TennCare's Episodes of Care: description of risk adjustment for Wave 4 episodes

Tennessee | Medicaid

Attention deficit hyperactivity disorder (ADHD); oppositional defiant disorder (ODD); coronary artery bypass graft (CABG); valve repair and replacement (VALVE); acute exacerbation of congestive heart failure (CHF); bariatric surgery

The State of Tennessee has implemented a bundle-based approach to reimburse providers for the care delivered to patients enrolled in the state's Medicaid program. Bundled payments cover all the services provided to a patient for treatment of a specific condition during a defined episode of care, including services related to diagnosing, managing, and treating that condition. The actual provision of services to a specific patient for a specific condition is herein called an *episode*, while the grouping for payment of episode-related services normally used to treat the condition is called a *bundle*. This distinction is useful because the state may choose as a matter of policy to exclude from the bundle some of the services in an episode. For each of these patients and episodes, a provider will be determined to have overall responsibility (the episode *quarterback*). The total cost of care for each quarterback in delivering all bundled services will be measured and compared with targets and thresholds to determine overall performance.

The comparison of bundle costs for a provider is based on the average risk-adjusted cost of the provider's episodes with the targets and thresholds established by the state for payment purposes. The healthcare services required to deliver a bundle of care can vary greatly across patient episodes. Risk adjustment quantifies the part of this variation in cost that can be explained by clinical factors such as disease progression, comorbidities, and other patient attributes that correlate with clinical need, including age and gender. A higher risk score for an episode means a higher expected cost relative to other episodes of the same type due to the clinical or demographic factors. Risk-adjusting bundle costs enables more equitable comparisons across providers and with targets and thresholds.

The first phase of this new payment initiative included three bundle types: asthma, acute exacerbation; perinatal; and total joint replacement. An earlier document, which included several detailed examples of episode risk adjustment, described the risk adjustment approach used for these three bundles. This earlier document may provide useful background to those new to bundled payment.

The present document provides details on the approach used by Wellpoint to compute episode risk and to risk-adjust episode costs for the following six bundles: attention deficit hyperactivity disorder (ADHD); oppositional defiant disorder (ODD); coronary artery bypass graft (CABG); valve repair and replacement (VALVE); acute exacerbation of congestive heart failure (CHF); bariatric surgery. It describes the general approach used to measure risk across all six bundle types, followed by a description of the specific risk markers used for each type of bundle.

I. Overview: measuring episode risk

Episode risk models are designed to predict the total *expected cost* for an episode of care — those costs that are expected given the clinical characteristics of the patient and the episode. These costs include the payments for all services received by a patient during the course of an episode. Given a measure of the expected cost, or relative risk, for an episode, actual episode costs can be risk adjusted. Risk-adjusted costs can then be compared across all quarterbacks and combined with targets to determine performance under the program. *Example 1* illustrates this concept.

Example 1 — Bariatric surgery episode risk adjustment:

- A surgeon serves as the quarterback for 10 bariatric surgery episodes during calendar year 2018.
- The total cost for each of those episodes is calculated using costs for all services included in the episode (anesthesia, imaging and testing, evaluation and management, medications, and so on).
- The characteristics of the 10 patients and their episodes are used to assign a risk score to each individual episode. This risk score represents the relative expected costs of each episode based on clinical and patient factors such as age, gender, diagnoses, and disease comorbidities.
- Episode risk is expressed as a relative score. A risk score of 1.000 represents the average risk of episodes for a given set of covered lives. An individual bariatric surgery episode that, based on its clinical and patient factors, is expected to be 10% higher cost than average would be assigned a risk score of 1.100
- The actual total cost for each of the surgeon's episodes is risk-adjusted to compute risk-adjusted total cost. Actual cost is divided by episode risk score so that higher risk episodes will have costs adjusted down, while lower risk episodes will have costs adjusted up, allowing episodes with different risk to be fairly compared. For example, an

episode with a total cost of $33,000 and a risk score of 1.100 would have a risk-adjusted total cost of $30,000.
- The quarterback's overall performance is based on average risk adjusted cost for the 10 episodes. This amount can be compared with that of other providers and with targets to determine performance under the program.

As shown in *Example 1,* all episodes for the quarterback are assessed to determine their relative risk and the quarterback's average risk-adjusted cost is computed.

A unique risk model was developed for each bundle type based on clinical and demographic variables that would influence the potential cost of those specific episodes.

