

Evolving Approaches for Vaccination Coverage Assessment of Young Children



Session 3C

NIS & IIS Coverage Estimates

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Presented by James A. Singleton, PhD

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Outline

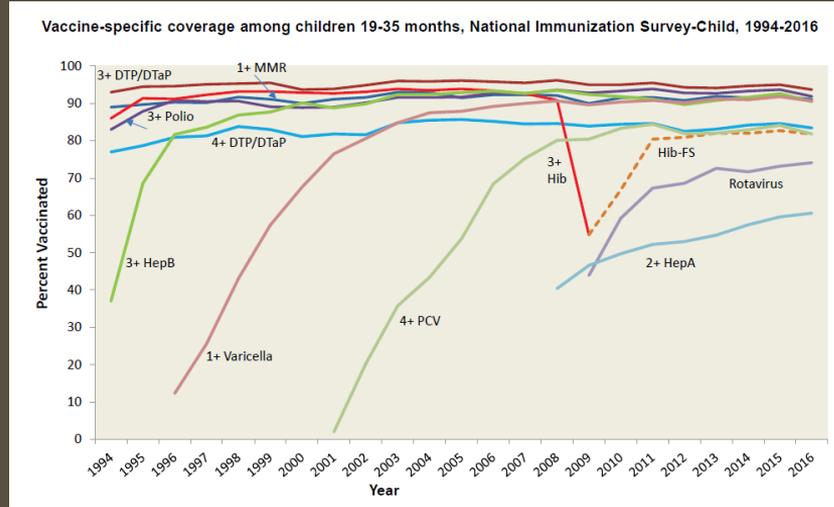
- CDC goals for vaccination coverage assessment
- Transition of NIS-Child estimates from survey year to birth year
- Assessing IIS data quality with IIS-NIS matches
- Update on IIS-NIS integration
- What does the future hold?

CDC's Vaccination Coverage Assessment Goals

- Encourage and support jurisdictional and sub-jurisdictional coverage assessment using IIS and other data sources
- Provide national and jurisdictional coverage estimates
 - Comparable over time and across jurisdictions
- Evaluate national disparities by race/ethnicity, poverty, health insurance, rural/urban status

And Ultimately...

- Ensure every IIS has high enough data quality to allow vaccination coverage assessment at local, state, territorial, and national levels
- Use the NIS sampling approach to assess national disparities in vaccination coverage



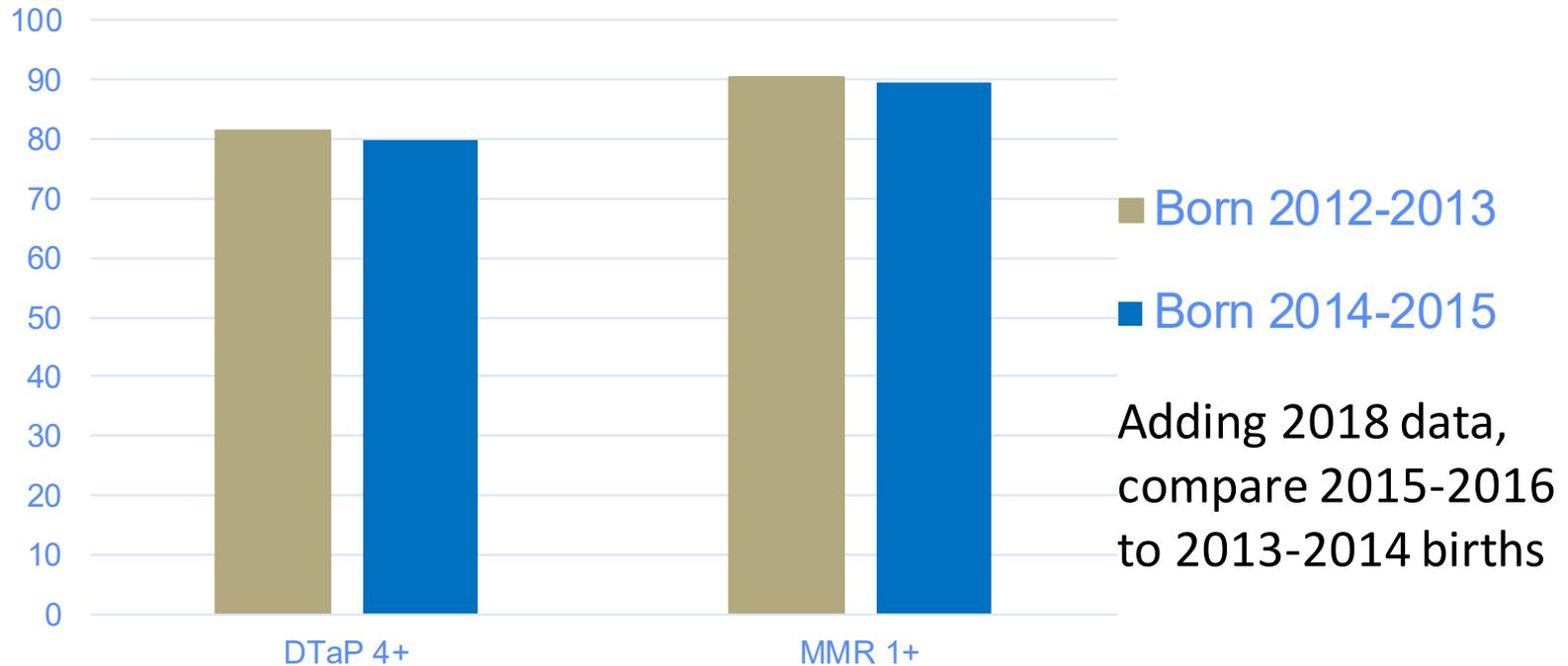
Transition NIS-Child Reporting from Survey Year to Birth Year

