

## CAPQuaM PQMP Perinatal MEASURE 4 Detailed Measure Specifications

### A. Description

Divides low birthweight neonates who are admitted to a Level 2 or higher nursery into five strata based upon their admission temperature and calculates the proportion of infants in each stratum based upon their temperature upon arrival to the Level 2 or higher nursery. All temperatures are analyzed using degrees Celsius and reported to one decimal place.

### B. Eligible Population

**Numerator:** Live-born neonates with a birthweight of less than 2500 grams (as identified by ICD-9-CM Principal or Other Diagnosis Codes in Table 1) using the first temperature taken in Level 2 or higher nursery.

The numerator has 5 comprehensive and mutually exclusive strata. Each is determined by the number of children whose qualifying temperature (usually the first temperature after arrival to the Level 2 or higher nursery) falls within the criteria for that stratum.

Stratum 1 “Cold”:

All neonates with temperatures less than or equal to 34.5 degrees Celsius.

Stratum 2 “Very cool”

All neonates with temperatures greater than 34.5 degrees Celsius and less than or equal to 35.5 degrees Celsius;

Stratum 3 “Cool”:

All neonates with temperatures greater than 35.5 degrees Celsius and less than or equal to 36.5 degrees Celsius;

Stratum 4 “Euthermic”:

All neonates with temperatures greater than 36.5 degrees Celsius and less than or equal to 37.5 degrees Celsius;

Stratum 5: “Overly warm”:

All neonates with temperatures greater than 37.5 degrees Celsius.

**Denominator:** Live-born neonates with birthweight of less than 2500 grams (as identified from either the medical record or by ICD-9-CM Principal or Other Diagnosis Codes in Table 1) and who were admitted to a level 2 or higher nursery within 24 hours of birth. Exclusions are noted below.

**Table 1. Included Populations:ICD-9-CM Principal or Other Diagnosis Code Low Birthweight Diagnosis Codes**

76400	LIGHT-FOR-DATES WTNOS	76490	FET GROWTH RETARD WTNOS
76401	LIGHT-FOR-DATES <500G	76491	FET GROWTH RETARD <500G
76402	LT-FOR-DATES 500-749G	76492	FET GROWTH RET 500-749G
76403	LT-FOR-DATES 750-999G	76493	FET GROWTH RET 750-999G
76404	LT-FOR-DATES 1000-1249G	76494	FET GRWTH RET 1000-1249G
76405	LT-FOR-DATES 1250-1499G	76495	FET GRWTH RET 1250-1499G
76406	LT-FOR-DATES 1500-1749G	76496	FET GRWTH RET 1500-1749G
76407	LT-FOR-DATES 1750-1999G	76497	FET GRWTH RET 1750-1999G
76408	LT-FOR-DATES 2000-2499G	76498	FET GRWTH RET 2000-2499G
76410	LT-FOR-DATE W/MAL WTNOS	76500	EXTREME IMMATUR WTNOS
76411	LT-FOR-DATE W/MAL <500G	76501	EXTREME IMMATUR <500G
76412	LT-DATE W/MAL 500-749G	76502	EXTREME IMMATUR 500-749G
76413	LT-DATE W/MAL 750-999G	76503	EXTREME IMMATUR 750-999G
76414	LT-DATE W/MAL 1000-1249G	76504	EXTREME IMMAT 1000-1249G

76415	LT-DATE W/MAL 1250-1499G	76505	EXTREME IMMAT 1250-1499G
76416	LT-DATE W/MAL 1500-1749G	76506	EXTREME IMMAT 1500-1749G
76417	LT-DATE W/MAL 1750-1999G	76507	EXTREME IMMAT 1750-1999G
76418	LT-DATE W/MAL 2000-2499G	76508	EXTREME IMMAT 2000-2499G
76420	FETAL MALNUTRITION WTNOS	76510	PRETERM INFANT NEC WTNOS
76421	FETAL MALNUTRITION <500G	76511	PRETERM NEC <500G
76422	FETAL MALNUTR 500-749G	76512	PRETERM NEC 500-749G
76423	FETAL MAL 750-999G	76513	PRETERM NEC 750-999G
76424	FETAL MAL 1000-1249G	76514	PRETERM NEC 1000-1249G
76425	FETAL MAL 1250-1499G	76515	PRETERM NEC 1250-1499G
76426	FETAL MAL 1500-1749G	76516	PRETERM NEC 1500-1749G
76427	FETAL MALNUTR 1750-1999G	76517	PRETERM NEC 1750-1999G
76428	FETAL MALNUTR 2000-2499G	76518	PRETERM NEC 2000-2499G

For codes 76400, 76410, 76420, 76490, 76500, birthweights should be verified from the medical record prior to including in measure.

