Introduction to National Immunization Survey and Public-Use Data Files

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Outline

- National Immunization Survey (NIS)
- Goals of the NIS
- Data collection
- Public Use Data Files (PUF)
- Summary
National Immunization Survey (NIS)

- Large ongoing RDD survey, conducted by CDC since 1994

- Measures vaccination coverage among children aged 19-35 months at National, State, and urban area levels

- Monitors Healthy People 2000 and 2010 goals of immunization coverage
  - >90% Coverage: 4DTP, 3Polio, 1MMR, 3HepB, 3Hib, and 4:3:1:3 series

- Monitors introduction of new vaccines (e.g., Varicella and Pneumococcal)

- <4% of households in the U.S. contain child of age 19-35 months
Goals of the NIS

- Nation’s primary tool for assessing and monitoring vaccination coverage in pre-school (19-35 month old) children

- ‘Earliest warning system’ for changes in vaccination coverage

- Vaccination coverage by antigen, vaccine, and series, for:
  - The nation
  - The states (50)
  - Selected urban areas (28)
  - Selected socio-demographic groups (by race/ethnicity, urbanicity, household income, poverty status, etc.)

- Comparison of vaccination coverage across 78 IAP areas

- Evaluation of age-appropriate immunizations
Goals of the NIS (cont…)

- *Trends in immunization coverage*

- *Factors contributing to under-immunization*

- *Identify areas and populations with low immunization coverage*

- *Evaluate extent of extra-immunization and late or delayed vaccinations*
NIS is More Than One Survey...
Sample Design

- **78 simultaneous and independent quarterly surveys to collect vaccination histories in 78 IAP areas consisting of 50 States, Washington, D.C., and 27 large urban areas**

- **1.2 million telephone numbers called to screen eligible households**

- **Computer Assisted Telephone Interview (CATI) of 33,000 households containing 35,000 eligible children**

- **Mail survey of children’s provider to obtain immunization histories for 23,000 children**

- **Compute 4-quarter moving averages as estimates of vaccination coverage among 78 IAP areas**
NIS Operations

- NIS RDD Sample
- CATI Screener
- Household Interview Completion Review
- No Consent or no provider info
- With Consent and with provider info
- Provider Record Check Study IHQ Mailed
- RDD Returned with data
- IHQ Nonresponse: missing provider data
- QC Check/ Data processing/ Matching Sheet review
- Internal Analytic File
  - Children with adequate Provider Data only
- Children with completed household interviews and adequate provider data
- DRB/confidentiality Review
- 4 QTR Estimates
- Final PUF
NIS Data Collection

- **Household CATI Screener and Interview**
  - Parent/Guardian (most knowledgeable person)
  - Socio-demographic information: mother and child
  - Vaccination history from shot card or memory recall
  - Vaccination dates (shot card only)
  - Provider’s contact information with consent

- **Provider Record Check Study (mailed IHQ)**
  - Provider’s office (e.g., staff, nurse, manager)
  - Mail, Fax, Telephone
  - Completed IHQ or copy of medical records
  - Matched on DOB, Gender, Name
  - Vaccination history (including vaccination dates)
  - Provider’s information
FIGURE 1. TRENDS IN KEY INDICATORS FROM HOUSEHOLD AND PROVIDER DATA COLLECTION, NATIONAL IMMUNIZATION SURVEY, 1995-2001

Key Indicator
- Screening Completion Rate
- Interview Completion Rate
- Resolution Rate
- Casro Response Rate
- Percentage of Children with Adequate Provider Data

Source: See Table 1 and NIS Data User’s Guides for Definition of Key Indicators
Quality Control in the NIS

- Continuous quality improvement program

- Evaluate and improve quality of the information collected
  - Extensive monitoring of data collection and processing

- Reduce/eliminate discrepancies
  - Extensive QC review
  - Automated data editing
  - Manual matching sheet reviews

- Improve quality of the estimates
  - Enhanced weighting procedure using latest statistical methods

- Reduce potential bias in official estimates of vaccination coverage rates
Observed Discrepancies in Dates

- **DOB**
  - Between household (HH) and provider(s)
  - Between multiple providers for a child

- **Vaccination dates**
  - Between HH and provider(s)
  - Within a single provider
  - Between multiple providers for a child
NIS 2001 Sample

- **35,985 households with eligible children 19-35 months**
  - 32,796 (91.1%) of eligible households with completed interviews
  - 33,437 age-eligible children with completed interviews
  - 23,531 (70.4%) children with completed interviews and ‘adequate’ provider data
### Sources of Immunization Histories, 2001 NIS

