maryland
health services
cost review commission

Care Transformation Initiative (CTI) Specifications and Methodology

Updated: December 2023

Introduction

Under the Maryland All-Payer Model, Maryland hospitals have engaged in numerous efforts to reduce avoidable utilization of healthcare services by investing in programs to help address specific population needs and provide more valuable health services to the beneficiaries they serve. The Health Services Cost Review Commission (HSCRC) evaluates these efforts, called Care Transformation Initiatives (CTIs), to reward and incentivize individual hospitals that make investments to meaningfully connect providers across Maryland's healthcare system and transform care. The HSCRC believes that the evaluation of hospitals' CTI efforts will also help to develop a systematic understanding of best practices for improving care and reducing unnecessary utilization across the State, ultimately leading to further dissemination, broader implementation, and the acceleration of care transformation in Maryland.

A CTI is an initiative undertaken by a hospital, group of hospitals, or collaborative partnering with a hospital to reduce the total cost of care (TCOC) of a defined population. CTIs focus on hospital investments that provide a return to the hospital through beneficiary-level TCOC reductions. CTIs are describable, quantifiable, and within the purview of individual hospitals to implement, therefore returns on these investments can be awarded to the participating entities. Payments to reward these hospital participants for CTI savings are called "reconciliation payments."

Hospitals must be able to identify specific beneficiary populations affected by their proposed initiative and HSCRC staff must be able to reliably calculate short-term TCOC savings, else the hospital's proposed initiative cannot be included in the CTI framework. Currently, CTI populations include only Medicare fee-for-service (FFS) beneficiaries, though HSCRC staff could develop a framework for other payers in the future.

In general, there are four steps to evaluate a hospital participant's CTI and determine reconciliation payments:

1. **Identify the population** of beneficiaries attributed to the participant based on an episode-triggering event and clinical conditions specified by the participant.

2. **Construct clinical episodes** based on the number of days after a triggering event that beneficiaries' TCOC should contribute to their total episode costs (i.e., the "episode window").

3. **Calculate a target price,** i.e., the pre-determined payment level based on historical (i.e., baseline) claims data that the participant hospital must provide services below to achieve episode savings.

4. **Compare** the average TCOC for episodes during the performance year versus the target price.

This document describes the data, specifications, and methods the HSCRC uses to identify the population (Step 1) targeted by a CTI and construct a database of episodes (Step 2) triggered by beneficiaries during a one-year "target" period. This document also describes the methodology for calculating total episode costs, determining a participant's target price (Step 3), and computing reconciliation payments (Step 4).

This document is intended for a hospital currently or potentially participating in a CTI, to enable it to use its own resources to

- Identify the beneficiaries in its patient populations who would or would not qualify for its proposed or approved CTI using the universe of Maryland residents' Medicare FFS claims and enrollment data;
- Construct a set of episodes attributed to it during a one-year target period, to track TCOC incurred during episode window; and
- Understand how HSCRC constructs a target price specific to the participant and CTI and determines that participant's reconciliation payment.

Required Data

HSCRC identifies CTI populations and episodes using the Maryland All-Payer Model (MDAPM) Claim and Claim Line Feed (CCLF) data provided by the Centers for Medicare & Medicaid Services (CMS) to the State of Maryland. This data file contains Medicare final action claims for all Part A and Part B services received by beneficiaries who reside in Maryland, regardless of where the services were received. The file also contains claims information on all Medicare-covered services furnished within Maryland to non-residents; however, non-residents are excluded from CTI episode construction. The data do not include Substance Abuse and Mental Health Services Administration (SAMHSA) claims.

Medicare beneficiaries excluded from clinical episodes:
- Non-Maryland residents
- Managed care enrollees
- ESRD patients
- Hospice enrollees

Medicare Parts A and B claims excluded from episode triggers and total episode costs:
- Non-final action
- Unpaid/Denied
- SAMHSA

HSCRC derives episode triggers and episode costs from Medicare FFS claims in the CCLF data for which Medicare is the primary payer, as are any flags based on beneficiaries' history of healthcare utilization that might be used to identify a given CTI's population. Beneficiaries who are enrolled in Medicare Advantage or other group health arrangements during an episode (or during the timeframe used to determine their history

of healthcare utilization) are not included in CTI populations. In addition, HSCRC excludes beneficiaries eligible for Medicare because of end-stage renal disease (ESRD) or for whom Medicare is the secondary payer.

HSCRC uses final paid claim amounts to calculate episode costs. Paid claim amounts are based on services provided, but are also subject to CMS adjustments for geography, quality incentives, and other factors. The sections below describe how total episode costs are calculated.

To identify the CTI population, construct episodes, and calculate total costs of care, the user will need access the following types of files from the Medicare administrative data:

- Medicare enrollment and demographic file.
- Inpatient.
- Outpatient.
- Carrier (i.e., claims submitted by professional providers, including physicians, physician assistants, clinical social workers, and nurse practitioners).
- Durable Medical Equipment.
- Skilled Nursing Facility.
- Home Health Agency.

The Chesapeake Regional Information System for Our Patients (CRISP) provides HSCRC with supplemental data files constructed by CRISP to identify specific subgroups of the Maryland patient population. To precisely identify a CTI population, the user will also need access to the following files:

- *"DRG Details"* – a file containing the All Patient Refined Diagnostic Related Groups (APR-DRG) code, Severity of Illness (SOI) code, and Risk of Mortality (ROM) code for each inpatient hospital claim in the CCLF data, which are constructed using proprietary algorithms based on diagnostic information on inpatient claims.
- *"Address File"* – a file containing the first and last dates that each beneficiary resided at a given address throughout the calendar year.
- *"Taxonomy Crosswalk"* – a file that links one or more provider taxonomy codes to each National Provider Identifier (NPI) number found in the Medicare Part B physician claims.
- *"First PAC"* – a file indicating the first post-acute care (PAC) setting that the patient was referred to after every hospital discharge (determined using the Medicare Data Analytics Data Exchange

(MADE) algorithm to identify *first* PAC settings after hospital discharge (i.e., admissions to long term care hospitals (LTCHs) or inpatient rehabilitation facilities (IRFs) are determined within two days of hospital discharge, skilled nursing facility (SNF) admissions are determined within three days of hospital discharge, and the start of home health agency (HHA) care is determined within 14 days of hospital discharge).

To completely identify the CTI population for a given target period, users must have access to Medicare claims data that span the entire period in which they might need to "look back" from the beginning of the target period to identify beneficiaries' prior history of healthcare utilization. Users will need to collect claims data from before and during the target period if they specify one of the following types of inclusion or exclusion criteria allowed for several CTIs:

- The number of inpatient stays, observation stays, or emergency department (ED) visits beneficiaries experienced before they were hospitalized.
- Beneficiaries who had a medical encounter with certain provider types before they were hospitalized.

Users will need data that span the full target period to calculate TCOC for all episodes in the target period (total episode costs are prorated if an episode ends after the target period ends, as described in Exhibits 20 and 21).

Current CTI Thematic Areas

The HSCRC, in collaboration with its stakeholder workgroups, has approved the CTI thematic areas shown in Exhibit 1. CTIs operating in the same thematic area share two traits: (1) a common attribution rule, and (2) a common set of parameters that participants can adjust to select their population of interest.

Exhibit 1. Current CTI Thematic Areas

Thematic Area	Description
Care Transitions	Interventions focusing on transitional care management (e.g., home assessments, hospital screenings, discharge coordination, telehealth transition services).
Palliative Care	Interventions to manage and direct the care of chronic pain patients (e.g., advance care planning; goals of care discussion; and coordination with home health, hospice, and SNFs).
Primary Care (Episode- or Panel-Based)	Interventions to improve primary care services (e.g., clinics established at primary care practices to deploy wraparound services, completion of social, behavioral, and home safety assessments; referrals to community resources).
Community-Based Care ("PAC Touch" or "Geographic")	Interventions targeting the broader health community (e.g., health coaches assigned to senior living buildings, care coordination for patients transitioning to or from SNFs or Assisted Living Facilities).
Emergency Care	Interventions to improve access to clinical and social services for users of the emergency department (e.g., deployment of community-based teams, nurse home visits, connection to resources to address SDOH).

Abbreviations: PAC, post-acute care; SDOH, social determinants of health; SNF, skilled nursing facility.

Episode- versus Panel-Based CTIs

Each CTI thematic area has a trigger event and beneficiary profile that can be identified in claims, and any beneficiary who meets the triggering conditions may be included in (i.e., "attributed" to) the CTI. Each CTI thematic area uses an incidence-based, episodic approach to measure the effectiveness of the intervention in reducing the TCOC of attributed beneficiaries. For several episode-based CTIs, a participating hospital submits a list of NPIs to the HSCRC. Beneficiaries who received a certain service from one of those NPIs and meet all other inclusion criteria are attributed to the CTI and assumed to have received the intervention. *Care Transitions* and *Emergency Care* CTIs are attributed beneficiaries who were discharged from a participating hospital (identified by the Medicare Certification Number (CCN) of the provider that submitted the claim) and met all other inclusion criteria.

Two thematic areas, *Primary Care* and *Community-Based Care*, allow CTI participants to choose to participate in "panel-based" CTIs, which use a population-based approach to attribute beneficiaries to the CTI. Beneficiaries who meet the pre-specified inclusion criteria are attributed to a panel-based CTI at the start of the performance year and assumed to be eligible to receive the intervention. HSCRC measures the attributed beneficiaries' TCOC during the full performance year and determines the effectiveness of the intervention by comparing the average annual TCOC during the performance year versus the average annual TCOC for beneficiaries meeting the same inclusion criteria during a baseline year.

Exhibit 2 summarizes the criteria used to attribute beneficiaries to CTIs in each thematic area.

Exhibit 2. Trigger Criteria for Current CTI Thematic Areas

Thematic Area	Description
Care Transitions	Triggered when a beneficiary is discharged from a short-term acute care hospital.
Palliative Care	Triggered when a beneficiary is discharged from an acute care hospital and had a claim submitted by an NPI affiliated with the CTI that occurred during the course of the hospital stay.
Episode-Based Primary Care	Triggered when the beneficiary has a claim with the primary care NPI.
Panel-Based Primary Care	Attributed beneficiaries received the plurality of their primary care services over the previous two years from the listed NPIs.
Episode-Based Community-Based Care ("PAC Touch")	Triggered when a beneficiary receives a service from a post-acute care provider affiliated with the CTI, determined by a list of facility NPIs submitted by the participant.
Panel-Based Community-Based Care ("Geographic")	Attributed beneficiaries reside in a set of ZIP codes submitted by the participant.
Emergency Care	Triggered when a beneficiary is admitted to the ED. Participants can choose to use as the trigger inpatient ED visits, outpatient ED visits (i.e., visits not leading to inpatient hospital admission), or both types of ED visits.

Abbreviations: ED, emergency department; NPI, National Provider Identifier; PAC, post-acute care.

Episode-Based CTIs

- Triggered by a specific type of medical encounter and a specific patient profile.
- Episodes are attributed to providers involved in the medical encounter.
- Episodes begin on any date during the performance year and end after a specified length of time.

Panel-Based CTIs

- Patients meeting a specific patient profile are attributed to providers, based on either a history of medical encounters (e.g., *Primary Care* CTI) or specified provider service area (e.g., *Community-Based Care* CTI).
- Patients are attributed to a provider for the full performance year.

Optional and General Criteria for CTIs

The HSCRC provides an "intake template" to CTI participants that allows them to customize their CTI for the population they are targeting. The Care Transformation Steering Committee finalizes the optional criteria for each thematic area. The *Care Transitions* CTIs allow the hospital participants to customize their CTIs based on the optional criteria described in Exhibit 3; these optional criteria are also common to the other thematic areas. Participants are allowed to select any combination of allowed criteria to target a specific patient population for a CTI. The criteria have default options that are implemented by the HSCRC if the participant chooses not to use a given criterion to customize its CTI population.

