

## Approaches to Developing State-Level Rates Using Data from Multiple Sources

### Introduction

The Child and Adult Core Sets of health care quality measures are designed to provide a national- and state-level snapshot of the quality of care provided to children and adults enrolled in Medicaid and the Children's Health Insurance Program (CHIP). In many states, data for the measures are collected separately by multiple entities, such as by program (Medicaid or CHIP); payment system (fee-for-service [FFS], primary care case management [PCCM], or managed care [MC]); health plan; or provider. We refer to each of these entities as reporting units. In such cases, states would have to combine separate rates across multiple reporting units to produce a single state-level rate that represents the quality of health care for children or adults, regardless of the program in which they are enrolled, the system used to pay for their care, or the health plans or providers that serve them. Development of a state-level rate based on data from multiple reporting units requires weighting the individual rates according to the size of the eligible population represented by each reporting unit. This technical assistance (TA) brief suggests approaches to developing state-level rates using data from multiple reporting units.

### Background

Depending on how a state organizes its Medicaid and CHIP programs, the number and kinds of reporting units that contribute to a state-level rate may vary. For example, states that enroll all of their Medicaid/CHIP beneficiaries in a FFS delivery system may calculate a single, state-level rate across their entire Medicaid/CHIP population. In other states, Medicaid and CHIP programs might collect data separately, and their data would have to be combined across the two programs to produce a state-level rate. States might also need to combine data across different payment systems, such as FFS and MC. Similarly, if multiple managed care plans each report a separate rate,

### About This Brief

*This technical assistance brief suggests approaches for developing state-level rates for the core sets of Medicaid/CHIP health care quality measures, where separate rates are reported across multiple reporting units (such as by program, payment system, health plan, or provider). This brief also discusses how state-level rates should be reported in the CHIP Annual Reporting Template System (CARTS) and caveats about calculating and interpreting state-level rates to measure health care quality in Medicaid/CHIP.*

states would have to combine rates across plans. The general approach for combining the data are the same, regardless of the number and kinds of reporting units across which the data are combined. The key factor, as discussed in this brief, is the method(s) used by the reporting units to calculate the measure.

- The *administrative method* calculates a rate based on the entire eligible population for the measure. Administrative data sources may include claims and encounter data, registries, and vital records.
- The *hybrid method* calculates a rate based on a sample of the eligible population, using a combination of administrative and medical records data to identify individuals in the measure-eligible population (denominator) who received the service included in the numerator.<sup>1</sup>

<sup>1</sup> More information on the hybrid method can be found in the technical assistance brief, "Using the Hybrid Method to Calculate Measures from the Child and Adult Core Sets," available at <http://www.medicaid.gov/Medicaid-CHIP-Program-Information/By-Topics/Quality-of-Care/Downloads/Hybrid-Brief.pdf>.

## Creating State-Level Rates Across Multiple Reporting Units Using the Administrative Method

For the Child and Adult Core Set measures that rely on administrative data sources exclusively, the rates are calculated for the *entire* eligible population as defined in the measure specifications. In this context, the term *eligible population* refers to the population included in the measure (that is, the denominator). The eligible population for each measure is defined in the technical specifications for the Child and Adult Core Sets (<http://www.medicaid.gov/License-Agreement.html>).

When data reside in independent administrative data systems, separate numerators, denominators, and rates may first be calculated by the reporting unit (such as program, provider, or health plan). In these situations, combining the data across reporting units is straightforward. So long as the reporting units are mutually exclusive, each reporting unit for which the measure is calculated contributes proportionately to the state-level rate, and no further weighting of results is required because the reporting unit's denominator is the same as its eligible population for that measure. Table 1 shows an example for four reporting units (such as four health plans), in which rates can be combined by summing the denominators (column 2) and numerators (column 3) to produce a state-level rate (column 4). In this example, the rate across the four reporting units is 71.9 percent (= 241,000/335,000).

**Table 1. Combining Administrative Method Results Across Multiple Reporting Units**

Reporting Unit	Denominator	Numerator	Rate
(Column 1)	(Column 2)	(Column 3)	(Column 4)
A	10,000	8,000	80.0%
B	25,000	15,000	60.0%
C	100,000	70,000	70.0%
D	200,000	148,000	74.0%
<b>State-Level Total</b>	<b>335,000</b>	<b>241,000</b>	<b>71.9%</b>

## Creating State-Level Rates Across Multiple Reporting Units Using the Hybrid Method

The hybrid method calculates results for a sample of the eligible population, using a combination of administrative and medical records data. When separate samples are drawn and individual rates are calculated by different reporting units—such as individual programs (Medicaid and CHIP) or individual health plans—the state-level rate is the average of the rates for each of the reporting units, weighted by the size of the eligible population for each of those units.

