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CTI Technical Review

November 2023

Overview

1. Data Source

2. Episode-Based versus Panel-Based CTIs

3. Identify a CTI Population

   - CTI Criteria with Examples: *Care Transitions for Inpatient Discharges*
   - Specific Steps to construct a set of episodes

4. Calculate Episode Costs

5. Calculate the Target Price and Reconciliation Payment

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Data Source

CTI episodes are constructed from the Maryland All-Payer Model (MDAPM) Claim and Claim Line Feed (CCLF) data.

- Medicare final action claims for all Part A and Part B services received by Maryland residents, regardless of service location.

Excluded **Beneficiaries:**
- Non-Maryland residents
- Managed care enrollees
- ESRD patients

Excluded **Claims:**
- Non-final Action
- Unpaid/Denied
- Substance Abuse and Mental Health Service Association (SAMHSA)

Datasets

The following types of files are used to identify the CTI population, construct episodes, and calculate total costs of care during episodes:

- Demographic and Enrollment

- Inpatient

- Outpatient

- Carrier (i.e., physician or professional claims)

- Durable Medical Equipment

- Hospice

- Skilled Nursing Facility

- Home Health Agency

Data spans a given "target period" and a participant-specified "look-back" period to determine whether the CTI criteria were met.

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Datasets (continued)

HSCRC also uses the following supplemental data files constructed by CRISP from Medicare claims to identify specific subgroups of the patient population:

- "DRG Details"
  - All Patient Refined Diagnostic Related Groups (APR-DRG) code, Severity of Illness (SOI) code, and Risk of Mortality (ROM) codes for each inpatient hospital claim.

- "Address File"
  - First and last dates that each beneficiary resided at a given address.

- "Taxonomy Crosswalk"
  - Provider taxonomy code(s) linked to each national provider identifier (NPI) in the carrier claims.

- "First PAC"
  - *First* post-acute care setting after every hospital discharge.
  - Based on MADE's algorithm to identify patients' first post-acute setting after hospital discharge.

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Episode versus Panel-Based CTIs

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 a
  - History of medical encounters between them (e.g., Primary Care)
  - Specified provider service area (e.g., Community Based Care)
- Patients are attributed to a provider for the full performance year.

Future CTI thematic areas could use a hybrid approach to attribute patients to providers.

- For example, a patient is attributed to a provider on any date and the episode spans the rest of the performance period.

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Identify a CTI Population:
Care Transitions for Inpatient Discharges

General Criteria for all CTIs

Criteria	Description
Maryland Resident	• Beneficiaries must reside in Maryland during the index hospitalization, throughout the episode window, and (if chosen as criteria) throughout the time window for identifying prior healthcare utilization or previous medical encounters.
Medicare Parts A and B Enrollment	• Beneficiaries must be enrolled in both Medicare Parts A and B during the index hospitalization, throughout the episode window, and (if chosen as criteria) throughout the time window for identifying prior healthcare utilization or previous medical encounters.
Medicare as Primary Payer	• Episodes are excluded if there is one or more claims (of any type) during the index hospitalization or episode window on which Medicare was not the primary payer.
No ESRD Treatment	• Episodes are excluded if the beneficiary ever received treatment for end-stage renal disease (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 if the beneficiary died during the index hospitalization or during the episode window (including the final day of the episode).

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Optional Criteria Common to CTIs

Type of Criteria	Options	Default	Example
Geographic Service Area	• 5-digit ZIP codes in which targeted patients must reside.	No restrictions	20 Maryland ZIP codes
Primary Dx, APR-DRG, SOI, or ROM	• Inpatient ICD-10-CM primary diagnosis codes. • APR-DRG, SOI, and/or ROM codes.	No restrictions	Cardiac APR-DRG codes (no SOI, ROM, ICD-10-CM specified)
Chronic Conditions	• Minimum number of the 27 CCW Chronic Conditions* with which a patient must have been diagnosed. • Specific CCW Chronic Conditions with which a patient must have been diagnosed.	No restrictions	1 or more CCW Chronic Conditions

* Chronic Conditions Data Warehouse. Chronic Conditions: https://www2.ccwdata.org/web/guest/condition-categories-chronic.