Exhibit 3. Optional Criteria for Participants to Customize Their CTI

Type of Criteria	Options	Default	*Care Transitions* CTI Example
Geographic Service Area	Hospitals may submit a list of five-digit ZIP codes in which targeted patients must reside.	No restrictions	List of 20 Maryland ZIP codes
Primary Diagnosis, APR-DRG, SOI, or ROM	Hospitals may submit a list of inpatient ICD-10-CM primary diagnosis codes or APR-DRG, SOI, and/or ROM codes required to trigger an episode.	No restrictions	Cardiac APR-DRG codes (no SOI, ROM, ICD-10-CM specified)
Chronic Conditions	Hospitals may indicate a minimum number of the 27 CCW Chronic Conditions* with which a patient must have been diagnosed. Alternatively, hospitals may submit a list of specific CCW Chronic Conditions with which a patient must have been diagnosed.	No restrictions	1 or more CCW Chronic Conditions
Prior Utilization	Hospitals may require thresholds on prior medical utilization. This requires selecting the setting (inpatient hospital, outpatient observation, or ED), then the threshold (e.g., 2 inpatient discharges) and time window for when that threshold was reached (e.g., 2 inpatient discharges in past 60 days).	No restrictions	1 inpatient hospital discharge during the 365 days preceding the episode begin date
Look Back	Hospitals may require that patients had a medical encounter in one or more specific healthcare settings (Primary Care/E&M visit, HHA, SNF, Assisted Living, Acute Care, Psychiatric Care Facility) before an inpatient admission and a time window for the encounter (e.g., SNF discharge in past 60 days). *Alternatively, hospitals may exclude patients on the same basis.*	No restrictions	Default
Look Forward	Hospitals may require that patients were discharged from the hospital to one or more specific post-acute care settings (LTCH, IRF, SNF, HHA, community with a physician consult).** *Alternatively, hospitals may exclude patients on the same basis.*	No restrictions	Discharged to LTCH, IRF, SNF, or HHA (i.e., not discharged home)
Episode Length* **	Each hospital must select the length of its CTI intervention to serve as the episode window. All healthcare services covered by Medicare Parts A and B that occur during this episode window will be included in calculations of TCOC. The episode window begins upon discharge from the hospital.	90 days	Default

Abbreviations: APR-DRG, All Patient Refined Diagnostic Related Groups; CCW, Chronic Conditions Data Warehouse; CTI, Care Transformation Initiative; E&M, Evaluation and Management; ED, emergency department; HHA, Home Health Agency; ICD-10-CM, International Classification of Diseases-Tenth Revision-Clinical Modification; IRF, Inpatient Rehabilitation Facility.; LTCH, Long Term Care Hospital; PAC, post-acute care; ROM, Risk of Mortality; SNF, Skilled Nursing Facility; SOI, Severity of Illness.

* Chronic Conditions Data Warehouse. *Chronic Conditions.* Accessed February 27, 2023, at: https://www2.ccwdata.org/web/guest/condition-categories-chronic.

** First PAC settings are determined using the Medicare Data Analytics Data Exchange (MADE) algorithm to identify patients' first PAC setting after hospital discharge: post-acute care admissions to LTCHs or IRFs are determined within two days of hospital discharge, SNF admissions are determined within three days of hospital discharge, and the start of HHA care is determined within 14 days of hospital discharge.

*** Panel-based CTIs do not allow participants to select an episode length. Beneficiaries are attributed to the participant hospital at the start of the performance year based on selected criteria, and all healthcare services covered by Medicare Parts A and B that occur during performance year will be included in calculations of TCOC.

Hospital participants can further customize episode-based CTIs by selecting a Maryland fiscal year (e.g., FY 2019 starts July 1, 2018, and ends June 30, 2019) as a baseline period in which to calculate the CTI target price. There is no default baseline period for episode-based CTIs; all hospitals must use the intake templates to specify their baseline period. **Participants cannot select a baseline period for panel-based CTIs; all panel-based CTIs use Maryland FY 2019 as a baseline period.**

Hospitals participating in the *Care Transitions* and *Palliative Care* CTIs must also choose whether to include or exclude the costs of the triggering hospital stay as part of the TCOC during the episodes (**the default option is to include the costs of the hospitalization in total episode costs of care**).

In addition to customizable criteria, all CTI populations have the same set of general inclusion or exclusion criteria for beneficiaries, described in Exhibit 4.

Exhibit 4. General Criteria for All CTIs

Criteria	Description
Maryland Resident	The beneficiary must reside in Maryland during the hospitalization that triggered the episode ("index hospitalization"), throughout the episode window, and (if chosen as part of a participant's customizable criteria) throughout the time window for identifying prior healthcare utilization or previous medical encounters.
Medicare Parts A and B Enrollment	The beneficiary must be enrolled in both Medicare Parts A and B during the index hospitalization, throughout the episode window, and (if chosen as part of a participant's customizable criteria) throughout the time window for identifying prior healthcare utilization or previous medical encounters.
Medicare as Primary Payer	Medicare must be the primary payer on every claim (of any type) that occurred during the index hospitalization and throughout the episode window. Episodes are excluded if there is one or more claims during the index hospitalization or episode window on which Medicare was not the primary payer.
No ESRD Treatment*	Episodes are excluded from the CTI if the beneficiary ever received treatment for ESRD during the calendar year in which they were discharged from the index hospitalization.
Patient Alive at the End of the Episode*	Episodes are excluded from the CTI if the beneficiary died during the index hospitalization or during the episode window (including the final day of the episode).

Abbreviations: CTI, Care Transformation Initiative; ESRD, end-stage renal disease. TCOC, total cost of care.
* Beneficiaries who die during the episode window and beneficiaries who receive ESRD services tend to have high TCOC. Consequently, these beneficiaries are likely to be outliers when compared to the rest of the CTI population and are excluded by default. However, hospitals can opt to include these beneficiaries in CTIs intended to manage the costs associated with these populations.

A Hypothetical *Care Transitions* CTI

The last column in Exhibit 3 describes a *Care Transitions* CTI customized by a hypothetical hospital participant to target a hypothetical patient population. The "Identifying a Care Transitions CTI Population" section below describes the Medicare datafiles, variables, variable values, and overall logic the user would use to identify all inpatient discharges during the specified target period, construct episode windows based on the episode length specified by CTI participants, and restrict the set of potential episodes based on the

general and customizable criteria. The "Example" criteria listed in Exhibit 3 is used to provide numerical examples for the output that one would expect to see as they address each set of customized and general criteria to isolate their target population.

The four remaining sections discuss how the HSCRC excludes episodes that trigger multiple CTIs from the final list of attributed episodes (e.g., a hospital discharge can trigger only one episode, attributed to one CTI participant, across all thematic areas) and how the HSCRC calculates total episode costs, determines a participant's target price, and calculates reconciliation payments.

Identifying a *Care Transitions* CTI Population

This section of the document describes the data files, variables, and logic necessary to restrict the overall set of Medicare claims to inpatient discharges that meet the general and customizable criteria for a *Care Transitions* CTI. Each logical description is followed by an example of the output that one would expect after implementing that logic, based on the hypothetical *Care Transitions* CTI described in Exhibit 3.

Though the specific set of optional criteria vary across thematic areas, the criteria in Exhibit 3 and described below are common to many thematic areas. This document uses the *Care Transitions* thematic area to illustrate how the HSCRC identifies a CTI population, but the same approach and general specifications are applied to identify the CTI populations for the other episode- and panel-based CTIs. A user would need to modify the specifications described below only to correctly identify the trigger date. For example, instead of using the date the beneficiary was discharged from the hospital as the trigger date (e.g., *Care Transitions* and *Palliative Care* CTIs), the user would define the trigger date as the date of the triggering primary care visit (for *Episode-Based Primary Care*), the date the beneficiary was admitted to post-acute care (for *Episode-Based Community-Based Care*), or the date of the ED visit (for *Emergency Care*). The order in which the steps are presented below reflects the order a user would apply the inclusion and exclusion criteria to minimize the time it takes to identify the final list of episodes from the Medicare claims and enrollment data.

Performance periods are defined as Maryland fiscal years:

- Year 1: July 2021–June 2022
- Year 2: July 2022–June 2023
- Year 3: July 2023–June 2024

Episode-based CTIs must specify one of the following baseline periods for calculating a target price:

- July 2016–June 2017
- July 2017–June 2018
- July 2018–June 2019

Panel-based CTIs must use July 2018–June 2019 (Maryland fiscal year 2019) as the baseline period.

Target Period

The hypothetical *Care Transitions* CTI for the example output below uses Maryland FY 2018 as its target/baseline period. The output is derived from Medicare FFS claims and enrollment data that span July 1, 2016, to June 30, 2018. This includes a one-year look-back period (July 2016–June 2017) and the target period (July 2017–June 2018).

Inpatient Discharges from Participating Facilities

The *Care Transitions* CTI thematic area focuses on patients discharged from short-term hospitalizations during the target year and referred for PAC or care management in their communities. Inpatient discharges are identified from Medicare Inpatient Hospital claims with discharge dates during the target year. The user should use the six-digit claim provider number (i.e., Provider Medicare Certification Number) to restrict the set of all inpatient discharges during the target year to discharges from the specific short-term hospital(s) pertinent to their *Care Transitions* CTI. Exhibit 5-A provides detailed specifications for identifying inpatient discharges from a participating facility that occurred during the target period.

Exhibit 5-A. Identify Inpatient Hospital Discharges during the Target Year

Objective	Identify all patient discharges from a Maryland hospital during the target year
Required File Types	Inpatient (Medicare Part A) Claims
Required Variables	Claim type code (CLM_TYPE_CD), Provider Medicare Certification Number (PROV_NUM), Discharge date (DSCHRG_DT)
Logic	1) Identify all claims for discharges from short-term hospitals using the following criteria: ✓ CLM_TYPE_CD equal to 60 or 61 ✓ PROV_NUM between 210001 and 210879* 2) Exclude hospital discharge claims that do not meet the following criteria: ✓ July 1, 20Y1 ≥ DSCHRG_DT ≥ June 30, 20Y2 where 20Y1 is the calendar year in which the target period begins and 20Y2 is the calendar year in which the target period ends

* The first two digits of a Provider Medicare Certification Number (CCN) identify the State or District in which the provider is located. CCNs for Maryland hospitals begin with 21. The next four digits identify the type of provider. The last four digits for short-term (general and specialty) hospitals are between 0001 and 0879.

Example Output Based on a Hypothetical Care Transitions CTI: Inpatient Discharges from a Given Facility

As an example of the output one would expect after the first criteria are applied to the data, Exhibit 5-B provides the count of inpatient hospital discharges identified in the CCLF data from Maryland FY 2018 that could potentially trigger a Care Transitions CTI, and the number of discharges from a hypothetical participant's short-term hospital facility (hypothetical provider number 210XXX).

Exhibit 5-B. Example Output – Identify Inpatient Hospital Discharges from a Given Facility

Input Files	Medicare Part A Claims
Target Period	Maryland FY 2018 (July 1, 2017–June 30, 2018)
Total Number of Inpatient Hospital Discharges during Target Period	233,000
Total Number of Inpatient Hospital Discharges from Provider Number 210XXX	7,600

Beginning and End Dates for Each Potential Episode

The next steps require the user to restrict the set of inpatient discharges that could potentially trigger a *Care Transitions* CTI based on patient outcomes and characteristics observed during the potential episode window and (if necessary) look-back periods. The episode begin date is the date that the patient was admitted to the hospital, if the participant chooses to include the cost of the hospital stay in the total episode costs. Otherwise, the episode begin date is the date that the patient was discharged from the hospital. The episode end date and look-back periods are determined by episode length, prior utilization, and look-back criteria specified by the participant.

