Psychoses/Related Conditions Measure

Draft Cost Measure Methodology

October 2018 Field Testing

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1.0 Introduction

This document details the draft methodology for the Psychoses/Related Conditions measure and should be reviewed along with the Psychoses/Related Conditions Draft Measure Codes List file, which contains the medical codes used in constructing the measure. These documents have been shared as part of field testing, where clinicians and clinician groups attributed at least 10 episodes from one or more of 11 episode-based cost measures received Field Test Reports containing measure performance information.

Field testing allows the Centers for Medicare & Medicaid Services (CMS) and the measure development contractor Acumen, LLC (referred to as "Acumen") to gather feedback on new episode-based cost measures and re-evaluated measures from clinicians and other stakeholders.[1] All stakeholders have the opportunity to provide feedback on the draft measure specifications and a Mock Field Test Report by reviewing this document and other publicly posted supplemental documentation. For more information about the development process for this measure please see the Episode-Based Cost Measures Development Process document.[2]

> We are collecting stakeholder feedback from **October 3, 2018, to October 31, 2018.** To provide feedback on any aspect of field testing please navigate to this feedback survey: https://www.surveymonkey.com/r/2018-macra-cost-measures-field-testing

1.1 Measure Name
Psychoses/Related Conditions 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 the Field Test Reports and all supplemental documentation, "cost" generally means the Medicare allowed amount, which includes both Medicare and trust fund payments and any applicable beneficiary deductible and coinsurance amounts.[3]

The Psychoses/Related Conditions episode-based cost measure evaluates a clinician's risk-adjusted cost to Medicare for beneficiaries who receive inpatient treatment for psychoses or related conditions during the measurement period. The cost measure score is the clinician's risk-adjusted cost for the episode group averaged across all episodes attributed to the clinician. This acute inpatient medical condition measure includes costs of services that are clinically related to the attributed clinician's role in managing care during each episode from 3 days prior to the clinical event that opens, or "triggers," the episode through 120 days after the trigger.

1.3 Measure Rationale
The Neuropsychiatric Disease Management Clinical Subcommittee recommended the Psychoses/Related Conditions episode-based cost measure for development because of its high impact in terms of patient population and Medicare spending. Psychotic disorders, including schizophrenia spectrum disorders, are associated with disturbances in thought

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[1] CMS worked with Acumen to develop and re-evaluate cost measures for potential use in the Merit-based Incentive Payment System (MIPS).
[2] "Measure Development Process," *MACRA Feedback Page* (October 2018), https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/Value-Based-Programs/MACRA-MIPS-and-APMs/MACRA-Feedback.html
[3] Claims data from Medicare Parts A and B are used to construct the episode-based cost measures used in the Field Test Reports.

processing and behaviors that result in a loss of contact with reality, and these disorders occur throughout the lifespan. A 2017 study found that Medicare patients being treated for psychotic disorders had both longer (1.52 days longer) and higher cost hospital stays compared to the mean hospital stay.[4]

1.4   Measure Numerator

The cost measure numerator is the sum of the ratio of observed to expected payment-standardized cost to Medicare for all Psychoses/Related Conditions episodes attributed to a clinician.[5] This sum is then multiplied by the national average observed episode cost to generate a dollar figure.

1.5   Measure Denominator

The cost measure denominator is the total number of episodes from the Psychoses/Related Conditions episode group attributed to a clinician.

1.6   Data Sources

The Psychoses/Related Conditions cost measure uses the following data sources:

- Medicare Parts A and B claims data from the Common Working File (CWF)
- Enrollment Data Base (EDB)
- Long Term Care Minimum Data Set (LTC MDS)
- Provider Enrollment, Chain, and Ownership System (PECOS)

The measurement period for the Field Test Reports is January 1, 2017, through December 31, 2017.

1.7   Care Settings

The Psychoses/Related Conditions cost measure can be triggered based on claims data from the following settings: inpatient (IP) hospitals and inpatient psychiatric facilities (IPF).