Optional Criteria Common to CTIs (continued)

Type of Criteria	Options	Default	Example
Prior Utilization	• Setting (Inpatient hospital, outpatient observation, or ED), threshold (e.g., 2 inpatient discharges), and time window for when the 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 (Inclusion or Exclusion)	• Medical encounter in one or more healthcare settings (primary care visit, HHA, SNF, assisted living, acute care hospital, psychiatric care facility) prior to inpatient admission, and a time window for the encounter (e.g., SNF discharge in past 60 days).	No restrictions	Default
Look Forward (Inclusion or Exclusion)	• Discharged from the hospital to one or more specific types of *first* post-acute care settings (LTCH, IRF, SNF, HHA, Community with a physician consult).**	No restrictions	Discharged to LTCH, IRF, SNF, or HHA (i.e., not discharged home)

** First post-acute care settings are determined using MADE's algorithm to identify patients' first PAC setting after hospital discharge. PAC 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.

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Other Options for CTIs

Type of Criteria	Options	Default	Example
Episode Length	• The length of the CTI intervention serves as the episode window, which begins upon discharge from the hospital. • All services covered by Medicare Parts A and B that occur during the episode window are included in total cost of care calculations. • Episode-based CTIs only	90 days	Default
Include or Exclude Costs of Index Hospital Stay	• Total costs of the index hospitalizations are included in total episode costs, unless the participant chooses to exclude them. • *Care Transitions* and *Palliative Care* CTIs only	Include	Default
Baseline Period	• Maryland Fiscal Years • Episode-based CTIs only (baseline period for all panel-based CTIs is FY 2019)	N/A	FY 2018

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Logical Steps to Identify a Set of *Care Transitions* CTI Episodes

- The following slides describe the data files, variables, and logic necessary to restrict a set of Medicare claims to inpatient discharges that meet the general and customizable criteria for a *Care Transitions* CTI.

- The order in which the inclusion and exclusion criteria are applied minimize the computing time it takes to identify the final set of episodes from the Medicare claims and enrollment data, but they could be implemented in any order.

- The slides provide examples of the output one would expect after implementing each logical step based on the hypothetical *Care Transitions* CTI described in the previous exhibits.

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Identify Inpatient Discharges from Participating Facilities

Objective	Identify all patient discharges from a Maryland hospital during the target year.
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 a specific short-term acute hospitals using the following criteria: ✓ CLM_TYPE_CD equal to 60 or 61 ✓ PROV_NUM = participant's Medicare certification number (Short-Term Acute Hospitals in Maryland will have PROV_NUM between 210001–210879) 1) 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.

Target Period
Maryland Fiscal Year 2018
Number of Hospital Discharges During Target Period
233,000
Number of Hospital Discharges from Provider 210XXX
7,600

Identify Beginning and End Dates for Each Potential Episode

Required Variables	Hospital admission / discharge dates (ADMSN_DT / 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, or DSCHRG_DT if they are not. 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 to look back for prior utilization or a previous medical encounter. 4) The end of the look-back period is ADMSN_DT – 1 day.

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Apply General Criteria for all *Care Transitions* CTIs

Specifications and Logic for including and excluding beneficiaries based on the general CTI criteria are in the *Appendix*:

- Maryland Residency and Medicare Parts A and B Enrollment

- End Stage Renal Disease (ESRD) Status

- Deaths

- Beneficiaries for Whom Medicare is Not the Primary Payer

Target Period
Maryland Fiscal Year 2018
Number of Hospital Discharges from Previous Output
7,600
Number of Hospital Discharges After Applying General Criteria
6,059
% of Hospital Discharges from Provider 210XXX (n=7,600)
79.7%

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Geographic Service Area

Objective	Exclude hospital discharges when the patient did not reside in one of the ZIP codes specified by the participant.
File Types	Supplemental "Address File"
Required Variables	Medicare Beneficiary Identification Number (MBI_NUM), Beneficiary mailing address ZIP code (BENE_MLG_CNTCT_ZIP), Address effective and end dates (EFCTV_DT / END_DT), Hospital discharge date (DSCHRG_DT)
Logic	1) Identify the Medicare Beneficiary Identification number (MBI_NUM) for each patient discharged from the hospital. 2) Identify the patient's (MBI_NUM) 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 5-digit ZIP codes specified by the CTI participant.