NIS-Child Estimates by Year of Birth

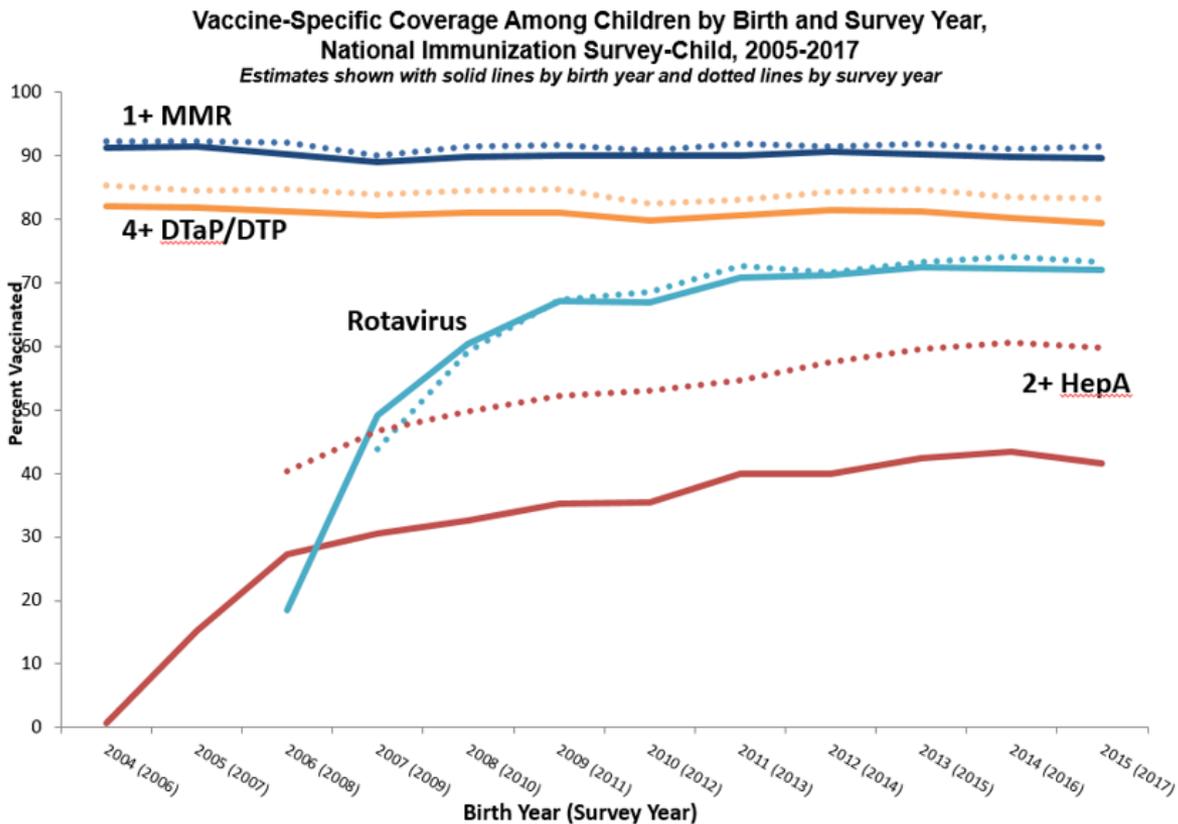
- Starting in 2019, report NIS-Child estimates by birth year instead of by survey year
- Combine 2-3 years of NIS-Child data to estimate vaccination coverage by birth year
- Estimates of vaccination coverage by the 2nd birthday
 - By 8 months for rotavirus, 35 months for HepA vaccination
- Add coverage with ≥ 2 flu vaccinations by age 2 years

