Technical Description of Method B's Grouping Algorithm

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1 INTRODUCTION

As mentioned in the overview paper, two methods are used to construct the 31 clinical episode types included in the posting for the Medicare Access and CHIP Reauthorization Act (MACRA) of 2015. Twenty-three clinical episode types were constructed using Method A and twelve clinical episode types using Method B. Both methods were used to construct four of the 31 clinical episode types. Method A was developed by the Center for Medicare and Medicaid Innovation (CMMI) to fulfill requirements of the ACA, and detailed information about Method A's algorithm is described elsewhere. Method B was developed by the Center for Medicare (CM) to complement those efforts and provide additional episode types to report in the Supplemental QRURs.[1] Both methods implement clinical logic to parse claims information to open episodes and to allocate medical services to one or more episodes during a specific length of time. Section 1.1 below provides a list of Method B episode types, and Section 1.2 lists the three steps of constructing episodes.

1.1 Method B Episode Types

The Method B episode types included represent acute conditions and procedures that are costly and prevalent in the Medicare FFS population. Acute condition episodes include all the care provided for the treatment of a condition, such as the initial and follow-up care for a gastrointestinal hemorrhage. Procedural episodes include the care associated with a specific treatment, such as a colonoscopy, as well as related follow-up care. For some major episode types, the reports also include episode subtypes to provide additional clinical detail and to improve the actionability of the reports. Clinicians were involved in identifying and determining subtypes for each major episode type. Subtypes were constructed for two primary reasons:

(1) to create homogenous patient cohorts with similar expected resource use; and

(2) to provide clinically meaningful results for reporting in the Supplemental QRURs.

Table 1 below lists each major condition and procedural episode type and subtype constructed using Method B. Full specifications for each episode type can be found in the *Episode Definition* files posted separately.

Table 1: Method B Major Episode Types and Subtypes

Type	Episode Name *(Subtypes listed in italics)*
Condition	Cellulitis (All)
Condition	*Cellulitis in Diabetics*
Condition	*Cellulitis in Patients with Wound, Non-Diabetic*

[1] The Supplemental QRURs are distributed to all medical group practices and solo practitioners. For more information, see this CMS Episode Grouper webpage.

Type	Episode Name *(Subtypes listed in italics)*
Condition	*Cellulitis in Obese Patients, Non-Diabetic without Wound*
Condition	*Cellulitis in All Other Patients*
Condition	Gastrointestinal (GI) Hemorrhage (All)
Condition	*GI Hemorrhage, Upper and Lower*
Condition	*GI Hemorrhage, Upper*
Condition	*GI Hemorrhage, Lower*
Condition	*GI Hemorrhage, Undefined*
Condition	Kidney and Urinary Tract Infection (UTI)
Procedural	Aortic Aneurysm Procedure (All)
Procedural	*Abdominal Aortic Aneurysm Procedure*
Procedural	*Thoracic Aortic Aneurysm Procedure*
Procedural	Cholecystectomy and Common Duct Exploration (All)
Procedural	*Cholecystectomy*
Procedural	*Surgical Biliary Tract Procedure*
Procedural	Colonoscopy (All)
Procedural	*Colonoscopy with Invasive Procedure*
Procedural	*Colonoscopy without Invasive Procedure*
Procedural	Hip Replacement or Repair (All)
Procedural	*Hip Arthroplasty*
Procedural	*Hip Arthroscopy and Hip Joint Repair*
Procedural	Knee Arthroplasty
Procedural	Knee Joint Repair (All)
Procedural	*Meniscus Repair*
Procedural	*Knee Ligament Repair*
Procedural	Lens and Cataract Procedures (All)
Procedural	*Cataract Surgery*
Procedural	*Discission*
Procedural	*Intraocular Lens (IOL) Removal/Repositioning or Secondary IOL Insertion*
Procedural	Spinal Fusion (All)
Procedural	*Lumbar and/or Thoracic Spinal Fusion*
Procedural	*Cervical Spinal Fusion*
Procedural	*Long-Segment Spinal Fusion for Deformity*
Procedural	Transurethral Resection of the Prostate (TURP) for Benign Prostatic Hyperplasia

1.2 Episode Construction Steps

Episodes are constructed by developing definitions specific to each episode condition or procedure for three steps: (1) opening the episode; (2) grouping services to the episode; and (3) closing the episode. These three construction steps define an episode using a combination of logic rules and medical billing codes specific to each episode condition or procedure:

(1) **Opening** (also referred to as "triggering"): episodes are opened when specific billing codes on a claim indicate the presence of the episode condition/procedure;

(2) **Grouping**: services are allocated to the episode according to clinical logic that defines relatedness; and

(3) **Closing**: episodes are closed after a specified length of time based on the typical course of care provided for a given episode type or as a result of patient death.

