ANALYTIC GUIDE

For Assessing Vaccination Coverage Using An IIS

Practical considerations and decision points in designing a population-based coverage assessment.

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AIRA AMERICAN IMMUNIZATION REGISTRY ASSOCIATION

Immunization Information Systems for a New Era

Analytic Guide for Assessing Immunization Coverage Using an IIS

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Assessment Steering Committee Webinar

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Overview of webinar

- Introduction of Topic (Alison)
- Process of Development of Guide (Sherry)
- Elements of Coverage Assessment (Vikki)
- Next Steps for AIRA (Alison)

Why a guide

- Provide information on how to do coverage assessments at population level
  - Need greater specificity and standardization
- Encourage IIS to USE their data
- Describe practical considerations and key decision points to produce a document useful to:
  - Target audience: Immunization & IIS program staff, Q.I. specialists, researchers, epidemiologists

The workgroup

- Laura Pabst MPH, IISSB, CDC
- Chas DeBolt RN MPH, WA
- Azadeh Tasslimi, MPH, WA
- Vikki Papadouka PhD MPH, New York City
- Rachel Potter DVM MS, MI
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- Rob Wester, MA MPH, San Diego
- N. Elaine Lowery JD MSPH, Public Health Consultant
- *Sherry Riddick, RN MPH, Independent Consultant, Project Facilitator/Technical Writer*
- *Alison Chi MPH, AIRA Program Director, Project Staff Lead*

The process

- Convened the workgroup in November 2014
- Collected & reviewed supporting documents
- Monthly phone calls
- Iterative review of versions of the Guide
- End product: Practical Analytic Guide on conducting assessments using an IIS, completed August 2015

The approach

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

Important related documents for IIS

- Management of Patient Active/Inactive Status (PAIS) in Immunization Information Systems: Replacement of 2005 Guidelines - 2015
- AFIX-IIS Integration: Operational and Technical Guidance for Implementing IIS-Based Coverage Assessment – Phase 1.
- Modeling of Immunization Registry Operations Work Group (MIROW) guides, e.g., Vaccination Level Deduplication, Data Quality Assurance in IIS: Incoming Data, Data Quality Assurance: Selected Aspects

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

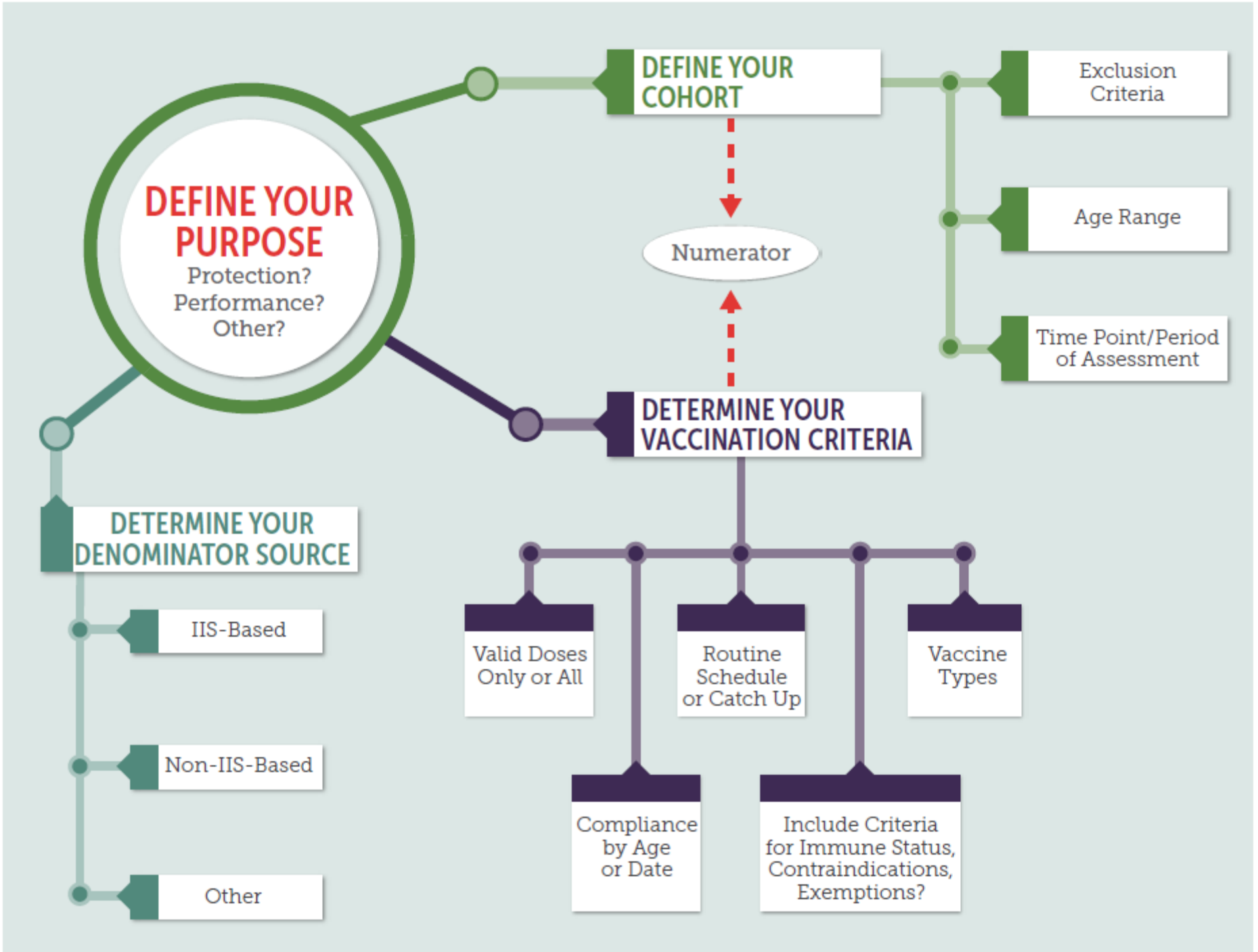
Definition and purpose of "assessment"

