Analytic Guide for Assessing Immunization Coverage Using an IIS

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Presenting on behalf of the workgroup on this topic

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Why a Guide?

- Need for information on how to do coverage assessments at population level
  - Emerged as a need after a survey of the IIS community by AIRA's Assessment steering committee
- Encourage IIS to USE their data
- As IIS get more sophisticated, complex and capture more fields, there is need for greater specificity and standardization in coverage assessment guidance

Immunization Information System Annual Report (IISAR)

Immunization Coverage for 19-35 month old children: How many children have received 4 DTaP, 3 polio, 3 Hepatitis B, 3 Hib and 1 Varicella (4:3:1:3:3:1 series)

Coverage calculation for 19-35 month olds IISAR Logic Guidance

2004

- For children born January 1, 2002 through May 31, 2003

2009

1. For children born January 1, 2007 through May 31, 2008
2. Count only valid doses, and those with documented immunity or disease
3. Do not count doses given after 12/31/2009
4. Consider 3+ doses of Hib-containing vaccine as up-to-date when calculating completeness
5. Exclude those with addresses outside jurisdiction
6. Exclude inactive children

2014

1. For children born January 1, 2012 through May 31, 2013
2. Include doses administered before 1/1/2015, including those recorded after 12/31/2014
3. The 4:3:1:3:3:1:4 series, include 4 or more doses of DTaP, 3 or more doses of Polio, 1 or more MMR, 3 or more Hepatitis B, >=4 or >=3 Hib*, 1 or more varicella**, and 4 or more pneumococcal containing vaccine.
   - When calculating Hib doses, include children who received 4+ Hib-containing vaccine doses (includes any type of Hib vaccine, including Hib, unspecified formulation), or 2 Hib-OMP doses (manufactured by Merck, includes PedVaxHib and Comvax) followed by >=1 dose of any type
4. Valid doses
   - Include
     - Doses that were administered according to ACIP routine recommendations that meet the criteria for series completion.
     - **When counting Varicella, INCLUDE those with history of disease
   - Exclude
     - Doses that are considered valid, but do not contribute to series completion (e.g., high risk-conditions)
5. All doses
   - Include valid and invalid doses
   - **When counting Varicella, EXCLUDE those with history of disease
6. Exclude children with addresses outside the jurisdiction
7. Exclude inactive children

The workgroup-process

- In November 2014, AIRA convened a workgroup of 10 experts (CDC, IIS, AIRA and independent consultants)
- Reviewed supporting documents
- Monthly phone calls
- End product: Practical Analytic Guide on conducting assessments using an IIS
- Target audience: IIS program staff, managers, researchers, technical staff, epidemiologists

Workgroup Approach

- Many ways to assess coverage, ideal method depends on what you need the coverage for, the maturity of your IIS, the quality of the IIS data, etc.
- Workgroup's approach was to define in detail all methods, indicate the pros and cons, and describe what each method is best suited for.
- Work in progress

Immunization Coverage Calculation

- Refers to the % of a population that is protected (or immunized)
- Calculation needs a Numerator and Denominator

$$\%\ \text{protected} = \frac{\#\ \text{of children protected/immunized}}{\#\ \text{of children in population}}$$