## EXCLUSIONS

Neonates who do not survive until the time limit of the measure (15 minutes after arrival to the NICU)

Neonates with Anencephaly ICD-9-CM 740

Neonates not born in hospital/medical care setting

Neonates for whom the hospital provides documentation that at the time of arrival to the NICU and before the temperature was taken the infant both had been identified as meeting written institutional criteria for the initiation of therapeutic hypothermia and such therapy was begun or planned {OPTIONAL EXCLUSION}

Neonates with Comfort care (requires all of the features below):

Died within 48 hours of birth; AND

Received no respiratory support after arrival to the Level 2 or higher nursery other than blow by oxygen (i.e., did not receive CPAP, intubation, or CPR after arrival at Level 2 or higher nursery)

## C. DATA SOURCES

A. Medical record (paper or electronic), may be utilized to identify:

- i. Date and time of birth
- ii. Date and time of arrival to a Level 2 or higher nursery;
- iii. Date and time of first temperature upon arrival to that nursery;
- iv. Temperature and units of measurement
- v. Race/ethnicity (preferred data source)
- vi. Home zip code Mother's State and County of Residence and or zip code (preferred data source)
- vii. Born in medical facility or transferred in (preferred data source)
- viii. 5 minute Apgar score
- ix. Birthweight (preferred data source)
- x. Documentation if child met local criteria for hypothermia and time so identified
- xi. Documentation if hypothermia was planned or initiated before temperature taken
- xii. Insurance type (optional data source)

B. Administrative data with billing and diagnosis codes, utilized to identify:

- i. ICD-9 codes to identify low birthweight infants and presence of anencephaly
- ii. Revenue codes indicating care in Level 2, 3, or 4 nursery (172, 173, 174)
- iii. OPTIONAL source for:
  - i. Date of birth
  - ii. race/ethnicity
  - iii. home zip code
  - iv. Whether child was inborn or transferred in
  - v. Birthweight range
  - vi. Insurance type and benefit plan {Preferred data source}

**D. CALCULATION**

**C. "CALCULATION" and Reporting**

**Step 1:** Identify all live-born neonates with a birthweight less than 2500 grams, using the aforementioned codes or recorded birthweights when practical.

**Step 2:** Identify all of those neonates from Step 1 who were admitted to Level 2 or higher nursery).

**Step 3:** Record relevant attributes:

- a. Record ICD-9 comorbid diagnoses.  
**EXCLUDE** those with anencephaly (ICD-9-CM 740xx ).
- b. Record:
  - i. Date and time of birth.
  - ii. Birthweight.
  - iii. 5 minute Apgar score
  - iv. Date and time of arrival to Level 2 or higher nursery.
  - v. If child was admitted to a Level 2 or higher nursery from regular newborn care
  - vi. If child was inborn or transferred to Level 2 or higher nursery from another facility.
- c. If transferred is there documentation that neonate was not born in a medical facility  
**EXCLUDE** if: child not born in a medical facility

**Step 4:** Record the following additional data elements for all eligible neonates:

- i. Race
- ii. Ethnicity
- iii. Insurance type (Medicaid, Commercial, Uninsured)
- iv. Benefit category (HMO, PPO, Medicaid Primary Care Management Plan, Fee for service, Other)
- v. Zip Code and/ or State and County or equivalent area of Mother's residence. Record FIPS if available
- vi. Evidence child received comfort care only (when appropriate).  
**EXCLUDE** if so.
- vii. Documentation child was eligible for and received therapeutic hypothermia (when appropriate). **EXCLUDE** if so.

**Step 5:** Identify and record:

- i. Time of first temperature taken in the nursery (ARRIVAL TEMPERATURE)
- ii. Value of first temperature taken in the nursery
- iii. Units that temperature was recorded in. If in Fahrenheit calculate Celsius as  $C=(F-32)*5/9$
- iv. Record infant age at time of ARRIVAL temperature

**Step 5:** If infant's age is > 75 minutes at the time of the initial temperature record the following as the ALTERNATE temperature:

- i. Time of last temperature taken in the unit where the infant was delivered
- ii. Value of that temperature
- iii. Units that temperature was recorded in. If in Fahrenheit calculate Celsius as  $C=(F-32)*5/9$
- iv. Record infant age at time of that temperature

If infant's age at time of ARRIVAL TEMPERATURE is > 75 minutes AND infant was admitted directly to the Level 2 or higher nursery without transport from another institution OR transfer from the normal newborn nursery, report the lower of the ARRIVAL and the ALTERNATE temperature.