These three steps use the service and diagnosis codes on Medicare claims data to identify services that meet the specifications for defining the episode.[2] The remainder of this document describes each construction step in turn. As noted above, full specifications for each episode type can be found in the *Episode Definition* files.

[2] Parts A and B Medicare claims data utilized in the analysis include the following claim types: inpatient (IP) hospital facility, outpatient (OP) hospital facility, physician/supplier Part B (PB), skilled nursing facility (SNF), home health (HH), and durable medical equipment (DME).

2 OPENING EPISODES

Episodes are opened, or triggered, based on the occurrence of a trigger event. A trigger event is identified by specific procedure and diagnosis medical codes, also known as "trigger codes," on Medicare claims that provide strong evidence of a beneficiary having a particular condition or treatment. Clinical reviewers assessed and approved the trigger codes for each episode.

Acute condition episodes are triggered based on Medicare Severity Diagnosis Related Groups (MS-DRGs) reported on IP claims while procedural episodes are opened based on Current Procedural Terminology (CPT) procedure codes on physician claims.[3] For acute condition episodes, Method B's opening logic requires a specific MS-DRG to be assigned to an IP claim. In addition, additional ICD-9 diagnosis information may be required to identify the episode subtype. For procedural episodes, Method B requires the occurrence of the procedure, identified by the presence of a CPT code. The opening logic may also classify episodes into subtypes according to the specific CPT code that triggered the episode. Triggering codes can be found in the "Episode_Trigger_Codes" tab of the *Episode Definition* files specific to each major episode type.

[3] CPT codes are also referenced as CPT-4 since Method B uses the fourth version of CPT.

3 GROUPING SERVICES

Once an episode is opened, Method B identifies and aggregates the related services provided for the management, treatment, or evaluation of the medical condition during the episode window specific to the episode type. Grouping rules identify relevant services and procedures on claims starting during or immediately prior to the episode and aggregate those claims to the related open episode. The assignment of services to episodes for Method B distinguishes two categories of medical care:

(i) "*treatment services*" which are services directly attributable to the provider managing the patient's condition as well as ancillary services complementing the services of the managing provider; and

(ii) *"clinically associated services*" which include those services not defined as treatment but are related to the care provided during the treatment component of the episode (e.g., routine follow-up as well as services linked to the occurrence of adverse outcomes fully or partially influenced by the quality of care delivered during treatment).

The definition and grouping rules for treatment services and clinically associated services is described in Section 3.1 and 3.2, respectively.

3.1 Grouping Treatment Services

Treatment services represent the care directly related to the provider managing the episode and are automatically grouped to the episode. Broadly, Method B classifies services as treatment if they are performed by the provider managing the patient's condition or are ancillary services complementing the services of the managing provider. The managing provider, or lead eligible professional (EP), is determined differently for acute condition and procedural episodes.[4] For acute condition episodes, the managing provider is the EP billing at least 30 percent of IP E&M visits during the initial treatment, or "trigger IP stay event," that opened the episode.[5] Inpatient E&M visits during the episode's trigger event represent services directly related to the management of the beneficiary's acute condition episode and are an effective way to identify the provider managing the patient's condition. For procedural episodes, the managing provider is

[4] EPs are defined as those physicians, practitioners, and therapists that are eligible to participate in the Physician Quality Reporting System (PQRS). These include Medicare physicians (e.g., doctors of medicine, osteopathy), practitioners (e.g., physician assistants, nurse practitioners), and therapists (i.e., physical therapists, occupational therapists, and qualified speech-language pathologists) who are paid for treating Medicare FFS beneficiaries. A list of EPs and additional information on EPs can be found on this CMS PQRS webpage.