Episode risk models use two key features: *episode risk markers* and *episode risk weights*. Risk markers describe those unique clinical characteristics of an episode that were found statistically to affect episode costs. Risk weights describe a risk marker's incremental relative contribution to expected episode costs, or risk.

As noted above, a separate risk model was developed for each bundle type. As a result, the risk markers and risk weights included in the models differ by bundle type. This is to be expected, given that different clinical factors will have a different impact on bundle costs, depending upon the type of episode.

Five major steps are used to assign a risk score to a bundle:
1. Identify clinical risk markers using clinical input.
2. Assign demographic risk markers.
3. Apply risk weights to each risk marker.
4. Compute an episode risk score.
5. Adjust preliminary risk scores for risk score neutrality.

Each of these steps is described below.

II. Assigning clinical risk markers to an episode
The following steps are used to assign clinical risk markers to an episode:
1. Identify qualified services that can contribute diagnoses to risk marker identification.
2. Identify the set of initial risk markers using clinical criteria.
3. Assign clinically appropriate service timing to risk markers.
4. Reduce to a minimum necessary set of risk markers per bundle using statistical criteria.

II.1 Identify qualified services
Only diagnoses from *qualified* service records are considered when identifying risk markers. Qualified services include such services as office visits, consultations, ER visits, surgeries, and inpatient stays. Nonqualified services include such services as lab or radiology or services

delivered by a DME or ambulance provider. In this way, the methodology does not consider diagnoses from ancillary services or *rule-out* tests. Only services with diagnoses confirmed and assigned by a clinician or facility are used. Qualified services are determined by examining the procedure and revenue codes on an individual service record.

II.2 Identify initial risk markers

Clinical risk markers are based on the diagnoses observed on qualified services. The diagnoses associated with qualified services are grouped into Episode Treatment Groups® (ETGs®). ETGs are then selected for evaluation as a risk marker based on their clinical relevance to the episode and their prevalence in the episodes.[1]

II.3 Assign service timing

Service timing is also important when setting initial clinical risk markers. Three windows of service timing, based on clinical appropriateness, were specified for all ETG-based risk markers: (1) risk marker occurred in the 365 days prior to the episode start through 30 days prior to the episode start (*Comorbidity risk marker, prior* window); (2) risk marker occurred in the 30 days prior to the episode start through end of the episode (*Episode risk marker* window); (3) risk marker occurred in the 365 days prior to the episode start through the episode end (*Comorbidity risk marker, full* window):

- *Episode risk marker* **window** — used to identify risk markers that occurred in the context of the episode itself. The *Episode risk marker* window begins 30 days prior to episode start and extends through the end of the episode.
- *Comorbidity risk marker, full* **window** — used to identify risk markers for other conditions not directly related to the episode that increase the complexity and risk associated with its delivery. This window includes a longer period of time — 365 days prior to the episode start through the episode end.
- *Comorbidity risk marker, prior* **window** — used to identify risk markers for other conditions not directly related to the episode that increase the complexity and risk associated with its delivery. This window covers the 365 days prior to the episode start through 30 days prior to the episode start. This approach allows for recognition of patient comorbidities that might be considered complications of the episode itself, if first observed during the *Episode risk marker* window.

Following this step, all initial clinical risk markers have been assigned to the episode.

II.4 Reduce to the minimum necessary set of risk markers per bundle

After the initial clinical review, the selected set of clinical risk markers are analyzed statistically to determine their impact on costs for the episode being evaluated. Risk factors for inclusion in the final model are determined based on their clinical relevance to the episode and their impact on costs.

III. Assign demographic risk markers to a bundle

Demographic characteristics of patients can also affect risk, either because age and gender can affect coverage decisions or because they serve as proxies for unmeasured clinical attributes. For this reason, the statistical evaluation of potential risk markers also evaluates the extent to which the models should distinguish among patients based on age and gender. Four of the six bundle types include two or more demographic risk markers in the final risk model — based on an individual's age and gender at the time of the trigger event. Age and gender did not have a statistically meaningful effect on the costs of ODD or bariatric surgery, which means that all individuals are assigned the same base risk weight that corresponds to an uncomplicated episode

IV. Apply risk weights to each marker

Each risk marker is assigned a *risk weight*. This risk weight describes a marker's incremental contribution to bundle risk for that bundle type. Model risk weights were estimated using historical data describing a large number of bundles. Additional data from Optum's Normative Health Information (NHI) Database was used to develop the risk models for bundles with low frequency in the Tennessee Medicaid population, specifically CABG, VALVE, and bariatric surgery episodes. The NHI database uses Optum's research data assets, which include administrative claims and enrollment information for both affiliated and nonaffiliated health plans comprising of over 150 million unique lives across all payer types.