1.8   Cohort

The cohort for this cost measure consists of patients who are Medicare beneficiaries enrolled in Medicare fee-for-service and who receive inpatient treatment for psychoses or related conditions that triggers a Psychoses/Related Conditions episode.

The cohort for this cost measure is also further refined by the definition of the episode group and episode group-specific exclusions (see Section 3).

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[4] Bessaha, Melissa L., Martha Shumway, Melissa Edmondson Smith, Charlotte L. Bright, and George J. Unick. "Predictors of Hospital Length and Cost of Stay in a National Sample of Adult Patients with Psychotic Disorders." Psychiatric Services (Washington, D.C.) 68, no. 6 (2017): 559-65.

[5] 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 (GPCIs) or other payment adjustments such as those for teaching hospitals. For more information, please refer to the "CMS Price (Payment) Standardization - Basics" and "CMS Price (Payment) Standardization - Detailed Methods" documents posted on QualityNet:
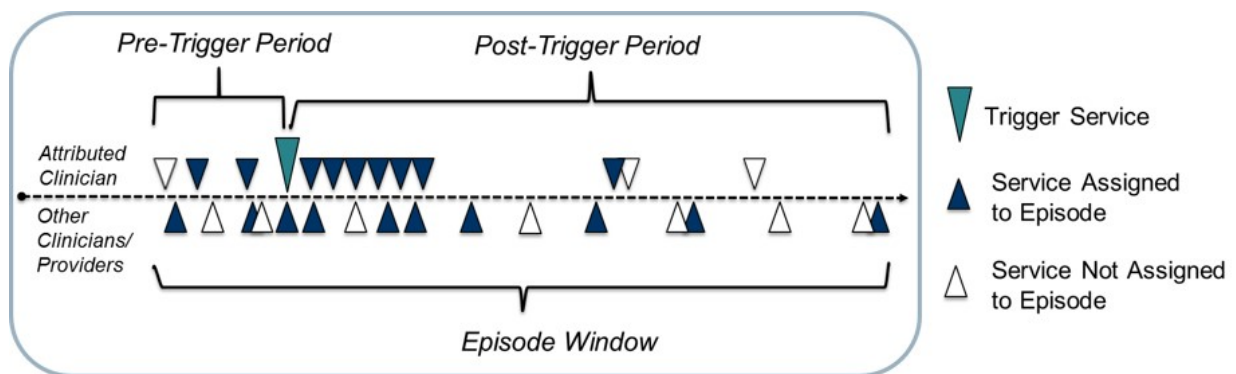http://www.qualitynet.org/dcs/ContentServer?c=Page&pagename=QnetPublic/Page/QnetTier4&cid=1228772057350

2.0 Overview of Measure Methodology

There are two overarching processes in calculating episode-based cost measure scores: episode construction (Steps 1-3) and measure calculation (Steps 4-6). This section provides a brief summary of these processes for the Psychoses/Related Conditions cost measure, and Section 3 describes the processes in detail.

1. **Trigger and define an episode**: Episodes are defined by billing codes that open, or "trigger," an episode. The episode window starts 3 days before the trigger and ends 120 days after the trigger. To enable meaningful clinical comparisons, episodes are placed into more granular, mutually exclusive sub-groups based on clinical criteria. Some episodes may also be excluded based on other information available at the time of the trigger.

2. **Attribute the episode to a clinician**: For this acute inpatient medical condition episode group, an attributed clinician is a clinician who bills Part B Physician/Supplier (PB) claims for evaluation and management (E&M) service(s) provided during the trigger IP stay.

3. **Assign costs to the episode and calculate the episode observed cost**: Clinically related services occurring during the episode window are assigned to the episode. The cost of the assigned services is summed to determine each episode's standardized observed cost.