Assessing Recent Change

Percent vaccinated by age 24 months,
U.S., NIS-Child Data 2013-2017



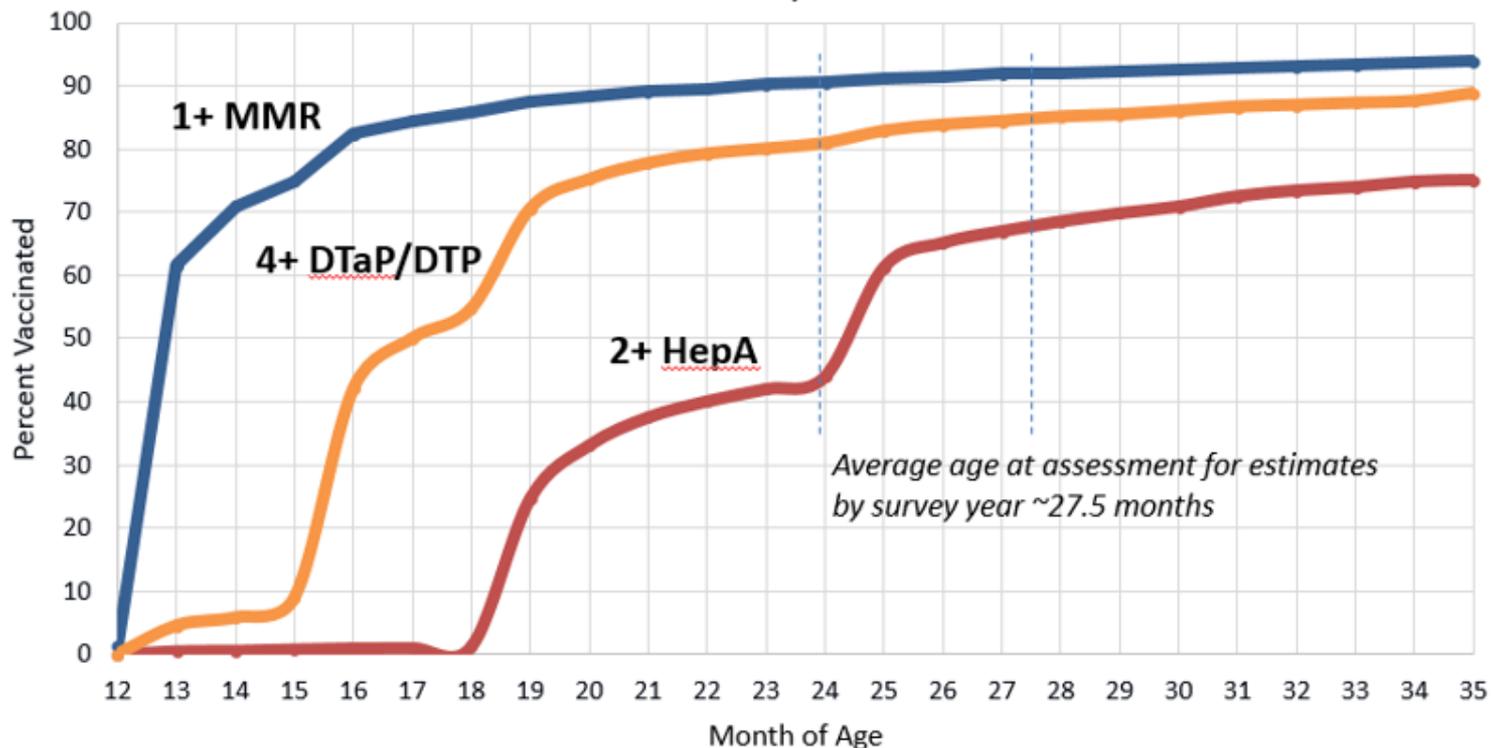
Trends in Vaccination Coverage by Old and New Methods



