into law in 2008; it required proof of annual immunization administered to all children 6 to 59 months of age between September 1 and December 31, prior to child care or preschool attendance.

- A bill requiring influenza immunization for health care workers was introduced into the NJ legislature in 2012; it failed to pass.


NJDOH MINIMUM IMMUNIZATION REQUIREMENTS FOR SCHOOL ATTENDANCE N.J.A.C. 8:57-4

- For other regulations concerning other vaccines see: http://nj.gov/health/cd/documents/instructions viewing regulations.pdf
RELIGIOUS EXEMPTIONS IN NJ

- There are few exemptions recognized by most large organized religious groups.
- In NJ there is a fairly recent decision by the attorney general of the state that anyone may claim a religious exemption without the necessity of explaining the circumstances.
- Note: If the NJ Commissioner of Health declares an epidemic, caused by a specific vaccine preventable agent, unimmunized children can be barred from attendance from schools and other sites.

White check marks indicate states where the documented incidence of pertussis exceeded the national average during 2012.³

Sanofi Pasteur announced that their flu vaccine would start to be shipped to US providers on July 25, 2013.

First shipments will go to the CDC VFC Program, Alaska and Hawaii.

NJ VFC started shipping flu vaccine in mid August, the earliest ever!!!

Influenza vaccines are generally effective for one season (8 to 12 months after administration); LAIV for perhaps two

NJ VFC Conference September 21, 2013

Some NEW Good and Bad News

According to the MMWR dated Aug 2, 2013: (62:607-12) KG immunization data for school year 2012-13: MMR, DTaP/DT, Varicella

- NJ - >97%; US - 94.5, 95.1, 93.8;
- Year 2010 goal >95%
- Highest state: Mississippi - 99.9%;
- Lowest: Colorado - 82.9

Immunization Exemption rates

- US - 1.8%; NJ - 0.4%
Some **NEW** Good and Bad News (cont’d)

- According to the ACIP recommendations from the June 19, 2013 meeting:
  - No booster dose of pertussis vaccines for previously immunized adolescents and adults are recommended.
  - Acellular pertussis NOT as effective and durable as whole cell.

- Rotavirus vaccine benefit far exceeds re-defined risk of intussusception:
  - 1/50,000 vs 1/3000
  - (annual risk of infant injury in car accidents is 1/4500)