Exhibit 6. Define the Episode Window and Look-Back Period for Each Potential Episode

Objective	For each inpatient hospital discharge, define an episode begin date, episode end date, and look-back period: • The episode begin date is the hospital discharge date. • The episode end date is the discharge date plus the participant-specified episode length, minus 1 day (to include the day of hospital discharge in the episode window). • The look-back period is determined from the participant-specified prior utilization and look-back criteria (Exhibit 3) ○ Define the look-back period as the *maximum* length of time specified by the participant (e.g., if the participant specified a 1-year look-back for prior hospitalization and a 6-month look-back for prior emergency department visits, then the look-back period for each episode will be 365 days before the episode begin date)
Required File Types	Not applicable (only output from previous steps)
Required Variables	Inpatient admission date (ADMSN_DT), Inpatient discharge date (DSCHRG_DT)
Logic	For each inpatient hospital discharge claim: 1) Define an episode begin date as ADMSN_DT if costs of the index inpatient hospitalizations are included in total episode costs, else use DSCHRG_DT 2) Define an episode end date as DSCHRG_DT + Episode Length – 1 day 3) The start of the look-back period is ADMSN_DT – α (where α is the maximum number of days specified by the participant to look back for any type of prior utilization or previous medical encounter) 4) The end of the look-back period is ADMSN_DT – 1 day

Maryland Residency and Medicare Parts A and B Enrollment

All beneficiaries in a CTI population are required to have been Maryland residents who were continuously enrolled in both Medicare Parts A and B during the entire inpatient stay and episode window. If the participant-specified inclusion or exclusion criterion that requires looking back before the trigger date to identify a threshold for prior utilization or medical encounter with a specific type of provider, then the

beneficiary must also have been a Maryland resident and enrolled in Medicare Parts A and B during the entire length of the specified look-back period, to ensure a complete claims history. Exhibit 7-A provides detailed specifications for identifying Maryland residents enrolled in Medicare Parts A and B during the episode window and, if necessary, the required look-back period.

Exhibit 7-A. Identify Maryland Residents and Beneficiaries Enrolled in Both Medicare Parts A and B

Objective	Exclude inpatient hospital discharges if the patient was not a Maryland resident or not enrolled in Medicare Parts A and B during the entire hospital stay, episode window, and look-back period
Required File Types	Medicare enrollment and demographic file
Required Variables	Medicare eligibility during year and month (ELIG_YYYY_MM), Maryland residency during year and month (MD_YYYY_MM), Inpatient admission date (ADMSN_DT*), Inpatient discharge date (DSCHRG_DT*)
Logic	1) Exclude hospital discharge claims that do *not* meet the following criteria: ✓ MD_YYYY_MM = 1 during every calendar month that overlaps the start of the look-back period through the end of the episode window ✓ ELIG_YYYY_MM = 'AB' during every calendar month that overlaps the start of the look-back period through the end of the episode window ✓ If a look-back period is not required, then MD_YYYY_MM = 1 and ELIG_YYYY_MM = 'AB' during every calendar month that overlaps the hospital admission date (ADMSN_DT*) through the episode end date (DSCHRG_DT* + Episode Length – 1 day) where YYYY is the calendar year and MM is the calendar month

* Inpatient admission (ADMSN_DT) and discharge (DSCHRG_DT) dates corresponding to inpatient hospital discharges that could potentially trigger an episode.

Example Output Based on a Hypothetical Care Transitions *CTI: Maryland Resident and Medicare Coverage*

Exhibit 7-B provides the count of inpatient hospital discharges (i.e., potential episodes) from Provider Number 210XXX during FY 2018, excluding discharges where the patient was not a Maryland resident or not enrolled in Medicare Parts A and B during the entire inpatient stay, episode window, and look-back period. The length of the episodes, look-back period, and look-forward period were defined by the prior utilization, look-back, and look-forward criteria for the "Example" CTI described in Exhibit 3.

Exhibit 7-B. Example Output – Exclude Inpatient Discharges If the Patient Did Not Meet the Maryland Residency and Medicare Coverage Criteria

Total Number of Inpatient Hospital Discharges from Provider 210XXX	7,600
Total Number of Inpatient Hospital Discharges after Excluding Non-Maryland Residents and Beneficiaries Not Covered by Medicare Parts A and B	6,924
Percentage of Hospital Discharges from Provider 210XXX	91.1%

End-Stage Renal Disease Status

ESRD patients are excluded from CTIs because they have a different cost profile than non-ESRD patients. Exhibit 8-A provides detailed specifications for identifying patients with ESRD.

Exhibit 8-A. Identify Beneficiaries Who Received Treatment for End-Stage Renal Disease

Objective	Exclude inpatient hospital discharges if the patient received treatment for end-stage renal disease during the same calendar year as the hospital discharge
Required File Types	Medicare enrollment and demographic file
Required Variables	Medicare eligibility during year (MS_CD_YYYY), Inpatient discharge date (DSCHRG_DT*)
Logic	1) Exclude hospital discharge claims if MS_CD_YYYY = 11, 21, or 31, where YYYY is the calendar year in which the patient was discharged from the hospital (i.e., the episode begin date)

* Inpatient discharge (DSCHRG_DT) dates corresponding to inpatient hospital discharges that could potentially trigger an episode.

Example Output Based on a Hypothetical Care Transitions *CTI: ESRD Status*

Exhibit 8-B provides the count of inpatient hospital discharges (i.e., potential episodes) after applying all criteria above and excluding hospital discharges for patients who received ESRD treatment during the same calendar year.

Exhibit 8-B. Example Output – Exclude Inpatient Discharges If the Patient Received Treatment for ESRD during the Same Calendar Year

Total Number of Inpatient Hospital Discharges from Previous Output	6,924
Total Number of Inpatient Hospital Discharges after Excluding Patients Who Received ESRD Treatment	6,785
Percentage of Hospital Discharges from Provider 210XXX (*n*=7,600)	89.2%

Deaths

Patients who died during an episode tend to have different cost profiles than those who did not die during an episode. Inpatient hospital discharges are excluded from the set of potential episodes if the patient was discharged from the hospital upon death or died during the potential episode window. Exhibit 9-A provides detailed specifications for identifying patients who died during the hospitalization or the episode window.

Exhibit 9-A. Identify Beneficiaries Who Died during the Hospitalization or the Episode Window

Objective	Exclude inpatient hospital discharges if the patient was discharged upon death or if the patient died during the episode window
Required File Types	Medicare enrollment and demographic file
Required Variables	Beneficiary Date of Death (BENE_DEATH_DT), Inpatient admission date (ADMSN_DT*), Inpatient discharge date (DSCHRG_DT*)
Logic	1) Exclude hospital discharge claims where: ✓ ADMSN_DT* ≤ BENE_DEATH_DT ≤ (DSCHRG_DT* + Episode Length – 1 day)

* Inpatient admission (ADMSN_DT) and discharge (DSCHRG_DT) dates corresponding to inpatient hospital discharges that could potentially trigger an episode.

Example Output Based on a Hypothetical Care Transitions CTI: Deaths

Exhibit 9-B provides the count of inpatient hospital discharges (i.e., potential episodes) after applying all criteria above and excluding hospital discharges for patients who died during the hospital stay or during the episode window.

Exhibit 9-B. Example Output – Exclude Inpatient Discharges if the Patient Died during the Hospitalization or the Episode Window

Total Number of Inpatient Hospital Discharges from Previous Output	6,785
Total Number of Inpatient Hospital Discharges after Excluding Patients Who Died during the Hospitalization or Episode Window	6,378
Percentage of Hospital Discharges from Provider 210XXX (*n*=7,600)	83.9%

Beneficiaries for Whom Medicare Is Not the Primary Payer

To ensure that the CCLF data contain every patient's complete claims history, inpatient hospital discharges are excluded from the set of potential episodes if the beneficiary had one or more claims with a date of service during the hospital stay or episode window that are covered by a primary payer other than Medicare (which means that there could be payments or claims for the patient that are not included in the CCLF data). Exhibit 10-A provides detailed specifications for identifying patients with claims during the hospitalization or episode window that were covered by a primary payer other than Medicare.

Exhibit 10-A. Identify Beneficiaries with Claims for which Medicare Is Not the Primary Payer

Objective	Exclude inpatient hospital discharges if the patient had one or more claims with service dates during the hospitalization or episode window that were covered by a primary payer other than Medicare
Required File Types	Inpatient, Outpatient, Carrier, Durable Medical Equipment, Skilled Nursing Facility, Home Health Agency (i.e., all fee-for-service claims)
Required Variables	Primary payer claim paid amount (PRPAYAMT), Claim service dates (CLM_FROM_DT – CLM_THRU_DT), Inpatient admission date (ADMSN_DT*), Inpatient discharge date (DSCHRG_DT*)
Logic	1) Exclude hospital discharge claims if the patient/beneficiary had one or more Medicare fee-for-service claims (of any type) where: ✓ ADMSN_DT* ≤ CLM_THRU_DT ✓ CLM_FROM_DT ≤ (DSCHRG_DT* + Episode Length – 1 day) ✓ PRPAYAMT > 0

* Inpatient admission (ADMSN_DT) and discharge (DSCHRG_DT) dates corresponding to inpatient hospital discharges that could potentially trigger an episode.

Example Output Based on a Hypothetical Care Transitions *CTI: Medicare Not Primary Payer*

Exhibit 10-B provides the count of inpatient hospital discharges (i.e., potential episodes) after applying all criteria above and excluding hospital discharges for patients who had claims with service dates during the hospital stay or episode window for which Medicare was not the primary payer.

Exhibit 10-B. Example Output – Exclude Inpatient Discharges If the Patient Had Any Claims for which Medicare Is Not the Primary Payer during the Hospitalization or Episode Window

Total Number of Inpatient Hospital Discharges from Previous Output	6,378
Total Number of Inpatient Hospital Discharges after Excluding Patients with Claims for which Medicare Is Not the Primary Payer	6,059
Percentage of Hospital Discharges from Provider 210XXX (*n*=7,600)	79.7%

Geographic Service Area

Many hospital participants choose to restrict their CTI population to a particular service area. Participants can choose to provide a list of five-digit ZIP codes in which the patients must reside at the time of their hospital discharge to be included in the given CTI population. Exhibit 11-A provides detailed specifications to identify beneficiaries' residential ZIP codes.

Exhibit 11-A. Identify the ZIP Code in which a Patient Resided at the Time They Were Discharged from the Hospital

Objective	Exclude inpatient hospital discharges when the patient did not reside in one of the ZIP codes specified by the participant
Required File Types	Supplemental "Address File"
Required Variables	Medicare Beneficiary Identification number (MBI_NUM), Beneficiary mailing address ZIP code (BENE_MLG_CNTCT_ZIP), Effective date (EFCTV_DT) and End date (END_DT) for beneficiary mailing address, Inpatient hospital discharge date (DSCHRG_DT*)
Logic	1) Identify the Medicare Beneficiary Identification number (MBI_NUM) for each patient discharged from the hospital 2) Using the MBI_NUM, identify the patient's mailing address ZIP code (BENE_MLG_CNTCT_ZIP) corresponding to the date they were discharged from the hospital, (i.e., where EFCTV_DT ≤ DSCHRG_DT* ≤ END_DT) 3) Exclude inpatient hospital discharge claims if the BENE_MLG_CNTCT_ZIP does not match one of the five-digit ZIP codes specified by the CTI participant

* Inpatient discharge (DSCHRG_DT) dates corresponding to inpatient hospital discharges that could potentially trigger an episode.