Abbreviations: MMR = measles, mumps, and rubella vaccine; DTaP/DTP = diphtheria and tetanus toxoids and pertussis vaccine / diphtheria and tetanus toxoids and acellular pertussis vaccine; HepA = hepatitis A vaccine

Vaccination Uptake by Age

Estimated Cumulative Vaccination Coverage by Month of Age, Children Born 2014-2015, NIS-Child 2015-2017, United States



Benefits of Birth Cohort Transition

- More directly assess immunization program performance
 - Estimates and trends easier to interpret
 - Standard age at assessment
 - Easier to compare with IIS estimates
 - Larger sample size combining data for two annual birth cohorts
 - Coherence with other measures, e.g., HEDIS
 - Averages over possible year-to-year changes in survey accuracy
- 



Matching Children from NIS to IIS

Let's see how compatible we are ...

The IIS-NIS Match



- Compares IIS quality and completeness with data collected through NIS (Child or Teen)
- Evaluates:
 - Completeness of population included in IIS
 - Completeness of IIS vaccination records for matched children
 - Characteristics of children with incomplete IIS vaccination records
- Requires data sharing agreement with NIS contractor

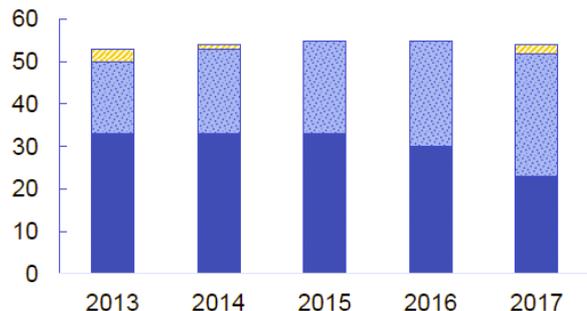
Participation in IIS-NIS Match

Opportunity for IIS-NIS Match	Number of Areas Participating
Awardees requested match using cooperative agreement funds, 2008-2017	18
CDC offered to pay for matches of 2017 NIS-Child and NIS-Teen data to 30 IIS with child series coverage estimates within 10 percentage points of NIS-Child estimate	21
CDC offered to pay for matches of 2019 NIS-Child and NIS-Teen data to 12 IIS participating in 2019 IIS-NIS integration	9

Ways to Assess IIS Data Completeness

Percentage Point Differences between NIS-Child and IISs for Combined 7-vaccine series Completion
– IIS Annual Report, US, 2013–2017

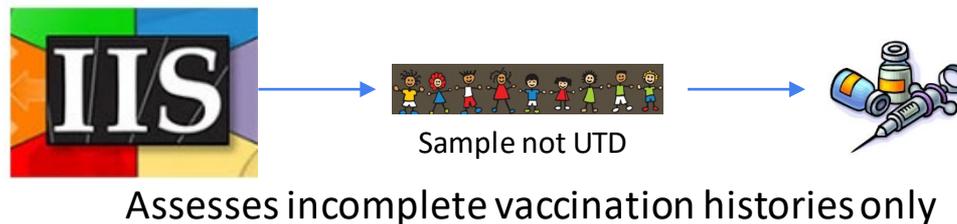
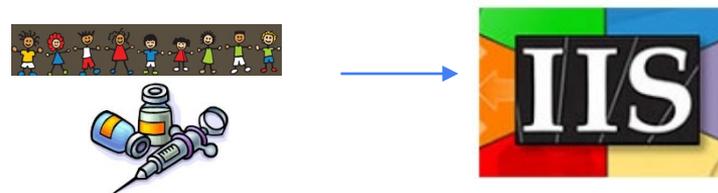
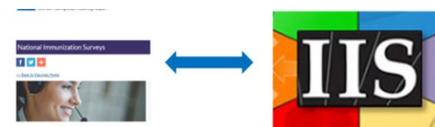
- ▨ Difference > 10 Percentage Points (IIS>NIS)
- ▤ Difference within 10 percentage points
- Difference > 10 Percentage Points (NIS>IIS)

