

Low Back Pain Measure

Cost Measure Methodology

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1.0 Introduction

This document details the methodology for the Low Back Pain measure and should be reviewed along with the Low Back Pain Measure Codes List file, which contains the medical codes used in constructing the measure.

1.1 Measure Name

Low Back Pain episode-based cost measure

1.2 Measure Description

Episode-based cost measures represent the cost to Medicare for the items and services provided to a patient during an episode of care (“episode”). In all supplemental documentation, the term “cost” generally means the standardized¹ Medicare allowed amount,² and claims data from Medicare Parts A, B, and D³ are used to construct this episode-based cost measure.

The Low Back Pain episode-based cost measure evaluates a clinician’s or clinician group’s risk-adjusted and specialty-adjusted cost to Medicare for patients receiving medical care to manage and treat low back pain. This chronic condition measure includes the costs of services that are clinically related to the attributed clinician’s role in managing care during a Low Back Pain episode.

1.3 Measure Rationale

Low back pain is common in the United States, with roughly 20% of Americans experiencing low back pain each year,^{4,5} and about 6% of Americans requiring ambulatory visits as a result of this

¹ Claim payments are standardized to account for differences in Medicare payments for the same service(s) across Medicare providers. Payment standardized costs remove the effect of differences in Medicare payment among health care providers that are the result of differences in regional health care provider expenses measured by hospital wage indexes and geographic price cost indexes or other payment adjustments such as those for teaching hospitals. For more information, please refer to the “CMS Part A and Part B Price (Payment) Standardization - Basics” and “CMS Part A and Part B Price (Payment) Standardization - Detailed Methods” documents posted on the [CMS Price \(Payment\) Standardization Overview](https://www.resdac.org/articles/cms-price-payment-standardization-overview) page (<https://www.resdac.org/articles/cms-price-payment-standardization-overview>).

Claim payments from Part D are payment standardized to allow resource use comparisons for providers who prescribe the same drug, even if the drug products are covered under varying Part D plans, produced by different manufacturers, or dispensed by separate pharmacies. For more information, please refer to the “CMS Part D Price (Payment) Standardization” document posted on the [CMS Price \(Payment\) Standardization Overview](https://www.resdac.org/articles/cms-price-payment-standardization-overview) page. (<https://www.resdac.org/articles/cms-price-payment-standardization-overview>).

² Cost is defined by allowed amounts on Medicare claims data, which include both Medicare trust fund payments and any applicable beneficiary deductible and coinsurance amounts.

³ Part D branded drug costs are also adjusted to account for post-point of sale drug rebates; more information can be found in the Methodology for Rebates in Part D Standardized Amounts on the [MACRA Feedback Page](https://www.cms.gov/Medicare/Quality-Payment-Program/Quality-Payment-Program/Give-Feedback) (<https://www.cms.gov/Medicare/Quality-Payment-Program/Quality-Payment-Program/Give-Feedback>).

⁴ Will, Joshua Scott, David Bury, and John Miller, “Mechanical Low Back Pain.” American Academy of Family Physicians 98(7) (2018): 421-428.

⁵ Blanpied et al., “Neck Pain: Revision 2017: Clinical Practice Guidelines Linked to the International Classification of Functioning, Disability and Health From the Orthopaedic Section of the American Physical Therapy Association.” Journal of Orthopaedic & Sports Physical Therapy 47(7) (2017): A1-A83. doi:10.2519/jospt.2017.0302

condition.⁶ It is also costly; a 2020 study found that low back and neck pain contributed the most to health care spending among 154 mutually exclusive diagnoses, at \$134.5 billion in 2016.⁷ Trends in data over the past decades indicate gaps in care and opportunities for improvement in treatment. Several studies evaluating data since 1998 indicate large increases resource use for low back pain, despite only modest increases in condition prevalence and little improvement in patient outcomes,^{8,9,10,11,12} which underscores the need for more precise measures of resource use and quality of care.

Given the prevalence of low back pain in the Medicare population, and the high costs associated with the management of the disease and its complications, the Low Back Pain cost measure represents an opportunity for improvement on overall cost performance.

The Low Back Pain episode-based cost measure was selected for development because of its high impact in terms of patient population, clinician coverage, and Medicare spending, and the opportunity build a complex, yet feasible, chronic condition measure that would address a condition not captured by other cost measures. Following initial feedback gathered during the Wave 4 public comment period,¹³ the subsequent measure-specific clinician expert workgroup provided extensive, detailed input on this measure.

1.4 Measure Numerator

The measure numerator is the weighted average ratio of the winsorized¹⁴ scaled standardized observed cost to the scaled expected¹⁵ cost for all Low Back Pain episodes attributed to a clinician, where each ratio is weighted by each episode's number of days assigned to a clinician. This sum is then multiplied by the national average winsorized scaled observed episode cost to generate a dollar figure.

1.5 Measure Denominator

The measure denominator is the total number of days from Low Back Pain episodes assigned to the clinician across all patients.

⁶ Matthew Davis, "Where the United States Spends its Spine Dollars: Expenditures on different ambulatory services for the management of back and neck conditions." *Spine* 37(19) (September 1 2012): doi:10.1097/brs.0B013E3182541F45.

⁷ Dieleman, Joseph, Jackie Cao, and Abby Chapin, "US Health Care Spending by Payer and Health Condition, 1996-2016." *JAMA Network* 323(9) (2020): 863-884. doi:10.1001/jama.2020.0734.

⁸ Luo, Xuemei, Ricardo Pietrobon, Shawn Sun, Gordon Liu, and Lloyd Hey, "Estimates and Patterns of Direct Health Care Expenditures Among Individuals With Back Pain in the United States." *Spine* 29(1) (2004): 79-86. doi:10.1097/01.BRS.0000105527.13866.0.

⁹ Davis, "Where the United States Spends its Spine Dollars: Expenditures on different ambulatory services for the management of back and neck conditions."

¹⁰ Norman Marcus Pain Institute, "Pain Facts." Last updated 23 January 2012.

<https://www.normanmarcuspaininstitute.com/tag/neck-and-shoulder-pain/>

¹¹ Ibid.

¹² Deyo, Richard, Sohail Mirza, Judith Turner, and Brook Martin, "Overtreating Chronic Back Pain: Time to Back Off?" *J Am Board Fam Med* 22(1) (2009): 62-68. doi:10.3122/jabfm.2009.01.080102.

¹³ "Wave 4 Public Comment Summary," MACRA Feedback Page, (<https://www.cms.gov/Medicare/Quality-Payment-Program/Quality-Payment-Program/Give-Feedback>)

¹⁴ For information on how costs are winsorized, please refer to Section 4.7.

¹⁵ Expected costs refer to costs predicted by the risk adjustment model. For more information on expected costs and risk adjustment, please refer to Section 4.7.

1.6 Data Sources

The Low Back Pain measure uses the following data sources:

- Medicare Parts A, B, and D claims data from the Common Working File (CWF)
- Enrollment Database (EDB)
- Long Term Care Minimum Data Set (LTC MDS)¹⁶

1.7 Care Settings

The Low Back Pain measure focuses on the care provided by clinicians for patients with low back pain. The most frequent settings in which a Low Back Pain episode is triggered include: office, outpatient hospital, and ambulatory surgical center (ASC).

1.8 Cohort

The cohort for this cost measure consists of patients who are Medicare beneficiaries enrolled in Medicare fee-for-service that receive care for low back pain.