Figure 1. Diagram Showing a Constructed Episode

4. **Exclude episodes**: Exclusions remove a small, unique group of patients from cost measure calculation in cases where it may be impractical and unfair to compare the costs of caring for these patients to the costs of caring for the cohort at large.

5. **Calculate expected costs for risk adjustment**: Risk adjustment aims to isolate variation in clinician costs to only costs clinicians can reasonably influence (e.g., accounting for beneficiary age, comorbidities and other factors). A regression is run using the risk adjustment variables as covariates to estimate the expected cost of each episode. Then, statistical techniques are applied to reduce the effect of extreme outliers on measure scores.

6. **Calculate the measure score:** For each episode, the ratio of standardized total observed cost (from step 3) to risk-adjusted expected cost (from step 5) is calculated and averaged across all of a clinician or clinician group's attributed episodes to obtain the average episode cost ratio. The average episode cost ratio is multiplied by the national average observed episode cost to generate a dollar figure for the cost measure score.

3.0 Detailed Measure Methodology

This section details the two overarching processes in calculating episode-based cost measure scores in more detail: Sections 3.1 through 3.3 describe episode construction and Sections 3.4 through 3.6 describe measure calculation.

3.1 Trigger and Define an Episode

Psychoses/Related Conditions episodes are defined by medical Medicare Severity Diagnosis-Related Group (MS-DRG) codes that open, or trigger, an episode. Specifically, episodes are triggered by the occurrence of IP E&M codes on PB claims during an IP facility stay with a specified MS-DRG. For the codes and logic relevant to this section please see the "Triggers" tab (and "Trigger_Exclusions" tab, if applicable) of the Psychoses/Related Conditions Draft Measure Codes List.

The steps for defining an episode for the Psychoses/Related Conditions episode group are as follows:

- **Identify** PB claim lines with positive standardized payment that meet the following conditions:
  - They have a relevant inpatient CPT/HCPCS E&M code as listed in the "Attribution" tab of the Psychoses/Related Conditions Draft Measure Codes List file.
  - They were billed by a physician, physician assistant, nurse practitioner, clinical nurse specialist, certified registered nurse anesthetist, or clinician group.
- **Identify** IP stays with positive standardized payment that have a trigger code specified in the "Triggers" tab of the Psychoses/Related Conditions Draft Measure Codes List file.
- **Trigger** an episode for an identified IP stay if at least one identified PB claim line has an expense date concurrent to the IP stay.
- **Establish** the episode window as follows:
  - Establish the episode trigger date as the IP stay admission date.
  - Establish the episode start date as 3 days prior to the episode trigger date.
  - Establish the episode end date as 120 days after the episode trigger date.
- **Define trigger exclusions** based on information available at the time of the trigger, if applicable.

Once a Psychoses/Related Conditions episode is triggered, the episode is placed into one of the episode sub-groups to enable meaningful clinical comparisons based on clinical criteria developed by the Psychoses/Related Conditions measure-specific workgroup. Sub-groups represent more granular, mutually exclusive patient populations defined by clinical criteria (e.g., information available on the beneficiary's claims at the time of the trigger). 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" tab of the Psychoses/Related Conditions Draft Measure Codes List file. This cost measure has seven sub-groups:

- Dementia and Psychosis
- Major Depressive Disorder with Psychosis
- Other Psychoses
- Schizoaffective Disorders
- Schizophrenia Spectrum Disorders
- Mania or Bipolar with Psychosis

- Intellectual and Developmental Disorders (IDD) with Dementia and/or Psychosis

3.2 Attribute Episodes to a Clinician

Once an episode has been triggered and defined, it is attributed to one or more MIPS-eligible clinicians. Clinicians are identified by Taxpayer Identification Number (TIN) and National Provider Identifier (NPI) pairs (TIN-NPI), and clinician groups are identified by TIN. Only MIPS-eligible clinicians are attributed episodes. For codes relevant to this section, please see the "Attribution" tab of the Psychoses/Related Conditions Draft Measure Codes List.