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<th>Source</th>
<th>Household data from Shot Card</th>
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<td>NO</td>
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<td>45.9*</td>
<td>18,099</td>
<td>54.1*</td>
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*Row percents*
NIS Data Files and Estimates

- **In-house internal analytic files**
- **Public-use data files (PUF)**
- **National, State, and Urban area level estimates of vaccination coverage**
  - Internet: [www.cdc.gov/nip/coverage](http://www.cdc.gov/nip/coverage)
  - MMWR
  - Journal Articles
  - Articles in Proceedings
  - Presentations at National and State Conferences
  - Publications are listed on NIS Web site
FIGURE 2. TRENDS IN VACCINE-SPECIFIC COVERAGE (EXCEPT VARICELLA) AMONG CHILDREN AGED 19-35 MONTHS IN THE U.S. NATIONAL IMMUNIZATION SURVEY, 1995-2001

![Graph showing trends in vaccination coverage for different vaccines from 1995 to 2001.](image)

**Vaccine Type**
- 4+ DTP
- 3+ HIB
- 3+ POLIO
- 3+ HEP B
- 1+ MCV
- 4:3:1
- 4:3:1:3

**Note:** 4:3:1 (4 DTP, 3 POLIO and 1 MCV). 4:3:1:3 (4 DTP, 3 POLIO, 1 MCV and 3 Hib)
The NIS PUF

- Requires clearance from the NCHS Disclosure Review Board

- Public-use data files (1995-2001): child-level records with region, state, and 78 IAP area identifiers

- Approximately 35,000 age-eligible children with household interview data

- Approximately 23,000 children with household interview and ‘adequate’ provider data

- PUFs are released on the Internet and CD-ROMs
  - Internet: www.cdc.gov/nis
  - CD_ROMs No 1-7
Contents of NIS PUF

Variables are grouped into 9 Categories in the PUF

Household Interview data items
- New sequence ID, Age at interview (months), gender, race/ethnicity, …
- Mother’s age group, education, marital status, …
- WIC participation, income, poverty status,…
- Vaccine specific immunization history (#doses, up-to-date status)
- IAP area and State identifiers, Census Region

Provider data items
- Vaccine-specific Immunization History:
  - age at vaccination(days/months),
  - number of doses, up-to-date status (UTD)
- Providers’ information (e.g., number of providers, facility type, participation in immunization registry and VFC;
Contents of NIS PUF (cont.)

- Composite variables with vaccine-specific and vaccine series flags and up-to-date status

- An alphabetical list of key variables that are changed during 1995-2001 is included with the 2001 NIS PUF

- Sampling weights and key analytic variables
  - Sampling weights:
    - Children with household interview (HY_WGT)
    - Children with Provider data (W0)
  - Stratum + PSU identification variables
Summary

NIS is a critical evaluation tool for national and state immunization programs.

Complicated Childhood Immunization Schedule; no single source is 100% complete or accurate.

<1% children were observed with discrepancies in household and/or provider reported data; number of discrepancies increased if more than one immunization provider per child was identified.

Some discrepancies which could not be verified from other sources remained after edits.

Some information could not be released in the PUF to reduce risk of disclosure.
Summary

- **Substantial underreporting in vaccination coverage rates from the household reports**

- **Strongly supports the use of provider-reported immunization histories in computing vaccination coverage estimates**

- **Official estimates from provider reports may slightly over or under estimate IAP area specific vaccination coverage due to missing provider data; however, provider data produced comparable estimates across IAP areas**

- **NIS estimates have helped states to develop and monitor changes in the immunization programs**
Future Enhancements

- Enhanced weighting procedure to account for noncoverage of households without telephone
- Research on improving sampling methods to identify telephone households with young children
- Research on methods to reduce nonresponse and increase participation among healthcare providers and household respondents
- Imputation of incomplete or missing immunization histories from providers
- Flexibility for adding new ‘Topical Modules’
- Assess impact of increasing use of cell phones and blocked RDD calls on the NIS
Visit the NIS Web Sites

Public-Use Data Files

2001 National Immunization Survey
- Readme File 16 KB
- Data User's Guide 485 KB
- Data Documentation, Codebook and Frequencies 262 KB
- Dataset 22 MB
- SAS Input Statements 45 KB

2000 National Immunization Survey
- Readme File 15 KB
- Data User's Guide 508 KB
- Data Documentation, Codebook and Frequencies 242 KB
- Dataset 20 MB
- SAS Input Statements 44 KB

1999 National Immunization Survey
- Readme File 15 KB
- Data User's Guide 799 KB
- Data Documentation, Codebook and Frequencies 241 KB