

TennCare's Episodes of Care: description of risk adjustment for Wave 8 episodes

Tennessee | Medicaid

Acute seizure (SEIZE); syncope (SYNC); acute gastroenteritis (GASTRO); pediatric pneumonia (PEDPNM); bronchiolitis (BRONC); colposcopy (COLPO); hysterectomy (HYST); gastrointestinal obstruction (GIOBS); appendectomy (APP); hernia repair (HERNIA)

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 — Hernia repair episode risk adjustment:

- A surgeon serves as the quarterback for 10 hernia repair episodes during calendar year 2019.
- 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 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 hernia repair 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 facility's episodes is risk adjusted to compute risk-adjusted total cost. Actual cost is divided by episode risk score so that higher risk

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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:

- Identify clinical risk markers using clinical input.
- Assign demographic risk markers.
- Apply risk weights to each risk marker.
- Compute an episode risk score.
- 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:

- Identify qualified services that can contribute diagnoses to risk marker identification.
- Identify the set of initial risk markers using clinical criteria.
- Assign clinically appropriate service timing to risk markers.
- 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 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.)

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. Five of the ten 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 pediatric pneumonia, bronchiolitis, colposcopy, gastrointestinal (GI) obstruction, and hernia repair, 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 below, in tables 1 to 10. 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 9 below.
- For example, if the risk neutrality factor for a hernia repair episode were 0.987, then a 27-year-old man without other clinical risk factors would have a final risk score of 0.8176 (0.987 multiplied by 0.8284 equals 0.8176).

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 10 below show the risk weights for acute seizure, syncope, acute gastroenteritis, pediatric pneumonia, bronchiolitis, colposcopy, hysterectomy, gastrointestinal (GI) obstruction, appendectomy, and hernia repair. The risk weights shown in these tables were used to risk-adjust the cost of the individual episodes. The preliminary risk score for each episode is the sum of the risk weights for all risk markers observed. The final risk score will be the preliminary risk score for an episode multiplied by an episode specific risk neutrality factor.

Table 1. Acute seizure (SEIZE)

Risk marker description	Risk weight
Ages 0 to 45	0.7776
Ages 46 to 55	0.7999
Ages 56 to 64	0.8617
Diabetes (<i>Comorbidity risk marker, full window</i>)	0.0983
Mental disorders, organic and drug-induced (<i>Episode risk marker window</i>)	0.0904
Alcohol dependence (<i>Comorbidity risk marker, full window</i>)	0.1067
Other conduction disorders (<i>Comorbidity risk marker, full window</i>)	0.1135
Bacterial lung infections (<i>Episode risk marker window</i>)	0.2142
Altered mental status (during the 60 days prior to the episode or during the trigger window)	0.2807
Conversion and dissociative disorders (during the 365 days prior to the episode or during the episode window)	0.0125
Degenerative nervous system conditions (during the 365 days prior to the episode or during the episode window)	0.1174
Encephalopathy (during the 365 days prior to the episode or during the episode window)	0.1782
Hyponatremia (during the 60 days prior to the episode or during the trigger window)	0.3020

Risk marker description	Risk weight
Intractable epilepsy (during the 365 days prior to the episode or during the episode window)	0.0684
Partial seizures (during the 60 days prior to the episode or during the trigger window)	0.0754
Status epilepticus (during the 60 days prior to the episode or during the trigger window)	0.3293
High-cost, low-incident conditions: Alzheimer's disease (<i>Comorbidity risk marker, full window</i>), hypernatremia (during the 60 days prior to the episode or during the trigger window), acute myocardial infarction (during the 60 days prior to the episode or during the trigger window), heart failure, diastolic (<i>Comorbidity risk marker, full window</i>), septicemia (<i>Episode risk marker window</i>) or acute respiratory distress syndrome (<i>Episode risk marker window</i>)	0.2116
Chromosomal anomalies (<i>Comorbidity risk marker, full window</i>) or other congenital anomalies (during the 365 days prior to the episode or during the episode window)	0.1339