The risk weights for each risk model, by episode type are described below, in tables 1 to 6. For each episode, all the demographic and clinical risk markers are captured along with the corresponding risk weights. All identified risk weight values are then added together to achieve the preliminary risk score for that individual episode.

V. Preliminary risk score

A risk scoring formula was applied following the identification of risk markers and the assignment of risk weights. These formulas are used to compute a risk score for each episode.

VI. Adjust preliminary risk for risk score neutrality

The preliminary risk score for an episode is multiplied by an episode specific risk neutrality factor. This factor was based on the adjustment needed to ensure that the average risk score for each episode was equal to 1.00 for Wellpoint. Risk neutrality factors are calculated at the beginning of each performance period. These values are held constant through the performance period to ensure that providers are measured against constant risk-adjusted thresholds. The final risk score after this adjustment is then used to risk adjust the cost of the individual episode.

Example 2 — applying risk neutrality factors:

- All risk factors associated with an episode are identified and the corresponding risk weight values (clinical and demographic) are added together to achieve the preliminary risk score for an individual episode.
- Preliminary risk scores are then multiplied by a risk neutrality factor to ensure that the average risk score for Wellpoint is 1.00.
- The application of the risk neutrality factor will make the final risk score different that the sum of risk weights listed in tables 1 to 6 below.
- For example, if the risk neutrality factor for a cystourethroscopy episode were 0.987 then a 17-year-old woman without other clinical risk factors would have a final risk score of 0.7428 (0.987 multiplied by 0.7526 equals 0.7428).

Please go to Availity Essentials to find the most recent *TennCare's Episodes of Care: Risk Neutrality Factors* document.

1 The methodology described here uses the clinical constructs of Episode Treatment Groups (ETGs) to categorize diagnosis codes into clinically meaningful groups. The clinical constructs within the ETG methodology are defined in terms of both ICD-9-CM and ICD-10-CM/PCS, which means that the risk models described here do not depend upon the underlying coding system used to populate claims.

Tables

Tables 1 to 6 below show the risk weights for attention deficit hyperactivity disorder (ADHD); oppositional defiant disorder (ODD); coronary artery bypass graft (CABG); valve repair and replacement (VALVE); acute exacerbation of congestive heart failure (CHF); bariatric surgery. The risk weights shown in these tables were used to risk-adjust the cost of the individual episodes. The risk score for each episode is the sum of the risk weights for all risk markers observed.

Table 1. Attention deficit hyperactivity disorder (ADHD)

Risk marker description	Risk weight
All, 4 to 8	0.97866
All, 9 to 12	0.85147
All, 13 to 15	0.75761
All, 16 to 20	0.60635
Risk factor — OCD (during 365 days prior to trigger or during episode window)	0.15448
Risk factor — sleep disorders (during 365 days prior to trigger or during episode window)	0.08256
Other neurological diseases (*Comorbidity risk marker, full* window)	0.05107
Risk factor — developmental disorders (during 365 days prior to trigger or during episode window) or developmental disorders (*Comorbidity risk marker, full* window)	0.07822
Family circumstances (during 365 days prior to trigger or during episode window)	0.48216
Risk factor — adjustment reaction (during 365 days prior to trigger or during episode window), risk factor — ODD (during 365 days prior to trigger or during episode window), risk factor — emotional disturbance of childhood and adolescence (during 365 days prior to trigger or during episode window) or risk factor — personality disorders (during 365 days prior to trigger or during episode window)	0.27205
Mood disorder, depressed (Comorbidity risk marker, full window) or risk factor — depression (during 365 days prior to trigger or during episode window)	0.17170
Anxiety disorder or phobias (*Episode risk marker* window)	0.32700
Epilepsy (*Comorbidity risk marker, prior* window)	0.15209

Risk marker description	Risk weight
Cardiovascular diseases signs and symptoms (*Episode risk marker* window)	0.10365
Hearing disorders (*Comorbidity risk marker, full* window)	0.10533