The cohort for this cost measure is also further refined by the definition of the episode group and measure-specific exclusions (refer to Section 4).

¹⁶ For information on how LTC MDS data are used in risk adjustment, please refer to Section 4.5.

2.0 Methodology Steps

There are 2 overarching processes in calculating chronic condition episode-based cost measure scores: episode construction (Steps 1-5) and measure calculation (Steps 6-8). This section provides a brief summary of these processes for the Low Back Pain cost measure. Section 4 describes the processes in detail and further defines the related concepts, and Appendix C contains a visual flowchart depicting these steps.

- 1. Identify patients receiving care:** A trigger event identifies the start or continuation of a clinician group's management of a patient's chronic condition. A trigger event is identified by the occurrence of 2 Part B Physician/Supplier (Carrier) claims billed by the same clinician group practice within 60 days of one another. The pair of services must include a trigger claim and a confirming claim. The trigger claim is any code from a set of CPT/HCPCS codes for clinically relevant outpatient services when accompanied by an ICD-10 diagnosis code indicating low back pain. The confirming claim can be either another trigger code, or a confirming code from an additional set of CPT/HCPCS codes when accompanied by an ICD-10 diagnosis code indicating low back pain. Once a trigger event is identified, this opens a 120-day attribution window from the point of the trigger claim, in which the patient's chronic condition care will be monitored by a clinician group.
- 2. Identify the total length of care between a patient and a clinician group:** Once an attribution window is opened, it continues for 120 days unless there is a service that demonstrates a continuing care relationship, also known as a reaffirming claim. This service is billed during an open attribution window (from Step 1) by the same clinician group that billed the trigger event, and reaffirms and extends a clinician group's responsibility for managing a patient's chronic condition. A reaffirming claim is another instance any confirming code.¹⁷ After a reaffirming claim is identified, the attribution window is extended by 120 days from the point of each reaffirming claim billed during an open attribution window. The total attribution window begins with the trigger claim and concludes 120 days after the final reaffirming claim. Therefore, the total attribution window can span multiple years and vary in length for different patients. This requires that the total attribution window is measured incrementally and periodically across multiple measurement periods.
- 3. Define an episode:** Episodes are segments of the total attribution window that are counted in a particular measurement period, allowing clinicians to have their costs for Low Back Pain episodes assessed for that year. Episodes are assigned to a clinician group (identified by Tax Identification Number [TIN]) or individual clinicians (identified by combination of TIN and National Provider Identifier [TIN-NPI]), and can vary in length. Episodes are assessed in the measurement period in which they conclude and only attribute days not previously measured in preceding measurement periods, so there is no double counting of episode costs. After episodes are constructed, they are placed into more granular, mutually exclusive and exhaustive sub-groups based on clinical criteria to enable meaningful clinical comparisons.
- 4. Attribute the episode to the clinician group and clinician(s):** The episode is attributed to the clinician group that bills the trigger and confirming claims for the total attribution window. To attribute the episode to an individual clinician, any clinician within the attributed clinician

¹⁷ While a trigger event requires two claims, a single reaffirming claim is needed to extend a clinician group's responsibility for managing a patient's chronic condition. This is because workgroups who have developed chronic condition measures to-date have favored a less strict reaffirming algorithm, indicating that once a clinician-patient relationship was established, a single reaffirming claim would be sufficient to extend the attribution window.

group who plays a substantial role in the care for the patient (i.e., billing at least 30% of trigger or confirming codes on Part B Physician/Supplier claim lines during the episode) is attributed the episode. There are also additional checks to ensure that clinicians are not attributed to an episode before they have their first encounter with the patient.

5. **Assign costs to the episode and calculate the episode scaled observed cost:** Services that are clinically related to the care and management of a patient's chronic condition that occur during the episode are included in the measure. The standardized cost of the assigned services is summed and averaged across the number of days in an episode. This average daily cost is then multiplied by 120 to determine each episode's scaled standardized observed cost.
6. **Exclude episodes:** Exclusions remove unique groups of patients or episodes from cost measure calculation in cases where it may be impractical or unfair to compare the costs of caring for these patients to the costs of caring for the cohort at large.
7. **Calculate the scaled expected cost for risk adjustment:** Risk adjustment predicts the expected costs by adjusting for factors outside of the clinician's or clinician group's reasonable influence (e.g., patient age, comorbidities, clinician specialty, and other factors). The episode group's scaled observed costs are winsorized at the 98th percentile for each model to handle extreme observations. A regression is then run using the risk adjustment variables as covariates to estimate the expected cost of each episode. Further statistical techniques are applied to reduce the effects of extreme outliers on measure scores.
8. **Calculate the measure score:** For each episode, the ratio of winsorized scaled standardized observed cost to scaled expected cost (both of which are from Step 7) is calculated. The measure is calculated as a weighted average of these ratios across all of a clinician's or clinician group's attributed episodes, where the weighting is each episode's number of assigned days. The weighted average episode cost ratio is then multiplied by the national average winsorized scaled observed episode cost to generate a dollar figure for the cost measure score.

3.0 Measure Specifications Quick Reference

This page provides a quick, at-a-glance reference for the Low Back Pain measure specifications. More details on each component can be found in Section 4, and the full list of codes and logic used to define each component can be found within the Low Back Pain Measure Codes List file.

Episode Window: During what time period are costs measured?

An episode is a segment of time during which clinicians or clinician groups are assessed for the care that they provide to a patient with low back pain.

- The episode window length for the Low Back Pain measure is between 120 days and 484 days, and can vary in length across patients.

Triggers: How does the measure identify the patient cohort and start of care?

- Patients receiving medical care for treatment of their low back pain are included in the measure.
- The start or continuation of a clinician group's management of a patient's low back pain is identified by the appearance of a pair of services within 60 days of one another: a **trigger code** followed by a **confirming code**. For the Low Back Pain measure:
 - A **trigger code** is any code from a set of CPT/HCPCS codes for clinically relevant outpatient services (outpatient E&Ms, therapy evaluation, chiropractic manipulation, osteopathic manipulation, therapy services) when accompanied by an ICD-10 diagnosis code indicating low back pain.
 - A **confirming code** is either any code from the same trigger set of CPT/HCPCS codes for clinically relevant outpatient services when accompanied by an ICD-10 diagnosis code indicating low back pain, or a code from an additional set of CPT/HCPCS codes (for spine injections, spinal neurostimulators, acupuncture, remote therapeutic monitoring, dry needling, or imaging) when accompanied by an ICD-10 diagnosis code indicating low back pain.

Sub-Groups: Is the measure stratified into smaller patient cohorts?

1. Surgical episode with history of complex low back pain (i.e., radiculopathy, spinal stenosis, or spondylolisthesis)
2. Surgical episode without history of complex low back pain
3. Non-surgical episode with history of complex low back pain
4. Non-surgical episode without history of complex low back pain

Service Assignment: Which clinically related costs are included in the measure?

Assigned services fall within the following 12 clinical themes:

- Spinal surgeries and procedures; hospitalizations; spinal injections and neurostimulators; imaging, diagnostics, and labs
- Outpatient visits; post-acute care services; therapy services and manipulation; telehealth; medications
- Behavioral health and ancillary services; durable medical equipment; patient transport

Risk Adjustors: Which risk factors are accounted for in the risk adjustment model?