Example Criteria
List of 20 Maryland ZIP codes
Number of Hospital Discharges from Previous Output
6,059
Number of Hospital Discharges After Excluding Patients Who Did Not Reside in the Specified Set of ZIP Codes
2,003
% of Hospital Discharges from Provider 210XXX (n=7,600)
26.4%

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Primary Diagnosis or APR-DRG-SOI

Objective	Identify hospital discharges with a primary diagnosis code that matches the list of primary diagnosis codes specified by the CTI participant.
File Types	Inpatient claims
Required Variables	Primary diagnosis code (ICD_DGNS_CD1)
Logic	1) Exclude hospital discharge claims that do not meet the following criteria: ✓ ICD_DGNS_CD1 equals any ICD-10-CM code selected by the participant.

Primary Diagnosis or APR-DRG-SOI (continued)

Objective	Identify 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.
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 corresponding to each inpatient hospital discharge claim. 3) Exclude hospital discharge claims if the APRDRG, SOI, and ROM codes do not match one of the specified APRDRG, SOI, and ROM codes, or combinations of these codes.

Example Criteria
Cardiac APR-DRG codes
Number of Hospital Discharges from Previous Output
2,003
Number of Hospital Discharges with APR-DRG Codes Matched to the Specified list of APR-DRG Codes
524
% of Hospital Discharges from Provider 210XXX (n=7,600)
6.9%

Chronic Conditions

Objective	Identify hospital discharges for patients previously diagnosed with the number of CCW Chronic Conditions, or the specific CCW Chronic Conditions, specified by the CTI participant.
File Types	Demographic and Enrollment file
Required Variables	Hospital discharge date (DSCHRG_DT), Mid-year flags (CC_MID_20YY or CCM_20YY) and End-year flags (CC_20YY) for all 27 CCW Chronic Conditions (CC) and the two calendar years overlapping with the targeted Maryland fiscal year
Logic	1) If July 1, 20Y1 ≥ DSCHRG_DT ≥ December 31, 20Y1 then beneficiaries were diagnosed with chronic condition "CC" if CC_MID_20Y1 = 1 or 3. 2) If January 1, 20Y2 ≥ DSCHRG_DT ≥ June 30, 20Y2 then beneficiaries were diagnosed with chronic condition "CC" if CC_20Y1 = 1 or 3. 3) Exclude hospital discharges if the patients' number of conditions is not ≥ the minimum threshold for the specified number of conditions or not diagnosed with one or more of the specified conditions.

Example Critera
One or more CCW Chronic Conditions
Number of Hospital Discharges from Previous Output
524
Number of Hospital Discharges Excluding Patients Without at Least One Chronic Condition
144
% of Hospital Discharges from Provider 210XXX (n=7,600)
1.9%

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Prior Utilization

Objective	Identify hospital discharges for patients who meet the threshold(s) for prior inpatient discharges, outpatient observation stays, and outpatient emergency department (ED) visits specified by the CTI participant.
File Types	Inpatient and Outpatient claims
Required Variables	Claim type code (CLM_TYPE_CD), Provider Medicare certification number (PROV_NUM), Claim service dates (CLM_FROM_DT / CLM_THRU_DT), Hospital admission / discharge dates (ADMSN_DT / DSCHRG_DT), Revenue center code (PROD_REV_CTR_CD), Claim line procedure codes (CLM_LINE_HCPCS_CD)
Logic	*Next slide*

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Prior Utilization (continued)

Logic	1) Identify all claims for inpatient hospital discharges that occurred during the look-back window for hospitalizations (ADMSN_DT* − α):
	✓ CLM_TYPE_CD equal to 60 or 61 (inpatient hospital)
	✓ PROV_NUM between 210001–210879
	✓ (ADMSN_DT* − α) ≤ DSCHRG_DT < ADMSN_DT*
	2) Identify all claims for outpatient observation stays that occurred during the look-back window for observation stays (ADMSN_DT* − β):
	✓ CLM_TYPE_CD equal to 40 (outpatient)
	✓ Any PROD_REV_CTR_CD = 0760 or 0762 *or* any CLM_LINE_CHPCS_CD = G0378 or G0379
	✓ (ADMSN_DT* − β) ≤ CLM_THRU_DT and CLM_FROM_DT < ADMSN_DT*
	3) Identify all claims for outpatient ED visits that occurred during the look-back window for ED visits (ADMSN_DT* − γ):
	✓ 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 99281–99285
	✓ (ADMSN_DT* − γ) ≤ CLM_THRU_DT and CLM_FROM_DT < ADMSN_DT*