Example Output Based on a Hypothetical Care Transitions *CTI: Geographic Service Area*

Exhibit 11-B provides the count of inpatient hospital discharges (i.e., potential episodes) after applying all criteria above and excluding hospital discharges for patients who did not reside in one of the 20 ZIP codes specified by the hypothetical CTI participant for the "Example" CTI described in Exhibit 3.

Exhibit 11-B. Example Output – Exclude Inpatient Hospital Discharges If the Patient Did Not Reside in the Set of ZIP Codes Specified by the CTI Participant

Total Number of Inpatient Hospital Discharges from Previous Output	6,059
Total Number of Inpatient Hospital Discharges after Excluding Patients Who Did Not Reside in the Specified Set of ZIP Codes	2,003
Percentage of Hospital Discharges from Provider 210XXX (*n*=7,600)	26.4%

Primary Diagnosis or APR-DRG-SOI

The hospital participants may choose to focus their intervention on patients who were hospitalized for specific conditions. If so, the participant can restrict its *Care Transitions* CTI population based on Primary ICD-10-CM diagnosis codes, APR-DRG codes, SOI codes, or ROM codes corresponding to hospital discharge claims. The participant may choose to restrict its CTI population based only on one type of code, or a specific combination of APR-DRG-SOI-ROI codes; or it may widen the scope of its search by using an assortment of these types of codes. Exhibits 12-A and 12-B provide detailed specifications for identifying the primary diagnosis and APR-DRG-SOI-ROM codes associated with inpatient hospital discharges and excluding those that do not meet the participant's specified diagnostic criteria.

Exhibit 12-A. Identify Inpatient Hospital Discharges with Primary Diagnosis Codes Specified by the Participant

Objective	Identify inpatient hospital discharges with a primary diagnosis code that matches the list of primary diagnosis codes specified by the CTI participant
Required File Types	Inpatient claims
Required Variables	Primary diagnosis code (ICD_DGNS_CD1)
Logic	4) Exclude hospital discharge claims that do *not* meet the following criteria: ✓ ICD_DGNS_CD1 equals any primary diagnosis code selected by the participant.

Exhibit 12-B. Identify Inpatient Hospital Discharges with APR-DRG, SOI, or ROM Specified by the Participant

Objective	Identify inpatient hospital discharges with APR-DRG, SOI, or ROM codes that match the list of APR-DRG, SOI, or ROM codes specified by the CTI participant
Required File Types	Supplemental "DRG_Details" file
Required Variables	Current Unique Claim Identifier (CUR_CLM_UNIQ_ID), APR-DRG code (APRDRG), Severity of Illness code (SOI), Risk of Mortality code (ROM)
Logic	1) Identify the Current Unique Claim Identifier (CUR_CLM_UNIQ_ID) for each of the remaining inpatient hospital discharge claims in the set of potential episodes 2) Using the CUR_CLM_UNIQ_ID, identify the APRDRG, SOI, and ROM codes corresponding to each inpatient hospital discharge claim 3) Exclude inpatient hospital discharge claims if their APRDRG, SOI, and ROM codes do not match one of the APRDRG, SOI, and ROM codes or combinations of these codes specified by the CTI participant

Abbreviations: APR-DRG, All Patient Refined Diagnostic Related Groups; SOI, Severity of Illness; ROM, Risk of Mortality.

Example Output Based on a Hypothetical Care Transitions CTI: Primary Diagnosis or APR-DRG-SOI-ROM

Exhibit 12-C provides the count of inpatient hospital discharges (i.e., potential episodes) after applying all criteria above and excluding hospital discharges that did not correspond to the subset of Cardiac APR-DRG codes specified by the hypothetical CTI participant for the "Example" CTI described in Exhibit 3.

Exhibit 12-C. Example Output – Exclude Inpatient Hospital Discharges If the Corresponding APR-DRG Code Did Not Match the Subset of APR-DRG Codes Specified by the Participant

Total Number of Inpatient Hospital Discharges from Previous Output	2,003
Total Number of Inpatient Hospital Discharges with APR-DRG Codes Matched to the Specified List of APR-DRG Codes	524
Percentage of Hospital Discharges from Provider 210XXX (*n*=7,600)	6.9%

Chronic Conditions

Hospital participants may choose to focus their intervention on patients who were previously diagnosed with one or more CCW Chronic Conditions. Alternatively, hospitals may submit a list of specific CCW Chronic Conditions, any one of which a patient must have been diagnosed with prior to hospital discharge. Exhibit 13-A provides detailed specifications for identifying patients diagnosed with one or more CCW Chronic Conditions and excluding those who do not meet the participant's specified criteria.

Exhibit 13-A. Identify Inpatient Hospital Discharges for Patients Diagnosed with Certain CCW Chronic Conditions or a Certain Number of CCW Chronic Conditions

Objective	Identify inpatient hospital discharges for patients previously diagnosed with the number of CCW Chronic Conditions** or with the specific CCW Chronic Conditions specified by the CTI participant
Required File Types	Medicare enrollment and demographic file
Required Variables	Inpatient hospital discharge date (DSCHRG_DT*), Mid-year flags (CCC_MID_YYYY or CCCM_YYYY) and End-year flags (CCC_YYYY) for all 27 CCW Chronic Conditions (CCC**) and the two calendar years ("YYYY") overlapping with the targeted Maryland fiscal year
Logic	1) Let 20Y1 represent the calendar year in which the target period begins and 20Y2 as the calendar year in which the target period ends 2) If July 1, 20Y1 ≥ DSCHRG_DT* ≥ December 31, 20Y1, then use the mid-year chronic conditions flags for the given year (CCC_MID_20Y1 or CCCM_20Y1) to determine whether a patient was previously diagnosed with chronic condition "CCC." Beneficiaries were diagnosed with chronic condition "CCC" if CCC_MID_20Y1 = 1 or 3 3) If January 1, 20Y2 ≥ DSCHRG_DT* ≥ June 30, 20Y2, then use the end-year chronic conditions flags for the previous year (CCC_20Y1) to determine whether a patient was previously diagnosed with chronic condition "CCC." Beneficiaries were diagnosed with chronic condition "CCC" if CCC_20Y1 = 1 or 3 4) Let the minimum threshold for the total number of chronic conditions, specified by the participant, equal *N* (default is *N* = 0). Exclude inpatient hospital discharge claims if the total number of chronic conditions with which the patient was previously diagnosed is not greater than or equal to *N* 5) If the participant specified a subset of chronic conditions (CCC**), then exclude inpatient hospital discharge claims if the patient was not previously diagnosed with one or more of the specific chronic conditions in subset CCC***

Abbreviation: CCW, Chronic Conditions Data Warehouse.

* Inpatient discharge (DSCHRG_DT) dates corresponding to inpatient hospital discharges that could potentially trigger an episode.

** Chronic Conditions Data Warehouse. *Chronic Conditions.* Accessed February 27, 2023, at: https://www2.ccwdata.org/web/guest/condition-categories-chronic. In 2022, CMS introduced three new condition algorithms, bringing the total number of conditions to 30: (1) Urologic Cancer (Kidney, Renal Pelvis and Ureter), (2) All Cause Pneumonia, and (3) Parkinson's Disease and Secondary. CMS also removed the mid-year flags, leaving only the end-year flags. HSCRC will update these specifications when data years prior to 2022 become obsolete regarding CTI.

*** Possible "CCC" values are ALZH, ALZHDMTA (or ALZHDMT), AMI, ANEMIA, ASTHMA, ATRIALFB, CATARACT, CHF, CHRNKIDN, CNCRENDM, CNCRBRST (or CNCRBRS), CNCRCLRC (or CNCRCLR), CNCRLUNG (or CNCRLNG), CNCRPRST (or CNCRPRS), COPD, DEPRESSN (or DEPRSSN), DIABETES (or DIABTES), GLAUCOMA (or GLAUCMA), HIPFRAC, HYPERL, HYPERP, HYPERT, HYPOTH, ISCHMCHT (or ISCHMCH), OSTEOPRS (or OSTEOPR), RA_OA, and STRKETIA (or STRKTIA).

Example Output Based on a Hypothetical Care Transitions CTI: Chronic Conditions

Exhibit 13-B provides the count of inpatient hospital discharges (i.e., potential episodes) after applying all criteria above and excluding hospital discharges for patients who did not meet the chronic conditions specified by the hypothetical CTI participant for the "Example" CTI described in Exhibit 3. In the example, the participant specifies that patients must have been diagnosed with at least one of the 27 CCW chronic conditions.

Exhibit 13-B. Example Output – Exclude Inpatient Hospital Discharges If the Patient Was Not Previously Diagnosed with At Least One CCW Chronic Condition

Total Number of Inpatient Hospital Discharges from Previous Output	524
Total Number of Inpatient Hospital Discharges after Excluding Patients Without At Least One Chronic Condition	144
Percentage of Hospital Discharges from Provider 210XXX (*n*=7,600)	1.9%

Prior Utilization

Hospital participants may also define their CTI populations through thresholds of prior medical utilization. Participants can specify the setting (i.e., inpatient hospital discharges, outpatient observation stay, or outpatient ED visit), the threshold (e.g., three inpatient discharges), and the time window for when that threshold was reached (e.g., three inpatient discharges in 60 days preceding the index hospitalization). Participants may choose to specify thresholds and time windows for each setting or one threshold and time window for a combination of settings (e.g., three inpatient discharges, ED visits, or observation stays in 60 days preceding the index hospitalization). Exhibit 14-A provides detailed specifications for identifying patients' prior utilization of inpatient hospital, observation, and ED services and excluding those that do not meet the participant's specified criteria.

Exhibit 14-A. Identify Patients' Prior Utilization of Inpatient Hospital, Observation, and Emergency Department Services Prior to the Index Hospitalization

Objective	Identify inpatient hospital discharges for patients who meet the threshold(s) for prior inpatient discharges, outpatient observation stays, and outpatient ED visits specified by the CTI participant.
Required File Types	Inpatient and Outpatient claims
Required Variables	Claim type code (CLM_TYPE_CD), Provider Medicare Certification Number (PROV_NUM), Inpatient Hospital Discharge date (DSCHRG_DT), Claim service dates (CLM_FROM_DT – CLM_THRU_DT), Revenue Center code (PROD_REV_CTR_CD), Claim Line procedure codes (CLM_LINE_HCPCS_CD), Inpatient Hospital Admission date (ADMSN_DT*)
Logic	1) Let α be the number of days, selected by the participant, to look back from the index hospital admission date (ADMSN_DT*) to identify prior inpatient hospital discharges. Identify all claims

for inpatient hospital discharges that occurred during the look-back period using the following criteria:

- ✓ CLM_TYPE_CD equal to 60 or 61 (inpatient hospital claim)
- ✓ PROV_NUM between 210001 and 210879**
- ✓ (ADMSN_DT* – α) ≤ DSCHRG_DT < ADMSN_DT*

2) Let β be the number of days, selected by the participant, to look back from the index hospital admission date (ADMSN_DT*) to identify prior outpatient observation stays. Identify all claims for outpatient observation stays that occurred during the look-back period using the following criteria:

- ✓ CLM_TYPE_CD equal to 40 (outpatient claim)
- ✓ Any PROD_REV_CTR_CD equal to 0760 or 0762 ***or*** any CLM_LINE_CHPCS_CD equal to G0378 or G0379
- ✓ (ADMSN_DT* – β) ≤ CLM_THRU_DT ***and*** CLM_FROM_DT < ADMSN_DT*