- Standard risk adjustors, including comorbidities captured by 79 Hierarchical Condition Category (HCC) codes that map with over 9,500 ICD-10-CM codes, count of HCCs, interaction variables accounting for a range of comorbidities, patient age category, patient disability status, patient end-stage renal disease (ESRD) status, number and types of

clinician specialties from which the patient has received care, and recent use of institutional long-term care.

- Risk adjustors for factors specific to this condition: spondylolysis, scoliosis and other spinal deformities, hospitalization for medical back problems, osteoarthritis, osteoporosis, depression, smoking, history of spine surgery, frailty, opioid use, cognitive status, and fibromyalgia. For the full list of standard and measure-specific risk adjustment variables, please reference the “RA” and “RA_Details” tabs of the Measure Codes List file.
- A separate linear regression is run for each sub-group and Medicare Part D enrollment status combination to ensure fair comparison. The episode group’s scaled observed costs are winsorized at the 98th percentile prior to the regression for each model to handle extreme observations.

Exclusions: Which populations are excluded from the measure?

- Standard exclusions to ensure data completeness:
 - The patient has a primary payer other than Medicare for any time overlapping the episode window or 120-day lookback period prior to the episode window.
 - The patient was not enrolled in Medicare Parts A and B for the entirety of the 120-day lookback period plus episode window, or was enrolled in Part C for any part of the lookback plus episode window.
 - The patient was not found in the Medicare EDB).
 - The patient’s death date occurred before the episode end date.
 - The patient has an episode window shorter than 120 days.
- Measure-specific exclusions including cauda equina syndrome, spinal infection, osteoporotic compression fracture, myelopathy, trauma, spinal neoplasms, and episodes with a spinal surgery occurring within 60 days after the initial trigger.

4.0 Detailed Measure Methodology

This section contains the technical details for the 2 overarching processes in calculating the Low Back Pain cost measure in more detail: Sections 4.1 through 4.5 describe episode construction, and Sections 4.6 through 4.8 describe measure calculation.

4.1 Identify Patients Receiving Care

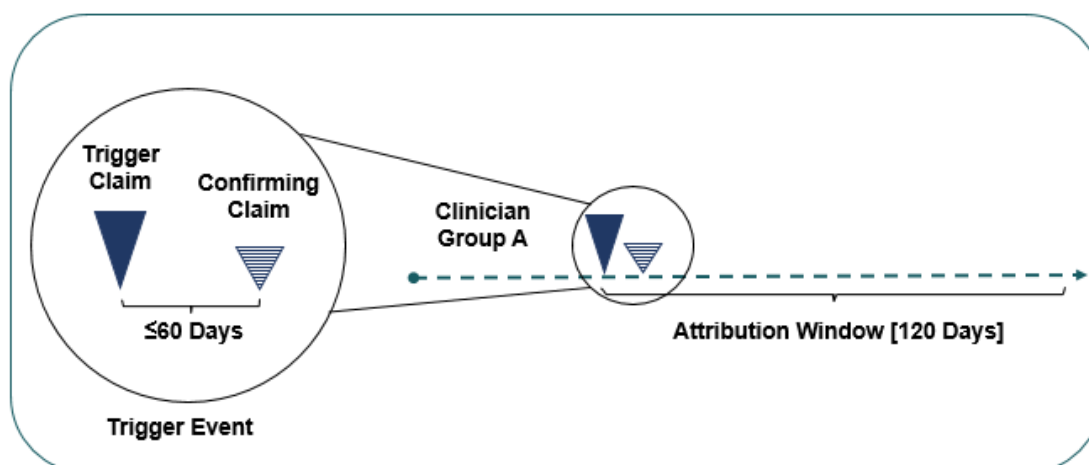
A **trigger event** is used to indicate the start of a clinician group's management of a patient's low back pain and is identified by the occurrence of 2 Part B Physician/Supplier (Carrier) claims billed by the same clinician group practice. To identify a trigger event, the following 2 claims must be billed within the trigger window (within 60 of one another): a **trigger claim**, followed by a **confirming claim**.

- A **trigger claim** is a Part B Physician/Supplier claim that contains a trigger code. For the Low Back Pain measure, a trigger code is:
 - Any code from a set of CPT/HCPCS codes for clinically relevant outpatient services when accompanied by an ICD-10 diagnosis code indicating low back pain. These outpatient services can be summarized as:
 - Outpatient E&Ms
 - Therapy evaluation
 - Chiropractic manipulation
 - Osteopathic manipulation
 - Therapy services
- A **confirming claim** is a second Part B Physician/Supplier claim billed by the same clinician group practice as the trigger claim, which contains a confirming code. For the Low Back Pain measure, a confirming code is:
 - Any code from the same trigger set of CPT/HCPCS codes for clinically relevant outpatient services when accompanied by an ICD-10 diagnosis code indicating low back pain, as listed above in trigger codes, or
 - Any code from an additional set of CPT/HCPCS codes, when accompanied by an ICD-10 diagnosis code indicating low back pain. These additional services can be summarized as:
 - Spine injections
 - Spinal neurostimulators
 - Acupuncture
 - Remote therapeutic monitoring
 - Dry needling
 - Imaging

For the full list of trigger and confirming codes, as well as the requisite diagnosis codes, please refer to the "Trigger_Confirming" and "Trigger_DGN" tabs of the Low Back Pain Measure Codes List file.

Once the trigger event is identified, the trigger event opens an **attribution window**, which is a 120-day period that begins on the date of the trigger claim. The attribution window defines a time period during which the patient's low back pain care will be monitored by a clinician group.

Figure 1. Trigger Event and Attribution Window



4.2 Identify the Total Length of Care Between a Patient and a Clinician Group

When the beginning of the clinician-patient relationship is identified, there might be evidence of a continuation of this relationship, as identified by reaffirming claims. A **reaffirming claim** is a service billed during an open attribution window by the same clinician group that billed the trigger event, and it reaffirms and extends a clinician group's responsibility for managing a patient's low back pain. A reaffirming claim has the same definition as a confirming claim as defined in Section 4.1, meaning that a reaffirming claim is either:

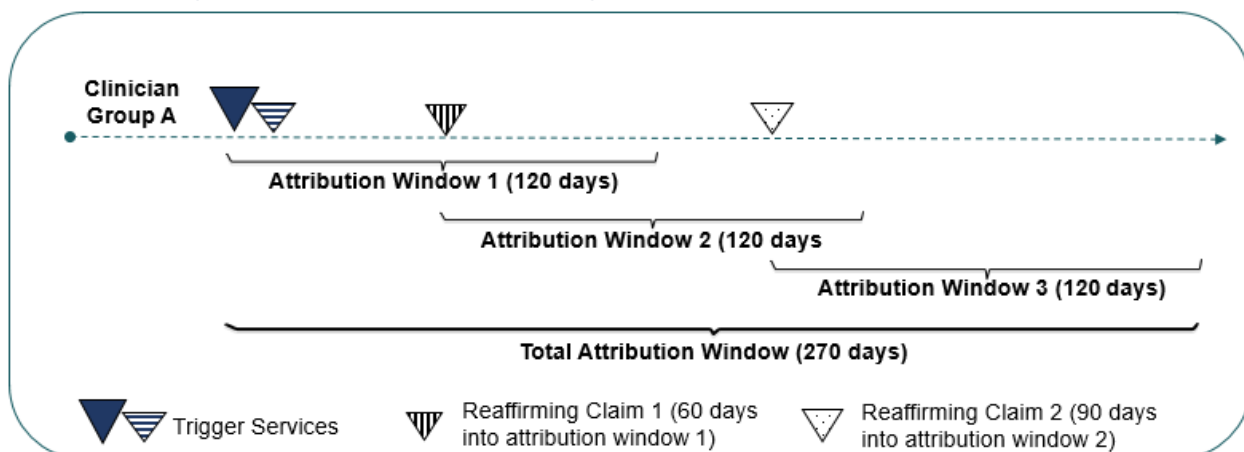
- Any code from the set of trigger CPT/HCPCS codes for clinically relevant outpatient services when accompanied by an ICD-10 diagnosis code indicating low back pain. These outpatient services fall into the following categories:
 - Outpatient E&Ms
 - Therapy evaluation
 - Chiropractic manipulation
 - Osteopathic manipulation
 - Therapy services
- Any code from the additional set of confirming CPT/HCPCS codes, when accompanied by an ICD-10 diagnosis code indicating low back pain. These additional services include:
 - Spine injections
 - Spinal neurostimulators
 - Acupuncture
 - Remote therapeutic monitoring
 - Dry needling
 - Imaging