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Prior Utilization (continued)

Logic	4) If the participant chose to count a combination of inpatient hospital discharges, observation stays, or outpatient ED visits, then use the following hierarchy to count overlapping events as only one event:
	
	   a) Combine two or more overlapping hospital stays (and hospital transfers) into a single event, retaining the earliest ADMSN_DT and latest DSCHRG_DT. Define hospital transfers as hospital admissions that occur on the same day or within one day of previous hospital discharges.
	
	   b) Exclude ED visits that overlap with an observation stay: $CLM\_FROM\_DT^{obs} \leq CLM\_THRU\_DT^{ED}$ and $CLM\_FROM\_DT^{ED} \leq CLM\_THRU\_DT^{obs}$
	
	   c) Exclude ED visits that overlap with an inpatient hospital stay: $ADMSN\_DT \leq CLM\_THRU\_DT^{ED}$ and $CLM\_FROM\_DT^{ED} \leq DSCHRG\_DT$
	
	   d) Exclude observations stays that overlap with an inpatient hospital stay: $ADMSN\_DT \leq CLM\_THRU\_DT^{obs}$ and $CLM\_FROM\_DT^{obs} \leq DSCHRG\_DT$
	
	5) Exclude hospital discharge claims if the total number of hospital stays, observation stays, and ED visits, respectively or in combination, is not ≥ specified threshold.

Example Criteria
One hospital discharge during the 365 days preceding the episode begin date.
Number of Hospital Discharges from Previous Output
144
Number of Hospital Discharges After Excluding Patients Based on Prior Utilization
101
% of Hospital Discharges from Provider 210XXX (n=7,600)
1.3%

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Prior Utilization: Example Applying Hierarchy to Overlapping Events

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**

This patient had 5 separate claims for inpatient stays, outpatient observation stays, and outpatient ED visits during their look-back window.

After applying the hierarchy (Step 4 of the Prior Utilization logic), they were considered to have had 1 outpatient ED visit and 2 inpatient stays during their look-back window.

Look Back for Previous Medical Encounters

Objective	Identify 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 ED within a certain number of days, as specified by the CTI participant.
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), Claim service dates (CLM_FROM_DT / CLM_THRU_DT), Hospital admission / discharge dates (ADMSN_DT / DSCHRG_DT), Revenue center code (PROD_REV_CTR_CD), Claim line procedure codes (CLM_LINE_HCPCS_CD), Carrier rendering provider NPI (RNDRG_PRVDR_NPI_NUM), NPI in the "Taxonomy Crosswalk" file, Primary taxonomy code ("PRIMARY").
Logic	*Next slide*

Look Back for Previous Medical Encounters (continued)

Logic	1) Identify all claims for inpatient hospital discharges that occurred during the look-back window for hospitalizations (ADMSN_DT* – α):
	✓ CLM_TYPE_CD equal to 60 or 61 (inpatient hospital)
	✓ PROV_NUM between 210001–210879
	✓ (ADMSN_DT* – α) ≤ DSCHRG_DT < ADMSN_DT*
	2) Identify all claims for outpatient ED visits that occurred during the look-back window for ED visits (ADMSN_DT* – γ):
	✓ CLM_TYPE_CD equal to 40 (outpatient)
	✓ Any PROD_REV_CTR_CD in (0450, 0451, 0452, 0456, 0459) *or* any CLM_LINE_CHPCS_CD between 99281–99285
	✓ (ADMSN_DT* – γ) ≤ CLM_THRU_DT and CLM_FROM_DT < ADMSN_DT*
	3) Identify all claims for SNF stays that occurred during the look-back window for SNF stays (ADMSN_DT* – ε):
	✓ CLM_TYPE_CD equal to 20 or 30 (SNF)
	✓ (ADMSN_DT* – ε) ≤ CLM_THRU_DT and CLM_FROM_DT < ADMSN_DT*

Look Back for Previous Medical Encounters (continued)