3) Let γ be the number of days, selected by the participant, to look back from the index hospital admission date (ADMSN_DT*) to identify prior outpatient ED visits. Identify all claims for outpatient ED visits that occurred during the look-back period using the following criteria:

- ✓ CLM_TYPE_CD equal to 40 (outpatient claim)
- ✓ Any PROD_REV_CTR_CD in (0450, 0451, 0452, 0456, 0459) or any CLM_LINE_CHPCS_CD between 99281 and 99285
- ✓ (ADMSN_DT* – γ) ≤ CLM_THRU_DT ***and*** CLM_FROM_DT < ADMSN_DT*

4) If the participant chooses to count a combination of inpatient hospital discharges, observation stays, or outpatient ED visits, then follow Steps 1–3 to identify those events that occurred within the participant-specified number of days to look back before the index hospital admission date (ADMSN_DT*), and use the following hierarchy to count overlapping events as only one event:

5) Combine two or more overlapping inpatient hospital stays (and hospital transfers) into a single inpatient event, retaining the earliest ADMSN_DT and latest DSCHRG_DT. Define a hospital transfer as a hospital admission that occurs on the same day or within 1 day of a previous hospital discharge

6) Exclude outpatient ED visits that overlap with an outpatient observation stay: $CLM\_FROM\_DT^{obs} \leq CLM\_THRU\_DT^{ED}$ ***and*** $CLM\_FROM\_DT^{ED} \leq CLM\_THRU\_DT^{obs}$

7) Exclude outpatient ED visits that overlap with an inpatient hospital stay: ADMSN_DT ≤ $CLM\_THRU\_DT^{ED}$ ***and*** $CLM\_FROM\_DT^{ED} \leq$ DSCHRG_DT

8) Exclude outpatient observations stays that overlap with an inpatient hospital stay: ADMSN_DT ≤ $CLM\_THRU\_DT^{obs}$ ***and*** $CLM\_FROM\_DT^{obs} \leq$ DSCHRG_DT

9) Exclude inpatient hospital discharge claims from the set of potential episodes if the total number of inpatient stays, outpatient observation stays, and outpatient ED visits, respectively or in combination, is not greater than or equal to the threshold specified by the participant

Abbreviations: ED, emergency department; HCPCS, Healthcare Common Procedure Coding System.
* Inpatient admission (ADMSN_DT) dates corresponding to inpatient hospital discharges that could potentially trigger an episode (i.e., the "index hospitalization").
** The first two digits of a Medicare Certification Number (CCN) identify the State or District in which the provider is located. CCNs for Maryland hospitals begin with 21. The next four digits identify the type of provider. The last four digits for short-term (general and specialty) hospitals are between 0001 and 0879.

Example Applying Prior Utilization Hierarchy to Overlapping Acute Care Claims

If the participant chooses to include a combination of inpatient hospital discharges, observation stays, and outpatient ED visits as part of its prior utilization criteria, then Step 4 in Exhibit 14-A describes the HSCRC

hierarchy to apply to count overlapping acute care events as only one event. Exhibit 14-B shows an example scenario in which the hierarchy was applied to the multiple acute care claims identified during one Medicare beneficiary's look-back period. After Steps 1–3 in Exhibit 14-A were applied, this beneficiary had separate claims for three inpatient hospital discharges, two outpatient ED visits, and one outpatient observation stay during their look-back period (top panel). After applying the hierarchy, the beneficiary was considered to have had one outpatient ED visit and two inpatient stays during their look-back period (bottom panel).

Exhibit 14-B. Example Applying Prior Utilization Hierarchy to Overlapping Acute Care Claims

Medicare Beneficiary ID	Claim Type	Admission Date / Claim From Date	Discharge Date / Claim Thru Date
ABC1DE2FG34	Outpatient ED	1/28/2018	1/28/2018
ABC1DE2FG34	Inpatient	2/1/2018	2/2/2018
ABC1DE2FG34	Inpatient	2/3/2018	2/4/2018
ABC1DE2FG34	Outpatient Obs.	2/4/2018	2/5/2018
ABC1DE2FG34	Outpatient ED	2/15/2018	2/15/2018
ABC1DE2FG34	Inpatient	2/15/2018	2/18/2018

Medicare Beneficiary ID	Claim Type	Admission Date / Claim From Date	Discharge Date / Claim Thru Date
ABC1DE2FG34	Outpatient ED	1/28/2018	1/28/2018
ABC1DE2FG34	Inpatient	2/1/2018	2/4/2018
ABC1DE2FG34	Inpatient	2/15/2018	2/18/2018

In the top panel of the figure, the admission date of the second inpatient claim was within one day of the discharge date of the first inpatient claim (red dates), therefore these two inpatient claims were suppressed to create one inpatient hospital stay based on the earliest admission date and latest discharge date between the two inpatient claims. The service "from" date on the subsequent claim for outpatient observation was the same as the discharge date for the latter hospital stay (blue dates), therefore the observation stay was part of the hospitalization and the claim for the observation stay was not counted as part of the patient's prior utilization. Finally, the second outpatient ED visit occurred on the same day as the beneficiary's most recent inpatient stay during the look-back period (purple dates). Therefore, the outpatient ED visit is considered as part of the subsequent hospital stay, and the claim for the ED visit was not counted as part of the patient's prior utilization (bottom panel).

Example Output Based on a Hypothetical Care Transitions *CTI: Prior Utilization*

Exhibit 14-C provides the count of inpatient hospital discharges (i.e., potential episodes) after applying all criteria above and excluding hospital discharges for patients who did not meet the threshold for prior utilization specified by the hypothetical CTI participant for the "Example" CTI described in Exhibit 3. In the

example, the participant specified that patients must have had at least one prior hospitalization during the past 365 days.

Exhibit 14-C. Example Output – Exclude Inpatient Hospital Discharges If the Patient Did Not Meet the Threshold for Prior Utilization Specified by the Participant

Total Number of Inpatient Hospital Discharges from Previous Output	144
Total Number of Inpatient Hospital Discharges after Excluding Patients Without At Least One Inpatient Hospital Discharge in the Past 365 Days	101
Percentage of Hospital Discharges from Provider 210XXX (*n*=7,600)	1.3%

Look Back for Previous Medical Encounters

Hospital participants may also define their CTI populations by "looking back" to determine whether the patient discharged from the hospital had a medical encounter with a particular type of healthcare provider within a specified number of days before their hospitalization. Participants can specify the type of provider (i.e., primary care, home health agency, skilled nursing facility, short-term acute care hospital, or emergency department), the time window for the encounter, and whether to include or exclude inpatient hospital discharges from the set of potential episodes based on each criterion. More than one criterion can be specified to broaden the CTI population, but combinations of provider types (e.g., one encounter with a short-term acute care hospital *and* one encounter with a home health agency within 180 days) cannot be specified. Exhibit 15-A provides detailed specifications for identifying previous medical encounters and excluding inpatient hospital discharges when the patient did not meet the participant's specified criteria.

Exhibit 15-A. Look Back to Identify Discharged Hospital Patients' Previous Medical Encounters

Objective	Identify inpatient hospital discharges for patients who had a previous medical encounter with a primary care provider, home health agency, skilled nursing facility, short-term acute care hospital, or emergency department within a certain number of days, as specified by the CTI participant
Required File Types	Supplemental "Taxonomy Crosswalk" file and Inpatient, Outpatient, Carrier, Skilled Nursing Facility, and Home Health Agency claims
Required Variables	Claim type code (CLM_TYPE_CD), Provider Medicare Certification Number (PROV_NUM), Inpatient Hospital Discharge date (DSCHRG_DT), Claim service dates (CLM_FROM_DT – CLM_THRU_DT), Revenue Center code (PROD_REV_CTR_CD), Claim Line procedure codes (CLM_LINE_HCPCS_CD), Carrier Rendering Provider National Provider Identifier number (RNDRG_PRVDR_NPI_NUM), National Provider Identifier number in the "Taxonomy Crosswalk" file, Primary taxonomy code ("PRIMARY"), Inpatient Hospital Admission date (ADMSN_DT*)
Logic	1) Let α be the number of days, selected by the participant, to look back from the index hospital admission date (ADMSN_DT*) to identify prior inpatient hospital discharges. Identify all claims for inpatient hospital discharges that occurred during the look-back period using the following criteria:

- ✓ CLM_TYPE_CD equal to 60 or 61 (inpatient hospital claim)
- ✓ PROV_NUM between 210001 and 210879**
- ✓ (ADMSN_DT* – α) ≤ DSCHRG_DT < ADMSN_DT*

2) Let γ be the number of days, selected by the participant, to look back from the index hospital admission date (ADMSN_DT*) to identify prior outpatient emergency department visits. Identify all claims for outpatient emergency department visits that occurred during the look-back period using the following criteria:
   - ✓ CLM_TYPE_CD equal to 40 (outpatient claim)
   - ✓ Any PROD_REV_CTR_CD in (0450, 0451, 0452, 0456, 0459) ***or*** any CLM_LINE_CHPCS_CD between 99281 and 99285
   - ✓ (ADMSN_DT* – γ) ≤ CLM_THRU_DT *and* CLM_FROM_DT < ADMSN_DT*
3) Let ε be the number of days, selected by the participant, to look back from the index hospital admission date (ADMSN_DT*) to identify a previous stay at a skilled nursing facility. Identify whether the patient was admitted to a skilled nursing facility on any day during the look-back period using the following criteria:
   - ✓ CLM_TYPE_CD equal to 20 or 30
   - ✓ (ADMSN_DT* – ε) ≤ CLM_THRU_DT *and* CLM_FROM_DT < ADMSN_DT*
4) Let ζ be the number of days, selected by the participant, to look back from the index hospital admission date (ADMSN_DT*) to identify a previous encounter with a home health agency. Identify whether the patient was in the care of a home health agency on any day during the look-back period using the following criteria:
   - ✓ CLM_TYPE_CD equal to 10
   - ✓ (ADMSN_DT* – ζ) ≤ CLM_THRU_DT *and* CLM_FROM_DT < ADMSN_DT*
5) Let θ be the number of days, selected by the participant, to look back from the index hospital admission date (ADMSN_DT*) to identify a previous encounter with a primary care provider. Identify whether the patient had an encounter with a primary care provider on any day during the look-back period using the following criteria:
   - ✓ CLM_LINE HCPCS_CD equal to any procedure code listed in Exhibit 15-B

     or

     CLM_LINE_HCPCS_CD equal to any procedure code listed in Exhibit 15-C ***and*** TAXONOMY (linked to Carrier claims by matching the corresponding National Provider Identifier number in the "Taxonomy Crosswalk" file to the RNDRG_PRVDR_NPI_NUM on the Carrier claims) equal to any taxonomy code listed in Exhibit 15-C
   - ✓ (ADMSN_DT* – θ) ≤ CLM_THRU_DT and CLM_FROM_DT < ADMSN_DT*
6) *Exclude* inpatient hospital discharge claims from the set of potential episodes if the participant specified that the patient should be *included* when they had a previous encounter with a primary care provider, home health agency, skilled nursing facility, short-term acute care hospital, or emergency department within a certain number of days, *and none of those criteria was met* (i.e., only one of the participant's specified *inclusion criteria* needs to have been met)
7) *Exclude* inpatient hospital discharge claims from the set of potential episodes if the participant specified that the patient should be *excluded* when they had a previous encounter with a primary care provider, home health agency, skilled nursing facility, short-term acute care hospital, or emergency department within a certain number of days, *and at least one of those criteria was met* (i.e., only one of the participant's specified exclusion criteria needs to have been met)

* Inpatient admission (ADMSN_DT) dates corresponding to inpatient hospital discharges that could potentially trigger an episode (i.e., the "index hospitalization").

