Factors associated with immunization provider reporting to IIS, 2006-2010

Results from the National Immunization Survey

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Outline

- Background
- Objectives
- Methods
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What is the National Immunization Survey (NIS)?

- NIS is a random-digit dial survey of parents that collects vaccination coverage information on children aged 19-35 months and adolescents aged 13-17 years.
- A mailed survey to immunization providers identified during the telephone interview is used to collect provider-reported vaccination histories.
- Conducted annually since 1994 to monitor childhood vaccination coverage at national, state, and selected local areas.
- In 2006, a national sample of adolescents aged 13-17 years was added (NIS-Teen).
Why examine provider reporting to IIS?

- IIS rely on immunization providers to report client vaccination information to IIS
  - Not all providers report to IIS; in 2012, 86% of children aged <6yo, 54% of adolescents aged 11-17 years and 25% of adults ≥ 19 years participated in an IIS
  - Provider participation rates are difficult to determine, and wide variation in rates in the U.S. have been documented

- Few studies have examined reasons for provider participation
  - Barriers to participation include high cost, too much staff time, and that the practice has its own system for recording and monitoring immunizations

Why examine provider reporting to IIS?

- Identification of factors that affect provider use of IIS is a research priority to increase provider participation.¹
- Longitudinal data from NIS provides an opportunity to examine factors that are associated with provider reporting to IIS in a nationally representative sample of children and adolescents in the U.S., and how these factors may have changed over time.
- This study will assist in determining strategies for increasing provider participation in IIS.

¹-Kelly et al 2007
Objectives

- To determine the frequency in which vaccination providers who care for children aged 19-35 months report use* of IIS
- To determine the frequency in which vaccination providers who care for adolescents aged 13-17 years report use of IIS
- To examine trends in provider use of the IIS from 2006-2010
- To identify factors associated with provider use of IIS

* Provider “use” of IIS includes immunization reporting to, and or obtaining information from, IIS
Methods

- Data from children 19 to 35 months of age and adolescents aged 13 through 17 years sampled by the 2006-2010 National Immunization Survey (NIS) were available for analysis.
- State of child’s/adolescent’s residence was used as a proxy for state of provider’s practice.
- Only children and adolescents with provider-verified data were included in the analysis.
  - Each child/adolescent had at least one and up to 5 providers surveyed.
- Children and adolescents who moved to another state since birth were excluded from the analysis (children n=7,240; adolescents n=13,671).
- Resulted in a sample size of 83,798 children and 50,768 adolescents for analysis.
Methods

- Immunization History Questionnaire: IIS questions

1. Was any of the immunization information for this child/adolescent obtained from your community or state registry?
2. Did you or your facility report any of this child’s/adolescent’s immunizations to your community or state registry?
Methods

- Percentages of children and adolescents with ≥1 provider reporting to or obtaining data from IIS were determined
  - Significance of trend from 2006-2010 evaluated by chi-square and trend test
  - State estimates calculated based on child’s/adolescent’s residence
  - Children and adolescents with missing/unknown data for IIS-specific questions were excluded from analyses (23%-38%)
Methods

Multivariable logistic regression was used to assess what factors were associated with having vaccination data reported to the IIS.

- **Variables included**
  - Provider factors such as:
    - obtained data from the IIS
    - ordered vaccine from a health department
    - facility type (private, public, etc)
  - Child/adolescent factors such as:
    - receipt of WIC benefits
    - race/ethnicity
    - urban/rural status
    - number of providers per child/adolescent
    - state of the child’s/adolescent’s residence

- Variables were assessed for correlation
Methods

- Analyses were performed using SAS/SUDAAN to account for the complex survey sample design in calculating standard errors.
- Predictive margins were used to calculate adjusted percentages of children with ≥1 provider reporting to the IIS.
  - Type of direct standardization
  - Allows for comparison of group outcomes while controlling for the covariate distribution in the population.
  - Best used when the outcome is not rare (i.e. > 10%).
  - Allow for easier comparisons since there is no referent group.
Preliminary results: child analysis
Percentage of children with ≥ 1 provider reporting vaccination records to an IIS, 2010