- Assessment = rate, frequency at which immunization events occur in a defined population
  - Numerator
  - Denominator
  - Period of time immunization events occur
- Purpose of assessment
  - Performance: is population vaccinated?
  - Protection: is population protected (may include those immune due to disease)

Elements of immunization coverage

- Cohort determination
- Vaccination criteria
- Denominator source

Key Decision Points



Cohort: who/where/when

- Exclusion criteria: inactive (e.g., deceased, moved), outside geographic area of interest
- Age range (e.g., 19-35 m olds, 13-17 year olds)
- Time period of assessment - used to calculate the age of your cohort
  - Point in time (e.g., 12/31/2014)
  - Period of time (e.g., 1/1/2014 – 12/31/2014) allowing and not allowing aging in/out

Cohort: Point in time analysis

Birthdate Calculations for Point in Time Assessment

EXAMPLE: Assess children who are 19 through 35 months of age as of 12/31/2014

Earliest date of birth: subtract 36 months from "as of" date of 12/31/2014 = 12/31/2011 and advance 1 day = 1/1/2012

Latest date of birth: subtract 19 months from "as of" date of 12/31/2014 = 5/31/2013

Birthdate range = 1/1/2012 through 5/31/2013, a 17-month wide cohort

Cohort: Point in time analysis

- Coverage as of a point in time (e.g., IISAR measures 19-35 month olds as of 12/31/2014)
  - **+** Simple, no aging in or out concerns
  - **-** Does not allow same opportunity for vaccination to all those in cohort

  Best use for easy comparisons across years and across different IIS

Cohort: Period of time analysis
(no aging in/out allowed)

Birthdate Calculations for Period of Time Assessment Without Aging In/Out:

EXAMPLE: Assess children who were 19 through 35 months throughout the period 1/1/2014–12/31/2014

Earliest date of birth: subtract 36 months from 12/31/2014 = 12/31/2011 and advance 1 day = 1/1/2012

Latest date of birth: subtract 19 months from 1/1/14 = 6/1/2012

Birthdate range = 1/1/2012 through 6/1/2012, a 5–month wide cohort

Cohort: Period of time analysis
(no aging in/out allowed)

