

TennCare's Episodes of Care: description of risk adjustment for Wave 3 episodes

Tennessee | Medicaid

Respiratory Infection (RI); pneumonia (PNA); inpatient urinary tract infection (UTI-I); outpatient urinary tract infection (UTI-O); esophagogastroduodenoscopy (EGD); gastrointestinal hemorrhage (GIH)

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.

<https://provider.wellpoint.com/tn>

Medicaid coverage provided by Wellpoint Tennessee, Inc.

We comply with the applicable federal and state civil rights laws, rules, and regulations and do not discriminate against members or participants in the provision of services on the basis of race, color, national origin, religion, sex, age, or disability. If a member or a participant needs language, communication, or disability assistance or to report a discrimination complaint, call 833-731-2154. Information about the civil rights laws can be found at tn.gov/tenncare/members-applicants/civil-rights-compliance.html.

TNWP-CD-080100-25-SRS78890 | 25-0422 | April 2025

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 bundles: respiratory infection (RI); pneumonia (PNA); inpatient urinary tract infection (UTI-I); outpatient urinary tract infection (UTI-O); esophagogastroduodenoscopy (EGD); and gastrointestinal hemorrhage (GIH). 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 — EGD episode risk adjustment:

- A gastroenterologist serves as the quarterback for 15 EGD episodes during calendar year 2018.
- The total cost for each of those episodes is calculated using costs for all services included in the episode (medications, imaging and testing, evaluation and management, and so on).
- The characteristics of the 15 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 spinal fusion 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 15 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

Two sets of clinical risk markers are considered for use in risk-adjusting episodes based on the diagnoses observed on qualified services. First, 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 In addition, the State of Tennessee defines risk makers using both Clinical Classifications Software (CCS) groups and the state's 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.)

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*.

In general, risk markers defined by the State include their own criteria with regard to service timing.

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. Three 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 respiratory infection (RI), outpatient urinary tract infection (UTI-O), or gastrointestinal hemorrhage (GIH) bundles, 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. The risk weights for each risk model, by episode type, are described later in tables 1 to 5. 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

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 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 than the sum of risk weights listed in tables 1 to 6 below.
- For example, if the risk neutrality factor for an EGD episode was 0.987, then a 27-year-old woman without other clinical risk factors would have a final risk score of 0.7985 (0.987 multiplied by 0.80898 equals 0.7985).

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 respiratory infection (RI), pneumonia (PNA), inpatient urinary tract infection (UTI-I), outpatient urinary tract infection (UTI-O), esophagogastroduodenoscopy (EGD), and gastrointestinal hemorrhage (GIH). 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. Respiratory infection (RI)

Risk marker description	Risk weight
All male and female, all ages	0.76432
Nutritional deficiency (<i>Comorbidity risk marker, full window</i>)	0.03417
Dehydration (<i>Comorbidity risk marker, full window</i>)	0.21554
Other metabolic disorders (<i>Comorbidity risk marker, full window</i>)	0.06571
Cardiovascular diseases signs & symptoms (<i>Episode risk marker window</i>)	0.52933
Otitis media (<i>Episode risk marker window</i>)	0.06427
Tonsillitis, adenoiditis or pharyngitis (<i>Comorbidity risk marker, full window</i>)	0.08791
Allergic rhinitis (<i>Comorbidity risk marker, full window</i>)	0.03592
Acute sinusitis (<i>Episode risk marker window</i>)	0.03612
Chronic sinusitis (<i>Comorbidity risk marker, full window</i>)	0.08608
Other infections of ear/nose/throat (<i>Comorbidity risk marker, full window</i>)	0.02217
Otolaryngology diseases signs & symptoms (<i>Comorbidity risk marker, prior window</i>)	0.01661
Acute bronchitis (<i>Episode risk marker window</i>)	0.37056
Asthma (<i>Episode risk marker window</i>)	0.12531
Chronic obstructive pulmonary disease (<i>Comorbidity risk marker, full window</i>)	0.17505
Inflammation of esophagus (<i>Comorbidity risk marker, full window</i>)	0.06543

Risk marker description	Risk weight
Other infectious diseases of intestines & abdomen (<i>Comorbidity risk marker, full window</i>)	0.02166
Gastroenterology diseases signs & symptoms (<i>Episode risk marker window</i>)	0.22746
Risk factor — gram negative infection (<i>During Episode window</i>)	0.26704
Risk factor — gram positive infection (<i>During Episode window</i>)	0.09980
Septicemia (<i>Episode risk marker window</i>)	0.83973
Immunodeficiencies (<i>Comorbidity risk marker, full window</i>)	0.15996
Ischemic heart disease (<i>Comorbidity risk marker, full window</i>)	0.16959
Inflammation of oral cavity (<i>Comorbidity risk marker, prior window</i>)	0.05527
Congenital and acquired anomalies of ear/nose/throat (<i>Comorbidity risk marker, full window</i>)	0.13478
Nonroutine inoculation (<i>Comorbidity risk marker, full window</i>)	0.02520

Table 2. Pneumonia (PNA)

Risk marker description	Risk weight
Female 22 to 54	0.47475
Female 55 to 64	0.71842
Male 22 to 54	0.40609
Male 55 to 64	0.72871
All male and female, 1 to 21	0.31676
Chronic obstructive pulmonary disease (<i>Comorbidity risk marker, prior window</i>)	0.10932
Septicemia (<i>Episode risk marker window</i>)	1.92418