Each time a reaffirming claim is identified during an open attribution window, the attribution window will be extended by 120 days from the point of the reaffirming claim. The resulting overall time period of responsibility is defined as the **total attribution window**, which begins with the trigger claim and concludes 120 days after the final reaffirming claim. Therefore, the total attribution window can span multiple years and vary in length for different patients.

Figure 2 below contains an example illustration of the relationship between a trigger event, reaffirming claims, and a total attribution window. In this hypothetical example, reaffirming claim 1 occurs 50 days into attribution window 1 and extends that attribution window by 120 days (until the end of attribution window 2), and then reaffirming claim 2 occurs 90 days into

attribution window 2, extending the attribution window by another 120 days until the end of attribution window 3. Once all reaffirming claims are identified, the total period of time of the clinician-patient relationship is defined as the period covered by all attribution windows, beginning with the trigger claim and concluding 120 days after the final reaffirming claim. For this example, the total attribution window is 270 days long.

Figure 2. Example of Reaffirming Claims and Total Attribution Window



4.3 Define an Episode

Once the total attribution window has been constructed, it is divided into segments of time, also known as episodes. Episodes allow the measure to be calculated for a given measurement period, which is a static year-long period (i.e., calendar year) in which a clinician or clinician group will be measured.

An **episode** is defined as the length of at least one attribution window (as a 120-day segment of the total attribution window). Episodes are assessed in the measurement period in which they end and only include days not previously measured in preceding measurement periods. Clinicians or clinician groups are measured on a patient at the end of the calendar year if there are at least 120 days' worth of claims data that has not previously been assessed or when the total attribution window ends, ensuring that costs are only assessed once. The episode window lengths may vary depending on the length of the total attribution window and the number of days that have not been assessed in preceding measurement periods.

After the episode windows are constructed, the **number of assigned days** for each episode is determined and used as a weighting factor in the measure score calculation step. This weighting is done to ensure fair comparison across episodes, where cost is effectively scaled respective to the episode length to allow like comparisons between episodes of similar length.

An episode is, at minimum, the length of one minimum attribution window (120 days for the Low Back Pain measure) as described in Section 4.1, and the **total** attribution window can be longer if reaffirming events occur that extend the relationship as described in Section 4.2. As such, there are several scenarios for how a total attribution window may interact with and overlap measurement years when defining an episode.

1. **The total attribution window starts and ends in the current measurement year.** In this case:
 - The episode **start date** is the start date of the total attribution window.
 - The episode **end date** is the end date of the total attribution window.
 - **Assign** the number of days between the episode start and end dates.

2. **The total attribution window starts in the current measurement year and extends into the next measurement year.** In this case:
 - The episode **start date** is the start date of the total attribution window.
 - The episode **end date** is the end of the current measurement year. The episode is only valid when it has enough data in the current measurement year (i.e., there are at least 120 days of data).
 - **Assign** the number of days between episode start and end dates.
3. **The total attribution window starts before the current measurement year and ends in the current measurement year.**
 - a. **If the total attribution window has enough data** in the previous measurement year (i.e., there are at least 120 days of data in the previous measurement year before it continues into the current measurement year, meaning those days have already been previously assessed), then:
 - The **episode start date** is the start of the current performance year, except when:
 - If the left-over portion of the total attribution window doesn't have enough data in the current measurement year (i.e., the portion of the total attribution window that extends into the current measurement year is less than the length of one attribution window [120 days]), then pull days from the previous measurement period till the episode has 120 days. In this case, the episode start date is equal to the end of the total attribution window minus 120 days.
 - The **episode end date** is the end of the total attribution window.
 - **Assign** the number of days between episode start and end date, except when:
 - If there isn't enough data in the current measurement year as described above, then only assign the number of days between the start of the measurement year and the end of the total attribution window, which is the unmeasured portion of the total attribution window.
 - b. **If the total attribution window does not have enough data** in the previous measurement year (i.e., there are less than 120 days of data in the previous measurement year before it continues into the current measurement year, meaning those days have not yet been assessed), then:
 - The episode **start date** is the start of the total attribution window.
 - The episode **end date** is the end of the total attribution window.
 - **Assign** the number of days between the episode start and end date.
4. **The total attribution window starts before the current measurement year, continues in the current measurement year, and extends into the next measurement year.**
 - a. **If the total attribution window has enough data** in the previous measurement year (i.e., there are at least 120 days of data in the previous measurement year before it continues into the current measurement year, meaning those days have already been previously assessed), then:
 - The episode **start date** is the start of the measurement year.
 - The episode **end date** is the end of the measurement year.
 - **Assign** the number of days between the episode start date and end date.
 - b. **If the total attribution window does not have enough data** in the previous measurement year (i.e., there are less than 120 days of data in the previous

measurement year before it continues into the current measurement year, meaning those days have not yet been assessed), then:

- The episode **start date** is the start of the total attribution window.
- The episode **end date** is the end of the measurement year.
- **Assign** the number of days between episode start and end date.

For more detailed examples and illustration of the episode construction and assignment of days, see Appendix A.

Once a Low Back Pain episode window is defined, the episode is placed into one of the episode sub-groups to enable meaningful clinical comparisons. Sub-groups represent more granular, mutually exclusive and exhaustive patient populations defined by clinical criteria. Sub-groups are useful in ensuring clinical comparability so that the corresponding cost measure fairly compares clinicians with a similar patient case-mix.

Codes used to define the sub-groups can be found in the “Sub_Groups” and “Sub_Groups_Details” tabs of the Low Back Pain Measure Codes List file. This cost measure has 4 sub-groups:

- Surgical episode with history of complex low back pain (i.e., radiculopathy, spinal stenosis, or spondylolisthesis)
- Surgical episode without history of complex low back pain
- Non-surgical episode with history of complex low back pain
- Non-surgical episode without history of complex low back pain

4.4 Attribute the Episode to a Clinician Group or a Clinician

Once an episode has been defined, it is attributed to one or more clinicians of a specialty that is eligible for MIPS. The episodes are attributed to clinician groups, who are identified by their unique TIN, and individual clinicians, who are identified by their TIN and NPI pair (TIN-NPI). For codes relevant to this section, please see the “Attribution” tab of the Low Back Pain Measure Codes List file.