Table 2. Syncope (SYNC)

Risk marker description	Risk weight
Ages 3 to 60	0.6569
Age 2 or less or age 61 or greater	0.8610
Hypo-functioning adrenal gland (<i>Comorbidity risk marker, full window</i>)	0.4309
Cerebral vascular disease (<i>Comorbidity risk marker, full window</i>)	0.2490
Pulmonary heart disease (<i>Comorbidity risk marker, full window</i>)	0.3168
Other conduction disorders (<i>Comorbidity risk marker, full window</i>)	0.0812
Pulmonary embolism (<i>Comorbidity risk marker, full window</i>)	0.3714
Abnormal EKG (During the 60 days prior to the episode or during the episode window)	0.3434
Acute MI (During the 365 days prior to the episode or during the episode window)	0.4611

Risk marker description	Risk weight
Altered mental status (during the 60 days prior to the episode or during the episode window)	0.2742
Chest pain (during the 60 days prior to the episode or during the episode window)	0.2993
Fluid and electrolyte disorders (during the 60 days prior to the episode or during the episode window)	0.3138
Headache (during the 60 days prior to the episode or during the episode window)	0.1710
Hypertension (during the 365 days prior to the episode or during the episode window)	0.1715
Hypothyroidism: hypothyroidism (<i>Comorbidity risk marker, full window</i>) or hypothyroidism (during the 365 days prior to the episode or during the episode window)	0.0963
Shortness of breath (during the 60 days prior to the episode or during the episode window)	0.1746
Substance abuse: opioid or barbiturate dependence (<i>Comorbidity risk marker, full window</i>) or Substance abuse (during the 180 days prior to the episode or during the episode window)	0.1256

Table 3. Acute gastroenteritis (GASTRO)

Risk marker description	Risk weight
Ages 0 to 12	0.2747
Ages 13 to 17	0.4069
Ages 18 to 25	0.3993
Ages 26 to 35	0.4610
Ages 36 to 45	0.5227
Ages 46 to 55	0.6173
Ages 56 and above	0.8740

Risk marker description	Risk weight
Bacterial infection (during the 60 days prior to the episode or during the trigger window)	0.5631
Cardiac arrhythmias (during the 365 days prior to the episode or during the episode window)	0.1688
Fever (during the trigger window)	0.0631
Gastrointestinal hemorrhage (during the 60 days prior to the episode or during the trigger window)	0.4974
Fluid disorders: fluid and electrolyte disorders (during the 60 days prior to the episode or during the episode window) or dehydration (<i>Episode risk marker window</i>)	0.6990
Biliary disorders: cholelithiasis (<i>Episode risk marker window</i>) or biliary disease (during the 60 days prior to the episode or during the episode window)	0.6435
Kidney stones (during the 60 days prior to the episode or during the episode window)	0.1326
Other GI disorders: gastritis and/or duodenitis (<i>Episode risk marker window</i>), ulcer (<i>Episode risk marker window</i>), inflammation of esophagus (<i>Episode risk marker window</i>) or bowel obstruction duodenitis (<i>Episode risk marker window</i>)	0.3158
Other high cost low incident conditions: Appendicitis (<i>Episode risk marker window</i>), Acute renal failure (<i>Episode risk marker window</i>), Hypotension (During the 60 days prior to the episode or during the episode window), Diverticulitis and diverticulosis (<i>Episode risk marker window</i>), or Clostridium Difficile infection (During the 60 days prior to the episode or during the trigger window)	1.1455
Septicemia (<i>Episode risk marker window</i>)	1.5778
Thrombocytopenia (<i>Episode risk marker window</i>)	0.7069
Iron deficiency anemia (<i>Comorbidity risk marker, full window</i>)	0.1888
Other conduction disorders (<i>Episode risk marker window</i>)	0.2898
Other inflammation of intestines and abdomen (<i>Episode risk marker window</i>)	0.2385
Hernias, except hiatal (<i>Comorbidity risk marker, full window</i>)	0.1678

