Informed Coverage Calculation

States are frequently asked to determine public insurance participation rates or measure continuity of enrollment among vulnerable children, both for federal compliance audits and performance-based incentives, and for internal studies concerning vulnerable populations. Participation rates are defined as the fraction of eligible children who are enrolled. We developed and validated this administrative claims–based participation metric, "Informed Coverage," using a naturally occurring randomization observed inside each state that dynamically informs assumptions about patterns of eligibility and allows statewide estimates of participation rates using only administrative claims data. This standardized measure can be used by states as a potential indicator of quality and access.

The numerator for Informed Coverage represents the sum (within a state) of months enrolled in Medicaid/CHIP for all children over an 18-month window. The denominator for Informed Coverage represents the sum (within a state) of months eligible for Medicaid/CHIP for all children over an 18-month window. The intermediate components are described in the below table and are each calculated separately, then used to determine a state's Informed Coverage value. A figure is provided to illustrate the difference between Presumed Eligible and Presumed Ineligible.

Figure 1: Coverage PE (Presumed Eligible)

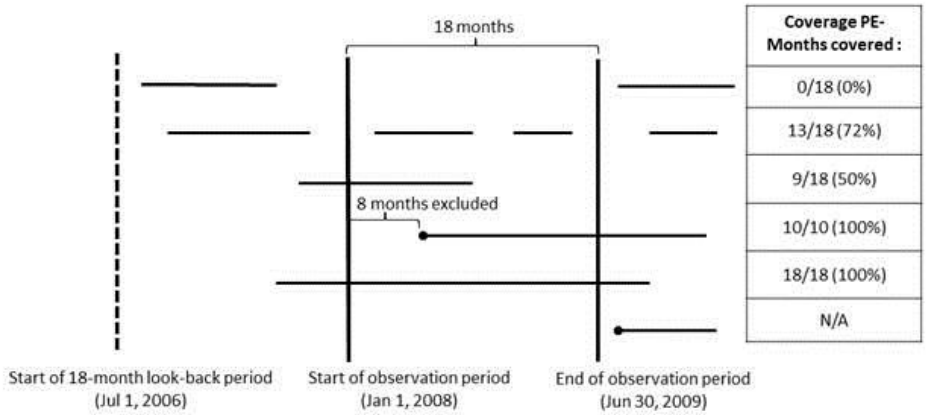
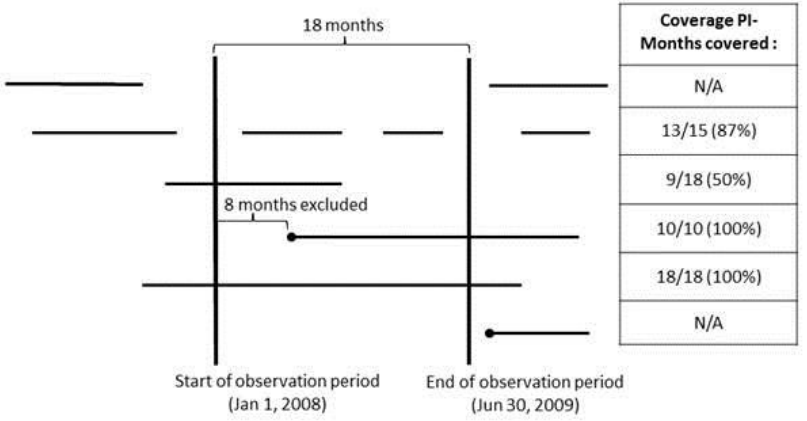


Figure 2: Coverage PI (Presumed Ineligible)