TIN level attribution: An episode is attributed to the clinician group that billed the trigger event (trigger and confirming claims) for the total attribution window. The clinically related costs from the total number of assigned days are attributed to that clinician group.

TIN-NPI level attribution: An episode is attributed to any clinician within the attributed clinician group that billed at least 30% of the trigger or confirming codes on Part B Physician/Supplier claim lines during the episode.¹⁸ The measure’s attribution methodology also imposes additional checks to ensure that TIN-NPIs are appropriately attributed. Specifically, TIN-NPIs that meet the 30% threshold must have billed at least one trigger or confirming code within 1 year prior to or on the episode start date.

¹⁸ For a diagram illustrating an example of attribution to a TIN and TIN-NPI, please refer to Appendix B.

Future attribution rules may benefit from the implementation of patient relationship categories¹⁹ and codes.²⁰ As required by section 101(f) of the Medicare Access and CHIP Reauthorization Act of 2015 (MACRA), the Centers for Medicare & Medicaid Services (CMS) will consider how to incorporate the patient relationship categories into episode-based cost measurement methodology as clinicians and billing experts gain experience with them.²¹

4.5 Assign Costs to an Episode and Calculate Episode Scaled Observed Costs

Medicare Parts A, B, and D services, and their costs, are assigned to an episode only when clinically related to the management and treatment of the patient's low back pain during the episode. Assigned services may include treatment and diagnostic services, ancillary items, services directly related to treatment, and those furnished as a consequence of care (e.g., complications, readmissions, unplanned care, and emergency department visits). Unrelated services are not assigned to the episode. For example, the cost of care for a procedure that occurs during the episode that is not clinically related to the management and treatment of the patient's low back pain would not be assigned to the episode.

To ensure that only clinically related services are included, services during the episode window are assigned to the episode based on a series of service assignment rules, which are listed in the "Service_Assignment_AB" and "Service_Assignment_D" tabs of the Low Back Pain Measure Codes List file.

For the Low Back Pain episode group, services performed in the following service categories are considered for assignment to the episode:

- Outpatient (OP) Facility and Clinician Services
- Emergency Department (ED)
- Inpatient (IP) – Medical
- IP – Surgical
- Inpatient Rehabilitation Facility (IRF), Long Term Care Hospital (LTCH), and Skilled Nursing Facility (SNF)²²
- Durable Medical Equipment, Prosthetics, Orthotics, and Supplies (DME)
- Home Health (HH)
- Part D drugs

In addition to service category, service assignment rules may be modified based on the service category in which the service is performed, as listed above. Service assignment rules can also

¹⁹ The MACRA Patient Relationship Categories aim to distinguish the relationship and responsibility of a clinician with a patient at the time of furnishing an item or service, thereby facilitating the attribution of patients and episodes to one or more clinicians for purposes of measure score calculations. For more information on Patient Relationship Categories, please refer to the Patient Relationship Categories and codes operational list. (<https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/Value-Based-Programs/MACRA-MIPS-and-APMs/CMS-Patient-Relationship-Categories-and-Codes.pdf>)

²⁰ The MACRA Patient Relationship Codes are HCPCS Level II modifier codes that clinicians report on claims to identify their patient relationship category. For the Patient Relationship Codes, please see Table 27 of the CY 2018 Physician Fee Schedule final rule. (<https://www.federalregister.gov/d/2017-23953/p-2203>)

²¹ For more information on the Patient Relationship Categories and Codes, please download the Patient Relationship Categories and Codes FAQ. (<https://qpp-cm-prod-content.s3.amazonaws.com/uploads/236/Patient-Relationship-Categories-and-Codes-webinar-FAQ.pdf>)

²² Services performed in the IRF, LTCH, and SNF settings are assigned to an episode based on their association with the grouped IP stay.

be defined based on specific service information alone or service information combined with diagnosis information. Services may be assigned to the episode based on the following combinations:

- High level service code alone
- High level service code combined with first 3 digits of the ICD-10 diagnosis code
- High level service code combined with more specific service code
- High level service code combined with more specific service code and with 3-digit ICD-10 diagnosis code

The steps for assigning costs are as follows:

- **Identify** all services on claims with positive standardized payment that occur within the episode window.
- **Assign** identified services to the episode based on the types of service assignment rules described above.
- **Assign** all trigger and reaffirming Part B Physician/Supplier claims occurring during the episode window.
- **Assign** all SNF stays based on the following criteria:
 - Identify SNF stays where both (i) the SNF stay's qualifying IP stay is assigned to episode and (ii) the SNF stay occurs during the episode window.
 - For those identified SNF stays, determine the number of days that overlap with the episode window; if the overlap is greater than 30 days, cap claim amount assigned to the episode at 30 days.
- **Assign** all IRF and LTCH stays based on the following criteria:
 - Identify IRF and LTCH stays for which (i) there is a preceding IP stay discharged within 7 days prior to the stay's start date, (ii) the preceding IP stay is assigned to the episode, and (iii) the IRF and LTCH stays occur during the episode window.
 - For those identified IRF and LTCH stays, determine the distribution of grouped claim cost across episodes and cap claim amount assigned to the episode at the 90th percentile of each observed cost distribution.²³
- **Assign** all inpatient E&M claims during IP stays assigned to episode.
- **Sum** the standardized Medicare allowed amounts for all claims assigned to each episode to obtain the total standardized episode observed cost.
- **Average** the total standardized episode observed cost over the number of days in the episode to get the episode average daily standardized observed cost.
- **Multiply** the episode average daily standardized observed cost by 120 to get the episode scaled standardized observed cost.

Service Assignment Example

- Clinician group A has been providing continuous care management for Patient K's low back pain, and is attributed an episode with Patient K during the measurement period.
- Clinician group A performs a spine MRI for Patient K during the episode window. Because the spine MRI is considered a clinically related service, its costs will be assigned to Clinician group A's Low Back Pain episode with Patient K.

²³ Capping costs aims to limit the effects of extreme observed cost values on episode observed costs. Capping involves limiting the amount of claim costs that a provider can be assigned during an episode. For Low Back Pain episodes with related LTCH and/or IRF costs, the value of the 90th percentile is assigned to all LTCH and IRF observed costs above the 90th percentile.

4.6 Exclude Episodes

Before measure calculation, episode exclusions are applied to remove certain episodes from measure score calculation. Certain exclusions are applied across all chronic condition episode groups, and other exclusions are specific to this measure, based on consideration of the clinical characteristics of a homogenous patient cohort. All measure-specific exclusions are listed in the “Exclusions” and “Exclusions_Details” tabs in the Low Back Pain Measure Codes List file.

Episodes are excluded from the Low Back Pain measure if they meet any of the following cross-episode group conditions:

- The patient has a primary payer other than Medicare for any time overlapping the episode window or 120-day lookback period prior to the episode window.
- The patient was not enrolled in Medicare Parts A and B for the entirety of the 120-day lookback period plus episode window, or was enrolled in Part C for any part of the 120-day lookback period plus episode window.
- The patient is not found in the Medicare EDB.
- The patient has an episode window shorter than 120 days.
- The patient’s death date occurred before the episode end date.
- The patient resided outside the United States or its territories during the episode window.