For each reporting unit, the sample size is the denominator of the measure. For every case in the sample, administrative data are used to find evidence of the numerator service, such as a prenatal visit or immunization. For cases in the sample in which the administrative data do not yield evidence of the numerator service, the medical records are then searched for evidence of the service. The numerator events found through administrative data and medical record review are combined to form the numerator for the measure. The rate for the reporting unit is the numerator divided by the denominator (the sample size).

To combine rates calculated across multiple reporting units using the hybrid method, the rates must be weighted by the eligible population for each of the units (referred to as the *measure-eligible population*). State-level rates are produced using the following steps, as illustrated in Table 2:

1. Sum the measure-eligible population across the reporting units to derive a state-level total (column 2).
2. Divide each reporting unit's measure-eligible population by this sum to get the weight for each reporting unit (column 3). For example, the weight for reporting unit A is  $10,000/335,000 = 0.0299$ .
3. Multiply the rate for each reporting unit (column 6) by its corresponding weight (column 3) to get the weighted rate (column 7).
4. Sum the weighted rates across all reporting units to get the weighted state-level rate. In this example, the weighted state-level rate is 72.0 percent.

**Table 2. Combining Rates Calculated Using the Hybrid Method Across Multiple Reporting Units**

Reporting Unit	Measure-Eligible Population	Weight <sup>a</sup>	Denominator (Sample Size)	Numerator	Rate <sup>b</sup>	Weighted Rate <sup>c</sup>
(Column 1)	(Column 2)	(Column 3)	(Column 4)	(Column 5)	(Column 6)	(Column 7)
A	10,000	0.0299	411	329	80.0%	2.4%
B	25,000	0.0746	411	247	60.1%	4.5%
C	100,000	0.2985	411	288	70.1%	20.9%
D	200,000	0.5970	411	304	74.0%	44.2%
<b>State-Level Total</b>	335,000	1.0000	n.a.	n.a.	n.a.	<b>72.0%</b>

<sup>a</sup> The weight is calculated by dividing the measure-eligible population for each reporting unit by the state-level total eligible population; for example, the weight for reporting unit A is calculated as 10,000/335,000 = 0.0299.

<sup>b</sup> The rate is calculated by dividing the numerator by the denominator for each reporting unit; for example, the rate for reporting unit A is calculated as 329/411 = 0.80 or 80 percent.

<sup>c</sup> The weighted rate is calculated by multiplying the weight and rate for each reporting unit; for example, the weighted rate for reporting unit A is calculated as 0.0299 x 0.80 = 0.024 or 2.4 percent.

n.a. = not applicable

### Creating State-Level Rates Across Multiple Reporting Units Using a Combination of Administrative and Hybrid Methods

States might have to combine rates developed using the administrative method for some reporting units and the hybrid method for others. For example, in a state that has both FFS and MC delivery systems, the FFS rate may be calculated using the administrative method and the MC rate may be calculated using the hybrid method. Table 3 demonstrates how to combine rates calculated using different methods. For rates calculated using the administrative method (reporting units A and C), the measure-eligible population (column 2) and denominator (column 4) are the same. In contrast, for rates calculated using the hybrid method (reporting units B and D), the measure-eligible population (column 2) and denominator (column 4) differ because the denominator reflects the sample size. Thus, the numerators and denominators for the two reporting units using administrative data (A and C) are larger than those for the two reporting units that use a sample (B and D). To combine the rates across reporting units, a weight (column 3) is applied to the rate (column 6) for each reporting unit. The weight for each reporting unit reflects the proportion of the measure-eligible population to the total measure-eligible population in the state, and the state-level rate shown in column 7 is the sum of the weighted rates across reporting units (72.0 percent).

### Reporting State-Level Rates in CARTS

CARTS is the web-based reporting system that states use to report the Child and Adult Core Set measures. CARTS allows states to report a single numerator, denominator, and rate for each measure (or component of a measure). Reporting a single numerator and denominator value is possible when: (1) there is a single sample for the entire state, regardless of the method used to calculate the rate, or (2) the state has combined multiple rates that were derived using the administrative method.

When a state combines data across multiple reporting units, all or some of which use the hybrid method (such as the examples shown in Tables 2 and 3), the state should report the rate for the combined data in the “Rate” field in CARTS, and enter zeros in the “Numerator” and “Denominator” fields. In addition, check “Yes” under “Did you Combine Rates from Multiple Reporting Units (e.g., health plans, delivery systems, programs) to Create a State-Level Rate.” If possible, provide the numerators, denominators, measure-eligible population, and rates for each health plan, delivery system, or program in the field labeled “Additional Notes on Measure,” as well as a description of the method used to calculate the state-level rate (including the approach used for weighting).