[5] See Appendix A for the list of IP E&M codes used to identify IP E&M visits.

determined by the EP billing the PB claim with the trigger CPT procedure code that opened the episode.[6] Clinical specialty is not taken into account when determining the lead EP(s).

For condition episodes, the following two types of services are considered treatment: (i) all services occurring during the trigger IP stay; and (ii) physician services provided by the managing provider in the three days prior to the episode triggering event. For procedural episodes, the following two types of services are considered treatment: (i) all services occurring on the day of the trigger procedure (or all services during the IP stay if the trigger procedure is performed in the IP setting); and (ii) all services in a fixed period before and after the trigger event on days the patient is treated by the managing provider. The latter procedural episode rule is supported by empirical evidence; investigation of services on these days found that the managing provider is generally responsible for the highest cost services on these days and that services provided on these days are clinically related to the episode.

3.2 Grouping Clinically Associated Services

Clinically associated services include those services that are not defined as treatment but are related to the care provided during the treatment component of the episode. Services defined as clinically associated services can include medical procedures for routine care of an episode and services that are potentially preventable with high-quality initial management of the episode illness (e.g., avoidable readmissions or side effects). There are three steps to defining services as clinically associated services and identifying appropriate rules for grouping clinically associated services to episodes:

(i) organize claims into clinically meaningful service categories;

(ii) exclude service categories constituting insignificant costs; and

(iii) perform clinical review to determine grouping rules for clinically associated services.

The first two steps preprocess the Parts A and B claims data to make the third step of performing clinical review to determine grouping rules for clinically associated services more manageable. Sections 3.2.1 to 3.2.3 describe each of these steps in turn.

3.2.1 Step 1: Organize Claims into Clinically-Meaningful Service Categories

Prior to performing clinical review on services eligible to be grouped as clinically associated services, claims were consolidated into service categories that had a coherent clinical meaning and were thus more appropriate for review. For each episode type, consolidated claims included those that occurred in the episode window and were delivered to patients in the Medicare population who experienced an episode. This combining of claims avoided the

[6] Attribution is based on positive-cost claims (IP E&M claims for acute condition episodes and PB claims for procedural episodes). Positive-cost claims are defined as claims with positive standardized allowed amounts.

complexity inherent in Medicare payment schemes for individual settings' services. For example, this process segregated outpatient hospital facility (OP) claims into the following clinically meaningful types of service categories:

(i) emergency room (ER) visits not resulting in hospitalization, identified by CPT code and place of service;

(ii) major outpatient procedures, as categorized by Ambulatory Payment Classifications (APCs); and

(iii) remaining OP claims (minor outpatient procedures) as classified by the Clinical Classification Software for Services and Procedures (CCS-Services and Procedures, or CCS) categorization.[7]

A complete list of the types of service categories assessed for clinical review are outlined in Table 2. SNF claims are not included in the process of clinical evaluation as they are grouped according to an overall rule based on their linkage to a preceding qualifying IP stay that is grouped to the episode.

Table 2: Types of Service Categories Assessed for Grouping Clinically Associated Services

Claim Type	Description of Service Categorization
Inpatient	Inpatient services, aggregated by MS-DRG families and ICD-9 CM procedure codes. MS-DRG families combine "w/o MCC/CC", "w/CC", and "w/MCC" MS-DRGs into a single DRG family.
Outpatient ER	Outpatient emergency room services classified by evaluation and management CPT procedure codes.
Major Outpatient Non-ER	Major outpatient services categorized by APCs.
Physician/Supplier Part B and Remaining Outpatient	Physician/Supplier Part B and all remaining OP services aggregated into CCS categories and CPT procedure codes.
Durable Medical Equipment	Durable medical equipment as defined by HCPCS code.
Home Health	Home health services grouped according to 3-digit revenue center code representing home health service type.