- ***Looks simple, but it is not!***

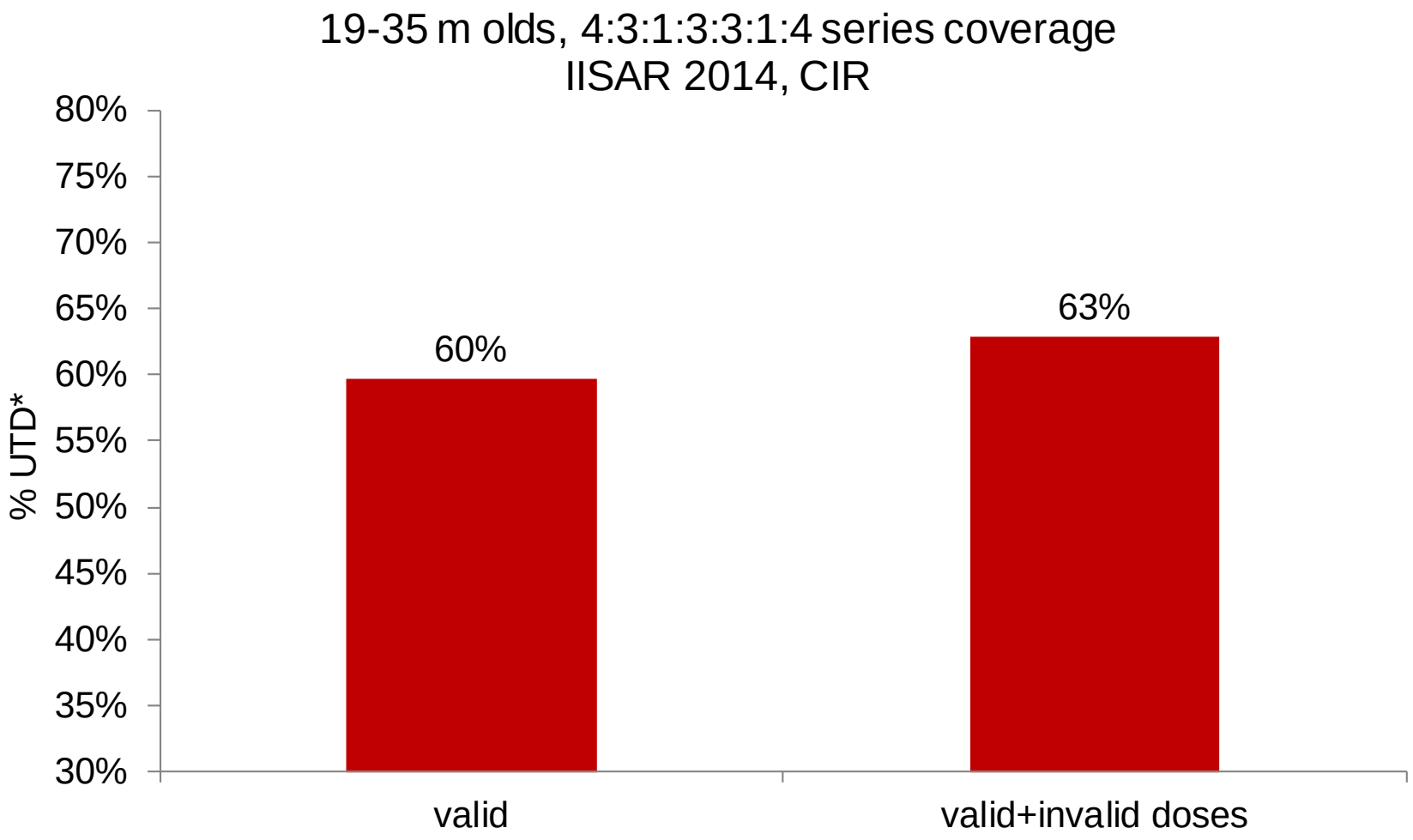
Elements of calculation: 1. Birth Cohort

- Define your cohort (e.g., 24-35 m. olds, 13-17 yr. olds)
  - As of date (e.g., 24-35 m olds, as of 12/31/2014)
  - As of a certain period (e.g., 24-35 m olds between August and December 2014)
    - Age in and out
    - Not age in and out
- Exclude certain patients (e.g., inactive)
- Define the date of birth (DOB) range so you can perform your IIS query