**Table 3. Combining Results Calculated Using Both Administrative and Hybrid Methods Across Multiple Reporting Units**

Reporting Unit (Method)	Measure-Eligible Population	Weight <sup>a</sup>	Denominator (Total or Sample Size)	Numerator	Rate <sup>b</sup>	Weighted Rate <sup>c</sup>
(Column 1)	(Column 2)	(Column 3)	(Column 4)	(Column 5)	(Column 6)	(Column 7)
A (Admin)	10,000	0.0299	10,000	8,000	80.0%	2.4%
B (Hybrid)	25,000	0.0746	411	247	60.1%	4.5%
C (Admin)	100,000	0.2985	100,000	70,000	70.0%	20.9%
D (Hybrid)	200,000	0.5970	411	304	74.0%	44.2%
<b>State-Level Total</b>	<b>335,000</b>	<b>1.0000</b>	<b>n.a.</b>	<b>n.a.</b>	<b>n.a.</b>	<b>72.0%</b>

Note: In column 4, the denominator shown for reporting units A and C is the measure-eligible population, whereas the denominator for reporting units B and D is the sample size. The measure-eligible population is shown for reporting units using administrative data to calculate the rate, whereas the sample size is shown for reporting units using the hybrid method.

<sup>a</sup> The weight is calculated by dividing the measure-eligible population for each reporting unit by the state-level total population; for example, the weight for reporting unit A is calculated as  $10,000/335,000 = 0.0299$ .

<sup>b</sup> The rate is calculated by dividing the numerator by the denominator for each reporting unit; for example, the rate for reporting unit A is calculated as  $8,000/10,000 = 0.80$  or 80 percent.

<sup>c</sup> The weighted rate is calculated by multiplying the weight and rate for each reporting unit; for example, the weighted rate for reporting unit A is calculated as  $0.0299 \times 0.80 = 0.024$  or 2.4 percent.

n.a. = not applicable.

### Caveats About State-Level Rates Involving Multiple Reporting Units

Calculating measures across multiple reporting units is more complex than calculating measures for a single reporting unit. Combining data across programs, payment systems, health plans, or providers can introduce several issues that might affect the rates. For example, methods can vary (even when following the same specifications) and introduce inconsistencies in how the rates are produced across reporting units. As another example, some children or adults may be excluded inadvertently (such as those transferring between programs or health plans), and some can even be double-counted, depending on how the eligible population is specified by each reporting unit. To minimize the effect of these issues, individuals should be attributed to the program in which they were enrolled at the end of the continuous enrollment period, or on the date of the qualifying event (such as their 64th birthday or delivery date of a newborn). States should note any deviations from the measure specifications in CARTS.

States should also be aware that results can vary depending on the source of data used. Research has shown that for measures in which either the administrative or the hybrid

method can be used, rates calculated using administrative data are often lower than rates calculated using both administrative and medical records data. This is because services often are not consistently or completely coded in claims/encounter data and because it is difficult to identify relevant exclusions that are apparent in the medical record but not coded in administrative data (Pawlson et al. 2007; Angier et al. 2014).

### For Further Information

Background information on the Child and Adult Core Set measures, guidance for collecting and reporting the measures, and technical specifications for each measure can be found in the Specifications and Resource Manuals for Federal Fiscal Year (FFY) 2014 Reporting, available at <http://www.medicaid.gov/License-Agreement.html>.

For TA related to calculating and reporting state-level rates or other measurement-related topics, contact the TA mailbox at [MACQualityTA@cms.hhs.gov](mailto:MACQualityTA@cms.hhs.gov).

## References

Angier, H., R. Gold, C. Gallia, A. Casciato, C. J. Tillotson, M. Marino, R. Mangione-Smith, and J. E. DeVoe. "Variation in Outcomes of Quality Measurement by Data Source." *Pediatrics*, vol. 133, no. 6, June 2014, pp. e1676–e1682.

Centers for Medicare & Medicaid Services, Center for Medicaid and CHIP Services. "Core Set of Children's Health Care Quality Measures for Medicaid and CHIP: Technical Specifications and Resource Manual for Federal Fiscal Year 2014 Reporting." Baltimore, MD: CMS, July 2014. Available at <http://www.medicaid.gov/License-Agreement.html>.

Centers for Medicare & Medicaid Services, Center for Medicaid and CHIP Services. "Core Set of Health Care Quality Measures for Adults Enrolled in Medicaid: Technical Specifications and Resource Manual for Federal Fiscal Year 2014 Reporting." Baltimore, MD: CMS, May 2014. Available at <http://www.medicaid.gov/License-Agreement.html>.

Centers for Medicare & Medicaid Services, Center for Medicaid and CHIP Services. "Using the Hybrid Method to Calculate Measures from the Child and Adult Core Sets." Baltimore, MD: CMS, October 2014. Available at <http://www.medicaid.gov/Medicaid-CHIP-Program-Information/By-Topics/Quality-of-Care/Downloads/Hybrid-Brief.pdf>.

Pawlson, G., Sarah Hudson Scholle, and Anne Powers. "Comparison of Administrative-Only Versus Administrative Plus Chart Review Data for Reporting HEDIS Hybrid Measures." *American Journal of Managed Care*, vol. 13, no. 10, October 2007, pp. 91–96.