- Coverage as of a period of time not allowing aging in and out (e.g., 19-35 m old in entire year 2014)
  - **+** Equal opportunity for vaccination
  - **-** May restrict your population significantly

  Best use when period of eligibility is limited, e.g., flu coverage

Cohort: Period of time analysis
(aging in/out allowed)

Birthdate Calculations for Period of Time Assessment Allowing Aging In/Out:

EXAMPLE: Assess children who are 19 through 35 months of age at some time between 1/1/2014 and 12/31/2014

Earliest date of birth: subtract 36 months from 1/1/2014 = 1/1/2011 and advance 1 day = 1/2/2011

Latest date of birth: subtract 19 months from 12/31/2014 = 5/31/2013

Birthdate range = 1/2/11 through 5/31/13, a 29–month wide cohort

Cohort: Period of time analysis
(aging in/out allowed)

- Coverage as of a period of time allowing aging in and out (e.g., 19-35 m of age at any point in the year 2015)
  - **+** Gives you a larger population to assess
  - **-** Population does not have equal opportunity to be vaccinated

Not a widely utilized method

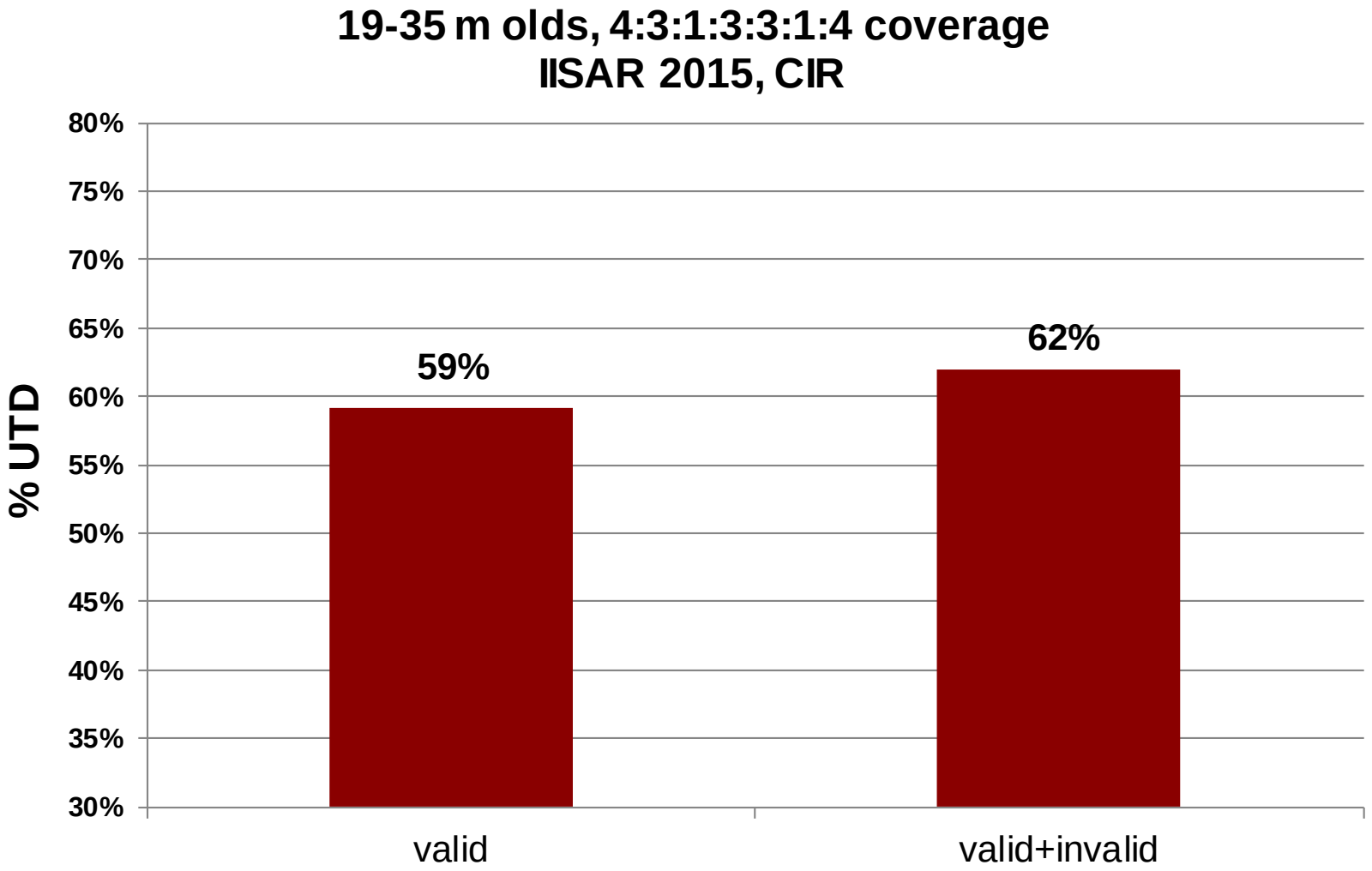
Vaccination criteria

- Age appropriate vaccines and # of doses
- Which products do you include?
  - Old CVX codes?
  - Inappropriate vaccines for age?
- Valid vs. valid + invalid immunizations
- Routine schedule or catch-up
  - Protection vs. performance

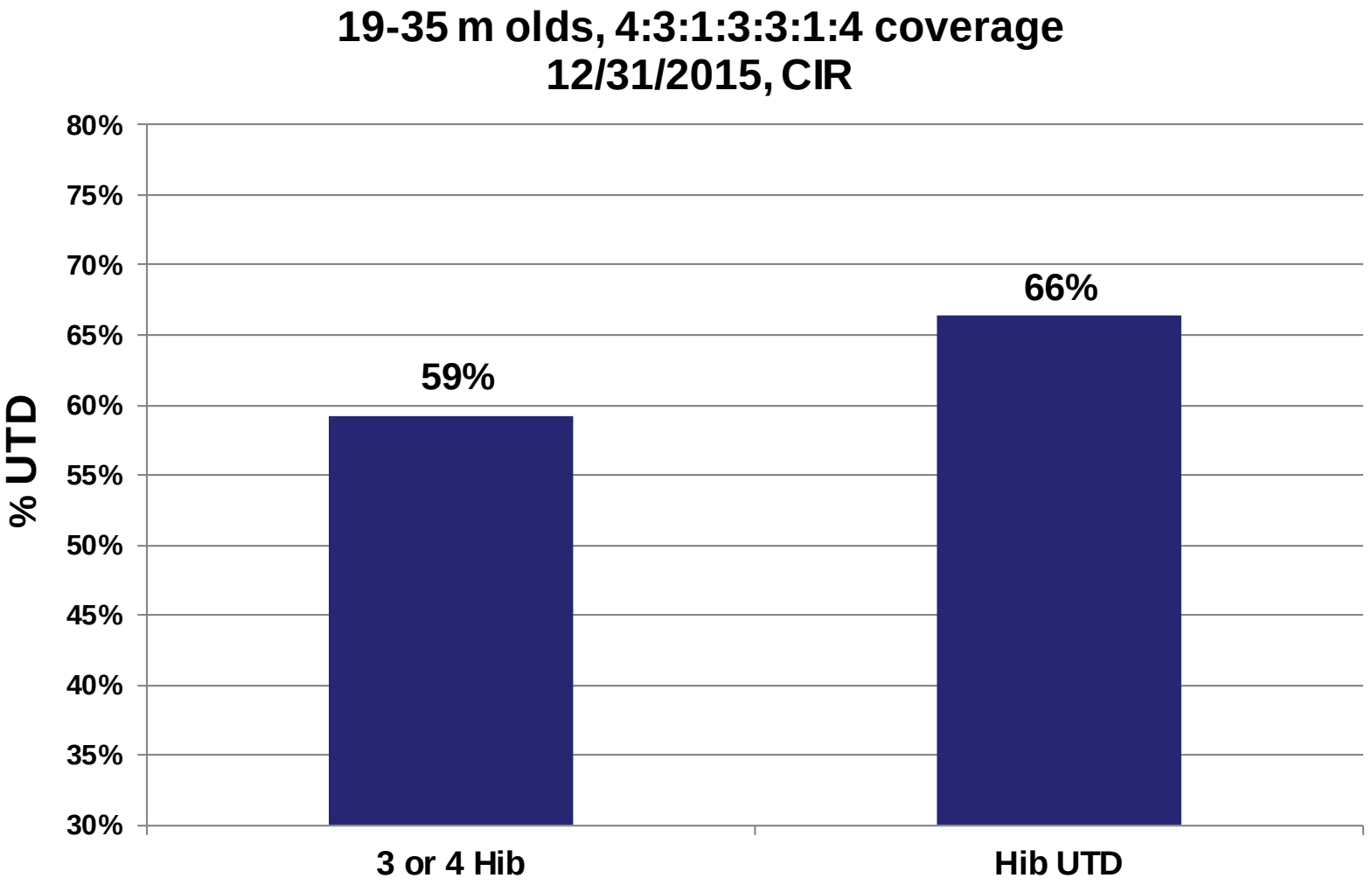
Vaccination criteria (continued)