Intermediate component	Description	Numerator	Denominator
Presumed Eligible Coverage (PE)	A child is defined as being eligible based on an 18-month observation, in combination with an 18-month look-back period. If any enrollment is observed in the 18-month look-back period, the child is defined as eligible for the entire 18-month observation window. If there is no evidence of enrollment in the 18-month look-back period, eligibility is defined from the first point of enrollment in the observation window.	1) Identify total number of months in the 18 month observation window covered by MAX/CHIP for each child in the Denominator. A month is considered "covered" if the child has greater than 14 days of enrollment in that month or if there is an indicator for S-CHIP coverage for that month 2) The Coverage PE numerator is the summation of total months covered within the 18-month observation window for all children in the eligible population.	1) Identify all children enrolled in Medicaid/CHIP at any point within the 18-month window of observation AND/OR the 18-month look back, excluding those older than 18 at the beginning of the 18-month observation window 2) Identify all children who are born within the 18-month window of observation – for these children, total months of eligibility begin from date of birth 3) Identify all children who reach the age of 18 before the end of the 18-month window of observation – for these children, total months of eligibility end with their 18th birthday 4) Identify all children who DO NOT APPEAR as covered at any point within the 18-month look back period ("covered" defined as at least one day of coverage) – for these children, total months of eligibility begin with their first day of coverage within the 18-month observation window 5) For all other children who do not represent populations in Steps 1, 2, or 3, total months of eligibility equals all 18 months in the observation window 6) The Coverage PE denominator is the summation of total number of eligible months for all children in the eligible population.
Presumed Ineligible Coverage (PI)	A child is defined as being eligible solely on the 18-month observation window. For Coverage PI, eligibility starts from the first enrolled month during the 18-month observation window.	1) Identify the total number of months in the 18-month observation window covered by MAX/CHIP for each child in the Denominator. A month is considered "covered" if the child has greater than 14 days of enrollment in that month or if there is an indicator for S-CHIP coverage for that month 2) The Coverage PI numerator is the summation of the total months covered within the 18-month observation window for all children in the eligible population.	1) Identify all children enrolled in Medicaid/CHIP at any point within the 18-month window of observation, excluding those children older than 18 at the beginning of the 18-month observation window 2) Identify all children who are born within the 18-month window of observation – for these children, total months of eligibility begin from date of birth 3) Identify all children who reach the age of 18 before the end of the 18-month window of observation – for these children, total months of eligibility ends with their 18th birthday 4) For all other children who do not represent populations in Steps 1, 2, or 3, months of eligibility begins with the first observed enrollment in the observation window and continues for the remainder of the observation window 5) The Coverage PI denominator is the summation of the total number of eligible months for all children in the eligible population.
Appendectomy Coverage Rate (ACR)	The ACR reflects a natural experiment since appendicitis is a random event, not dependent on healthcare of SES status. We determine if a child was enrolled prior to hospitalization using a look-back to their state of enrollment 4 months prior to hospitalization.	1) Identify the total number of children with pre-existing enrollment in Medicaid or CHIP in the Denominator. Pre-existing enrollment is defined as an observed enrollment exactly four months prior to their date of admission.	1) Identify all children between the ages 2 and 16 at the start of the 18-month observation window 2) Identify the number of children with an inpatient admission for either a principal diagnosis of appendicitis (ICD-9 CM codes 540-541; ICD-10 codes K35.2, K35.3, K35.80, K35.89, K37) or a principal procedure of appendectomy (ICD-9 CM codes 47.0-47.09, 47.2; ICD-10 codes 0DTJ4ZZ, 0DTJ0ZZ, 0DTJ7ZZ, 0DTJ8ZZ, 0D9J00Z, 0D9J0ZZ, 0D9J30Z, 0D9J3ZZ, 0D9J40Z, 0D9J4ZZ, 0D9J70Z, 0D9J7ZZ, 0D9J80Z, 0D9J8ZZ).
Proportion of Appendectomy Patients Without Previous Coverage (K)	The proportion of appendectomy patients that did not have coverage for any month from 18 months before the appendectomy until 4 months prior to the appendectomy. This proportion will be used to adjust the presumed eligible estimate by accounting for potentially unseen lack of coverage.	1) Identify the number of appendectomy patients in the state which lacked coverage during the entire lookback until the 4th month before the appendectomy.	1) Identify all children between the ages 2 and 16 at the start of the 18-month observation window 2) Identify the number of children with an inpatient admission for either a principal diagnosis of appendicitis (ICD-9 CM codes 540-541; ICD-10 codes K35.2, K35.3, K35.80, K35.89, K37) or a principal procedure of appendectomy (ICD-9 CM codes 47.0-47.09, 47.2; ICD-10 codes 0DTJ4ZZ, 0DTJ0ZZ, 0DTJ7ZZ, 0DTJ8ZZ, 0D9J00Z, 0D9J0ZZ, 0D9J30Z, 0D9J3ZZ, 0D9J40Z, 0D9J4ZZ, 0D9J70Z, 0D9J7ZZ, 0D9J80Z, 0D9J8ZZ).

Coverage PE' (adjusted presumed eligible coverage) Intermediate Calculation:

Multiply the presumed eligible estimate (PE) by the complement of the state's proportion of appendectomy patients without any previous evidence of coverage (1 – K) to get the adjusted presumed eligible coverage:

$$PE' = PE * (1 - K)$$

Final Informed Coverage Calculation:

Use the formula to compute the Informed Coverage measure. When calculating Informed Coverage for an entire state's population, all intermediate and final calculations will use the statewide population. But when calculating the Informed Coverage for a subset of the population, use the subset population for intermediate calculations and for the PE' and PI of the final Informed Coverage formula, but use the overall state's population values for calculation of the weight (w).

The formula for Informed Coverage when PE' < ACR < PI:

$$Informed\ Coverage = PE' * w + PI * (1 - w)$$

Where,

PE' is the state's Coverage PE'

PI is the state's Coverage PI

ACR is the state's Appendectomy Coverage Ratio (the proportion of appendectomy patients having insurance coverage prior to developing appendicitis)

w = (PI – ACR) / (PI – PE'),

When ACR ≤ PE', Informed Coverage = PE'

When ACR ≥ PI, Informed Coverage = PI