The steps for attributing a Psychoses/Related Conditions episode are as follows:

- **Identify** PB claim lines for which all of the following conditions are true:
  - They have an expense date concurrent to the trigger IP stay.
  - They have a CPT/HCPCS code included in the list of IP E&M codes for TIN-NPI attribution.
- **Attribute** an episode to a TIN if that TIN billed at least 30 percent of the IP E&M codes on identified PB claim lines during the trigger IP stay.
- **Attribute** the episode to a TIN-NPI if a clinician within an attributed TIN billed any IP E&M codes on identified PB claim lines during the IP stay.

Future attribution rules may benefit from the implementation of patient relationship category codes. 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.

3.3 Assign Costs to an Episode and Calculate Total Observed Episode Cost

Services, and their Medicare costs, are assigned to an episode only when clinically related to the attributed clinician's role in managing patient care 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 chronic condition that is concurrent to the episode but not related to the clinical management of the patient relative to the inpatient treatment for psychoses or related conditions would not be assigned.

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 "SA_[Pre/Post]_[Service_Category]" tabs of the Psychoses/Related Conditions Draft Measure Codes List file.

For the Psychoses/Related Conditions episode group, only services performed in the following service categories are considered for assignment to the episode costs:

- Emergency Department (ED)
- Outpatient (OP) Facility and Clinician Services
- IP - Medical
- Home Health (HH)

As an overview, service assignment rules may be modified based on the service category in which the service is performed, as listed above. Service assignment rules may also vary based on (i) additional criteria determined by other diagnosis, procedure, or billing codes appearing alongside the service code, or (ii) number of days from trigger. Services may be assigned to the episode based on the following criteria:

- Service code alone
- Service code in combination with other diagnosis, procedure, or billing codes such as:
    - The first three digits of the International Classification of Diseases – Tenth Revision diagnosis code (3-digit ICD-10 DGN)
    - The full ICD-10 DGN
    - Additional service information

Additionally, services may be assigned only if they occur during a specific time period within the episode window, and may be assigned for a period shorter than the full duration of the episode window.

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.
- **Sum** standardized Medicare allowed amounts for all claims assigned to each episode to obtain the standardized total observed episode cost.

Example – Service Assignment
- Clinician A performs surgical treatment for renal or ureteral stones for Patient K on January 1, 2017. This service triggers a Renal or Ureteral Stone Surgical Treatment episode, which is attributed to Clinician A.
- Clinician B inserts a catheter, which is considered a clinically related service, during the episode window on January 7, 2017.
- Because insertion of a catheter is considered to be clinically related to the surgical treatment for renal or ureteral stones, the cost of the catheter will be assigned to Clinician A's Renal or Ureteral Stone Surgical Treatment episode.

3.4   Exclude Episodes

Before measure calculation, episode exclusions are applied to remove certain episodes from measure score calculation. Certain exclusions are applied across all acute inpatient medical condition episode groups, and other exclusions are measure-specific. The measure-specific exclusions were developed based on input from the Psychoses/Related Conditions workgroup and are listed in the "Exclusions" and "Exclusions_Details" tabs in the Psychoses/Related Conditions Draft Measure Codes List file.

The steps for episode exclusion are as follows:
- **Exclude** episodes from measure calculation if:
    - The beneficiary has a primary payer other than Medicare for any time overlapping the episode window or 120-day lookback period prior to the trigger day.
    - The beneficiary was not enrolled in Medicare Parts A and B for the entirety of the lookback period plus episode window, or was enrolled in Part C for any part of the lookback plus episode window.
    - No TIN is attributed the episode.
    - The beneficiary's date of birth is missing.
    - The beneficiary's death date occurred before the episode ended.
    - The trigger IP stay has the same admission date as another IP stay.