- Compliance by
  - a certain date (as of 12/31/2014)
  - a certain age (e.g., by 24 months) – gives same opportunity to vaccinate to all members of your cohort
- Immunity
  - Do you consider those with immunity in your numerator
- Contraindications
- Exemptions

Valid vs. Valid + Invalid Doses



Regular schedule vs. catch-up



Denominator Choices

- IIS-based
- Non-IIS based
  - Census
  - Schools
  - Birth records
- Other denominator options: testing new approaches

IIS-based denominator: all children in IIS

- Use all children in the IIS (excluding inactive patients)
  - **+** Simple solution, no other sources of data necessary
  - **+** Consistency between numerator and denominator
  - **+** More likely to include truly unvaccinated
  - **-** Major challenge: denominator inflation
    - Most IIS do not track well those who moved out
    - Duplicate/unresolved records

Best use: mature IIS with good de-duplication and inactivation systems; new and/or underpopulated IIS; small area analyses with no census estimates

IIS-based denominator: children in IIS with immunizations

- Use only children with (x # of) immunizations on IIS record
  - **+** More likely to include active children
  - **-** Can underestimate or overestimate denominator
  - **-** Not backed by research

Best use for small areas with no census estimates; when IIS denominators exceed census

IIS-based denominator: other adjustments to data

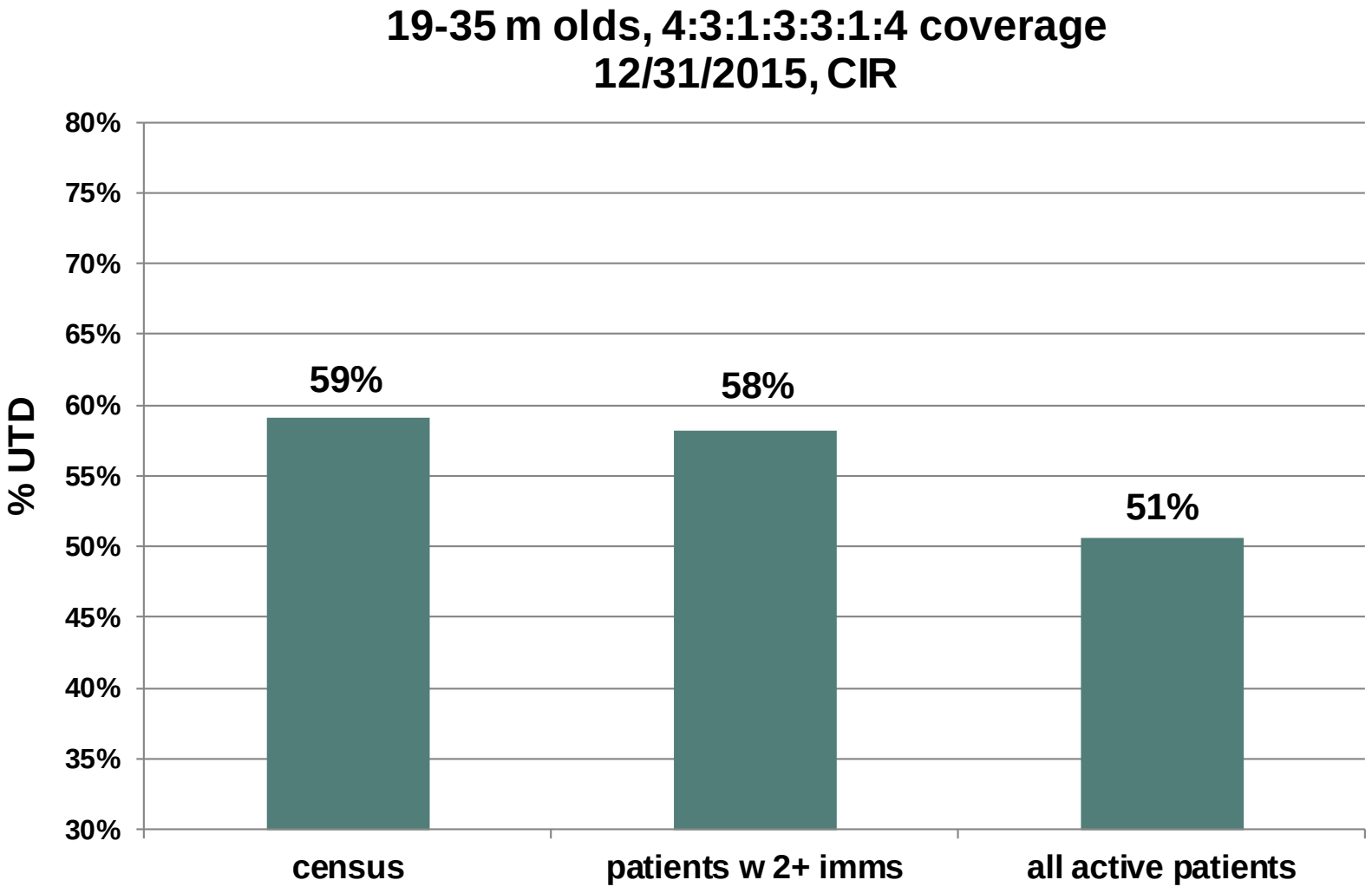
- Administrative cut-off: exclude children with no immunizations for x period of time (depending on age)