Logic	4) Identify all home health agency claims that occurred during the look-back window for home health care (ADMSN_DT* – ζ): ✓ CLM_TYPE_CD equal to 10 (home health agency) ✓ (ADMSN_DT* – ζ) ≤ CLM_THRU_DT and CLM_FROM_DT < ADMSN_DT* 5) Identify all claims for primary care visits that occurred during the look-back window for primary care visits (ADMSN_DT* – θ): ✓ CLM_LINE HCPCS_CD = any procedure code listed in *Appendix* **or** CLM_LINE_HCPCS_CD = any procedure code listed in *Appendix* and TAXONOMY (linked to Carrier claims by matching the corresponding NPI in the "Taxonomy Crosswalk" file to the RNDRG_PRVDR_NPI_NUM on the Carrier claims) = any taxonomy code listed in *Appendix*. ✓ (ADMSN_DT* – θ) ≤ CLM_THRU_DT and CLM_FROM_DT < ADMSN_DT*

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Look Back for Previous Medical Encounters (continued)

Logic	6) Exclude hospital discharge claims if the participant specified to *include* patients who had a previous encounter with a primary care provider, HHA, SNF, acute care hospital, or ED within a certain number of days, and none of those criteria were met (i.e., **only one of the participant's specified inclusion criteria needs to have been met**). 7) Exclude hospital discharge claims if the participant specified to *exclude* patients who had a previous encounter with a primary care provider, HHA, SNF, acute care hospital, or ED within a certain number of days, and at least one of those criteria were met (i.e., **only one of the participant's specified exclusion criteria needs to have been met**).

Example Criteria
Default (no criteria)
Number of Hospital Discharges from Previous Output
101
Number of Hospital Discharges After Accounting for Previous Medical Encounters
101
% of Hospital Discharges from Provider 210XXX (n=7,600)
1.3%

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Look Forward to the First Setting of Care Post Discharge

Objective	Identify hospital discharges where the patient's first post-acute care setting after hospital discharge was inpatient post-acute care (long term care hospital or inpatient rehabilitation facility), a skilled nursing facility, a home health agency, or the community.* Exclude if the specified criteria for the first post-acute care setting after discharge was not met.
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	*Next slide*

* First post-acute care settings are determined using MADE's algorithm to identify patients' first PAC setting after hospital discharge.

Look Forward to the First Setting of Care Post Discharge (cont.)

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 if the first post-acute care setting *does not* match one of the settings specified 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 to be excluded from the CTI population.

Example Criteria
Discharged to LTCH, IRF, SNF, or HHA (not discharged home)
Number of Hospital Discharges from Previous Output
101
Number of Hospital Discharges After Accounting for First Post-Acute Care Setting
80
% of Hospital Discharges from Provider 210XXX (n=7,600)
1.1%

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Construct the Final Set of CTI Episodes

The remaining set of inpatient hospital discharge claims represent the set of episodes for the specific CTI definition and participating provider(s).

- The hospital discharge claim is the "triggering" event.

However, the final set of episodes for a given CTI definition is created after resolving episodes that overlap across other CTI definitions.

Eliminate Episodes that Overlap Other CTI Definitions

Allowed Overlaps

- Episodes/beneficiaries attributed to two different hospitals (i.e., CTIs).
- Episodes/beneficiaries attributed to the same hospital's episode- and panel-based CTIs.

Overlaps that are Not Allowed

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

Overlapping Episodes (Within a CTI Definition)

Objective	Exclude hospital discharges that were triggered during the episode window for a potential episode triggered by a previous inpatient hospital discharge.
Required Variables	Medicare Beneficiary Identification Number (MBI_NUM), Hospital admission / discharge dates (ADMSN_DT / 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 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.*

Target Period
Maryland Fiscal Year 2018
Number of Hospital Discharges After Applying Criteria
80
Number of Hospital Discharges After Excluding Overlapping Episodes
52
% of Hospital Discharges from Provider 210XXX (n=7,600)
0.7%

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Example of Overlapping Episodes (Within a CTI Definition)

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

- Exclude Episode 2 because it overlaps with Episode 1

- Do not exclude Episode 3 because it does not overlap any remaining episodes after Episode 2 is excluded.

Eliminate Episodes that Overlap Other CTI Definitions

HSCRC's CTI hierarchy applies to episode-based overlaps of CTIs within the same hospital:

- Prioritizes CTIs from lowest to highest episode volume.

