The Ohio Department of Medicaid's Methods for CHIPRA's Core Set of Children's Quality Measures

Provider Agreement Effective July 1, 2014 to June 30, 2015

FINAL

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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) Managed care plan (MCP) submitted encounter data as submitted and accepted by ODM.
(2) Medicaid fee-for-service (FFS) claims data.
(3) Vital statistics data file from the Ohio Department of Health to identify birth weight.
(4) 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.

The linking process, described below on page 6, is a complex process that is always being assessed for potential improvements. As a result, additional enhancements to the linking process may be made to the methods to increase the match rate.

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, FFS Data, Vital Statistics Data, Data Warehouse Demographic and Enrollment data

Report Period: January 1, 2014 - December 31, 2014

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
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 age is between 10 and 65 years of age at the start of 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 they meet any of the five scenarios listed below:[1]

1. The last names, address, and zip code are the same for the mother and infant.
2. The address and zip code are the same for the mother and infant.
3. The last names are the same for the mother and infant.

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.

4. A similarity score will be calculated using the COMPLEV function as follows:

$$Number\ of\ Changes\ Made \div Max\ Length\ of\ the\ Mom\ and\ Baby\ Last\ Name$$

Records with a value less than or equal to 0.25 will be considered a match.

[1] Pairs matched in a given step are removed based on member ID and first date of service before proceeding to the subsequent step.

5. Using the methodology outlined in step 4, records with values between 0.25 and 0.35 will be considered a match.

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
	Mother's Maiden Name	Father's Last Name	

Linking Process

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.

First Iteration

The following are parameters that will be used to create a Cartesian join in SAS to compare pairs of records.[2]

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.
b. Identify Matching Variables – A total of 12 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 12 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.
c.

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
Child's Gender	Exact
Mother's Maiden Name	Inexact
Father's Last Name	Inexact

d. Calculating Matching Scores – Matching scores will be calculated based on both exact matching and inexact matching methods outlined below. Only fields that are populated in both files will count towards the score.

    1. Exact Matching Methods – 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

[2] 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.

frequency of the name as described below. In all fields except for race, -5 points are assigned if the two records are not a match at all. Race variables that do not match will be given 0 points.

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

    i. Weighting Names by Frequency – The inverse natural log of the overall frequency of a name from the birthfile determines the maximum points a matching name can receive. Therefore, a name with a higher frequency will receive fewer matching points than a name with a lower frequency.

    ii. 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.

    iii. 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.

e. 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.

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.

Second Iteration

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 processes described in items a through f above will be performed with the remaining mothers and infants. One difference to the first iteration processes is noted below:

a. Blocking the Data – For the second iteration, a dummy variable will be used for blocking so that all remaining members in the first file will be compared to all remaining members of the second file.

The results of the two iterations are combined to create a master file of linked claims and vital statistics records. In the event of a vital statistics record matching to more than one claim only the highest scoring pair will be retained. If there is a tie, both pairs will be dropped as the best match cannot be determined. In the event of a claim matching to more than one vital statistics record, the vital statistics records will be analyzed to determine if it is a result of multiple births.

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.

Rate Calculation

Calculate rates using the birth weight listed in the vital statistics file.

Appendix A

Linking Process Through SAS

Starting with SFY 2014, ODM has automated the linking process through SAS rather than using LinkPlus. 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 requires 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.