** The first two digits of a Medicare Certification Number (CCN) identify the State or District in which the provider is located. CCNs for Maryland hospitals begin with 21. The next four digits identify the type of provider. The last four digits for short-term (general and specialty) hospitals are between 0001 and 0879.

Exhibit 15-B lists procedure codes that can be used alone to identify a primary care claim. Exhibit 15-C lists procedure codes and Maryland Primary Care Practitioner Taxonomy Codes that must both be on the same claim to identify primary care claims.

Exhibit 15-B. Procedure Codes That Indicate a Primary Care Visit

Description	Procedure Codes (HCPCS/CPT)
Welcome to Medicare	G0402
Annual Wellness Visit	G0438, G0439
Chronic Care Management, Complex Chronic Care Management, and Care Planning for Chronic Care Management Beneficiary Services	99487, 99489-99491
Transitional Care Evaluation and Management Services	99495, 99496
Home Care	99324–99328, 99334–99337, 99339–99345, 99347–99350
Prolonged Services	99354, 99355
Advance Care Planning	99497, 99498

Abbreviations: CPT, Current Procedural Terminology; HCPCS, Healthcare Common Procedure Coding System.

Exhibit 15-C. Procedure Codes and Maryland Primary Care Practitioner Taxonomy Codes: One Procedure Code and One Taxonomy Code Must Be on a Single Claim to Indicate a Primary Care Visit

Description	Procedure Codes (HCPCS/CPT)
Psychiatric Collaborative Care Management Services	99492-99494, G0502-G0504*
Office or Other Outpatient Services	99201-99205, 99211-99215
Preventive Medicine Services	99381-99429
Cognition and Functional Assessment for Patient with Cognitive Impairment	99483, G0505*

Taxonomy	Code	Taxonomy	Code
Family Medicine	207Q00000X, 363LF0000X	Obstetrics & Gynecology	207V00000X, 207VG0400X, 207VX0000X
Adolescent Medicine	207QA0000X, 207RA0000X	Maternal & Fetal Medicine	207VM0101X
Addiction Medicine	207QA0401X, 207RA0401X	Pediatrics	208000000X
Adult Medicine	207QA0505X, 363LA2200X	Psychiatry	2084P0800X
Geriatric Medicine	207QG0300X, 207RG0300X	General Practice	208D00000X
Internal Medicine	207R00000X	Physician Assistant	363A00000X, 363AM0700X
Hospice & Palliative Medicine	207QH0002X, 207RH0002X, 207VH0002X	Nurse Practitioner	363L00000X, 363LA2100X, 363LC1500X

Abbreviations: CPT, Current Procedural Terminology; HCPCS, Healthcare Common Procedure Coding System.
* G-codes are obsolete as of 12-31-2017.

Example Output Based on a Hypothetical Care Transitions *CTI: Look Back for Previous Medical Encounters*

In the "Example" CTI described in Exhibit 3, the hypothetical CTI participant did not specify a previous medical encounter as a criterion for the inclusion or exclusion of inpatient hospital discharges in the set of potential episodes. That is, the participant chose the default option for this subset of criteria. The total number of inpatient hospital discharges remains the same as in the previous output (see Exhibit 14-C).

Exhibit 15-D. Example Output – Exclude Inpatient Hospital Discharges If the Patient Did Not Meet the (Default) Threshold for Previous Medical Encounters Specified by the Participant

Total Number of Inpatient Hospital Discharges from Previous Output	101
Total Number of Inpatient Hospital Discharges after Accounting for Previous Medical Encounters	101
Percentage of Hospital Discharges from Provider 210XXX (*n*=7,600)	1.3%

Look Forward to the First Setting of Care Post Discharge

Hospital participants can choose to specify the first setting of care for patients after they are discharged from hospitalization; that is, inpatient post-acute care (LTCH or IRF), SNF, HHA, or the community). Participants can choose to include or exclude patients based on whether they were referred to each setting, and more than one setting of care can be specified to broaden the CTI population. Exhibit 16-A provides detailed specifications for identifying patients' first setting of care after hospital discharge and excluding hospital discharges when the patient did not meet the participant's specified criteria.

Exhibit 16-A. Look Forward to Identify the First Setting of Care after Hospital Discharge

Objective	Identify inpatient hospital discharges for patients referred to inpatient post-acute care (long-term care hospital or inpatient rehabilitation facility), a skilled nursing facility, a home health agency, or the community and exclude them if the criteria specified by the CTI participant are not met*
Required File Types	Supplemental "First PAC" file
Required Variables	Medicare Beneficiary Identification number (MBI_NUM), Current Unique Claim Identifier (CUR_CLM_UNIQ_ID), Index admission claim number (INDXADM_CLAIM_NO) in the "First PAC" file, First post-acute care setting after hospital discharge (EPIS_FIRST_PAC)

Logic	1) Identify the Current Unique Claim Identifier (CUR_CLM_UNIQ_ID) for each of the remaining inpatient hospital discharge claims in the set of potential episodes 2) Match the CUR_CLM_UNIQ_ID to index admission claim number (INDXADM_CLAIM_NO) in the "First PAC" file to identify the first post-acute care setting after hospital discharge (EPIS_FIRST_PAC) corresponding to each inpatient hospital discharge claim 3) *Exclude* inpatient hospital discharge claims from the set of potential episodes if the first post-acute care setting does not match one of the settings specified by the participant to be *included* in the CTI population 4) *Exclude* inpatient hospital discharge claims from the set of potential episodes if the first post-acute care setting does match one of the settings specified by the participant to be *excluded* from the CTI population

Abbreviations: MADE, Medicare Data Analytics Data Exchange; PAC, post-acute care.
* First post-acute care settings are determined using MADE's algorithm to identify patients' first PAC setting after hospital discharge.

Example Output Based on a Hypothetical Care Transitions *CTI: Look Forward to the First Setting of Care Post Discharge*

Exhibit 16-B provides the count of inpatient hospital discharges (i.e., potential episodes) after applying all criteria above and excluding hospital discharges for patients who did not meet the look-forward criteria specified by the hypothetical CTI participant for the "Example" CTI described in Exhibit 3. In the example, the participant chose to *exclude* all inpatient hospital discharges when the patient was referred home (to the community).

Exhibit 16-B. Example Output – Exclude Inpatient Hospital Discharges If the Patient Did Not Meet the Look-forward Criteria Specified by the Participant

Total Number of Inpatient Hospital Discharges from Previous Output	101
Total Number of Inpatient Hospital Discharges after Excluding Patients Whose First Setting after Hospital Discharge Was in the Community	80
Percent of Hospital Discharges from Provider 210XXX (n=7,600)	1.1%

Construct the CTI Population

Once the user has addressed general and customizable criteria, the inpatient hospital discharge claims that remain represent the set of *potential* episodes in the given CTI population. The inpatient hospital discharge claim is called the "triggering" claim or event. The episode begin date is the hospital admission date if the participant chose to include the costs of the triggering hospital stay in total episode costs; the episode begin date is the hospital discharge date if they chose not to include the costs of the triggering hospital stay. The episode end date is the discharge date plus the episode length specified by the participant minus one day.

The *final* set of episodes for a given CTI definition is determined after removing episodes where the hospital discharge:

- Occurred during the episode window of another potential episode that was triggered earlier, based on the same CTI definition; or
- Triggered episodes under multiple CTI definitions in which the hospital is participating.

CTI episodes *are allowed* to overlap if they are attributed to *different* hospital participants (i.e., under different CTI definitions), even if it was the same hospital discharge that triggered episodes for multiple participants.

Prohibited and Unprohibited Episode Overlaps across CTI Definitions and Thematic Areas

Overlaps That Are Not Allowed:

- Episodes that trigger multiple episode-based CTI definitions for the same hospital participant.
- Beneficiaries attributed to more than one of the same hospital participant's panel-based CTIs.

Overlaps That Are Allowed:

- Episodes or beneficiaries attributed to two different hospital participants.
- Episodes or beneficiaries attributed to the same hospital participant, but under one episode-based CTI and one panel-based CTI.

Exclude Overlapping Episodes Within a Given CTI Definition

To avoid duplicating costs when the HSCRC calculates total episode costs, the HSCRC allows only one active episode per beneficiary per day under the same CTI definition. Using the remaining set of inpatient hospital discharges *for this CTI definition*, the HSCRC eliminates hospital discharges that occurred during the episode window of another potential episode (i.e., episodes under the same CTI definition that were triggered by a previous inpatient hospital discharge). Exhibit 17-A provides detailed specifications for eliminating overlapping episodes.

Exhibit 17-A. Exclude Inpatient Hospital Discharges That Occurred during Other Potential Episodes

Objective	Exclude inpatient hospital discharges that were triggered during the episode window for a potential episode triggered by a previous inpatient hospital discharge
Required File Types	Not applicable; only output from previous steps

Required Variables	Medicare Beneficiary Identification Number (MBI_NUM), Inpatient Hospital Admission date (ADMSN_DT), Inpatient Hospital Discharge date (DSCHRG_DT)
Logic	1) Sort potential episodes by MBI_NUM and from earliest to latest begin date 2) For each MBI_NUM: Start with the earliest episode begin date and exclude the hospital discharge claim if the episode begin date occurs between the begin date and the end date of an earlier potential episode, or where: ✓ Other episode begin date ≤ DSCHRG_DT* ✓ DSCHRG_DT* ≤ Other episode end date 3) Repeat Step 2 for the MBI_NUM's remaining episodes

* Replace DSCHRG_DT with ADMSN_DT if the costs of the index inpatient hospitalizations are included in total episode costs.

Exhibit 17-B shows an example scenario in which two sets of overlapping potential episodes are triggered by the same beneficiary under a given CTI definition. Episode 2 (in red) begins during the episode window of Episode 1. Episode 3 begins during the episode window of Episode 2. After Episode 2 is eliminated, Episode 3 does not overlap with any of the remaining episodes for this beneficiary and is retained in the final set of episodes for this CTI definition.

Exhibit 17-B. Example – Excluding One of Two Overlapping Episodes for the Same Beneficiary

Medicare Beneficairy ID	Episode ID	Admission Date	Discharge Date	Length of Episode	Episode Begin Date	Episode End Date
ABC1DE2FG34	1	2/1/2018	2/2/2018	90	2/2/2018	5/2/2018
ABC1DE2FG34	2	2/23/2018	2/25/2018	90	2/25/2018	5/25/2018
ABC1DE2FG34	3	5/5/2018	5/9/2018	90	5/9/2018	8/6/2018

Note: The user should exclude Episode 2, because it overlaps with Episode 1. The user should not exclude Episode 3, because it does not overlap any of the remaining episodes for this beneficiary after Episode 2 is excluded.

Example Output Based on a Hypothetical Care Transitions *CTI: Overlapping Episodes*

Exhibit 17-C provides the count of inpatient hospital discharges (i.e., potential episodes) after applying all criteria above and excluding hospital discharges for patients that occurred during the episode window of another potential episode.

Exhibit 17-C. Example Output – Exclude Inpatient Hospital Discharges That Occurred during Other Potential Episodes

Total Number of Inpatient Hospital Discharges from Previous Output	80
Total Number of Inpatient Hospital Discharges after Excluding Overlapping Potential Episodes	52
Percentage of Hospital Discharges from Provider 210XXX (*n*=7,600)	0.7%

Eliminate Episodes That Overlap Other CTI Definitions

Beneficiaries may have only one active CTI episode attributed to the same hospital participant per day. Overlapping episodes between different *episode-based* CTI definitions are resolved according the HSCRC's CTI hierarchy, which prioritizes CTIs from lowest to highest episode volume to ensure that smaller CTIs are attributed as many episodes as possible. Moreover, a specific triggering event (e.g., an inpatient hospital discharge) is allowed to trigger only one CTI episode. If a single event could trigger multiple episode-based CTI definitions, then the CTI definition with the highest precedence in the CTI hierarchy is retained and the others are excluded from their respective CTI populations.[1]

Beneficiaries who qualify to be attributed to more than one of a hospital participant's *panel-based* CTIs are only allowed to be attributed to one of the panel-based CTIs. The HSCRC's CTI hierarchy also prioritizes panel-based CTIs from lowest to highest episode volume to ensure smaller panel-based CTIs are attributed as many beneficiaries as possible.