- o The IP facility is not one that is paid under the Inpatient Prospective Payment System (IPPS) or the Inpatient Psychiatric Facility (IPF) Prospective Payment System (PPS).[6]
- **Apply** measure-specific exclusions, which check the beneficiary's Medicare claims history for certain billing codes (as specified in the Draft Measure Codes List file) that indicate the presence of a particular procedure, condition, or characteristic.

3.5 Estimate Expected Costs through Risk Adjustment

Risk adjustment is used to estimate expected episode costs in recognition of the different levels of care beneficiaries 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,[7] as well as other standard risk adjustors (e.g., beneficiary age) and variables developed with input from the Psychoses/Related Conditions workgroup. A full list of risk adjustment variables can be found in the "RA_Vars" and "RA_Vars_Details" tabs of the Psychoses/Related Conditions Draft Measure Codes List file.

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

- **Define** HCC and episode group-specific risk adjustors using service and diagnosis information found on the beneficiary's Medicare claims history in the 120-day period prior to the episode trigger day (or the timing specified in the "RA_Vars_Details" tab of the Draft Measure Codes List file) for certain billing codes that indicate the presence of a procedure, condition, or characteristic.
- **Define** other risk adjustors that rely upon Medicare beneficiary enrollment and assessment data as follows:
  - o Identify beneficiaries who are originally "Disabled without end-stage renal disease (ESRD)" or "Disabled with ESRD" using the original reason for joining Medicare field in the Medicare beneficiary enrollment database.
  - o Identify beneficiaries with ESRD if their enrollment indicates ESRD coverage, ESRD dialysis, or kidney transplant in the Medicare beneficiary enrollment database in the lookback period.
  - o Identify beneficiaries who reside in a long-term care institution as of the episode trigger day using MDS assessment data.
- **Drop** risk adjustors that are defined for less than 15 episodes nationally for each sub-group to avoid using very small samples.
- **Categorize** beneficiaries into age ranges using their date of birth information in the Medicare beneficiary enrollment database. If an age range has a cell count less than 15, collapse this with the next adjacent higher age range category.
- **Include** the MS-DRG of the episode's trigger IP stay as a categorical risk adjustor.
- **Run** an ordinary least squares (OLS) regression model to estimate the relationship between all the risk adjustment variables and the dependent variable, the standardized

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[6] Only stays at IP facilities that are paid under IPF PPS or IPPS will be included. These included IP facilities are hospitals in the 50 states and D.C. other than: rehabilitation hospitals, hospitals whose inpatients are predominantly under 18 years old, hospitals whose average inpatient length of stay exceeds 25 days, and hospitals involved extensively in treatment for or research on cancer.

[7] 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.

observed episode cost, to obtain the risk-adjusted expected episode cost. A separate OLS regression is run for each episode sub-group nationally.

- **Winsorize**[8] by assigning the value of the 0.5th percentile to all expected episode costs below the 0.5th percentile.
- **Renormalize**[9] values by multiplying each episode's winsorized expected cost by the sub-group's average expected cost, and dividing the resultant value by the sub-group's average winsorized expected cost.
- **Exclude**[10] episodes with outliers as follows. This step is performed separately for each sub-group.
  - o Calculate each episode's residual as the difference between the re-normalized, winsorized expected cost computed above and the observed cost.
  - o Exclude episodes with residuals below the 1st percentile or above the 99th percentile of the residual distribution.

3.6   Calculate Measure Scores

Measure scores are calculated for a TIN or TIN-NPI as follows:

- Calculate the ratio of observed to expected episode cost for *each* episode attributed to the clinician/clinician group.
- Calculate the *average* ratio of observed to expected episode cost across the *total* number of episodes attributed to the clinician/clinician group.
- Multiply the average ratio of observed to expected episode cost by the national average observed episode cost to generate a dollar figure representing risk-adjusted average episode cost.