4.7 Estimate Scaled Expected Costs for Risk Adjustment

Risk adjustment is used to estimate episode expected costs in recognition of the different levels of care patients may require due to comorbidities, disability, age, and other risk factors. The risk adjustment model includes variables from the CMS Hierarchical Condition Category Version 22 (CMS-HCC V22) 2016 Risk Adjustment Model,²⁴ as well as other standard risk adjustors (e.g., patient age) and variables for clinical factors that may be outside the attributed clinician’s reasonable influence. A full list of risk adjustment variables can be found in the “RA” and the “RA_Details” tabs of the Low Back Pain Measure Codes List file.

Steps for defining risk adjustment variables and estimating the risk adjustment model are as follows:

- **Define** HCC, number and types of clinician specialties from which the patient has received care, and episode group-specific risk adjustors using service and diagnosis information found on the patient’s Medicare claims history in the 120-day period prior to the episode start date (or the timing specified in the “RA_Details” tab of the Measure Codes List file) for certain billing codes that indicate the presence of a procedure, condition, or characteristic. For clinician specialty information, include information obtained on the episode start date.
 - **Create** the following categories to identify HCC frequency as a marker of patient comorbidity: 0, 1, 2-3, 4-6, and 7+ HCCs.
- **Define** other risk adjustors that rely upon Medicare beneficiary enrollment and assessment data as follows:
 - Identify beneficiaries who are originally “Disabled without ESRD” or “Disabled with ESRD” using the original reason for joining Medicare field in the Medicare beneficiary EDB.

²⁴ CMS uses an HCC risk adjustment model to calculate risk scores. The HCC model ranks diagnoses into categories that represent conditions with similar cost patterns. Higher categories represent higher predicted healthcare costs, resulting in higher risk scores. There are over 9,500 ICD-10-CM codes that map to one or more of the 79 HCC codes included in the CMS-HCC V22 model.

- Identify beneficiaries with ESRD if their enrollment indicates ESRD coverage, ESRD dialysis, or kidney transplant in the Medicare beneficiary EDB in the 120-day lookback period.
- Identify beneficiaries who have spent at least 90 days in a long-term care institution (LTCI) without having been discharged to the community for 14 days, using LTC MDS assessment data. Then, identify the beneficiaries whose Low Back Pain episode start date overlaps with their stay in an LTCI.
- **Drop** risk adjustors that are defined for less than 15 episodes nationally for each sub-group and Part D enrollment status combination to avoid using very small samples.
- **Categorize** beneficiaries into age ranges using their date of birth information in the Medicare beneficiary EDB. If an age range has a cell count less than 15, collapse this in the next adjacent age range category towards the reference category (65-69).

The following steps are performed separately for each sub-group and Part D enrollment status combination:

- **Winsorize**²⁵ the episode scaled observed cost as follows:
 - **Assign** the value of the 98th percentile to all episode scaled observed costs above the 98th percentile.
- **Run** an ordinary least squares (OLS) regression model to estimate the relationship between all the risk adjustment variables and the dependent variable, the episode winsorized scaled observed cost calculated from the previous step, to obtain the episode scaled expected cost.
- **Winsorize** the episode scaled expected cost as follows:
 - **Assign** the value of the 0.5th percentile to all episode scaled expected costs below the 0.5th percentile.
 - **Renormalize**²⁶ values by multiplying each episode's winsorized scaled expected cost by the average scaled expected cost, and dividing the resultant value by the average winsorized scaled expected cost.
- **Exclude** episodes with outliers as follows:
 - **Calculate** each episode's residual as the difference between the re-normalized, winsorized scaled expected cost computed above and the winsorized scaled observed cost.
 - **Exclude** episodes with residuals below the 1st percentile or above the 99th percentile of the residual distribution.
 - **Renormalize** the resultant scaled expected cost values by multiplying each episode's winsorized scaled expected costs by the average winsorized scaled observed cost (after excluding outliers), and dividing by the average winsorized scaled expected cost (after excluding outliers).

²⁵ Winsorization aims to limit the effects of extreme values on expected costs. Winsorization is a statistical transformation that limits extreme values in data to reduce the effect of possible outliers. Winsorization of the lower end of the distribution (i.e., bottom coding) involves setting extremely low predicted values below a predetermined limit to be equal to that predetermined limit, and similarly for the higher end of the distribution involves setting extremely high predicted values above a predetermined limit to be equal to that predetermined limit.

²⁶ Renormalization is performed after adjustments are made to the episode's expected cost, such as winsorization or residual outlier exclusion. This process multiplies the adjusted values by a scalar ratio to ensure that the resulting average is equal to the average of the original value.

4.8 Calculate Measure Score

Measure scores are calculated for a clinician or clinician group practice as follows:

- **Calculate** the ratio of winsorized scaled standardized observed cost to scaled expected episode cost for each episode attributed to the clinician or clinician group.
- **Calculate** the measure as a weighted average of these ratios across all of a clinician's or a clinician group's attributed episodes, where the weighting is the number of assigned days for a clinician or a clinician group during the episode.
- **Multiply** the weighted average episode cost ratio by the national average winsorized scaled observed episode cost to generate a dollar figure for the cost measure score.

The clinician-level (or clinician group practice-level) risk-adjusted and specialty-adjusted cost for any attributed clinician (or clinician group practice) "j" can be represented mathematically as:

$$Measure\ Score_j = \left[\frac{1}{n_j} \sum_{i \in \{I_j\}} \left(\frac{Y_{ij}}{\hat{Y}_{ij}} \times n_{ij} \right) \right] * \left(\frac{1}{N} \sum_{i \in \{I\}} Y_i \right)$$

where:

Y_{ij}	is the winsorized scaled observed payment for episode i and attributed clinician (or clinician group practice) j
\hat{Y}_{ij}	is the scaled expected payment for episode i and attributed clinician (or clinician group practice) j
n_{ij}	is the number of assigned days for episode i and attributed clinician group practice j
n_j	is the total number of days assigned to attributed clinician (or clinician group practice) j across all episodes (summation of n_{ij})
N	is the total number of episodes attributed to clinicians (or clinician group practices) nationally
Y_i	is the winsorized scaled observed payment for episode i
$i \in \{I_j\}$	is all episodes attributed to clinician (or clinician group practice) j
$i \in \{I\}$	is all episodes attributed to clinicians (or clinician group practices) nationally

A diagram demonstrating a visual depiction of an example measure calculation can be found in Appendix D.

A lower measure score indicates that the observed episode costs are lower than or similar to expected costs for the care for the particular patients and episodes included in the calculation.

A higher measure score indicates that the observed episode costs are higher than expected for the care provided for the particular patients and episodes included in the calculation.