- Ensures that smaller CTIs are attributed as many episodes as possible.

- If a single event could trigger multiple CTI definitions, then the CTI definition with the lowest volume in the CTI hierarchy is retained and the others are excluded.

Beneficiaries who qualify to be attributed to more than one of a hospital's panel-based CTIs are only allowed to be attributed to one panel-based CTI.

Participants in more than one CTI definition can designate their own hierarchy to determine the precedence between overlapping CTIs.

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Calculate Episode Costs

Excluded Costs

Total episode costs equal the cumulative Medicare Parts A and B expenditures accrued by the beneficiary during the episode window, excluding certain types of payments.

Medicare Payments Excluded from Calculations of Total Episode Costs
Claims with negative standardized amounts.
Payments on outpatient, carrier, and DME claims for blood clotting factor (CLM_LINE_HCPCS_CD = J7199).
Payments on inpatient claims for new technology add-ons (CLM_VAL_CD = 77).
Medical device pass-through payments on outpatient claims (REVSTIND = H).
Per-beneficiary-per-month (PBPM) payments on carrier and hospice claims (CLM_LINE_HCPCS_CD = G9678).
PBPM 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).

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Completing Claim Payments

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 ***claims completion factor***.

In order to facilitate faster turnaround on performance data as requested by participants while ensuring consistent, accurate evaluation of program payments, the HSCRC developed a method of extrapolating the amounts on nearly-complete claims, called the ***claims completion process***.

This is done by 'freezing' each claim after three months of ***runout*** from the date of service rather than delaying all claim reporting until all claims are totally complete. A claims completion factor is then applied 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 of claims payments – in aggregate – are about 93% complete.

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Completing Claim Payments

Type of Service	3 Month Completion Factor (FY 2020)	SAMPLE 3-Month Paid Amount	SAMPLE 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

Each type of claim (SNF, IP, HHA, etc.) has a different completion curve which varies over time, so individual completion factors are calculated for each claim type and period, then applied to the claim paid amounts for matching claims before calculating the final paid amount. This is done for both baseline and performance period calculations.

An example is shown at left. The completed amount is then use as the input for all downstream payment calculations.

Total Episode Costs

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.
File Types	All Fee-For-Service (FFS) 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 payments for the services listed under "Medicare Payments Excluded from Calculations of Total Episode Costs" from the FFS claims. 2) For each episode, retain all FFS claims that meet the following criteria: ✓ MBI_NUM = MBI_NUM associated with the attributed patient. ✓ Episode begin date ≤ CLM_THRU_DT **and** CLM_FROM_DT ≤ episode end date. 3) Sum the total paid amounts (CLM_PYMT_AMT) on all claims meeting the criteria in Steps 1 and 2 to obtain the total episode costs.

Prorating Claim Payments

The HSCRC prorates claims and payments that span beyond the episode window to appropriately allocate a portion of those payments to the episode.

- 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 overlaps the episode window with the mean length of stay for the same DRG during the same fiscal year:

  - If the number of days overlapping the post-anchor period is greater than the mean length of stay, 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.

- The LOS method prorates *outlier* payments on a per diem basis.

Proration Methods 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)	LOS
Hospital Inpatient (outlier payments)	Per diem
Long-term care hospital (non-outlier payments)	LOS
Long-term care hospital (outlier payments)	Per diem
Hospital Outpatient	Never prorate
Skilled nursing facility	Per diem

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 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.

- CCLF file does **not** contain standardized amounts.

Inflation Adjustments

All claims are inflated to performance period dollars prior to calculating episode costs, revised target prices, and reconciliation amounts. All payments for a given period displayed in the CTP (baseline and performance) are displayed in same-year dollars for comparability.

- Non-regulated payments are inflated based on CMS' PPS-specific market basket update factors.

- Regulated payments are inflated based on HSCRC update factors.

- A special adjustment is made to account for overpayments in the SNF PPS due to CMS policy change beginning in 2019.

- Additional adjustments account for unique policy scenarios (e.g., suspension of sequestration during the Covid-19 PHE) or changes in policy during the performance year.