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

$$Measure\ Score_j = \left(\frac{1}{n_j} \sum_{i \in \{I_j\}} \frac{Y_{ij}}{\widehat{Y_{ij}}} \right) \left(\frac{1}{n} \sum_j \sum_{i \in \{I_j\}} Y_{ij} \right)$$

where:

Y_{ij} is the standardized payment for episode *i* and attributed clinician (or clinician group practice) *j*

$\widehat{Y}_{ij}$ is the expected standardized payment for episode *i* and clinician (or clinician group practice) *j,* as predicted from risk adjustment

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[8] 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.

[9] Renormalization is performed after adjustments are made to the episode's expected cost, such as bottom-coding 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.

[10] This step excludes episodes based on outlier residual values from the calculation and renormalizes the resultant values to maintain a consistent average episode cost level.

n_j	is the number of episodes for clinician (or clinician group practice) j
n	is the total number of TIN/TIN-NPI attributed episodes nationally
$i \in \{I_j\}$	is all episodes i in the set of episodes attributed to clinician (or clinician group practice) j

A lower measure score indicates that the observed episode costs are lower than or similar to expected costs for the care provided for the particular patients and episodes included in the calculation, whereas 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. How to Use the Draft Measure Codes List File

The Draft Measure Codes List file is an Excel workbook that provides clinicians with the specific codes and logic that apply to this cost measure. It is intended to be reviewed along with the detailed measure methodology in Section 3.

Overview

The "Overview" tab provides introductory information on the measure, a Table of Contents with descriptions of and links to the tabs in the workbook, and a Key Terms and Acronyms section that introduces acronyms used throughout the file. Each tab has a hyperlink in the top right corner to proceed to the next tab and in the top left corner to return to the "Overview" tab.

Trigger and Define an Episode

The following tabs present the codes and logic that define an episode of the episode group, as well as those that specify the sub-groups that comprise the episode group if applicable, as described in Section 3.1.

- "Triggers" lists all of the codes which trigger (or open) the episode group, along with the logic accompanying those triggers.
- If applicable, "Trigger_Exclusions" lists codes that will cause the episode not to be triggered if they occur in conjunction with the trigger codes.
- If applicable, "Sub_Groups" contains all of the sub-groups for the episode group, as well as the codes and logic used to specify each sub-group.

Clinician Attribution

The "Attribution" tab presents the codes that aid in attributing episodes to clinicians, as described in Section 3.2.

Service Assignment

These service assignment (SA) tabs, with tab names containing the "SA" prefix, present the service assignment codes and logic for different service categories during either the pre-trigger period or the post-trigger period. These codes and logic determine services for which costs are assigned to an episode, as described in Section 3.3.

- "SA_Pre_[Service_Category]" tabs indicate services assigned in the pre-trigger period for various service categories/settings.
- "SA_Post_[Service_Category]" tabs indicate services assigned in the post-trigger period for various service categories/settings.

