Immunization Information Systems (IIS) - National Immunization Survey (NIS) Integration Update

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Overview of Presentation

- Goals of IIS-NIS Integration
- Background
- Integration Status – Phase 1 Overview
- Participating Awardees Overview
- Readiness Indicators
- Discussion

Goals of IIS-NIS Integration

- One integrated system for vaccination coverage assessment across local, state, and national levels
- Reduce reliance on survey methods
  - Declining response rates and increasing costs
  - Public and vaccination provider burden
- Improve efficiency of NIS data collection
  - Lower cost for same amount of data
  - More data at same cost

The Path to Full IIS-NIS Integration

Phase 1

- Phone numbers from IIS augment the NIS cell phone RDD sampling frame
- Vaccination data collected via the NIS provider record check (PRC)

Phase 2

- IIS serves as the primary sampling frame (RDD frame dropped or reduced)
- Vaccination data collected via the NIS PRC

Phase 3

- IIS serves as the sole sampling frame
- Vaccination data collected from both NIS PRC and IIS

Phase 4

IIS serves as the sole sampling frame
Vaccination data collected from IIS only (drop the NIS PRC)

Immunization Program Operation Manual (IPOM) 2023

Strategy B3: Participate in the integration of immunization information system (IIS) data with CDC's National Immunization Survey (NIS).

Required Activities:

B3a. Identify and implement steps to increase the percentage of IIS records for children ages 0 through 17 years with at least one current telephone number. Continue to monitor the percentage of IIS records for children that have at least one current telephone number. (See Appendix I.)

B3b. Develop, implement, or maintain data use agreements (DUA) that will allow CDC's NIS contractor to use selected patient information from children in the IIS (e.g., age) to more efficiently sample households to conduct the NIS. (See Appendix I.)

- Obtain awardee-specific approvals needed for data sharing (e.g., IRB, legal review).
- Upon completion of the signed DUA, establish protocols to share selected IIS data with the NIS contractor, and share IIS data quarterly with the NIS contractor.

Background

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The NIS is sponsored by the Centers for Disease Control and Prevention (CDC) and was implemented in 1994 to monitor vaccination coverage in children, after a large measles outbreak

- Monitors vaccination coverage estimates for children aged 19-35 months (NIS-Child) and adolescents 13-17 years (NIS-Teen), as well as all children 6 months to 17 years (NIS-Flu)
  - Monitoring of COVID-19 vaccination began for adults in April 2021 (NIS-ACM), and for children in July 2021 (NIS-CCM)
- Nationwide cell-phone random-digit-dial (RDD) survey
- National, state, and selected local area and U.S. territory estimates of vaccination coverage using a standard methodology
- Two phase data collection for NIS-Child and NIS-Teen: household and child's provider(s)
  - Phase 1: Household telephone interview to obtain data on child, mother, and household and to gain consent to contact health care providers
  - Phase 2: Providers mailed an Immunization History Questionnaire (IHQ) for detailed vaccination records

NORC's IIS-NIS involvement started in 2008 and has worked with 43 of the 59 NIS-IIS jurisdictions

- **NIS-IIS Match Project (pre-NORC; 2008-2012; 2013-2017; 2018 to present)**
  - Match the NIS sample to children in the IIS to assess population coverage and completeness of IIS vaccination data. (Completed 42 reports with 19+ participating IISs so far)
- **NIS-IIS Local Area Pilot (Q2/2013 – Q2/2015)**
  - Improve strategies used by IISs to accurately conduct local area analysis of vaccination coverage. Piloted by seeding the NIS with IIS sample. (4 participating IISs)
- **NIS-IIS Sample Frame Pilot (Q1-Q2 2008, Q2/2013 – Q2/2014)**
  - Determine the feasibility and impact of an IIS sample frame, without introducing unnecessary bias, if such an approach offers cost-savings. Piloted by seeding the NIS with IIS sample. (4 participating IISs)

IIS Integration Status

Phase 1 Overview

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IIS-NIS integration goal is to have vaccination coverage assessment based on IIS data, while using the NIS processes to collect information not currently available across IISs