Dehydration (<i>Episode risk marker window</i>)	0.21680
Cardiovascular diseases signs and symptoms (<i>Episode risk marker window</i>)	0.19966
Acute renal failure (<i>Episode risk marker window</i>)	0.30057
Other metabolic disorders (<i>Comorbidity risk marker, full window</i>)	0.46021
Congestive heart failure (<i>Comorbidity risk marker, full window</i>)	0.43480
Cirrhosis (<i>Comorbidity risk marker, full window</i>)	0.79999

Table 3. Inpatient urinary tract infection (UTI-I)*

Risk marker description	Risk weight
Females, all ages	0.30298
Males, all ages	0.69654
Septicemia (<i>Episode risk marker window</i>)	0.42250
Other infectious diseases (<i>Episode risk marker window</i>)	0.23038
Acute renal failure (<i>Comorbidity risk marker, full window</i>)	0.46459
Dehydration (<i>Comorbidity risk marker, prior window</i>)	0.09024
Bacterial lung infections (<i>Episode risk marker window</i>)	0.73991
Pulmonology diseases signs and symptoms (<i>Episode risk marker window</i>)	0.50644
Infection of upper genitourinary system (<i>Episode risk marker window</i>)	0.09458
Inflammation of genitourinary system, except kidney stones (<i>Episode risk marker window</i>)	0.23594
* In 2023, the EGD, GIH, and UTI-I risk models were updated to test new risk markers and incorporate 2023 episode design and configuration file maintenance changes.	

Table 4. Outpatient urinary tract infection (UTI-O)

Risk marker description	Risk weight
All Ages	0.94612
Dehydration (<i>Episode risk marker window</i>)	0.15314
Infection of upper genitourinary system (<i>Episode risk marker window</i>)	0.48665
Kidney Stones (<i>Episode risk marker window</i>)	0.54013
Substance abuse: cocaine or amphetamine dependence (<i>Comorbidity risk marker, full window</i>), opioid or barbiturate dependence (<i>Comorbidity risk marker, full window</i>), or alcohol dependence (<i>Comorbidity risk marker, full window</i>)	0.08534
GI conditions: gastroenterology diseases signs and symptoms (<i>Episode risk marker window</i>), diverticulitis and diverticulosis (<i>Comorbidity risk marker, full window</i>) or ulcer (<i>Comorbidity risk marker, full window</i>)	0.29350
GU conditions: inflammation of genitourinary system, except kidney stones (<i>Episode risk marker window</i>), acute renal failure (<i>Episode risk marker window</i>), acute renal inflammation (<i>Episode risk marker window</i>), or urinary incontinence (<i>Episode risk marker window</i>)	0.09713
Gynecological conditions: infection of ovary and/or fallopian tubes (<i>Comorbidity risk marker, full window</i>), nonmalignant neoplasm of female genital tract (<i>Episode risk marker window</i>), or infection of uterus (<i>Comorbidity risk marker, full window</i>)	0.13454

Table 5. Esophagogastroduodenoscopy (EGD)*

Risk marker description	Risk weight
Female 1 to 21	0.98095
Female 22 to 64	0.88483
All male	0.91175
Inflammation of esophagus (<i>Episode risk marker window</i>)	0.05267
Other metabolic disorders (<i>Episode risk marker window</i>)	0.15973

Risk marker description	Risk weight
Tonsillitis, adenoiditis or pharyngitis (<i>Episode risk marker window</i>)	0.03027
Pulmonology diseases signs and symptoms (<i>Episode risk marker window</i>)	0.059978
Cirrhosis (<i>Comorbidity risk marker, prior window</i>)	0.15651
Acute renal failure (<i>Comorbidity risk marker, full window</i>)	0.10659
Bowel obstruction (<i>Comorbidity risk marker, full window</i>)	0.11633
* In 2023, the EGD, GIH, and UTI-I risk models were updated to test new risk markers and incorporate 2023 episode design and configuration file maintenance changes.	

Table 6. Gastrointestinal hemorrhage (GIH)*

Risk marker description	Risk weight
All male and female, all ages	0.30910
Nutritional deficiency (<i>Episode risk marker window</i>)	0.24574
Dehydration (<i>Episode risk marker window</i>)	0.19693
Other metabolic disorders (<i>Episode risk marker window</i>)	0.53919
Iron deficiency anemia (<i>Episode risk marker window</i>)	0.38607
Hematology signs and symptoms (<i>Episode risk marker window</i>)	0.52769
Alcohol dependence (<i>Episode risk marker window</i>)	0.17576
Ischemic heart disease (<i>Episode risk marker window</i>)	0.34350
Ulcer (<i>Episode risk marker window</i>)	0.40305
Non-malignant neoplasm of intestines and abdomen (<i>Episode risk marker window</i>)	0.55833
Other diseases of hepatobiliary system (<i>Episode risk marker window</i>)	0.22100

Risk marker description	Risk weight
Acute renal failure (<i>Episode risk marker window</i>)	0.32307
Acute respiratory distress syndrome (<i>Comorbidity risk marker, full window</i>)	0.20818
Cirrhosis (<i>Comorbidity risk marker, full window</i>)	0.16530
Hepatology diseases signs and symptoms (<i>Episode risk marker window</i>)	0.27508
* In 2023, the EGD, GIH, and UTI-I risk models were updated to test new risk markers and incorporate 2023 episode design and configuration file maintenance changes.	