Appendix A. Example Illustrations of Scenarios for Episode Construction and Assignment of Days

Section 4.3 describes defining an episode in detail, and the figures below provide specific example scenarios of how episodes are constructed and attributed to a particular measurement period to illustrate. Overall, an episode's window is defined based on:

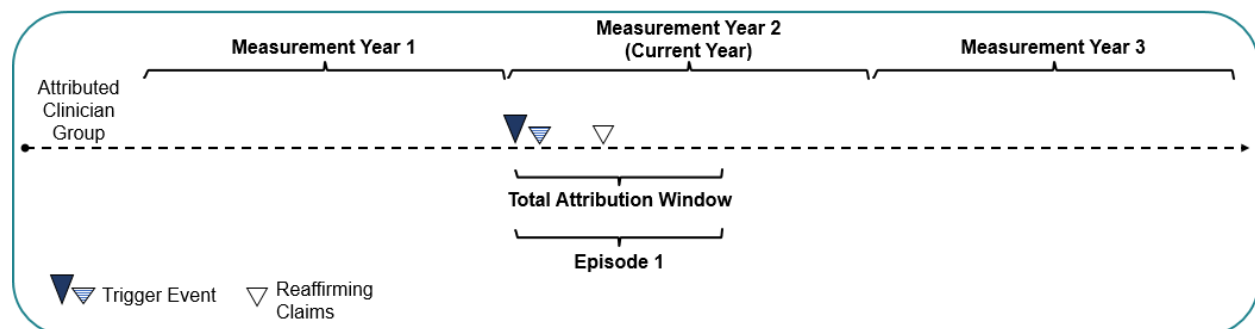
- Whether the patient-clinician relationship during the measurement period was continuous, and
- The amount of claims data that has not been assessed in preceding measurement periods.

These examples also show how days are assigned to episodes. In each of these examples, we focus on episodes assessed in Measurement Year 2. Assigned days are used as a weighting factor at the measure score calculation step, where the observed to expected ratio of each episode is weighted by the number of assigned days to that episode and then averaged over all episodes attributed to the clinician or clinician group. Therefore, to ensure fair comparison, longer episodes are given more weight during measure calculation than shorter episodes.

Scenario 1: The Total Attribution Window Starts and Ends in the Current Measurement Year

Figure A-1 illustrates a Low Back Pain episode that is 210 days long. This episode begins during the current measurement year (i.e., Measurement Year 2) with a pair of triggering services that opens a 120-day attribution window. The trigger event occurs January 1. There is only 1 reaffirming claim that occurs 30 days after the trigger event, so the total attribution window ends 120 days after the last reaffirming claim for a total attribution window length of 210 days. Costs will only be assessed during Measurement Year 2 because there was not 120 days' worth of claims during the previous Measurement Year 1, and because the episode ended in Measurement Period 2 containing at least 120 days' worth of claims data that have not previously been assessed. All 210 days are assigned to Episode 1 and used as a weighting factor at the measure score calculation step.

Figure A-1. Scenario Where Total Attribution Window Is Limited to Current Measurement Year

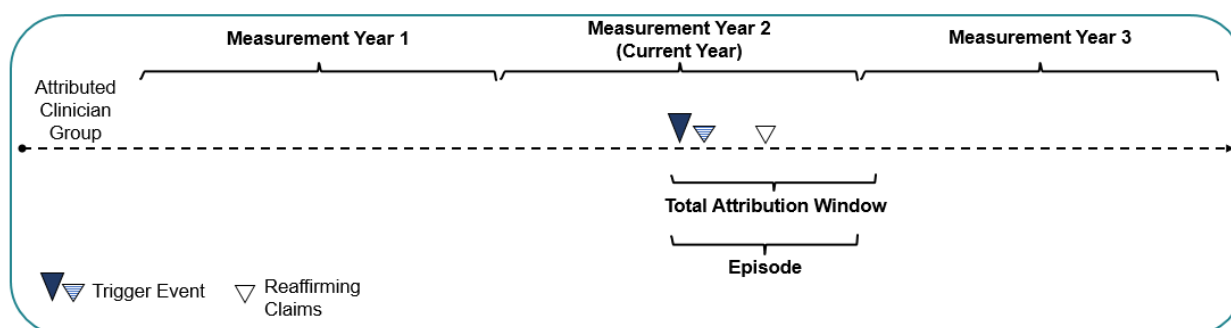


Scenario 2: The Total Attribution Window Starts in Current Year and Extends Into Next

Figure A-2 illustrates a Low Back Pain episode that is 210 days long. This episode begins during the current measurement year (i.e., Measurement Year 2) with a pair of triggering

services that opens a 120-day attribution window. The trigger event occurs July 1. There is only 1 reaffirming claim that occurs 30 days after the trigger event, so the total attribution window ends 120 days after the last reaffirming claim for a total attribution window length of 210 days that ends at approximately the end of January in the next measurement year (Measurement Year 3). Costs will be assessed during Measurement Year 2 until the end of the measurement year because there are at least 120 days' worth of claims data that have not previously been assessed in the current measurement year (specifically 180 days).

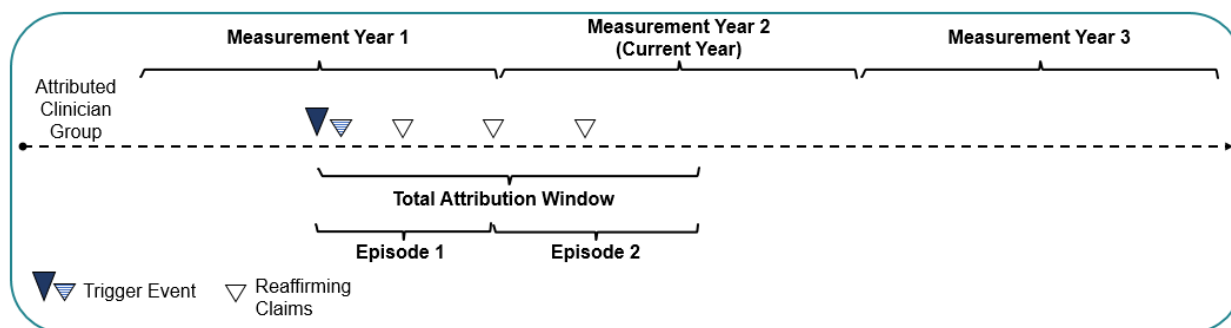
Figure A-2. Scenario Where Total Attribution Window Covers Current Measurement Year and Extends



Scenario 3: The Total Attribution Window Starts Before the Current Measurement Year and Extends into the Current Measurement Year

Figure A-3 illustrates a total attribution window that is 390 days long. It begins during the previous measurement year (i.e., Measurement Year 1) with a pair of triggering services that opens a 120-day attribution window. There are 3 reaffirming claims (occurring approximately 90 days apart) that extend the total attribution window to 120 days past the last reaffirming claim, ending the total attribution window in the middle of the current measurement year (Measurement Year 2). Because there is enough data (i.e., at least 120 days) in both measurement years, costs will be assessed in 2 episodes, one in each measurement year, where Episode 1 will be assessed for costs in Measurement Year 1 with 180 days assigned, and Episode 2 will be assessed for costs in Measurement Year 2 with 210 days assigned.

Figure A-3. Scenario Where Total Attribution Window Covers Previous and Current Measurement Year



Appendix B. Illustration of Attribution to Individual Clinicians (TIN-NPI)

This appendix provides a detailed illustration of the attribution methodology at the TIN and TIN-NPI levels. Once a Low Back Pain episode has been defined, it is attributed:

- To the TIN that billed the trigger services (trigger claim and confirming claim) for the total attribution window.
- To the TIN-NPI(s) within the attributed TIN that billed at least 30% of trigger or confirming codes on Part B Physician/Supplier claim lines during the episode.

The measure's attribution methodology also imposes additional checks to ensure that TIN-NPIs are appropriately attributed. Specifically, TIN-NPIs that meet the 30% threshold must have billed at least one trigger or confirming code within 1 year prior to or on the episode start date.

