# ODM Methods for CHIPRA's Core Set of Children's Quality Measures

**Provider Agreement Effective July 1, 2013 to June 30, 2014**

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These methods are based on the CHIPRA Initial Core Set Technical Specifications Manual 2013 developed by the Centers for Medicare & Medicaid Services (CMS), Center for Medicaid, CHIP and Survey & Certification Children and Adults Health Programs Group.

The sources of the data for these measures are as follows:
(1) MCP submitted encounter data as submitted and accepted by ODM.
(2) Vital statistics data file from the Ohio Department of Health to identify birth weight.
(3) ODM's data warehouse file to obtain recipient demographic, enrollment, and eligibility information.

**NOTE: Unless otherwise noted, codes are stated to the minimum specificity required. For example, if a code is presented to the third digit, any valid fourth or fifth digits may be used for reporting. When necessary, a code may be specified with an "x," which represents a required digit.**

**In addition, CMS' CHIPRA Initial Core Set Technical Specifications Manual 2013 does not specify a minimum enrollment criterion for these measures. Therefore, a minimum enrollment criterion is not included.**

# CHIPRA MEASURES

## Percentage of Live Births Weighing Less than 2,500 grams

*The percentage of women who delivered live births less than 2,500 grams during the reporting year.*

**Numerator**: Number of resident live births less than 2,500 grams in the denominator. Data from the Vital Statistics file will be used to determine birth weight.

**Denominator**: Number of resident live births during the reporting year (see *Steps for Identifying Live Births* below).

**Data Source**: Encounter Data, Vital Statistics Data, Data Warehouse Demographic and Enrollment data

**Report Period**: January 1, 2013 - December 31, 2013

**Measure Steward**: Centers for Disease Control and Prevention (CDC)

***Steps for Identifying Live Births:***

***Step 1:*** Identify live births. For the desired date range, identify all members that have claims containing any of the codes listed in *Table 1: Codes to Identify Live Births*. Exclude all deliveries whose admission date (first date of service) is not during the reporting year.

**Table 1: Codes to Identify Live Births**

| **ICD-9-CM Diagnosis Codes** |
|---|
| 650 -Normal Delivery |
| V27.0 - Single liveborn |
| V27.2 - Twins, both liveborn |
| V27.3 - Twins, one liveborn and one stillborn |
| V27.5 - Other multiple birth, all liveborn |
| V27.6 - Other multiple birth, some liveborn |
| V30 - Single liveborn |
| V31 - Twin, mate liveborn |
| V32 - Twin, mate stillborn |
| V33 - Twin, unspecified |
| V34 - Other multiple, mates all liveborn |
| V35 - Other multiple, mates all stillborn |
| V36 - Other multiple, mates live- and stillborn |
| V37 - Other multiple, unspecified |
| V39 - Unspecified |

***Step 2:*** Identify deliveries for members not identified in Step 1. For the reporting period, identify all members that have encounters containing any of the codes listed in *Table 2: Codes Used to Identify Deliveries*. Exclude all deliveries whose admission date (first date of service) is not during the reporting year.

**Table 2: Codes Used To Identify Deliveries**

**ICD-9-CM Procedure Codes:**

72.x Forceps, vacuum, and breech delivery
73.x Other procedures inducing or assisting delivery
74.0 Cesarean section and removal of fetus; Classical cesarean section
74.1 Cesarean section and removal of fetus; Low cervical cesarean section
74.2 Cesarean section and removal of fetus; Extraperitoneal cesarean section
74.4 Cesarean section and removal of fetus; Cesarean section of other specified type
74.99 Cesarean section of unspecified type

**ICD-9-CM Diagnosis Codes:**

640.x1, 641.x1, 642.x1, 642.x2, 643.x1, 644.21, 645.x1, 646.x1, 646.x2, 647.x1, 647.x2, 648.x1, 648.x2, 649.x1, 649.x2, 651.x1, 652.x1, 653.x1, 654.x1, 654.02, 654.12, 654.32, 654.x2, 655.x1, 656.01, 656.11, 656.21, 656.31, 656.51, 656.61, 656.71, 656.81, 656.91, 657.01, 658.x1, 659.x1, 660.x1, 661.x1, 662.x1, 663.x1, 664.x1, 665.01, 665.x1, 665.x2, 666.x2, 667.x2, 668.x1, 668.x2, 669.x1, 669.x2, 670.02, 671.x1, 671.x2, 672.02, 673.x1, 673.x2, 674.x1, 674.x2, 675.x1, 675.x2, 676.x1, 676.x2, 678.x1, 679.x1, 679.x2

**CPT Codes:**

59400 Routine obstetrical care including antepartum and postpartum care and vaginal delivery
59409 Vaginal delivery (with or without episiotomy and/or forceps)
59410 Obstetrical care for vaginal delivery only, including postpartum care
59510 Cesarean delivery
59514 Cesarean delivery only
59515 Cesarean delivery only; including postpartum care
59610 VBAC delivery
59612 Vaginal delivery only, after previous cesarean delivery (with or without episiotomy and/or forceps)
59614 VBAC care after delivery; vaginal delivery only, after previous cesarean delivery, including postpartum care
59618 Attempted VBAC delivery
59620 Cesarean delivery only, following attempted vaginal delivery after previous cesarean delivery
59622 Attempted VBAC after care, cesarean delivery only, following attempted vaginal delivery after previous cesarean delivery, including postpartum care