Risk Adjustment and Exclusions

The following tabs present the variables used during measure calculation to ensure that clinician performance is being compared on a like-to-like basis, as described in Sections 3.4 and 3.5.
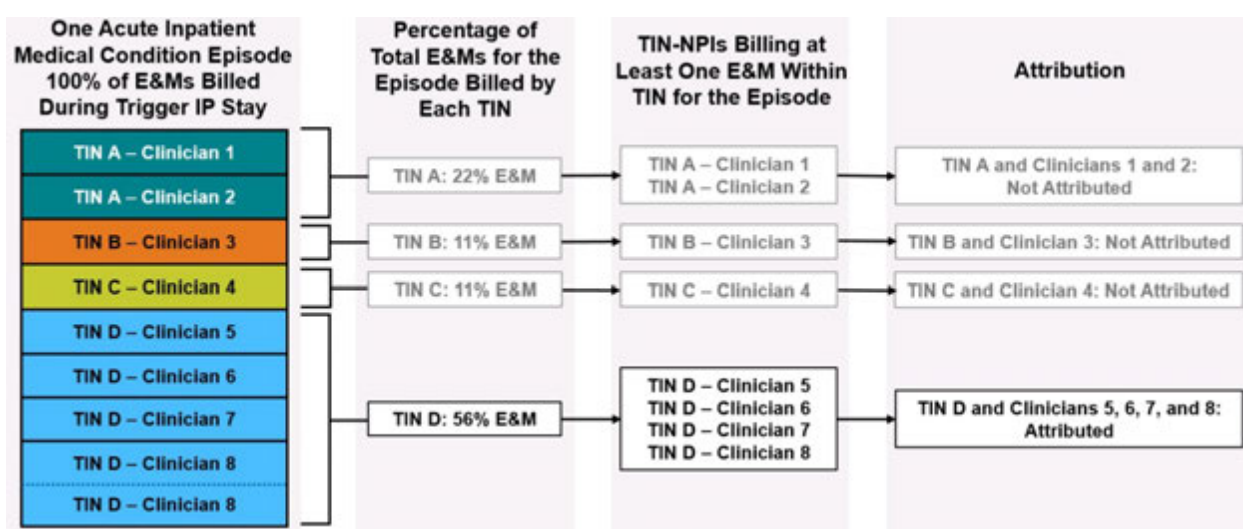
- "RA_Vars" contains the risk adjustment variables used in the construction of the measure's risk adjustment model, including variables used in the risk adjustment model for all episode-based cost measures and measure-specific variables (if applicable).
- If applicable, "RA_Vars_Details" provides more detail on the risk adjustment variables that are specific to this measure.
- If applicable, "Exclusions" contains a list of measure-specific variables that indicate that an episode is not clinically comparable. If these variables are present in an episode, that episode will not be included in measure score calculation.
- If applicable, "Exclusions_Details" provides additional information on measure-specific exclusion variables, including the codes and logic used to define the variables.

Appendix B. Example of Attribution for Acute Inpatient Medical Condition Episodes

This appendix provides some further details and an example of attribution for acute inpatient medical condition episodes. An episodes is attributed to a:

- TIN if that TIN billed at least 30 percent of the IP E&M codes on identified PB claim lines during the trigger IP stay, and to a
- TIN-NPI if a clinician within an attributed TIN billed any IP E&M codes on identified PB claim lines during the IP stay.

Figure A-1. Diagram of E&Ms Billed Within One Acute Inpatient Medical Condition Episode

In the example shown above, the stacked, colored boxes on the left represent E&Ms billed by eight different clinicians (Clinicians 1 through 8) across four TINs (TINs A through D) in the trigger IP stay for one acute inpatient medical condition episode. Clinicians 1 through 7 billed one E&M claim each under their respective TINs, and Clinician 8 billed two E&M claims under TIN D. The next set of boxes to the right of the colored boxes show the percentage of total E&Ms for that trigger IP stay billed by each of the four TINs. Moving right, the next set of boxes list the clinicians within each of the four TINs who had billed at least one E&M during the trigger IP stay. Finally, the diagram shows a summary of how this affects attribution.

Only TIN D billed at least 30 percent of the IP E&M codes during the trigger IP stay. This means:

- At the TIN-level, only TIN D is attributed this episode.
  - TINs A, B, and C did not meet the 30% threshold, so they are not attributed this episode.
- At the TIN-NPI level, each TIN-NPI (Clinicians 5, 6, 7, and 8) billing at least one E&M within TIN D is attributed this episode.

TINs A, B, and C did not meet the 30% threshold, so the TIN-NPIs billing within them are not attributed this episode.