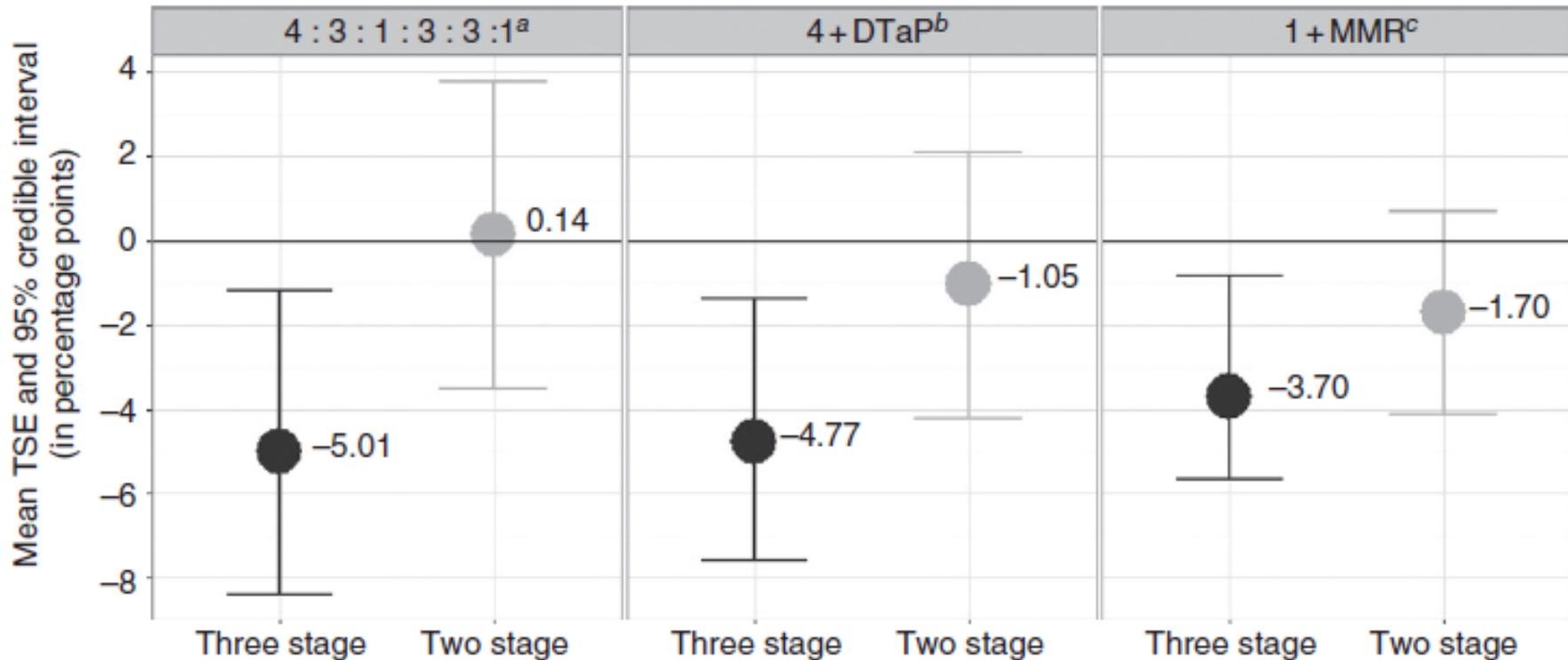


Incomplete population and/or incomplete vaccination history?

Comparison matching on key characteristics (Steve Robison)

The IIS-NIS Match





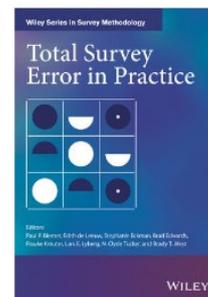
Total Survey Error Assessment for Sociodemographic Subgroups in the 2012 U.S. National Immunization Survey

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IIS-NIS Integration Update

Why Integrate IIS and NIS?

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

What Does IIS-NIS Integration Look Like?

