TennCare Episodes of Care: Detailed description of episode risk adjustment for Wave 4 episodes

Attention-deficit hyperactivity disorder, oppositional defiant disorder, coronary artery bypass graft, valve repair and replacement, acute exacerbation of congestive heart failure, bariatric surgery

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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 of 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 health care 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 3 bundle types: asthma – acute exacerbation, perinatal and total joint replacement. An earlier document, that includes several detailed examples of episode risk adjustment, describes the risk adjustment approach used for these 3 bundles. This earlier document may provide useful background to those new to bundled payment.

The present document provides details on the approach used by UnitedHealthcare to compute episode risk and to risk-adjust episode costs for 6 care 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 6 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.

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 2 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.

When assigning a risk score to a bundle, 5 major steps are followed:

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.

Example 1:
Bariatric surgery episode risk adjustment

- A surgeon served as the quarterback for 10 bariatric surgery episodes during calendar year 2019

- The total cost for each of those episodes is calculated using costs for all services included in the episode (for example anesthesia, imaging and testing, evaluation and management, medications, etc.)

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Example 1: (cont.)
Bariatric surgery episode risk adjustment

- 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 have a 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.

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

1. Identify qualified services

Only diagnoses from **qualified** service records are considered when identifying risk markers. Qualified services include services such as office visits, consultations, ER visits, surgeries and inpatient stays. Non-qualified services include services such as lab or radiology or services delivered by a durable medical equipment (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.

2. Identify initial risk markers

Based on the diagnoses observed on qualified services, 2 sets of clinical risk markers are considered for use in risk-adjusting episodes. First, the diagnoses associated with qualified services are grouped into Episode Treatment Groups® (ETGs®).

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2. Identify initial risk markers (cont.)

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] In addition, the state of Tennessee defines risk makers using both Clinical Classifications Software (CCS) groups and their own specific definitions. The second set of risk makers consists of those markers that are specified by the state that meet minimum requirements regarding frequency of occurrence. (The CCS groups are not used since they tend to duplicate information captured by ETGs.)

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.

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. Assigning 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. In the final risk model, 4 of the 6 bundle types include 2 or more demographic risk markers — 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.

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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 the 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 research data assets, which include administrative claims and enrollment information for both affiliated and non-affiliated 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 1–6. For each episode, all of 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

The preliminary risk score for each individual episode is calculated as the sum of individual risk weight values that apply to that episode. Preliminary risk scores for each episode are then adjusted to achieve risk score neutrality across all episodes.

VI. Adjust preliminary risk for risk score neutrality

The preliminary risk score for an episode is <u>multiplied</u> by an episode-specific risk neutrality factor. This factor was based on the adjustment needed to help ensure that the average risk score for each episode was equal to 1.00 for UnitedHealthcare. Risk neutrality factors are calculated at the beginning of each performance period. These values are held constant through the performance period to help 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 help ensure that the average risk score for UnitedHealthcare is 1.00
- The application of the risk neutrality factor will make the final risk score different than the sum of risk weights listed in Tables 1–6 below
- For example, if the risk neutrality factor of an ADHD episode was 0.987, then a 17-year-old woman without other clinical risk factors would have a final risk score of 0.6279 (0.987 * 0.6362 = 0.6279))

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Please log in to the UnitedHealthcare Provider Portal at **UHCprovider.com.** Click Sign In at the top-right corner and log in using your One Healthcare ID and password. Once signed in, you can access the most current TennCare Episodes of Care risk neutrality factors.

Tables 1–6 below show the risk weights for ADHD; ODD; CABG; VALVE; acute exacerbation of 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 ADHD bundle risk markers and weights	
Description of risk marker	**Risk weight**
All males and females, ages 4–8	0.91810
All males and females, ages 9–12	0.79092
All males and females, ages 13–15	0.69706
All males and females, ages 16–20	0.54580
Risk factor – obsessive-compulsive disorder (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
Cardiovascular diseases signs and symptoms (episode risk marker window)	0.10365
Hearing disorders (comorbidity risk marker, full window)	0.10533

Table 2
ODD bundle risk markers and weights

Description of risk marker	Risk weight
All males and females, ages 4–18	0.90622
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*
CABG bundle risk markers and weights

Description of risk marker	Risk weight
All males and females, ages 0–64	0.66658
Obstructive sleep apnea (episode risk marker window)	0.43802
Other pulmonary disorders (episode risk marker window)	0.15281
Valvular disorder (episode risk marker window)	0.21609
Acute respiratory distress syndrome (comorbidity risk marker, full window)	0.20779
Bacterial lung infections (comorbidity risk marker, full window)	0.22209
Other conduction disorders (comorbidity risk marker, full window)	0.22541

*In 2024, the CABG risk model was updated to test new risk markers and incorporate 2024 episode design and configuration file maintenance changes.

Table 4
VALVE bundle risk markers and weights

Description of risk marker	Risk weight
All males and females, ages 0–1	1.14645
Males, ages 2–64	0.31250
Females, ages 2–64	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

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Table 5
CHF bundle risk markers and weights

Description of risk marker	Risk weight
Males, ages 31–64	0.21958
Females, ages 31–64	0.25516
All males and females, ages 1–30	0.33362
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 bundle risk markers and weights

Description of risk marker	Risk weight
All demographics	0.89200
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

[1]The methodology described here uses the clinical constructs of Episode Treatment Groups® (ETGs®) to categorize diagnosis code 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.

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