- Uniform time record: assign weight to each record based on time since last report in linear fashion
- Ogive Hybrid method: also uses weighing for each record – but adjusts for the strong effect of not reporting after 5-7 yrs
  - **+** Denominators comparable to census
  - **+** Estimate active population mathematically
  - **+** Formula can be adjusted for specific populations
  - **-** Time consuming, have to be recalculated every time, and have not been tested enough by IIS community

Non-IIS based: Census

- Census (census.gov): common source of denominator data in public health (e.g., IISAR)
  - **+** Uniform methodology, can compare results across jurisdictions
  - **+** More realistic denominator than IIS, particularly for IIS with denominator inflation
  - **-** Potential undercount, particularly in high immigration areas
  - **-** Less accurate for smaller areas

Best use for comparisons across IIS (consistent denominator); when IIS denominator is very inflated

Census vs. IIS Denominators



Non-IIS based denominator: schools, birth data

- School census (nces.ed.gov/ccd)
  - + Potential ability to measure at the more granular levels of school district or even school building
  - + May be more UTD than IIS for older children
  - - Variable quality across districts/geo areas
- Vital Statistics (birth records)
  - + Most IIS receive birth record feeds
  - + De-duplicated, good source for coverage of very young children (e.g., birth HepB coverage)
  - - Does not include children who moved in jurisdiction
- New approaches