**Step 6:** Identify which numerator stratum to which the reported temperature should be assigned:

The numerator has 5 comprehensive and mutually exclusive strata. Each is determined by the number of children whose reported temperature falls within the criteria for that stratum.

**Stratum 1 "Cold":** All neonates with temperatures less than or equal to 34.5 degrees Celsius.

**Stratum 2 "Very cool":** All neonates with temperatures greater than 34.5 degrees Celsius and less than or equal to 35.5 degrees Celsius;

**Stratum 3 "Cool":** All neonates with temperatures greater than 35.5 degrees Celsius and less than or equal to 36.5 degrees Celsius;

**Stratum 4 "Euthermic":** All neonates with temperatures greater than 36.5 degrees Celsius and less than or equal to 37.5 degrees Celsius;

**Stratum 5: "Overly warm":** All neonates with temperatures greater than 37.5 degrees Celsius.

**Step 8.** Calculate the percent of neonates who are in each stratum:

=  $[100*\text{number of children in each stratum}] / [\text{total number of infants eligible for the measure}]$ . Percents should be reported to 2 decimal places.

Minimum sample size for reporting overall nursery rates is N=20; Reporting should be further stratified by the application of stratification variables as described below to both the numerator and the denominator. Reporting strata with denominator samples less than N=15 should not be reported.

**Step 9. (Optional)** Calculate 90% confidence intervals around each reported percentage as

$1.68 * [\text{square root of the } [\text{proportion in the confidence interval} * (\text{one minus that percentage}) / \text{the eligible N}].$

**Step 10.** Using eligible births and qualified temperatures, repeat steps 8 and 9 and report for each stratification category listed below, using the following data elements:

- i. Birthweight (3 birthweight categories: <999 grams; 1000-1499 grams; 1500-2499 grams)
- ii. Perform stratifications as indicated herein (report for each stratum where denominator  $\geq 15$ ):
  - a. Race and ethnicity (Using White non Hispanic, Black non Hispanic, Hispanic, Asian/Pacific Islander, other)
  - b. Insurance type (Public/Medicaid, Private/Commercial, None/Other)
  - c. Admission source (use 3 categories: inborn, transported, transferred from newborn nursery)

Location of delivery

APPLY THESE RULES IN ORDER. STOP WHEN CATEGORIZED

- i. Categorize location of delivery as birthing room if:
  1. Location was identified as delivery room on the labor and delivery suite but was not an operating room  
OR
  2. Location was identified as a birthing room or equivalent  
OR
  3. Infant was a vaginal delivery other than a multiple gestation AND Operating Room or equivalent (C-section room would be an example of an equivalent to an operating room) is not specified as location.
- ii. Otherwise categorize location as OPERATING ROOM if:
  1. Location was identified as an operating room or equivalent, OR
  2. If neonate was delivered by c-section, OR
  3. If infant was a multiple gestation (and location is unspecified) OR
  4. If location is identified as Emergency Department OR other

- d. 5 minute Apgar score (Apgar of 5 or less versus 6 or more)
- e. Benefit Category (Benefit category (HMO, PPO, Medicaid Primary Care Management Plan, Fee for service, Other)
- f. Urban Influence Code(1) or UIC. (2013 urban influence codes available at: <http://www.ers.usda.gov/data-products/urban-influence-codes.aspx#.UZUvG2cVoj8> .

Use mother's place of residence to determine UIC. State and County names can be linked or looked up directly or zip codes can be linked to County indirectly, using the Missouri Census Data Center (<http://mcdc.missouri.edu/>).

- g. Level of Poverty in the County of Residence. The percent of all residents in poverty by county are available from the US Department of Agriculture at <http://www.ers.usda.gov/data-products/county-level-data-sets/download-data.aspx> Our stratification standards are based on 2011 US population data that we have analyzed with SAS 9.3.

Using Mother's state and county of residence (or equivalent) or FIPS code, use the variable PCTPOVALL\_2011 to categorize into one of 5 Strata:

- i. Lowest Quartile of Poverty if percent in poverty is  $\leq 12.5\%$
  - ii. Second Quartile of Poverty if percent in poverty is  $> 12.5\%$  and  $\leq 16.5\%$
  - iii. Third Quartile of poverty if percent in poverty is  $> 16.5\%$  and  $\leq 20.7\%$
  - iv. First upper quartile (75<sup>th</sup>-90<sup>th</sup>) if percent in poverty is  $> 20.7\%$  and  $\leq 25.7\%$
  - v. Second upper quartile ( $> 90^{\text{th}}$  percentile) if percent in poverty exceeds 25.7%
- iii. Repeat stratifications a-g within birthweight categories (report for all strata for which denominator  $\geq 15$ )