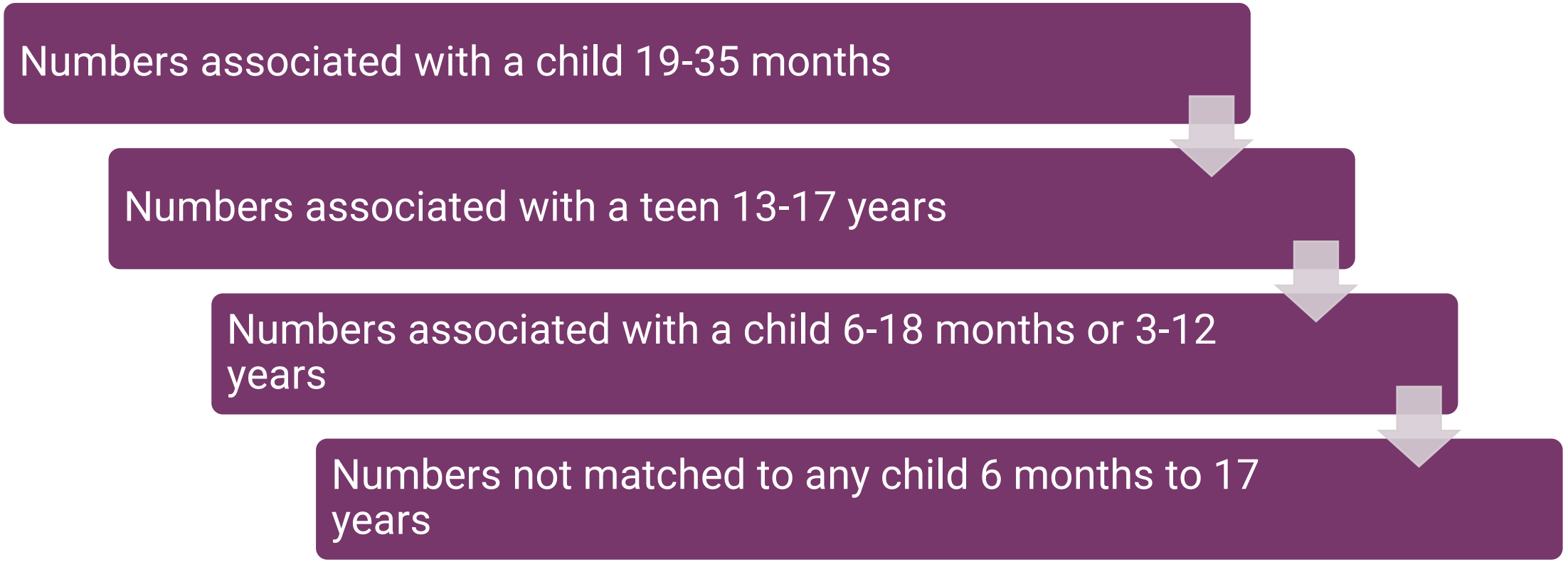
- **Over time, response rates have decreased for surveys in general, and that has also been seen with the NIS**
  - Finding a respondent who has age eligible children and is willing to complete the survey is the largest cost component of the NIS
  - Millions of phone numbers are dialed each year to attain the required number of completed surveys to meet statistical requirements
- **In 2018, CDC and NORC collaborated to determine ways in which the IIS data could be leveraged to create data collection efficiencies**
  - Created a four-phase plan for IIS integration
  - Phase 1 of the IIS-NIS Integration began in January 2019 with 9 awardees participating

Phase 1 of the IIS-NIS Integration

- Phase 1:
  - Phone numbers from the IIS augment the NIS cell-phone RDD sampling frame
  - Vaccination data collected via the NIS PRC
- Use the IIS data to create a more efficient frame
  - Sampled phone numbers are matched to the IIS data and flagged if associated with a child eligible for one of the modules
  - Use of numbers that are flagged as potentially having an eligible child is much more efficient than use of those that are not flagged as having an age-eligible child

Phase 1 of the IIS-NIS Integration

- Numbers are categorized into four sequential strata:



Phase 1 of the IIS-NIS Integration

- Allocate sample across the four strata to allow for the most efficient sample distribution across the four categories, taking cost and eligibility rates into consideration
  - This allows for a more efficient data collection compared to a simple random sample of phone numbers

- All four categories of numbers are dialed, including numbers which were not matched to any phone number in the registry data associated with children
  - Children are found in the group of numbers that were not identified as having a child
  - This could be for multiple reasons:
    - A child may have moved recently into the state
    - A new phone number was obtained by the parent or guardian
    - Contact information on the IIS data may be incomplete
- Using these sampling efficiencies, awardees typically receive 15% more completes than non-integration estimation areas

Participating Awardees Overview

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Phase 1 IIS Participation

- **In 2019, 12 awardees participated in Phase 1 of the IIS-NIS Integration**
  - Two additional awardees were unable to participate due to legal data sharing issues
  - CDC and NORC worked with awardees to meet the initial requirements, including legal oversight
  - Only nine awardees were able to participate at the beginning of 2019, but three more awardees were able to participate and were added during other quarters

- **Legal oversight included a few different steps, and was typically the biggest challenge to participation**
  - Data Use Agreement (DUA) process
    - NORC has standard DUA template, but it may need to be revised based on requirements of an awardee
    - Purpose of DUA is to protect the exchange of data, as well as the data itself
  - Legal review
  - IRB review
  - Other approvals

Phase 1 tasks for awardees include creating a data extract

- Extracting and uploading files of phone numbers and age flags on a quarterly basis
  - NORC provided specifications for data and fields required and provided support as needed