Inflation Process – Unregulated Payments

- Actual regulation market basket update data used by CMS for prospective payment system (PPS) values are used to inflate the unregulated Medicare fee-for-service payments used for assessing CTI episodes.
  - Data files and methodology are available from the CMS.gov research, statistics, data, and systems site (URL below)

- For each PPS claim type (using the same claim identification methods as described previously, e.g., CLM_TYPE_CD = 20 or 30 for SNF), the full market basket update less productivity adjustment is taken for each intervening period to be inflated over and cumulatively applied to each claim payment variable (e.g., CLM_PYMT_AMT).

- Only general CMS inflation update policy is applied. The inflation process does not and is not intended to replicate any program-specific inflation policies from other CMS initiatives (e.g., MIPS), as these may vary from program to program.

* https://www.cms.gov/research-statistics-data-and-systems/statistics-trends-and-reports/medicareprogramratesstats/marketbasketdata

Inflation Process – Unregulated Payments

Simplified example of an episode with 2 claims:

SNF PPS	FY2017	FY2018	FY2019	FY2020	FY21	FY22
Actual Regulation Market Basket Update	2.4	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

HHA PPS	FY2017	FY2018	FY2019	FY2020	FY21	FY22
Actual Regulation Market Basket Update	2.5	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 = $100.00 + $50.00 = $150
Inflated "episode" total   = $111.05 + $55.91 = $166.97

Inflation Process - Regulated Payments

- All regulated setting payments (IPPS and hospital OPPS for MD regulated hospitals) are standardized, inflated, and renormalized to derive an inflation adjusted amount that eliminates any GBR fluctuations or payment policy from influencing or penalizing payment evaluation.

- All regulated payments are first standardized using the CMS standardization methodology for allowed amount at the claim level.

- A hospital-specific Standardization Ratio is then calculated as the ratio of actual paid to standardized paid over the entire Program Baseline Period.
  - Formula is (Actual Paid Amount) / (Standardized Payment Amount)
  - Example: if actual Maryland charges are $100 in the program baseline period and standardized payments are $60, then the Standardization Ratio is 100 / 60 = 1.66.

- For each period, a cumulative HSCRC inflation factor is calculated 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 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 previously.

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Inflation Process - Regulated Payments

- The standardized amounts are then multiplied by the cumulated inflation factor for the given performance period to arrive at a standardized, inflated amount.

- The standardized, inflated amount is then converted to an inflation-adjusted actual amount by multiplying by the standardization ratio for that hospital.

$$\textit{Final Inflated Regulated Claim Payment Amount}$$
$$= \textit{Standardized Payment} * \textit{Inflation}_{Period}$$
$$* \textit{Standardization Ratio}_{Participant}$$

Calculate the Target Price

Target Price

For each participant and CTI thematic area, 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 attributed beneficiaries.

- The average All Patients Refined Diagnosis Related Groups and Severity of Illness (APR-DRG-SOI) weight among attributed beneficiaries.

  - APR-DRG weights are only included when episodes are triggered by an inpatient hospital stay.

Assigning Preliminary Target Prices for CTIs in a Thematic Area

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

α: series of fixed effects that capture the average baseline costs of unattributed (α_{state}) and attributed ($\alpha_{attributed}$) episodes for each provider, adjusted for HCC scores and APR-DRG weights.

HCC: average HCC score for beneficiaries in all episodes triggered during baseline.

- β captures the state-wide average effect of the HCC score on episode costs (one value for all potential episodes for a given CTI definition).

$APRDRG$: average APR-DRG weight for trigger (index) stays in all episodes triggered during the baseline.

- Currently only included for Care Transitions and Palliative Care CTIs.

- γ captures the state-wide average effect of the APR-DRG weight on episode costs (one value for all potential episodes for a given CTI definition).

(PY1 Target Prices 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.)

Assigning a Revised Target Price for each CTI

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

Target prices are revised to account for changes in a participant's (p) average risk score between the baseline and intervention periods.

- A participant's revised 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 attributed to the participant during the intervention period.

Example:

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

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Calculate Reconciliation Payments

Important Disclaimer for Reconciliation

Preliminary reconciliation calculations truly are "Preliminary."

- Preliminary and interim target prices are based on the most recent inflation data available, while final target prices and reconciliation amounts are calculated after CMS reports data on inflation for the full performance year.

- Target prices change as the risk-profile of the attributed population changes over time.