Appendix C. Example of Measure Calculation

1. Calculate the observed cost of each episode by summing all standardized allowed amounts for services assigned to episode cost.
2. Calculate the expected cost of each episode by running a risk adjustment model that includes only episodes within the same sub-group nationally.
   - *For measures with sub-groups*, this ensures that expected cost for an episode in an intrinsically lower cost sub-group is estimated separately from the expected cost for an episode in an intrinsically higher cost sub-group.
   - *If a measure does not have sub-groups*, the model includes all episodes within the episode group nationally.
3. Divide each episode's observed cost by the expected cost to obtain the observed to expected cost ratio for each episode.
   - If the observed to expected cost ratio is greater than 1, this indicates that the episode's observed cost was greater than expected. A ratio less than 1 indicates that the observed cost was less than expected.
   - For example, if an episode's observed cost is $5,000, and the expected cost for the episode is $3,000, then the ratio will be $5,000/$3,000 = 1.67, which would indicate that the episode cost is greater than expected.
   - If an episode's observed cost is $3,000, and the expected cost for the episode is $5,000, the ratio would be 0.6, which would indicate that the episode cost is less than expected.
4. Sum the observed/expected ratios for all episodes across the entire episode group (i.e., across all sub-groups for applicable measures) and divide by the total number of episodes across the episode group to get **the average observed/expected ratio** for all episodes attributed to the clinician.
   - As the expected cost is calculated for each sub-group (see step #2 above) for measures that have sub-groups, the average ratio calculated in this step accounts for the episode sub-group breakdown, where applicable.
5. Multiply the **average observed/expected ratio** by the average of the observed cost for all episodes nationally.
   - This step is done to convert the average observed/expected ratio into a more meaningful figure to clinicians, by having the clinician's average cost measure score represented as a dollar amount rather than a ratio.
   - Multiplying by the national average observed episode cost yields a measure score that is similar in scale to the amount a given episode might actually cost. Choosing to multiply by a different dollar constant would not affect clinicians' rankings on the measure, but the national average cost is used for ease of interpretation.

Appendix D. Psychoses/Related Conditions Measure-Specific Workgroup

Table A-1 lists the members of the Psychoses/Related Conditions measure-specific workgroup along with their specialty, city, and state. For workgroup members who were unable to attend one or more of the meetings, the substitutes who attended in their stead are indicated underneath. The Psychoses/Related Conditions workgroup is composed from the larger Neuropsychiatric Disease Management Clinical Subcommittee. The composition list of the Clinical Subcommittee is included in the Episode-Based Cost Measures Development Process document. The workgroup chair is denoted with an asterisk (*), and workgroup members who were also Clinical Subcommittee co-chairs are denoted with a caret (^).[11]

Table A-1. Composition of the Psychoses/Related Conditions Workgroup

Name and Credentials	Primary Affiliation	City, State
Allan Anderson, MD	American Psychiatric Association	Cambridge, MD
Ann Hackman, MD	American Association of Community Psychiatrists	Baltimore, MD
Bonnie Zima, MD, MPH	American Psychiatric Association	Los Angeles, CA
C. Vaile Wright, PhD	American Psychological Association	Washington, DC
Cynthia Peacock, MD	American Academy of Developmental Medicine and Dentistry	Houston, TX
Jennifer Cowart, MD	Society of Hospital Medicine	Jacksonville, FL
John Cook, MD	American College of Physicians	Leesburg, VA
^Joshua Hirsch, MD	American College of Radiology	Boston, MA
^Marc Raphaelson, MD	American Academy of Neurology	Upperville, VA
Melinda Lantz, MD	American Association for Geriatric Psychiatry	New York, NY
Michael Malone, MD	The American Geriatrics Society	Milwaukee, WI
*Naakesh Dewan, MD	American Psychiatric Association	Palm Harbor, FL
Nicholas Breitborde, PhD	American Psychological Association	Columbus, OH
Sabrena McCarley, MBA-SL, OTR/L, CLIPP, RAC-CT	American Occupational Therapy Association	Napa, CA

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[11] The chair and co-chairs facilitated discussions and assisted in reaching consensus on cost measure development recommendations during workgroup meetings, webinars, and activities.