Participants that are participating in more than one CTI definition are allowed to designate their own hierarchy to determine precedence among overlapping CTIs, as a substitute for HSCRC's default CTI hierarchy.

Calculate Total Episode Costs

Total cost of each episode equals the TCOC accrued by the beneficiary during the episode window (or, for panel-based CTIs, during the performance year). TCOC equals the cumulative Medicare Parts A and B expenditures accrued by the beneficiary during the episode window, after excluding certain types of Medicare payments. If the participant chose to include the cost of the triggering hospital stay in the total episode costs for *Care Transition* or *Palliative Care* CTIs, then the episode window starts on the day the patient was admitted to the hospital. Otherwise, the episode window starts on the day the patient was discharged from the hospital.

Excluded Episode Costs

Exhibit 18 lists the specific types of payments that the HSCRC excludes before calculating TCOC. If the level of payment is at the claim-line level, then only the claim-line should be removed from the dataset before calculating TCOC (i.e., all other payments made on the given claim contribute to the total costs of care). If the level of payment is at the claim level, then the entire claim can be removed from the dataset before calculating TCOC.

[1] Episodes or beneficiaries attributed to the same hospital participant, but under one episode-based CTI and one panel-based CTI, are allowed. However, beneficiaries who qualify to be attributed to more than one of a hospital's panel-based CTIs are allowed to be attributed to only one panel-based CTI.

Exhibit 18. Medicare Payments Excluded from Calculations of Total Episode Costs

Description	Level of Payment
Claims with negative standardized amounts	Claim
Payments on outpatient, carrier, and durable medical equipment claims for blood clotting factor (CLM_LINE_HCPCS_CD = J7199)	Claim-Line
Payments on inpatient claims for new technology add-ons (CLM_VAL_CD = 77)	Claim-Line
Medical device pass-through payments on outpatient claims (REVSTIND = H)	Claim-Line
Per-beneficiary-per-month payments on carrier and hospice claims (CLM_LINE_HCPCS_CD = G9678)	Claim-Line
Per-beneficiary-per-month payments on hospice claims made under the Medicare Care Choices Model (DEMO_ID_NUM = 73 *and* CLM_BILL_FAC_TYPE_CD = 8 *and* CLM_BILL_CLSFCTN_CD = 1 or 2)	Claim

Calculate Episode Costs

Exhibit 19 provides specifications for how the HSCRC uses all Medicare fee-for-service claims to calculate total episode costs.

Exhibit 19. Calculate Total Episode Costs for a Given CTI Definition

Objective	Calculate total episode costs as the cumulative Medicare Parts A and B expenditures accrued by each beneficiary during their episode window, after excluding certain types of expenditures
Required File Types	All Fee-For-Service Claims
Required Variables	Medicare Beneficiary Identification Number (MBI_NUM), User-generated Episode ID, Episode Begin Date, and Episode End Date, Claim service dates (CLM_FROM_DT – CLM_THRU_DT), Claim Payment Amount (CLM_PYMT_AMT)
Logic	1) Exclude claim or claim-line payments for the services listed in Exhibit 18 2) For each episode, retain all fee-for-service claims that meet the following criteria: ✓ MBI_NUM = MBI_NUM associated with the attributed patient ✓ Episode begin date ≤ CLM_THRU_DT ✓ CLM_FROM_DT ≤ Episode end date 3) Prorate claim payments (see proration methodology in Exhibits 20 and 21) that span beyond the episode window to allocate the appropriate portion of those payments to the episode 4) Sum the total or prorated paid amounts (CLM_PYMT_AMT) on all claims meeting the criteria in Steps 1 and 2 to obtain the total episode costs

Prorated Episode Costs

The HSCRC prorates claims and payments that span beyond the episode window to appropriately allocate a portion of those payments to the episode. The HSCRC uses two methods to prorate claims, depending on the claim type:

- The ***per diem method*** prorates payments based on the number of days in the claim that occur during the clinical episode.
- The ***length of stay (LOS) method*** prorates *non-outlier* payments by comparing the number of days of an inpatient stay that overlap the episode window with the mean length of stay for the same Diagnosis Related Group (DRG) during the same fiscal year.

Exhibit 20 lists the proration method used for each claim type. Exhibit 21 describes the steps used by the HSCRC to prorate all claims that overlap with a beneficiary's episode window.

Exhibit 20. Proration Method by Claim Type

Claim Type	Proration Method
Carrier (i.e., professional)	Never prorate
Critical access hospitals	Per diem
Durable medical equipment	Never prorate
Home health agency	Per diem
Hospice	Per diem
Inpatient psychiatric facility	Per diem
Hospital Inpatient (non-outlier payments)	Length of stay
Hospital Inpatient (outlier payments)	Per diem
Long-term care hospital (non-outlier payments)	Length of stay
Long-term care hospital (outlier payments)	Per diem
Hospital Outpatient	Never prorate
Skilled nursing facility	Per diem

Exhibit 21. Prorate Claims and Payments That Span beyond the Episode Window

Objective	Identify all claims that overlap with the clinical episode but end after the clinical episode; and retain the subset of payments that should be assigned to the clinical episode
Required File Types	All Fee-For-Service Claims (after excluding payment types in Exhibit 18)
Required Variables	Claim type code (CLM_TYPE_CD), Episode Begin Date and Episode End Date, Claim service dates (CLM_FROM_DT – CLM_THRU_DT), Claim Payment Amount (CLM_PYMT_AMT)
Logic	1) Identify claims to prorate: Identify all claims that overlap with the clinical episode but end after the clinical episode to determine whether all or a subset of payments are assignable to the clinical episode. Never prorate outpatient, carrier, and durable medical equipment claims. Assign them to the clinical episode 2) Identify and prorate the following types of claims based upon a per-diem rate: Assign payments to the clinical episode proportionate to the total number of days on the claim that occur during the clinical episode ✓ Critical access hospitals

	✓ Home health agency ✓ Hospice ✓ Inpatient psychiatric facility ✓ Skilled nursing facility 3) Distinguish outlier payment amounts from and non-outlier payment amounts on the remaining claim types to be prorated (Inpatient rehabilitation facility, Long-term care hospital, and Hospital Inpatient): • Outlier payment amounts: https://www.cms.gov/medicare/medicare-fee-for-service-payment/acuteinpatientpps/outlier 4) Prorate outlier payments on a per-diem basis, as described in Step 2 5) For non-outlier payments, calculate the number of days of the inpatient stay (on the claim that needs to be prorated) that overlap with the episode window *and* the average length of stay for inpatient stays with the same diagnosis-related group during the same fiscal/target year: • If the number of days that overlap the episode window is greater than the average length of stay, then assign the full non-outlier payment amount to the episode • Otherwise, prorate on a per-diem basis, giving double weight to the first day of the overlap

Disclaimer: Episode Costs Cannot Be Perfectly Replicated Using CCLF Data

All regulated payments are standardized using the CMS methodology for standardized allowed amounts to avoid feedback effects from the Global Budget Revenue. After standardization, regulated payments are converted back to real dollars using the ratio of actual to standardized payments. The ratio is based on total regulated payments for each hospital over full performance years. (The same ratio is used to calculate target prices and determine reconciliation.) The episode costs calculated by the HSCRC cannot be perfectly replicated using the CCLF data files because the CCLF data does not include standardized amounts.

Completion Factors

The claims processing, adjudication, and finalization process can take up to a year to complete, which introduces considerable delays into reporting for most claims-based program evaluation. Until this process works its course, claims are considered *incomplete*, making comparative assessments of payments on these claims difficult. The proportion of claim payments reflected by final action claims in the CCLF at any given point in time relative to the final, total paid amount is called the “claims completion factor.”

To facilitate faster turnaround on hospital participants’ performance data while ensuring a consistent and accurate evaluation of program payments, the HSCRC developed a method of extrapolating the amounts on nearly complete claims, called the “claims completion process”: HSCRC freezes each claim after three months of runout from the date of service, as opposed to delaying claim reporting until all claims are totally complete. Then it applies a claims completion factor to this amount to inflate it to the expected final amount.

This period was determined via actuarial analysis of claims throughout the history of the TCOC model, which found that at three months, claims payments – in aggregate – are about 93% complete.

Each type of claim has a different completion curve, which varies over time. HSCRC calculates a separate completion factor for each claim type and period, then applies them to the claim paid amounts for matching claims, before calculating the final paid amount. It does this for both baseline and performance period calculations. Exhibit 22 shows a *hypothetical* example of how completion factors are applied. The completed amount is then used as the input for all downstream payment calculations.

Exhibit 22. Example of How Three-Month Completion Factors Are Applied to Claim Payments

Type of Service	3-Month Completion Factor (FY 2020)	3-Month Paid Amount	Completed 12-Month Paid Amount
10 – Home Health	.9280	$100	$107.76
20 – Non-Swing Bed SNF	.9431	$100	$106.03
30 – Swing Bed SNF	.9152	$100	$109.27
40 – Outpatient	.9540	$100	$104.82
50 – Hospice	.9427	$100	$106.08
60 - Inpatient	.9800	$100	$102.04
71 – Carrier Non-DMEPOS	.9515	$100	$105.10
72 – Carrier DMEPOS	.8764	$100	$114.11
81 – DMERC non-DMEPOS	.9169	$100	$109.06
82 – DMERC DMEPOS	.8962	$100	$111.58

Abbreviations: DMEPOS, Durable Medical Equipment, Prosthetics, Orthotics and Supplies; DMERC, Durable Medical Equipment Regional Carrier; SNF, skilled nursing facility.

Inflation Adjustments

HSCRC inflates all claims to performance period dollars prior to calculating episode costs, revised target prices, and reconciliation amounts. All payments for a given period displayed in CRISP's Care Transformation Profiler (baseline and performance) are displayed in same-year dollars for comparability. It inflates non-regulated payments based on CMS' Prospective Payment System (PPS)-specific market basket update factors. Regulated payments are inflated based on HSCRC update factors.

Additional adjustments account for unique policy scenarios (e.g., suspension of sequestration during the Covid-19 public health emergency) or changes in policy during the performance year. For example, the HSCRC implemented a special adjustment to payments during the first CTI performance year to account for overpayments in the Skilled Nursing Facility PPS due to a change in CMS payment policy beginning in 2019.

Inflation Adjustments for Unregulated Payments

CMS uses actual regulation market basket update data used for PPS values. HSCRC uses that data to inflate the unregulated Medicare FFS payments in assessing CTI episodes. Data files and methodology are available from CMS: Market Basket Data | CMS.[2] HSCRC applies only the general CMS inflation update policy. The inflation process is not intended to replicate any program-specific inflation policies from other CMS initiatives (e.g., the Merit-based Incentive Payment System), as those can vary from program to program.

For each PPS claim type, HSCRC uses the full market basket updates for every intervening period between the baseline and performance periods, less the productivity adjustment, to calculate the cumulative amount of inflation between the baseline and performance period. Then it adjusts every claim payment variable (e.g., CLM_PYMT_AMT) by the cumulative inflation amount. Exhibit 23 provides a simplified example of inflation adjustments for an episode with only two claims with unregulated payments contributing to the total episode costs.