***Step 3:*** For members identified in Step 2, use *Table 3: Codes Used to Verify Live Births* to exclude members that have a delivery claim not resulting in a live birth.

| **Table 3: Codes Used to Verify Live Births** |
|---|
| **Exclude Deliveries Not Resulting in a Live Birth:** |
| 630-637 Other abnormal product of conception, hydatidiform mole, ectopic or abdominal pregnancy, missed or spontaneous abortion, legally/illegally induced abortion, legally unspecified abortion |
| 639 Complications following abortion or ectopic and molar pregnancies |
| 656.4 Intrauterine death affecting management of mother |
| 768.0 Fetal death from asphyxia or anoxia before onset of labor or at unspecified time |
| 768.1 Fetal death from asphyxia or anoxia during labor |
| V27.1 Outcome of delivery, single stillborn |
| V27.4 Outcome of delivery, twins, both stillborn |
| V27.7 Outcome of delivery, other multiple birth, all stillborn |

***Step 4:*** Attach member's demographic information for all live births identified in steps 1 and 3.

***Step 5:*** For any claims identified as mother's claims (where the member's date of birth is not the reporting year), attach possible infant demographics to each claim.

An infant pool is created by looking at all members whose date of birth in the demographics file is during the reporting year. Mothers and infants are considered a potential match if the infant's date of birth is within 14 days of the admission date of the claim and either the last names are the same for the mother and infant or the address and zip code are the same for mother and infant. The resulting data file should contain the elements listed in *Table 4: Birthfile Data Elements*.

While delivery claims are most often assigned to the mother, the infant's demographic information gives additional fields to match to information in the vital statistics file and helps to limit the erroneous matches that could occur based on the mother's information alone. Also, for mothers with multiple births, the mothers' information should be matched to multiple infants in the vital statistics file. Attaching the infants' information to the mothers' prior to linking to the vital statistics file aids in ensuring that all infants are included in the measure. Where it was not possible to match a mother with an infant, only the mother's information was used to link to the vital statistics file.

| **Table 4: Birthfile Data Elements** | | |
|---|---|---|
| Claim Number | Child's Middle Initial | Mother's First Name |
| Child's Member ID | Child's Last Name | Mother's Last Name |
| Plan Name | Child's Gender | Mother's Middle Initial |
| CRISE ID | Child's Date of Birth | Mother's Race |
| Child's First Name | Mother's Member ID | Mother's Date of Birth |

***Step 6:*** Attach demographic information from the name and address file provided by the Ohio Department of Health (ODH) to the vital statistics file by matching unique certificate numbers in each file. The resulting file should contain the data elements listed in *Table 5: Vital Stats File Data Elements*.

| Table 5: Vital Stats File Data Elements | | | |
|---|---|---|---|
| Certificate Number | Mother's First Name | Mother's Date of Birth | Birth weight |
| Child's First Name | Mother's Middle Initial | Child's Date of Birth | Plural Birth Indicator |
| Child's Middle Initial | Mother's Last Name | Child's Gender | Birth Order |
| Child's Last Name | Mother's Race | County of Birth | Indicator of Live Birth |

***Step 7:*** Common unique identifiers derived from ODM's demographic data and encounter data (i.e., birthfile), and the vital statistics data (i.e., vital stats file) are used to match infants and mothers to the birth weight information recorded in the vital statistics data. This linking process is performed using the statistical programming software SAS. Additional information about the automated linking process through SAS can be found in Appendix A. Using SAS, two iterations of linking will be performed. Two iterations are performed in order to reduce processing time by blocking the data as explained below. Prior to performing the second iteration, mothers and infants that were matched in a previous iteration will be removed before attempting to link the files again. The following are parameters that will be used to create a Cartesian join in SAS to compare pairs of records.[1]

a. Blocking the Data – The blocking variable used in the first iteration will be Child's Date of Birth. This means that two people will be compared only if their child's date of birth is the same. For the second iteration, a dummy variable will be used for blocking so that all members in the first file will be compared to all members of the second file.

b. Identify Matching Variables – A total of 10 variables will be used to match the records between the two files. These variables and the corresponding match methods used are listed in Table 6: Matching Variables. The same matching variables will be used in all iterations. All 10 variables will be used together to derive a matching score. The total sum of the matching scores for each variable determines how closely one record in one file matches a record in the second file.

| Table 6: Matching Variables | |
|---|---|
| **Variable Name** | **Match Method** |
| Child's Date of Birth | Inexact |
| Mother's Date of Birth | Inexact |
| Child's Last Name | Inexact |
| Child's First Name | Inexact |
| Child's Middle Initial | Exact |
| Mother's Last Name | Inexact |
| Mother's First Name | Inexact |
| Mother's Middle Initial | Exact |
| Mother's Race | Exact |

[1] A Cartesian join is a join of every row of one table to every row of another table. This type of merging allows each record of the birthfile to be compared to each record in the vital stats file regardless of whether any of the fields in both records are an exact match or not.

| Table 6: Matching Variables | |
|---|---|
| **Variable Name** | **Match Method** |
| Child's Gender | Exact |

c. Calculating Matching Scores – Matching scores will be calculated based on both exact matching and inexact matching methods outlined below.