Figure B-1. TIN-NPI Attribution

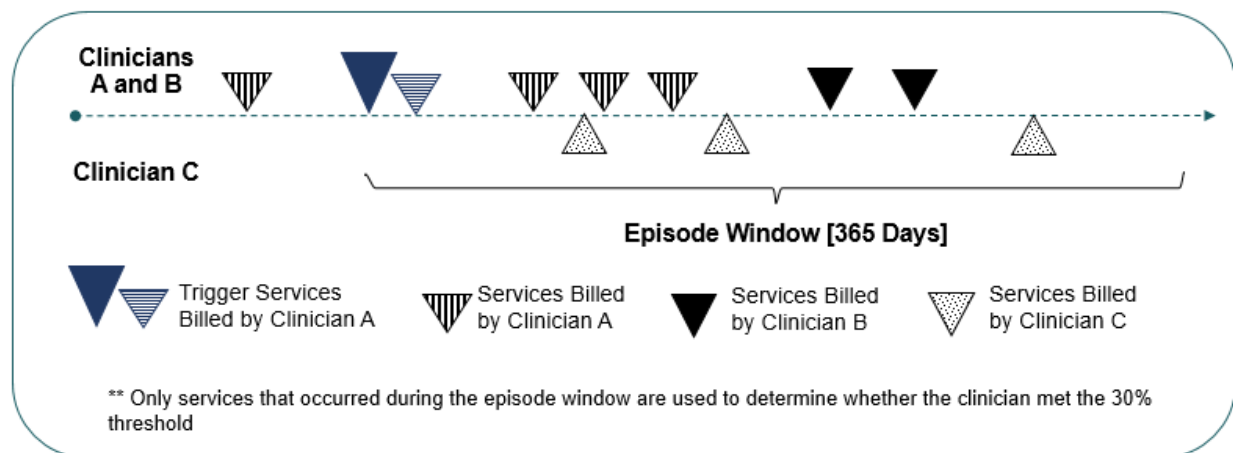


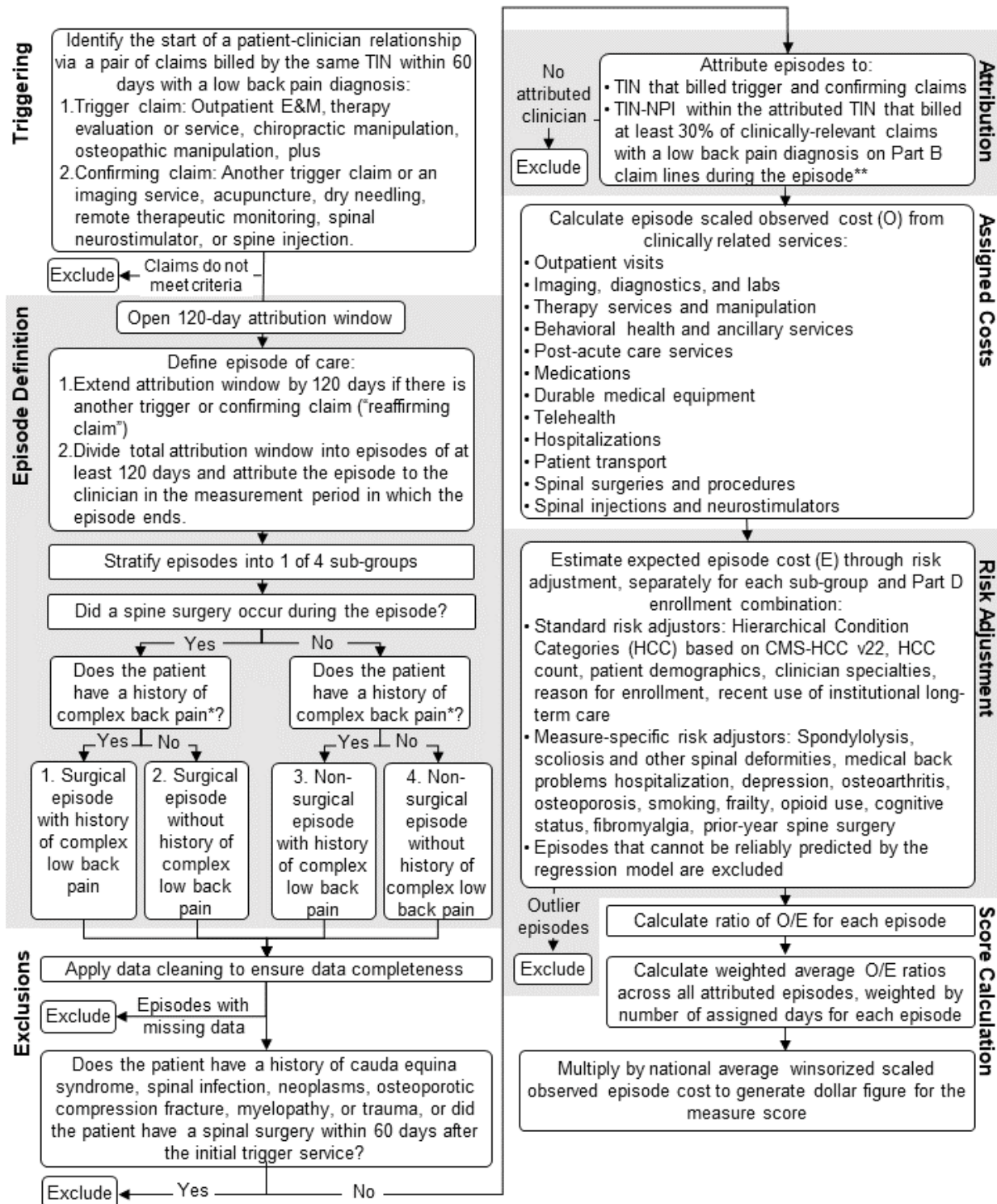
Figure B-1 illustrates a scenario in which 3 clinicians (A, B, and C) within an attributed clinician group (TIN 1) have billed services during a patient's episode window. Within the episode window, there are a total of 10 services billed across the 3 clinicians. Each of these services is uniquely marked depending on the clinician that billed the service.

For TIN level attribution, TIN 1 is attributed the episode because it billed the trigger services for the patient. **For TIN-NPI level attribution,** Clinician A bills 5 qualifying services (5/10, 50%), Clinician B bills 2 services (2/10, 20%), and Clinician C bills 3 services (3/10, 30%) during the episode window. Clinicians A and C met the 30% threshold, so they are considered for attribution. Clinician B did not meet the 30% threshold, so it is not considered for attribution.

- Check: Clinician A billed at least one trigger or confirming code within 1 year prior to or on the episode start date, so it is considered for attribution. Clinician C did not bill any such services, so Clinician C is not considered for attribution.

Since only Clinician A met the 30% threshold and the additional check, it is attributed this episode.

Appendix C. Measure Flowchart for Low Back Pain Measure



* Complex low back pain is defined as one of: radiculopathy, spinal stenosis, or spondylolisthesis

**To ensure that TIN-NPIs are appropriately attributed, TIN-NPIs meeting the 30% threshold must also have billed at least 1 relevant Part B claim with a low back pain diagnosis within 1 year prior to the start of the episode.

Appendix D. Measure Calculation Example

This sub-section shows how the measure score is calculated. Figure D-1 below provides an illustrated example of measure calculation, using an example measure where the clinician group has only 4 attributed episodes for demonstration purposes.

Figure D-1. Chronic Condition Episode-Based Cost Measure Calculation Steps