Overall: 77.4%
Trends in IIS use: Percentage of children with ≥1 provider reporting to or obtaining data from IIS
Factors associated with reporting a child’s vaccination records to an IIS: Results from multivariable analysis (1)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Predictive margins adjusted estimate (95% CI)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provider obtained vaccination information from IIS</td>
<td></td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>≥1 Providers</td>
<td>85.9 (84.2, 87.6)</td>
<td></td>
</tr>
<tr>
<td>No Providers</td>
<td>69.6 (68.5, 70.6)</td>
<td></td>
</tr>
<tr>
<td>Provider ordered vaccine from state/local health department</td>
<td></td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>≥1 Providers</td>
<td>75.2 (74.2, 76.1)</td>
<td></td>
</tr>
<tr>
<td>No Providers</td>
<td>58.2 (55.9, 60.5)</td>
<td></td>
</tr>
<tr>
<td>Type of Provider Facility</td>
<td></td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Mixed</td>
<td>92.2 (90.1, 94.2)</td>
<td></td>
</tr>
<tr>
<td>All public facilities</td>
<td>82.7 (80.6, 84.7)</td>
<td></td>
</tr>
<tr>
<td>All hospital facilities</td>
<td>78.2 (75.6, 80.8)</td>
<td></td>
</tr>
<tr>
<td>All private facilities</td>
<td>68.1 (67.0, 69.3)</td>
<td></td>
</tr>
<tr>
<td>All military/other facilities</td>
<td>60.7 (65.7, 75.1)</td>
<td></td>
</tr>
</tbody>
</table>
Factors associated with reporting a child’s vaccination records to an IIS:
Results from multivariable analysis (2)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Predictive margins adjusted estimate (95% CI)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child received WIC benefits</td>
<td></td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Yes, currently</td>
<td>76.2 (74.7, 77.7)</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>69.6 (68.4, 70.8)</td>
<td></td>
</tr>
<tr>
<td>Child’s residence</td>
<td></td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Rural</td>
<td>74.9 (73.0, 76.8)</td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>73.2 (71.9, 74.5)</td>
<td></td>
</tr>
<tr>
<td>Suburban</td>
<td>71.7 (70.4, 72.9)</td>
<td></td>
</tr>
<tr>
<td>Number of providers per child</td>
<td></td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>2 or more Providers</td>
<td>74.7 (73.1, 76.3)</td>
<td></td>
</tr>
<tr>
<td>1 Provider</td>
<td>72.0 (71.0, 73.1)</td>
<td></td>
</tr>
</tbody>
</table>

Variables included in model not shown: child’s race/ethnicity and child’s state of residence
Preliminary results: adolescent analysis
Percentage of teens with ≥1 provider reporting vaccination records to an IIS, 2010

Overall: 72.8%

- 0-49% (n=9)
- 50-79% (n=15)
- 80-100% (n=27)
Trends in IIS use: Percentage of teens with ≥1 provider reporting to or obtaining data from IIS
Factors associated with reporting a teen’s vaccination records to an IIS: multivariable analysis

<table>
<thead>
<tr>
<th>Variable</th>
<th>Predictive margins adjusted estimate (95% CI)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Provider obtained vaccine information from IIS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥1 Providers</td>
<td>84.8 (83.1, 86.3)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>No Providers</td>
<td>58.8 (57.3, 60.2)</td>
<td></td>
</tr>
<tr>
<td><strong>Provider ordered vaccine from state/local health department</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥1 Providers</td>
<td>71.7 (70.5, 72.8)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>No Providers</td>
<td>45.4 (42.6, 48.2)</td>
<td></td>
</tr>
<tr>
<td><strong>Type of Provider Facility</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mixed</td>
<td>88.2 (86.1, 89.9)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>All public facilities</td>
<td>78.9 (76.2, 81.4)</td>
<td></td>
</tr>
<tr>
<td>All hospital facilities</td>
<td>71.5 (67.3, 75.3)</td>
<td></td>
</tr>
<tr>
<td>All STD/School/Teen clinic/other</td>
<td>61.6 (54.8, 68.0)</td>
<td></td>
</tr>
<tr>
<td>All private facilities</td>
<td>59.9 (58.4, 61.3)</td>
<td></td>
</tr>
<tr>
<td><strong>Teen’s residence</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>72.1 (70.4, 73.7)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Rural</td>
<td>67.9 (65.7, 70.1)</td>
<td></td>
</tr>
<tr>
<td>Suburban</td>
<td>63.3 (61.8, 64.9)</td>
<td></td>
</tr>
</tbody>
</table>
Limitations

- Data from the NIS provider questionnaire are self-reported, and the respondent is unknown.
- Prior to 2011, NIS excluded children and adolescents from wireless phone only households.
  - However, the data are weighted for nonresponse bias, telephone coverage, and birth/immigration patterns.
- All data are analyzed at child- and teen-levels, not provider-level.
- The state where a child or adolescent resides was used as a proxy measure for the provider and IIS location.
Conclusions (1)

Rates of IIS participation by provider sites increased during 2006-2010 for both children and adolescents, but still remains suboptimal

- In 2010, 77% of children and 73% of teens had ≥1 providers report their vaccination data to an IIS
- In 2010, 34% of children and 42% of teens had ≥1 providers obtain vaccination data from an IIS
- Estimates varied substantially by state
Conclusions (2)

- Children and adolescents were less likely to have their vaccination records reported to an IIS if they:
  - Did not have their vaccination history obtained from an IIS by any providers
  - Had no providers who ordered vaccine from a state/local health department
  - Received their care from private providers
  - Lived in a suburban area
  - Additionally, children were less likely to have their records reported if they had only 1 provider and they never received WIC benefits
Recommendations

- To increase IIS use by providers, State health departments should:
  - Target providers who are less likely to report to IIS
    - private providers
    - providers who do not order vaccine from the local/state health department
  - Target providers of children and teens who are less likely to have their vaccination data reported to IIS
    - Children and teens who live in suburban areas
    - Children who have never received WIC benefits
    - Children who only have 1 provider
Thank you

Please contact Cristina Cardemil at ccardemil@cdc.gov for questions

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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.