1. Basic Scoring – The following points will be assigned for matching: (1) zero points if one field is missing in either record, (2) positive points for matching, and (3) negative points for not matching. The number of possible points for each field is determined by the type of field and whether the two records are an exact match or a partial match. For fields where only exact matches are possible (i.e., race, gender), 5 points are given for an exact match. For date fields, 10 points are assigned for exact matches. For name fields, the maximum number of points assigned to a name is based on the frequency of the name as described below. In all fields, -5 points are assigned if the two records are not a match at all.

2. Weighting Names by Frequency – A name with a higher frequency will receive fewer matching points than a name with a lower frequency. The maximum number of points assigned to each name is calculated as $-\log_2$ (frequency of the name).

3. Inexact Matching Methods – Partial points will be assigned to a matching score for the following fields:

    i. For dates, 9 points will be assigned if the day and month are transposed between records. Additionally, 6 points will be assigned if two of the three fields match.

    ii. For name fields, two methods of inexact matching will be utilized. First, the COMPLEV function will be used as an "edit-distance" method to see how many letters you have to add, delete, or change to get from one name to the other (e.g., changing "hope" to "horse" requires two letter changes). The percentage of letters that have to be altered to change a name in one record to the name in the comparison record will be used to determine the amount of partial points assigned. If the percentage of letters changed is less than 25 percent, the number of points will be 80 percent of the maximum point value for that name. If the percentage of letters changed is greater than 25 percent and less than 35 percent, the number of points will be 60 percent of the maximum point value for that name. If the percentage of letters changed is greater than or equal to 35 percent, the SOUNDEX function will be used to compare how similar the two names sound. If the SOUNDEX is the same for both records, the number of points will be 50 percent of the maximum point value for that name. If the first letter of the name does not match between records but the remaining SOUNDEX values are the same, the number of points will be 30 percent of the maximum point value for that name.

d. Determining a Threshold – Once all records have been assigned a total match score, a threshold will be chosen to determine what minimum matching score will be considered a good match. The following steps will be performed:

    1. Create a histogram of the matches. The resulting graph should have a bimodal distribution with two local maxima and a local minimum. A threshold will be set somewhere near the local minimum of the graph. The value of the threshold will depend on the data and the goal of the threshold is to include true matches while excluding false matches.

    2. Once a threshold is chosen, a random sample of matches near the threshold will be reviewed to ensure the chosen threshold is an appropriate cutoff.

e. Create a Unique ID – A unique identifier for each link will be created. The Medicaid ID from the Birthfile data combined with the Certificate Number from the vital stats file will serve as the unique ID.

***Step 8:*** Calculate rates using the birth weight listed in the vital statistics file.

## Annual Number of Asthma Patients with at least One Asthma-related Emergency Room Visit

*The percentage of pediatric patients with an asthma diagnosis who have one or more asthma-related ED visit during the reporting period.*

**Numerator**: Patients with one or more asthma-related ED visits (Table 8). The asthma diagnosis (Table 7) must be the primary diagnosis on the ED encounter.

**Denominator**: Children two through 20 years of age as of the end of the reporting period with a diagnosis of asthma (Table 7) during the reporting period. Members with a diagnosis code in Table 9 should be excluded.

**Data Source**: Encounter Data, Data Warehouse Demographic and Enrollment Data

**Report Period**: January 1, 2013 - December 31, 2013

**Measure Steward**: Alabama Medicaid

| Table 7: Diagnosis Codes to Identify Asthma |
|---|
| 493.00, 493.01, 493.02, 493.10, 493.11, 493.12, 493.81, 493.82, 493.90, 493.91, 493.92 |

| Table 8: CPT Codes to Identify ED Visits |
|---|
| 99281-99285 |

| Table 9: Diagnosis Code Exclusions |
|---|
| 493.20, 493.21, 493.22 |

# Appendix A: Linking Process Through SAS

For SFY 2014, ODM is automating the linking process through SAS rather than using LinkPlus as was discussed in the previous year's methodology. SAS allows for a more standardized, automated approach to calculate the Percentage of Live Births Weighing Less than 2,500 grams measure. Using the previous methodology, the measure used two separate programs to create the rates. SAS was used for data preparation and rate calculation, while LinkPlus was used to match claims data to vital statistics data. One disadvantage of this methodology was the amount of manual review that was required by LinkPlus. This manual review was not only time intensive but also made replication of results difficult since the process was very user dependent. By using SAS, the process is more streamlined and will require less manual work. The SAS program uses many of the same linking techniques as LinkPlus (e.g., partial date and name matching methods) and takes less time overall to calculate the rates.