- Use IIS:
 - Improve efficiency of NIS
 - IIS augments or replaces NIS sampling frame
 - IIS augments or replaces the NIS provider record check as a source of provider-reported vaccination data
- Use NIS:
 - Provide national and awardee level vaccination coverage estimates comparable across awardees and over time
 - Collect a uniform set of sociodemographic information from a sample of children in the IIS

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

Phase 3

Phase 4

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 sole sampling frame (RDD frame dropped)
- Vaccination data collected via the NIS PRC

Phase 3

Phase 4

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 sole sampling frame (RDD frame dropped)
- 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



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 sole sampling frame (RDD frame dropped)
- 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)

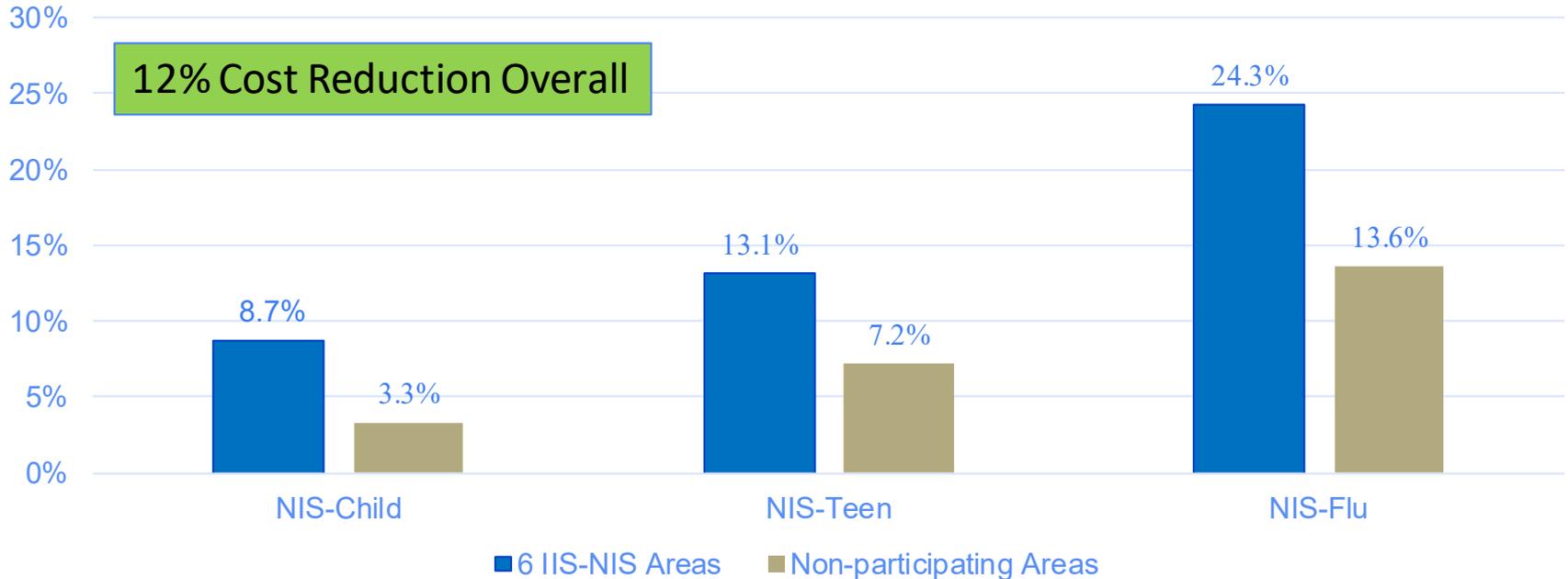
Phased Approach to Maintain Data Comparability

- Allows each IIS to enter and progress as it is ready, willing, and able
- Designed to maintain comparability across awardees and over time