Table 2. Oppositional defiant disorder (ODD)

Risk marker description	Risk weight
All male and female, 4 to 18	0.99136
Brain trauma (*Comorbidity risk marker, full* window)	0.66374
Mood disorder, depressed (*Comorbidity risk marker, full* window)	0.18926
Mood disorder, bipolar (*Comorbidity risk marker, full* window)	0.60004
Chemical dependency related disorders, antenatal origin (*Comorbidity risk marker, full* window)	1.99628
Neurological diseases signs and symptoms (*Comorbidity risk marker, full* window)	0.14666

Table 3. Coronary artery bypass graft (CABG)

Risk marker description	Risk weight
Male, 45 to 64	0.70953
Female, 45 to 64	0.64306
All male and female, 0 to 44	0.73574
Other infectious diseases (*Episode risk marker* window)	0.18306
Nutritional deficiency (*Episode risk marker* window)	0.61555
Other metabolic disorders (*Episode risk marker* window)	0.13115
Opioid or barbiturate dependence (*Comorbidity risk marker, full* window)	0.48948

Risk marker description	Risk weight
Valvular disorder (*Comorbidity risk marker, full* window)	0.16242
Severe ventricular rhythms (*Episode risk marker* window)	0.23861
Other cardiac diseases (*Comorbidity risk marker, full* window)	0.07798
Other inflammatory lung diseases (*Episode risk marker* window)	0.30527
Acute respiratory distress syndrome (*Episode risk marker* window)	0.10668
Acute renal failure (*Episode risk marker* window)	0.19609

Table 4. Valve repair and replacement (VALVE)

Risk marker description	Risk weight
All male and female, 0 to 1	1.14645
Male, 2 to 64	0.31250
Female, 2 to 64	0.21038
Cerebral vascular disease (*Comorbidity risk marker, full* window)	0.34614
Heart failure, diastolic (*Comorbidity risk marker, full* window)	0.14664
Cardiac congenital disorder (*Comorbidity risk marker, full* window)	0.10440
Chromosomal anomalies (*Comorbidity risk marker, full* window)	1.37672
Non-aortic valve (*Comorbidity risk marker, full* window)	0.19766
Other metabolic disorders (*Episode risk marker* window)	0.33084
Other hematologic diseases (*Episode risk marker* window)	0.19140
Severe ventricular rhythms (*Episode risk marker* window)	0.98201
Acute renal failure (*Episode risk marker* window)	0.20916

Table 5. Acute exacerbation of congestive heart failure (CHF)

Risk marker description	Risk weight
Male, 31 to 64	0.38221
Female, 31 to 64	0.41779
All male and female, 1 to 30	0.49625
Ischemic heart disease (*Comorbidity risk marker, full* window)	0.05362
Cardiomyopathy (*Comorbidity risk marker, full* window)	0.10018
Acute respiratory distress syndrome (*Episode risk marker* window)	0.63421
Anemia of chronic diseases (*Episode risk marker* window)	0.40545
Pulmonary heart disease (*Episode risk marker* window)	0.14080
Heart failure, diastolic (*Episode risk marker* window)	0.06028
Valvular disorder (*Episode risk marker* window)	0.11075
Other conduction disorders (*Episode risk marker* window)	0.26580
Atrial fibrillation and flutter (*Episode risk marker* window)	0.30476
Arterial inflammation (*Episode risk marker* window)	0.35696
Acute renal failure (*Episode risk marker* window)	0.19562
Diabetes (*Episode risk marker* window)	0.15543
Acute alcohol intoxication (*Comorbidity risk marker, prior* window)	0.15003
Embolism and thrombosis of veins and Pulmonary embolism (*Episode risk marker* window)	0.27231

Table 6. Bariatric surgery (BARI)*

Risk marker description	Risk weight
All male and female, 18 to 64	0.091322
Nutritional deficiency (*Comorbidity risk marker, prior* window)	0.05643
Hypertension (*Comorbidity risk marker, prior* window)	0.07417
Hepatology diseases signs and symptoms (*Comorbidity risk marker, full* window)	0.06742
Kidney stones (*Comorbidity risk marker, full* window)	0.15873
Other drug dependence (*Comorbidity risk marker, full* window)	0.08046
* In 2023, the BARI risk model was updated to test new risk markers and incorporate 2023 episode design and configuration file maintenance changes.	