Elements of calculation: 2. Compliance

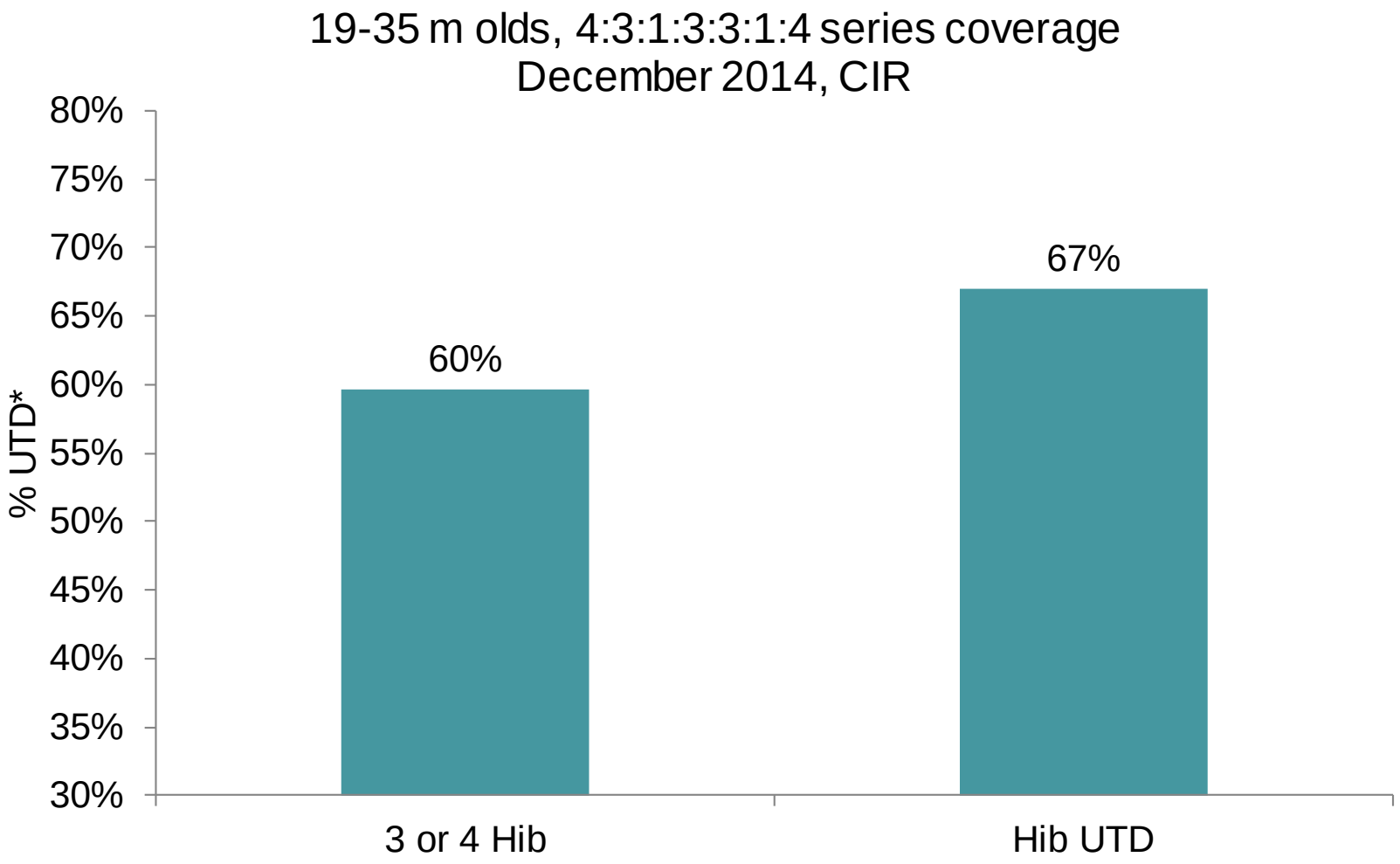
- Decide which immunizations are appropriate for your cohort (e.g. 4:3:1:3:3:1:4)
  - Do you include only valid immunizations?
  - Do you include all vaccine codes, even expired ones?
- Compliance by
  - a certain age (e.g., 24 months)
  - a certain date (as of 12/31/2014)
  - Must exclude immunizations administered after your compliance age or date

Valid vs. Valid + Invalid Doses



*Up-To-Date

Hib series: 3/4 doses, vs. Hib UTD



*Up-To-Date

Elements of calculation: 3. Other considerations

- Immunity: do you include those with history of disease in your numerator?
- Do you exclude those with contraindications from your denominator?
- Do you exclude those with exemptions?

Elements of calculation: 4. Denominator

- **IIS-based, usually with certain exclusions**
  - Inactive patients
    - Moved out of jurisdiction
  - Deceased patients