- Exchange data file via a secured FTP site
  - Awardees identified staff responsible for uploading the required data
  - NORC set up secured FTP site for each awardee

- NORC worked closely with awardees to provide feedback and support on any data extract or file exchange issues

Phase 1 IIS participation over time

- 31 awardees have been involved in at least one year of the IIS-NIS integration process
  - Two additional awardees will likely be added by end of 2023
  - 2019: 12 awardees
  - 2020: 18 awardees
  - 2021: 27 awardees
  - 2022: 29 awardees
  - 2023: 31 awardees

- 11 of the initial 12 awardees have been consistently involved over the five years of data collection (2019-2023)
- Awardees onboarded the earliest quarter possible
- The number of awardees has steadily increased, with a vast majority continuing participation each year once they have joined the integration process

Readiness Indicators

When is an IIS ready to move to the next phase in the IIS-NIS Integration?

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Phase 2 of the IIS-NIS Integration plan is for the IIS to serve as the sampling frame for the NIS; vaccination data collected via NIS PRC

- **Readiness to move towards Phase 2 will be assessed for each jurisdiction individually**
- **Multiple options for Phase 2 under consideration**
  - Variant 1: Select a large cell-phone RDD sample, match to telephone numbers associated with children in the IIS. Select subsamples from matched numbers and conduct cell-phone interview
    - Pros: Data collection cost savings, can be implemented today without major changes to NIS data collection and estimation procedures
    - Cons: Lower coverage of the target population than the current NIS approach, potential changes in vaccination coverage rate estimates
  - Variant 2: Select a sample of children from a roster of all age-eligible children contained in the IIS and conduct cell-phone interview if available, landline interview if available and no cell-phone number is available, and mail questionnaire if neither cell-phone nor landline numbers are available
    - Pros: Higher coverage of the target population compared to Variant 1, additional data collection modes available (i.e., landline numbers and addresses)
    - Cons: Unable to directly assess readiness for Variant 2 with just the data available, more involvement/cooperation/data sharing required from states beyond what is currently provided

When assessing the readiness of an IIS for Phase 2 of integration regardless of the variant, key considerations might be:

- Is there an acceptable number of children in the IIS relative to the number of children in the population?
- Among children in the IIS, is the availability of contact information acceptable?
- Among children in the IIS with contact information, is the accuracy of that contact information acceptable?
- Overall, of the children in the target population, is the proportion that are in the IIS with available, accurate contact information acceptable?
- Are the IIS's policies and procedures for populating the IIS, obtaining contact information, and sharing data acceptable? Has the IIS demonstrated an ability to share the necessary data in a consistent, accurate, and timely fashion?
- Would vaccination coverage rate estimates produced under Phase 2 be acceptably accurate?

When assessing the readiness of an IIS for Phase 2 of integration, key considerations might be:

- Coverage: provide an indication of how completely the IIS represents the children within its jurisdiction, based on counts of children ages 19-35 months in the IIS database compared to external benchmarks
- IISAR Enrollment and Participation: number of children 4 months to 5 years in the IIS compared to external benchmarks, and further review as to the number with two or more documented vaccines
- Contact Rates: Proportion of the children in the IIS that have contact information available
- Telephone Number Coverage: the product of the Coverage and the Contact (Phone) information

IIS Policies: Understanding the mechanism through which the IIS is updated helps us better interpret the data we use

- **Source: Provides the initial source of child names, ages or dates of birth, and contact information**
  - For example: Vital Records, First Dose of any Vaccine
- **Updating of Children: Provides the means of updating the IIS for children who either move in or out of the jurisdiction**
  - For example: Provider Reporting, Third-party National Change of Address Service, Local Health Departments
- **Updating of Contact Information: Provides the means of updating the IIS for both telephone numbers and address changes**
  - For example: HL7, Provider Reporting, Manual Updates, Data Exchange Partners

Discussion

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IIS Integration Plan

- Overarching goal is to have one integrated system that allows for vaccination coverage assessment at all levels
  - Reduces reliance on telephone survey methods
  - Improves efficiencies
- Four phase plan allows for more reliance on IIS data with each step
  - Final phase (Phase 4) uses IIS database as basis for sampling frame and vaccination data

Current IIS Integration

- Phase 1 is where cell-phone numbers are matched to telephone numbers found in an IIS database
  - 31 jurisdictions involved in 2023
- Next steps: looking towards Phase 2
  - Multiple options being considered
  - Key questions need to be answered for a jurisdiction to move to next phase
    - Assess coverage of children in the IIS database, IISAR enrollment and participation, and contact information
- In the meantime, what can you do?
  - Current participants: Continue to help us by doing the things you have already been doing!
    - Uploading quarterly data
    - Answering our questions about your data
    - Keeping your IIS populated and up-to-date for children and contact information
  - Want to participate? Reach out to your CDC contact!

Thank you.

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