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Rationale for Two Doses

- Children 6 months through 8 years
  - For adequate immune response
  - First influenza season
  - Selected children later influenza seasons
    - Depending on influenza vaccination histories
    - Advisory Committee on Immunization Practices (ACIP) yearly recommendations
Sample ACIP Recommendation, 2010–2011

“As in previous recommendations, all children aged 6 months–8 years who receive a seasonal influenza vaccine for the first time should receive 2 doses. Children who received only 1 dose of a seasonal influenza vaccine in the first influenza season that they received vaccine should receive 2 doses, rather than 1, in the following influenza season. In addition, for the 2010–11 influenza season, children aged 6 months--8 years who did not receive at least 1 dose of an influenza A (H1N1) 2009 monovalent vaccine should receive 2 doses of a 2010–11 seasonal influenza vaccine, regardless of previous influenza vaccination history. Children aged 6 months--8 years for whom the previous 2009–10 seasonal or influenza A (H1N1) 2009 monovalent vaccine history cannot be determined should receive 2 doses of a 2010–11 seasonal influenza vaccine.”

- No H1N1 vaccine history, regardless of seasonal flu vaccination history
- If >=1 H1N1 last year, but no seasonal flu vaccination history
- If >=1 H1N1 last year, but only 1 dose of seasonal flu vaccine last year, no seasonal flu vaccination history before last year
Literature Review

- Two-dose compliance
  - Children 6–23 months: 29%–54%
  - Children 2–8 years: 12%–24%

- Full influenza vaccination coverage
  - Children 6–23 months: 28%–45%
  - Children 2–4 years: 3%–16%
  - Children 5–8 years: 1%–7%

Influenza Full Vaccination Coverage
(National Immunization Survey)


- Full influenza vaccination coverage
  - 6–23 month olds: ↑
  - 2–4 and 5–8 year olds: ↑ until 2010–11

- Two-dose compliance
  - 6–23 month olds: ↑
  - 2–4 and 5–8 year olds: no increase

Objectives

- Updates previous reports with new data
  - 2010–11 season through 2014–15 season
  - Full influenza vaccination coverage
  - Two-dose compliance

- Analyzes timing of dose administration
  - Timing of dose administration
  - Dose intervals
Methods

- **Data source**
  - IIS Sentinel sites:
    - North Dakota, Michigan, Minnesota, New York City, Oregon (six counties), Wisconsin
  - Approximately 10% of the United States population

- **Cohort selection**
  - Children in the 6–23 months, 2–4 years, and 5–8 years age groups throughout each influenza vaccination season (July 1 – June 30)
Methods, cont’d

▪ Eligibility for two doses
  • ACIP’s yearly recommendations

▪ Coverage calculation
  • Census denominator

▪ Two-dose compliance definition
  \[
  \frac{\# \text{ children who required 2 doses and received } 2+ \text{ doses}}{\# \text{ children who required 2 doses and received the first doses}}
  \]
Influenza Vaccination Coverage*, 2010–2015

*Census data were used as denominators while Immunization Information Systems data were used as numerators.
Percentage* of Children Recommended to Receive Two Influenza Vaccine Doses, 2010–2015

*Both numerators and denominators were from Immunization Information Systems data.
Two-dose Compliance* with Influenza Vaccine Recommendations, 2010–2015

*Definition: (children who required two doses and received at least two doses of influenza vaccine during the season)/(children who required two doses and initiated the series)
Influenza Vaccination Coverage*, 2010–2015

*Census data were used as denominators while Immunization Information Systems data were used as numerators.
Timing of Cumulative Influenza Vaccine Dose Administration, 2014–2015

- Children who are recommended to receive 1 dose and received 1+ dose
- Children who are recommended to receive 2 doses but received only 1 dose
- Children who are recommended to receive 2 doses and received 2+ doses, first doses
- Children who are recommended to receive 2 doses and received 2+ doses, second doses
Dose Interval Analysis

- Median dose interval = 7 weeks
  - 42-46 days across seasons
- Maximum dose interval > 300 days
- Potentially missed opportunities
Discussion

- **Strengths**
  - Only source for assessment of two-dose compliance in children 2-8 years
  - Timeliness
  - Provider verified data

- **Limitations**
  - Not nationally representative
  - Data completeness
Conclusions

- **Two-dose compliance remain unchanged**
  - Fair in 6–23 month olds (>60%)
  - Very low in 2–4 and 5–8 year olds (<20%)

- **Strategies are needed**
  - Improved messaging
  - Access to full immunization history
  - Early vaccination and shortened intervals (within ACIP recommendations)
Acknowledgement

- Sentinel sites
  - Rachel Potter, Cristi Bramer, Erin Roche, Miriam Muscoplat, Mary Woinarowicz, Molly Howell, Vikki Papadouka, Alexandra Ternier, Andrew Osborn, Aaron Dunn, Ashley Petit, Matthew Jacobs

- CDC
  - Amy Parker Fiebelkorn
  - Laura Pabst
  - Loren Rodgers
  - Warren Williams
Thank you!

For more information, contact CDC
1-800-CDC-INFO (232-4636)

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.
FIGURE 1. Influenza vaccine dosing algorithm for children aged 6 months through 8 years -- Advisory Committee on Immunization Practices (ACIP), 2011–12 influenza season

Alternate Text: The figure above shows influenza vaccine dosing algorithm for children aged 6 months through 8 years for the 2011-12 influenza season, according to the Advisory Committee on Immunization Practices (ACIP). Children aged 6 months through 8 years who did not receive at least 1 dose of the 2010-11 seasonal influenza vaccine, or for whom it is not certain whether the 2010-11 seasonal vaccine was received, should receive 2 doses of the 2011-12 seasonal influenza vaccine.
### Vaccination Coverage (19-35 m. o.)

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<thead>
<tr>
<th>Vaccine Doses</th>
<th>Site A %</th>
<th>Other Sites</th>
<th>NIS-Child</th>
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</thead>
<tbody>
<tr>
<td>3+ DTaP</td>
<td>92</td>
<td>91</td>
<td>89.4±6.1</td>
</tr>
<tr>
<td>4+ DTaP</td>
<td>81</td>
<td>78</td>
<td>77.7±8.1</td>
</tr>
<tr>
<td>3+ Polio</td>
<td>91</td>
<td>88</td>
<td>87.8±6.5</td>
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<tr>
<td>Hib - UTD</td>
<td>80</td>
<td>75</td>
<td>77.4±7.7</td>
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<tr>
<td>3+ HepB</td>
<td>91</td>
<td>88</td>
<td>89.2±5.1</td>
</tr>
<tr>
<td>3+ Pnuemo</td>
<td>90</td>
<td>89</td>
<td>85.2±6.9</td>
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<tr>
<td>4+ Pneumo</td>
<td>78</td>
<td>76</td>
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<tr>
<td>1+ MMR</td>
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<td>1+ VAR</td>
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<td>2+ HepA</td>
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