3.2.2 Step 2: Exclude Service Categories Constituting Insignificant Costs

Once integrated into clinically meaningful service categories, categories that did not account for a sufficiently large share of payments were excluded to allow clinicians to focus their review of clinically associated services on high-cost services. This second step determined the total payments and the overall share for each service category in relation to aggregate spending within and across service claim types. For each claim type listed in Table 2 above, service categories assessed for grouping must have met a threshold of at least 1% of payments within the

[7] The CCS-Services and Procedures categorization is maintained by the Agency for Healthcare Research and Quality (AHRQ) through its Healthcare Cost and Utilization Project (HCUP). CCS organizes Healthcare Common Procedure Coding System (HCPCS) and CPT procedure codes into 244 mutually exclusive procedure categories with no hierarchical structure.

claim type during the episode window or been among the highest cost services across claim types, defined as the highest cost service categories that together accounted for 95% of cumulative cost during the episode window. The inclusion thresholds were set at low levels to ensure that important services were not missed for the third step of determining grouping rules for clinically associated services.

3.2.3 Step 3: Perform Clinical Review to Determine Grouping Rules for Clinically Associated Services

After the preprocessing steps were completed, clinicians assigned rules that specified which service categories (henceforth "services") to include in each episode as clinically associated services and under which circumstances. For each type of episode, clinicians assessed the high-cost, frequent services that occurred in the episode window and were delivered to patients in the Medicare population who experienced an episode. As mentioned above, services identified as clinically associated services can include medical procedures for routine care of an episode and services that were potentially preventable with high-quality initial management of the episode. Clinicians determined the best grouping rule for use with each service according to its clinical context. The set of potential grouping rules that could be selected are listed in Table 3.

Table 3: Method B Service Grouping Options for Clinically Associated Services

Grouping Rule	Description
1. Always Group Service	The service is grouped to the episode when occurring in the episode window (regardless of diagnosis or any other information).
2. Group if Service is Newly Occurring[8]	The service, when occurring in the episode window, is grouped to the episode if the service is newly apparent in the patient's claims history after the episode begins.
3. Group Service with Diagnosis	The service, when occurring in the episode window, is grouped to the episode when occurring with the specified diagnosis on the claim.
4.Group Service with Diagnosis if Service is Newly Occurring	The service, when occurring in the episode window, is grouped to the episode when occurring with the specified diagnosis on the claim and the service is newly apparent in the patient's claims history after the episode begins.
5. Group if Diagnosis is Newly Occurring	The service, when occurring in the episode window, is grouped to the episode if the specified diagnosis on the claim is newly apparent in the patient's claims history after the episode begins.
6. Group if Service or Diagnosis is Newly Occurring	The service, when occurring in the episode window, is grouped to the episode if the service *or* specified diagnosis on the claim is newly apparent in the patient's claims history after the episode begins.

[8] "Newly occurring" or "newly apparent" services or diagnoses are defined as those that do not occur in the patient's claim history in the 90 days prior to the episode trigger.

Grouping Rule	Description
7. Group if Service and Diagnosis are Newly Occurring	The service, when occurring in the episode window, is grouped to the episode if the service *and* specified diagnosis on the claim are newly apparent in the patient's claims history after the episode begins.

Method B constructed a clinical web tool for each episode type that clinicians used to conduct reviews of potential clinically associated services. This tool listed all the candidate services for assignment, with all necessary diagnosis and procedure information about each service. Clinicians had the option to group services based on the services alone or only when the services appeared on claims with specific procedural or diagnosis information. The complete grouping logic for each episode type can be found in the *Episode Definition* file. As an example, clinicians chose to group a hospital admission for skin ulcers as clinically associated services for the Cellulitis episode. In other words, clinicians determined that a hospitalization for skin ulcers was clinically associated with the initial cellulitis hospitalization. To group this service, clinicians selected "always group service" for the MS-DRG for skin ulcers on the IP medical section of the clinical web tool. Therefore, an IP claim with a MS-DRG for skin ulcers was grouped as clinically associated services to the Cellulitis episode, regardless of any other diagnosis or procedure information on the claim. As another example, in the OP section of the clinical web tool, clinicians determined that an evaluation and management (E&M) service for "established patient office or other outpatient visit, typically 25 minutes" (CPT 99213) was clinically associated with the episode and should only be grouped based on supporting information on the claim, such as diagnosis information. On the clinical web tool, clinicians selected "group service with diagnosis" and reviewed a list of diagnoses that occurred with that service in the claims data. Clinicians determined that the service should be grouped to the episode only when it occurred with a primary diagnosis for "cellulitis and abscess of leg, except foot" (ICD-9 diagnosis 682.6) or for "cellulitis and abscess of unspecified site" (ICD-9 diagnosis 682.9).