Exhibit 23. Simplified Example of an Episode That Includes Two Claims with Unregulated Payments

Skilled Nursing Facility PPS	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
Actual Regulation Market Basket Update	2.0	2.0	2.4	2.2	2.0
Actual baseline 2017 claim payment total: $100 Cumulated SNF Inflation Factor = 1.02 * 1.02 * 1.024 * 1.022 * 1.02 = 1.11058 Inflated claim payment total = $100 * 1.11058 = $111.05					
Home Health Agency PPS	**FY 2018**	**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**
Actual Regulation Market Basket Update	1.9	2.2	2.6	2.0	2.6
Actual baseline 2017 claim payment total: $50 Cumulated HHA Inflation Factor = 1.019 * 1.022 * 1.026 * 1.02 * 1.026 = 1.1182 Inflated claim payment total = $50 * 1.1182 = $55.91					
Uninflated episode total = $150 ($100.00 + $50.00) Inflated episode total = $166.97 ($111.05 + $55.91)					

Abbreviations: HHA, home health agency; PPS, Prospective Payment System; SNF, skilled nursing facility.

[2] CMS.gov. Market Basket Data. Accessed December 5, 2023 at: https://www.cms.gov/data-research/statistics-trends-and-reports/medicare-program-rates-statistics/market-basket-data

Inflation Adjustments for Regulated Payments

All regulated setting payments (Hospital Inpatient PPS and Hospital Outpatient PPS for Maryland regulated hospitals) are standardized, inflated, and re-normalized to derive an inflation-adjusted amount that eliminates any Global Budget Revenue fluctuations or payment policy from influencing or penalizing payment evaluation:

1) HSCRC first standardizes all regulated payments using the CMS standardization methodology for allowed amounts at the claim level.

2) It then calculates a hospital-specific Standardization Ratio as the ratio of actual paid to standardized paid over the entire Program Baseline Period (i.e., Actual Paid Amount / Standardized Payment Amount). For example, if the actual Maryland charges are $100 in the program baseline period and standardized payments are $60, then the Standardization Ratio is 1.66 (= 100 / 60).

3) For each period, HSCRC calculates a cumulative inflation factor as the cumulative HSCRC inflation for the prior year multiplied by (1 + the current year update factor). The program baseline period cumulative HSCRC inflation factor is equal to 1.0. The HSCRC provides update factors for each period based on the actual Maryland policy for that time window. This process is otherwise similar to the inflation factor cumulation example shown in Exhibit 23 above.

4) It then multiplies the standardized amounts by the cumulated inflation factor for the given performance period to arrive at a standardized, inflated amount.

5) Finally, it converts the standardized, inflated amount to an inflation-adjusted actual amount by multiplying by the standardization ratio for that hospital:

$$\textbf{\textit{Final Inflated Regulated Claim Payment Amount}} = Standardized\ Payment * Inflation_{Period} * Standardization\ Ratio_{Participant}$$

Calculating a Participant's Target Price for a Single CTI Definition

For each participant hospital and CTI definition, the target price is calculated as the predicted level of episode spending during the performance period, based on:

- The participant's average episode spending during a selected baseline period.
- The average Hierarchical Condition Categories (HCC) score among the participant's attributed beneficiaries.

- The average APR-DRG-SOI weight among the participant's attributed beneficiaries (*Note*: *APR-DRG weights are included only when episodes are triggered by an inpatient hospital stay*).

Calculating a Preliminary Target Price

HSCRC uses statewide data to assign a preliminary target price to each CTI definition in a CTI thematic area based on the following equation:

$$\boldsymbol{Total\ Episode\ Costs} = \boldsymbol{\alpha_{state}} + \boldsymbol{\alpha_{attributed}} + \boldsymbol{\beta} * \boldsymbol{HCC} + \boldsymbol{\gamma} * \boldsymbol{APRDRG}$$

where:

- $\boldsymbol{HCC}$ is the average HCC score of beneficiaries in all episodes triggered in Maryland during the baseline period.
- $\boldsymbol{APRDRG}$ is the average APR-DRG-SOI weight associated with the triggering hospital stay for all episodes triggered in Maryland during the baseline period (included only when episodes are triggered by an inpatient hospital stay; currently, these include the *Care Transitions* and *Palliative Care* CTIs).
- $\boldsymbol{\alpha}$ is a series of fixed effects that capture the average baseline costs of unattributed ($\boldsymbol{\alpha_{state}}$) and attributed ($\boldsymbol{\alpha_{attributed}}$) episodes for each hospital provider in Maryland during the baseline period, adjusted for the HCC scores and APR-DRG weights of the beneficiaries.[3]
- $\boldsymbol{\beta}$ captures the statewide average effect of the HCC score on episode costs (one value for all potential episodes for a given CTI definition).
- $\boldsymbol{\gamma}$ captures the statewide average effect of the APR-DRG weight on episode costs (one value for all potential episodes for a given CTI definition).

HSCRC calculates a participant's ($\boldsymbol{p}$) preliminary target price for a given CTI definition using the model parameters estimated from baseline data and the average risk scores ($\overline{\boldsymbol{HCC}}^{\boldsymbol{p}}$ and $\overline{\boldsymbol{APRDRG}}^{\boldsymbol{p}}$) among the patients/episodes that were attributed to the participant during the baseline period:

$$\boldsymbol{Preliminary\ Target\ Price^{p}} = \boldsymbol{\alpha^{p}_{attributed}} + \boldsymbol{\beta} * \overline{\boldsymbol{HCC}}^{\boldsymbol{p}} + \boldsymbol{\gamma} * \overline{\boldsymbol{APRDRG}}^{\boldsymbol{p}}$$

[3] $\boldsymbol{\alpha\_state}$ was added to the target price equation in Program Year 2. Target prices in Program Year 1 were calculated using only one series of fixed effects to capture the average baseline cost of each provider's attributed episodes, adjusted for HCC score and APR-DRG.

Calculating a Final Target Price

HSCRC revises the target price for a given CTI definition prior to reconciliation to account for changes in a participant hospital's average risk score between the baseline and intervention periods. A participant's final target price is based on the preliminary model parameters estimated from baseline data and the average risk scores ($\overline{HCC}^{p}$ and $\overline{APRDRG}^{p}$) among the patients who were attributed to the participant during the performance period. Exhibit 24 provides an example of how a hypothetical CTI definition's target price could be revised based on the change in the average HCC score and average APR-DRG-SOI weight among beneficiaries attributed to the participant during the baseline and performance periods.

Exhibit 24. Example Calculation of a CTI Definitions Preliminary and Final Target Prices

CTI	Period	Intercept (α)	Average HCC Score	HCC Coefficient (β)	Average APR-DRG Weight	APR-DRG Coefficient (γ)	Target Price
01-999	Baseline	$14,915	3.69	$172.22	1.23	$16,507.13	$35,854.26
01-999	Performance	$14,915	3.23	$172.22	1.24	$16,507.13	$35,940.11

Abbreviations: APR-DRG, All Patient Refined Diagnostic Related Groups; HCC, Hierarchical Condition Categories.

Calculating Reconciliation Payments for a CTI Participant

A participating hospital's reconciliation payments are based on the cumulative amount of savings that it achieves across all episode-based CTIs in all CTI thematic areas in which it chooses to participate. A participant's cumulative savings rate, across all episode-based CTIs, is calculated as

$$\textbf{Cumulative Savings Rate} = \sum_{n=1}^{N}\left[1-\left(\frac{Total\ Episode\ Costs}{Final\ Target\ Price * Episode\ Volume}\right)\right]_{n}$$

where N is the total number of episode-based CTI definitions in which the hospital participated during the performance year, across all CTI thematic areas.

HSCRC reconciles a participant's actual cumulative savings against a participant-specific Minimum Savings Rate (MSR) that is determined by the total volume of episodes across all episode-based CTIs in all CTI thematic areas in which it participates. A participant's cumulative episode-based CTI savings must be greater than the MSR to receive a CTI reconciliation payment. If a participant's cumulative episode-based CTI savings exceeds its MSR, the participant's episode-based CTI reconciliation payment is equal to its *total* amount of cumulative savings, *minus the statewide savings offset*.

Determining the Minimum Savings Rate

HSCRC calculates episode-based and panel-based CTI savings separately for each CTI participant. A hospital participant is assigned a single MSR for all its episode-based CTIs, according to the total volume of episodes across all its episode-based CTIs. A hospital participant is also assigned a single MSR for all its panel-based CTIs according to the total volume of beneficiaries across all its panel-based CTIs. Exhibit 25 shows how the MSR increases with a participant's total volume of episodes or beneficiaries.

Exhibit 25. Minimum Savings Rates for Episode-based and Panel-based CTIs, by Volume

Minimum Savings Rate (%)	Episode-Based CTI Volume	Panel-Based CTI Volume
1.0	>8,977	>19,655
1.5	3,991–8,977	8,736–19,655
2.0	2,246–3,990	4,916–8,735
2.5	1,441–2,245	3,146–4,915
3.0	1,001–1,440	1,286–3,145
3.5	731–1,000	1,606–1,285
4.0	561–730	1,231–1,605
4.5	441–560	971–1,230
5.0	361–440	791–970
5.5	301–360	651–790
6.0	251–300	551–650
6.5	210–250	466–550
7.0	181–210	401–465
7.5	161–180	351–400
8.0	141–160	311–350
8.5	126–140	271–310
9.0	111–125	246–270
9.5	101–110	221–245
10.0	91–100	201–220
15.0	<91	<201

Calculate the Reconciliation Amount

A participant's reconciliation amount is calculated as follows:

1) Rank the participant's episode-based CTIs (i.e., each CTI definition) according to how much actual CTI savings exceeded the required CTI savings. Required CTI savings for each CTI is equal to the sum of Total Episode Costs across all episodes multiplied by the participant-specific MSR.
2) Starting from the CTI with the most savings:
    - Actual and required savings are accumulated over subsequent CTIs and compared.
    - If the cumulative actual savings exceed the cumulative required savings, then another CTI is added.
    - If not, the hospital earns the cumulative amount of actual savings prior to the addition of the most recently added CTI.
3) Reconciliation payments are equal to the recognized amount of cumulative savings *minus the statewide savings offset*.

Exhibit 26 presents a hypothetical scenario for a hypothetical participant in seven different episode-based and panel-based CTIs. In this scenario, the participant's cumulative actual savings exceeds the cumulative required savings (green) until CTI 2 (red) is added to the totals, hence the participant's total recognized savings is $1,063,000 (bolded).

Exhibit 26. Example Scenario for Calculating the Total Recognized Savings for a CTI Participant

CTI	Number of Episodes	Total Episode Costs ($1,000s)	Minimum Savings Rate	Required Savings ($1,000s)	Actual Savings ($1,000s)	Difference (Ranked Highest to Lowest)	Cumulative Episode Costs	Cumulative Required Savings	Cumulative Actual Savings
CTI 3	175	$6,300	3.0%	$189	$485	$359	$6,300	$189	$485
CTI 6	115	$600	3.0%	$18	$35	$17	$6,900	$207	$520
CTI 1 (*panel*)	1,235	$5,000	4.0%	$200	$201	$1	$11,900	$407	$721
CTI 4	300	$10,500	3.0%	$315	$292	($23)	$22,400	$722	$1,013
CTI 5	160	$3,000	3.0%	$90	$50	($40)	$25,400	$812	**$1,063**
CTI 2	100	$9,800	3.0%	$294	($200)	($494)	$35,200	$1,106	$863
CTI 7	330	$4,500	3.0%	$135	($210)	($345)	$39,700		