- **Non-IIS-based**
  - Census
  - Vital records
  - School census

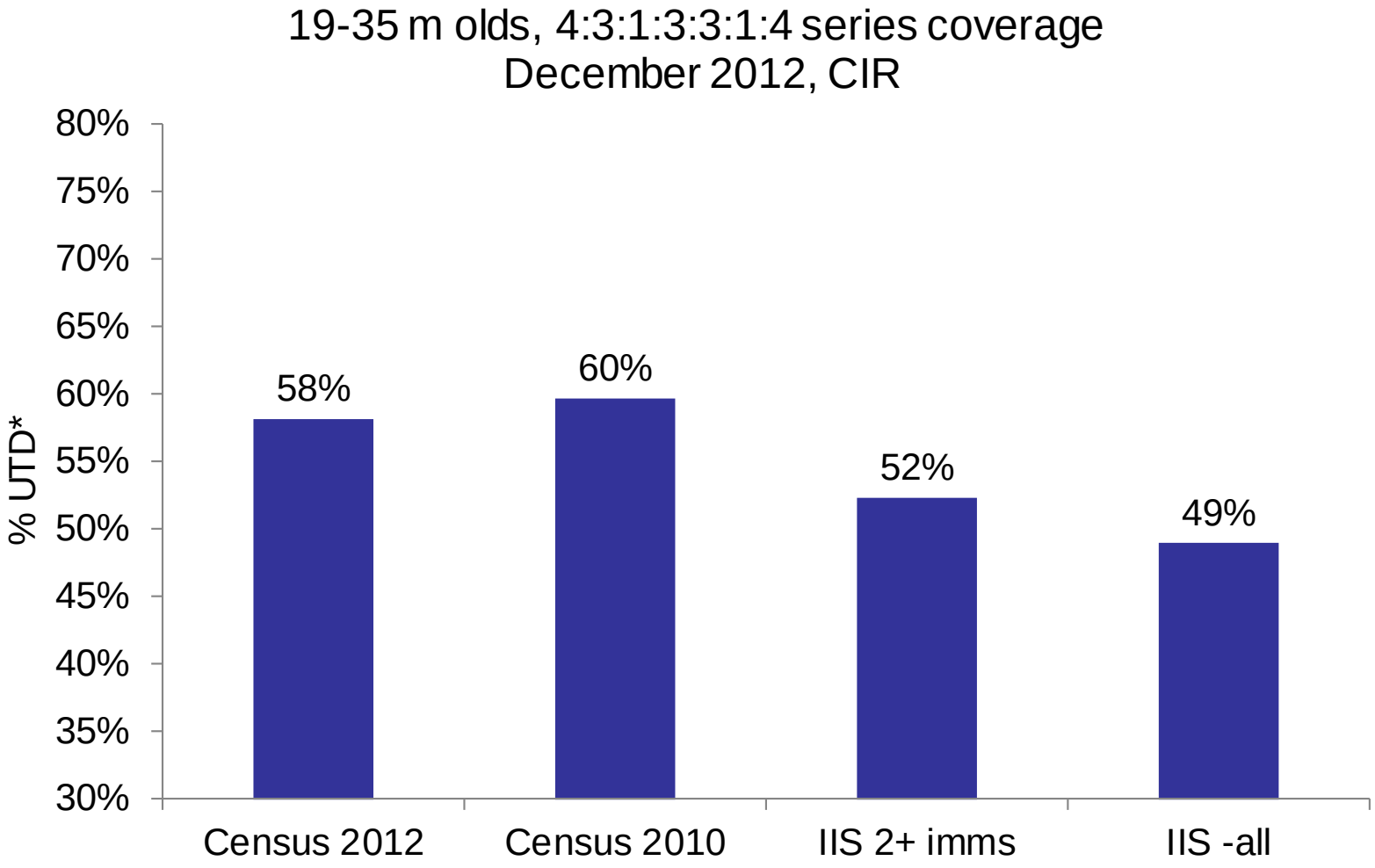
Denominator: IIS-based

- **Use all children in your IIS**
  - +Consistency between numerator and denominator
  - - Many IIS have inflated denominators due to duplicate records and non-removal of inactive patients, underestimates coverage
  - Good choice for newer IIS, with incomplete population capture
- **Use children who have 2+ immunizations**
  - +More likely to exclude inactive patients
  - - May exclude unimmunized children; overestimate coverage
  - Good choice for smaller geo units with no census estimates
- **Statistically adjust your IIS population**
  - +Takes care of inactive patients mathematically
  - - More complicated and time consuming
  - Good choice for older cohorts, small areas w/o census estimates

Denominator: Non IIS-based

- Census
  - +Uniform methodology across US, adjusted each year
  - -Undercount, especially for areas with high immigration, and not available for smaller areas
  - Good choice for comparisons across jurisdictions
- Vital Records
  - +Clean and de-duplicated dataset
  - -Inaccurate in areas of large in-out migration
  - Good choice for coverage of very young (e.g., birth Hep B coverage)

Census vs. IIS Denominator



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5. Other Considerations that impact your assessment

- Patient status – Active/Inactive
- Data Quality
  - Accuracy
  - Completeness
  - Timeliness
- Record duplication
- Clinical Decision Support
- Ever changing IIS data
- IIS Maturity

Important Resource Documents to Help with IIS-based Coverage

- Updated/developed recently:
  - Management of Patient Active/Inactive Status (PAIS) in Immunization Information Systems: Replacement of 2005 Guidelines
  - AFIX-IIS Integration: Operational and Technical Guidance for Implementing IIS-Based Coverage Assessment – Phase 1.
- Modeling of Immunization Registry Operations Work Group (MIROW) guides found at:

  http://www.immregistries.org/resources/aira-mirow

Progress and Next Steps

- As of April 2015, a fairly comprehensive draft document has been developed
- Iterations of the document are passed back and forth to members of the workgroup for review and refinement, some organizational details still being finalized
- Final guidance document available August 2015

The workgroup

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