Risk marker description	Risk weight
Other diseases of intestines and abdomen (<i>Episode risk marker window</i>)	0.3799
Gastroenterology diseases signs and symptoms (<i>Episode risk marker window</i>)	0.2588
Acute pancreatitis (<i>Episode risk marker window</i>)	0.6382
Infection of lower genitourinary system, not sexually transmitted (<i>Episode risk marker window</i>)	0.1475

Table 4. Pediatric pneumonia (PEDPNM)

Risk marker description	Risk weight
All ages	0.5805
Dehydration (<i>Episode risk marker window</i>)	2.2190
Cardiac arrhythmias (during the 365 days prior to the episode or during the episode window)	0.2864
Other lower respiratory diseases (during the 365 days prior to the episode or during the episode window)	0.6367
Acute respiratory distress syndrome (<i>Episode risk marker window</i>)	0.8872
Pulmonology diseases signs and symptoms (<i>Episode risk marker window</i>)	0.4001

Table 5. Bronchitis (BRONC)

Risk marker description	Risk weight
All ages	0.5662
Dehydration (<i>Episode risk marker window</i>)	1.7028
Asthma (<i>Episode risk marker window</i>)	0.3586
Inflammation of esophagus (<i>Episode risk marker window</i>)	0.5167

Risk marker description	Risk weight
Cardiac arrhythmias (during the 365 days prior to the episode or during the episode window)	0.1649
Other lower respiratory diseases (during the 60 days prior to the episode or during the trigger window)	1.1997
Congenital or acquired anomalies: congenital and acquired anomalies of ear/nose/throat (<i>Comorbidity risk marker, full window</i>) or orthopedic deformity — head and face (<i>Comorbidity risk marker, full window</i>)	0.1363
Bacterial lung infections (<i>Episode risk marker window</i>)	0.3230
Acute respiratory distress syndrome (<i>Episode risk marker window</i>)	1.6757

Table 6. Colposcopy (COLPO)*

Risk marker description	Risk weight
All ages	0.4832
Mood disorder, bipolar (<i>Comorbidity risk marker, full window</i>)	0.1436
Ischemic heart disease (<i>Comorbidity risk marker, full window</i>)	0.2047
Hypertension (<i>Comorbidity risk marker, full window</i>)	0.0462
CIN 1 (during the 365 days prior to the episode or during the episode window)	0.0525
CIN 2 or 3 (during the 365 days prior to the episode or during the episode window)	0.2572
Diseases of female genital organs (during the 365 days prior to the episode or during the episode window)	0.1241
Excision (during the episode window) without malignant cancer (<i>Comorbidity risk marker, full window</i>)	2.2298
Malignant cancer (<i>Comorbidity risk marker, full window</i>) without excision (during the episode window)	0.1857

Risk marker description	Risk weight
* In 2023, the COLPO risk model was updated to test new risk markers and incorporate 2023 episode design and configuration file maintenance changes.	

Table 7. Hysterectomy (HYST)

Risk marker description	Risk weight
Ages 0 to 54	1.0971
Ages 55 to 64	1.2756
Obesity: Obesity (<i>Comorbidity risk marker, full window</i>) or Morbid Obesity (During the 365 days prior to the episode or during the episode window)	0.0736
Urinary Incontinence: Urinary incontinence (<i>Episode risk marker window</i>) or Stress Incontinence (During the 60 days prior to the episode, during the pre-trigger window or during the trigger window)	0.1780

Table 8. Gastrointestinal obstruction (GIOBS)