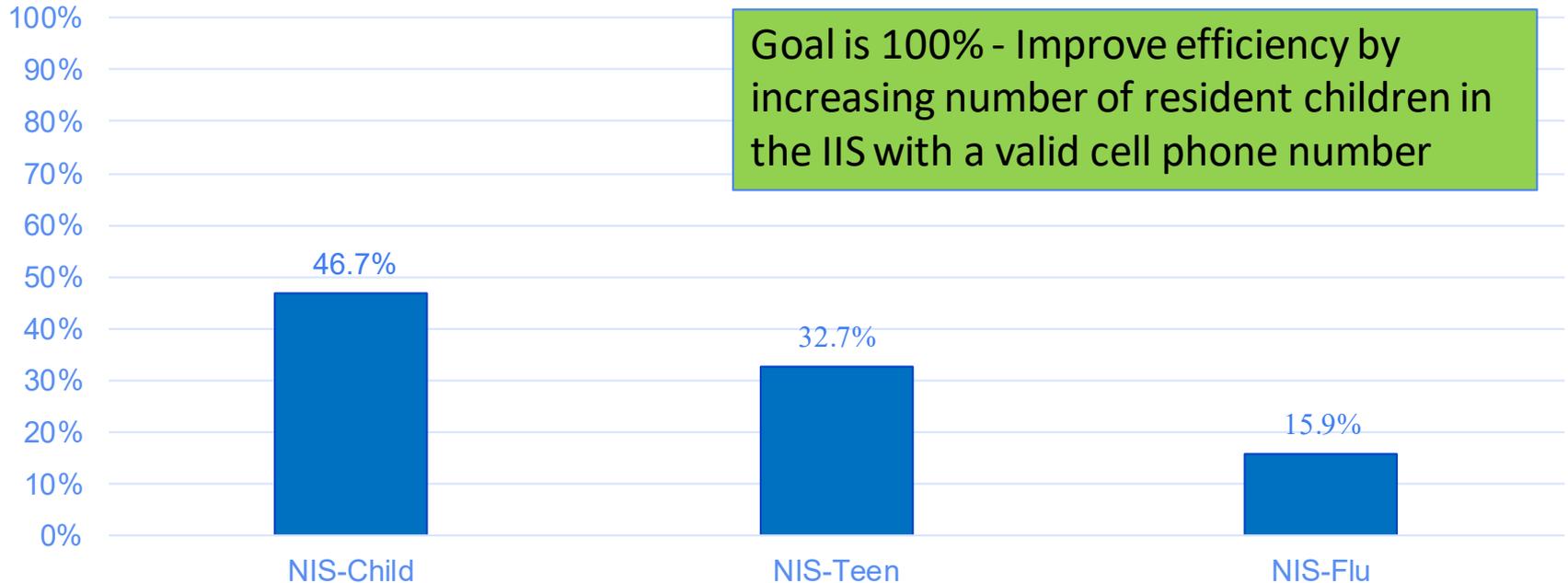
Phase 1 Implementation

- Twelve state and local immunization programs sharing IIS phone numbers for 2019 NIS sampling
 - Phone number locating offered at no cost
 - Matching of NIS sample to IIS offered at no cost
- Twenty programs signed up for 2020 IIS-NIS integration

NIS Age-Eligibility Rates Among Screened Households, Q1 2019



Percent of Eligible Population Identified by IIS, Six IIS-NIS Areas, Q1 2019



Next Steps

- Further evaluate data collection efficiency and optimum allocation method
- Identify extent of data sharing and other barriers to immunization program participation
- Develop criteria for readiness to enter Phase 2 – sampling solely from the IIS
- Continue efforts to promote and evaluate IIS data quality

IIS-NIS Integration Strategy in VFC/317 Immunization Program Cooperative Agreement

- Required activities for July 2019 – June 2020
 - Improve prevalence of telephone numbers in IIS
 - Develop data sharing agreements
- Future years
 - Participation in IIS-NIS integration may be required



Uncertain Future

Future of IIS-NIS Integration

- How fast can we implement the IIS-NIS integration plan?
- How long will the NIS remain viable?
 - Expand bias assessment with “bridging cohort analysis”, total survey error model, and comparison to IIS and other data sources
- Are there better ways to conduct the NIS?
 - Address-based sample using multiple ways to contact and receive responses (mail, Internet, phone)

Other Considerations

- When is an IIS ready to identify pockets of need?
 - Assess IIS data quality using IIS-NIS match and other approaches
 - Define quality with a “fit for purpose” paradigm
- Plan B
 - Estimate national vaccination coverage from selected, higher-quality IIS
 - Blend IIS and NIS data together with modelling approaches



Thank You Questions?

For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348 www.cdc.gov

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.