Method B examines services in the context of each episode independently. A service is either clinically associated with a given episode or not, regardless of other episodes the patient may be experiencing. Episodes also do not interact with each other. If a service is associated with more than one episode type, the full cost of the service will be assigned to all associated episodes. For example, a hospital readmission could be grouped to one episode while also triggering another episode. Thus, if a beneficiary with a Hip Replacement episode is readmitted to a hospital for cellulitis that resulted as a complication of the hip replacement, the readmission will be grouped to the Hip Replacement episode as well as trigger a Cellulitis episode. The full cost of the hospital readmission will be grouped to the Hip Replacement episode and to the Cellulitis episode.

4 CLOSING EPISODES

The final step in episode construction is ending the episode. The grouping algorithm for Method B utilizes a fixed window of time after a trigger event to end the episode. This time window, or episode length, was selected for each episode type based on the typical course of medical care provided for that episode type. The clinical reviewers discussed and validated these episode lengths during the episode development process. The episode length for each episode type is listed on the "Overview" tab of the *Episode Definition* files.

APPENDIX A: EVALUATION AND MANAGEMENT (E&M) CODES

As discussed in Section 3.1, the managing provider of acute condition episodes is determined based on IP E&M visits. Table A.1 lists the CPT codes used to identify IP E&M visits.

Table A.1: Inpatient E&M Codes

CPT Codes	Description
99221	Initial Hospital Care, Per Day, For The Evaluation And Management Of A Patient, Which Requires These 3 Key Components: A Detailed Or Comprehensive History; A Detailed Or Comprehensive Examination; And Medical Decision Making That Is Straightforward Or Of Low Complexity.
99222	Initial Hospital Care, Per Day, For The Evaluation And Management Of A Patient, Which Requires These 3 Key Components: A Comprehensive History; A Comprehensive Examination; And Medical Decision Making Of Moderate Complexity.
99223	Initial Hospital Care, Per Day, For The Evaluation And Management Of A Patient, Which Requires These 3 Key Components: A Comprehensive History; A Comprehensive Examination; And Medical Decision Making Of High Complexity.
99231	Subsequent Hospital Care, Per Day, For The Evaluation And Management Of A Patient, Which Requires At Least 2 Of These 3 Key Components: A Problem Focused Interval History; A Problem Focused Examination; Medical Decision Making That Is Straightforward Or Of Low Complexity.
99232	Subsequent Hospital Care, Per Day, For The Evaluation And Management Of A Patient, Which Requires At Least 2 Of These 3 Key Components: An Expanded Problem Focused Interval History; An Expanded Problem Focused Examination; Medical Decision Making Of Moderate Complexity.
99233	Subsequent Hospital Care, Per Day, For The Evaluation And Management Of A Patient, Which Requires At Least 2 Of These 3 Key Components: A Detailed Interval History; A Detailed Examination; Medical Decision Making Of High Complexity.
99238	Hospital Discharge Day Management; 30 Minutes Or Less
99239	Hospital Discharge Day Management; More Than 30 Minutes
99234	Observation Or Inpatient Hospital Care, For The Evaluation And Management Of A Patient Including Admission And Discharge On The Same Date, Which Requires These 3 Key Components: A Detailed Or Comprehensive History; A Detailed Or Comprehensive Examination; and Medical Decision Making That Is Straightforward Or Of Low Complexity.
99235	Observation Or Inpatient Hospital Care, For The Evaluation And Management Of A Patient Including Admission And Discharge On The Same Date, Which Requires These 3 Key Components: A Comprehensive History; A Comprehensive Examination; And Medical Decision Making Of Moderate Complexity.
99236	Observation Or Inpatient Hospital Care, For The Evaluation And Management Of A Patient Including Admission And Discharge On The Same Date, Which Requires These 3 Key Components: A Comprehensive History; A Comprehensive Examination; And Medical Decision Making Of High Complexity.
99291	Critical Care, Evaluation And Management Of The Critically Ill Or Critically Injured Patient; First 30-74 Minutes