Risk marker description	Risk weight
All ages	0.6477
Septicemia (<i>Episode risk marker window</i>)	0.2357
Congenital anomalies of intestines and abdomen (<i>Comorbidity risk marker, full window</i>)	0.6531
Intestinal perforation (during the 60 days prior to the episode or during the trigger window)	0.7478
Kidney disorders: acute kidney failure (during the 60 days prior to the episode or during the trigger window) or chronic kidney failure (during the 365 days prior to the episode or during the episode window)	0.4066
Nonmalignant immunodeficiency (during the 365 days prior to the episode or during the episode window)	0.1432

Risk marker description	Risk weight
Obstruction from procedural complication (during the 60 days prior to the episode or during the trigger window)	0.6647
Substance abuse: cocaine or amphetamine dependence (<i>Comorbidity risk marker, full window</i>), alcohol dependence (<i>Comorbidity risk marker, full window</i>), or acute alcohol intoxication (<i>Comorbidity risk marker, full window</i>), opioid or barbiturate dependence (<i>Comorbidity risk marker, full window</i>), or other drug dependence (<i>Comorbidity risk marker, full window</i>)	0.0366
Cardiovascular conditions (<i>Comorbidity risk marker, full window</i>): ischemic heart disease, pulmonary heart disease, congestive heart failure, cardiomyopathy, aortic aneurysm, heart failure, diastolic, valvular disorder, severe heart block, or other conduction disorders	0.0896
Malignant cancers: malignant cancer (<i>Comorbidity risk marker, full window</i>), primary gastrointestinal and abdominal cancers (during the 365 days prior to the episode or during the episode window), or metastatic cancers (during the 365 days prior to the episode or during the episode window)	0.3033
Hiatal hernia (<i>Episode risk marker window</i>) or ulcer (<i>Episode risk marker window</i>)	0.5183

Table 9. Appendectomy (APP)

Risk marker description	Risk weight
Ages 0 to 6	1.1296
Ages 7 or greater	0.8284
Abdominal adhesions (during the 60 days prior to the episode or during the trigger window)	0.4163
Peritonitis (during the 60 days prior to the episode or during the trigger window)	0.1003
Dehydration: dehydration (<i>Episode risk marker window</i>) or fluid and electrolyte disorders (during the 60 days prior to the episode or during the trigger window)	0.4777
Other high-cost, low-incident conditions: septicemia (<i>Episode risk marker window</i>), respiratory insufficiency (during the 365 days prior to the episode or during the trigger window), acute respiratory distress syndrome (<i>Comorbidity risk marker, full window</i>), Acute kidney failure (during the 60 days prior to the episode or during the trigger window)	1.8234

Risk marker description	Risk weight
window), or coronary heart disease (during the 365 days prior to the episode or during the episode window)	

Table 10. Hernia repair (HERNIA)

Risk marker description	Risk weight
All ages	0.9494
Cholelithiasis (<i>Episode risk marker window</i>)	0.2175
Abdominal Adhesions (During the 60 days prior to the episode, during the pre-trigger window or during the trigger window)	0.2582
Bilateral Groin Hernias (During the 60 days prior to the episode, during the pre-trigger window or during the trigger window)	0.2008
Congenital Male Genitourinary Disorders (During the 365 days prior to the episode or during the episode window)	0.2044
History Of Abdominopelvic Surgery (During the 365 days prior to the episode or during the episode window)	0.0983
Incisional Hernias (During the 60 days prior to the episode, during the pre-trigger window or during the trigger window)	0.1214
Obesity — BMI 40 Or Greater (During the 365 days prior to the episode or during the episode window)	0.1520
Other Abdominal Hernias (During the 60 days prior to the episode, during the pre-trigger window or during the trigger window)	0.0603
Pregnancy (During the 180 days prior to the episode or during the episode window)	0.1229
Substance Abuse: Cocaine or amphetamine dependence (<i>Comorbidity risk marker, full window</i>), Alcohol dependence (<i>Comorbidity risk marker, full window</i>), or Opioid or barbiturate dependence (<i>Comorbidity risk marker, full window</i>)	0.1461