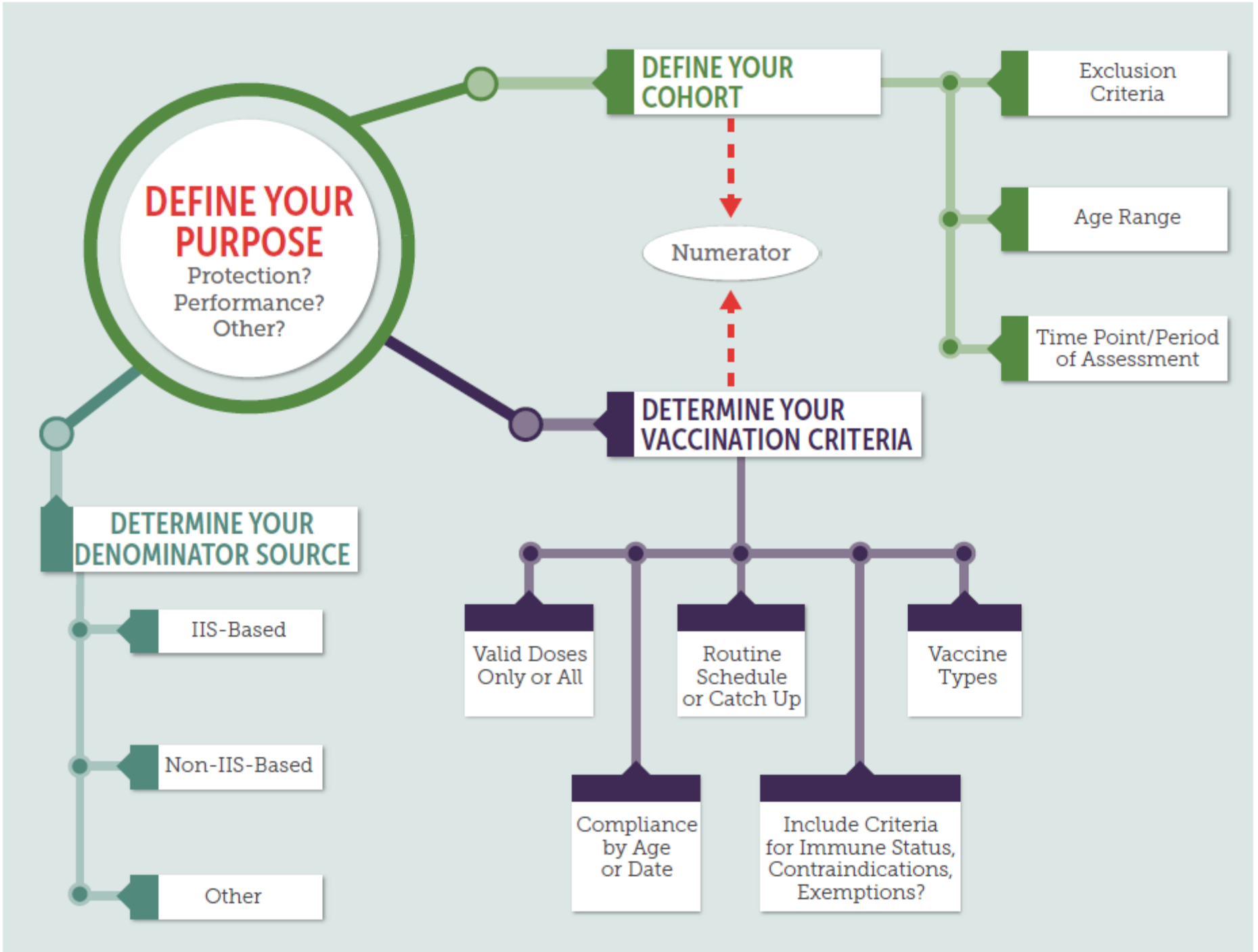
Other Considerations

1. Data Quality
   - Accuracy, completeness
   - De-duplication (if possible resolve dups before running coverage)
2. Clinical Decision Support (maintain current & ensure accuracy based on ACIP rules)
3. Fluidity of IIS data (IIS changes constantly)
4. IIS maturity and completeness will determine what choices you make for elements of assessment

Additional resources in guide's appendix

- PAIS (patient active/inactive status) rules
- Definitions and acronyms
- Location of resources such as MIROW, documents, CDSi, code sets)
- References
- Examples of birthdate calculations, denominators
- Examples of real-life coverage assessments

Key Decision Points



Take-home points

- Guide is not prescriptive, but tries to be inclusive of common methods, highlighting strengths, weaknesses and best uses
- Experiment with different methodologies, compare results, be very critical of your data
- Document all your steps, and compare across years, areas, etc., using the same methodology

Next Steps for AIRA

- Addendum to the Guide
  - Document assessment practices in place today at representative IIS
  - Case studies of practical applications

Questions???