- Target prices could be adjusted in response to changes in state or federal policy or economic events during the performance year (e.g., inflation, sequestration, update factors, risk-score methodology, etc.).

Minimum Savings Rate (MSR)

A participant's CTI savings rate must be greater than the MSR to receive a CTI payment.

$$Savings\ Rate$$

$$= 1 - \left(\frac{Total\ Episode\ Costs}{Final\ Target\ Price * Episode\ Volume} \right)$$

Episode-based and Panel-based CTI Savings are calculated separately.

- A hospital 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 is assigned a single MSR for all its panel-based CTIs, according to the total volume of beneficiaries across all its panel-based CTIs.

Minimum Savings Rate	Setting Specific CTI	Community Triggered CTI
1.0	> 8977	> 19655
1.5	3991 - 8977	8736 - 19655
2.0	2246 - 3990	4916 - 8735
2.5	1441 - 2245	3146 - 4915
3.0	1001 - 1440	1286 - 3145
3.5	731 - 1000	1606 - 2185
4.0	561 - 730	1231 - 1605
4.5	441 - 560	971 - 1230
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	270 - 310
9.0	111 - 125	246 - 270
9.5	101 - 110	221 - 245
10.0	91 - 100	201 - 220
15.0	< 90	< 200

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Minimum Savings Rate and Reconciliation Amount

A participant's MSR is evaluated across all its CTI and their reconciliation amount is calculated in the following manner:

1. Rank (highest to lowest) a participant's CTIs according to how much actual CTI savings exceeded required savings (based on the participant's MSR).

2. Starting from the CTI with the most savings:
   1. Actual and required savings are accumulated over subsequent CTIs and compared.
   2. If the cumulative actual savings exceed the cumulative required savings, then another CTI is added.
   3. 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*.

Minimum Savings Rate (continued)

In the scenario below, the participant's total recognized savings is $1,063,000.

CTI	Number of Episodes	Total Episode Costs (Thousands $)	MSR	Required Savings (Thousands $)	Actual Savings (Thousands $)	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		

Thank You

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Appendix

Maryland Residency and Medicare Parts A and B Enrollment

Objective	Exclude discharges if patient was not a MD resident or not enrolled in Parts A and B during the index hospital stay, episode window, lookback, and look-forward period.
File Types	Demographic and Enrollment file
Required Variables	Medicare eligibility year/month (ELIG_YYYY_MM), MD residency year/month (MD_YYYY_MM), Hospital admission / discharge dates (ADMSN_DT / DSCHRG_DT)
Logic	1) Exclude hospital discharge claims that do *not* meet the following criteria: ✓ MD_YYYY_MM = 1 & ELIG_YYYY_MM = 'AB' during every calendar month that overlaps the start of the look-back period through the end of the look-forward period. ✓ If a look-back and look-forward period are not required: MD_YYYY_MM = 1 & 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).

Target Period
Maryland Fiscal Year 2018
Number of Hospital Discharges from Provider 210XXX
7,600
Number of Hospital Discharges After Excluding Non-Maryland Residents and Beneficiaries Not Covered by Parts A and B
6,924
% of Hospital Discharges from Provider 210XXX
91.1%

End Stage Renal Disease (ESRD) Status

Objective	Exclude hospital discharges if the patient received treatment for ESRD during the same calendar year as the hospital discharge.
File Types	Demographic and Enrollment 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.

Target Period
Maryland Fiscal Year 2018
Number of Hospital Discharges from Previous Output
6,924
Number of Hospital Discharges After Excluding Patients Who Received ESRD Treatment
6,785
% of Hospital Discharges from Provider 210XXX (n=7,600)
89.2%

Deaths

Objective	Exclude hospital discharges if the patient was discharged upon death or if the patient died during the episode window.
File Types	Demographic and Enrollment file
Required Variables	Beneficiary date of death (BENE_DEATH_DT), Hospital admission / discharge dates (ADMSN_DT / DSCHRG_DT)
Logic	1) Exclude hospital discharge claims where: ✓ ADMSN_DT* ≤ BENE_DEATH_DT ≤ (DSCHRG_DT* + *Episode Length* – 1 day)

Target Period
Maryland Fiscal Year 2018
Number of Hospital Discharges from Previous Output
6,785
Number of Hospital Discharges After Excluding Patients Who Died During the Hospitalization or Episode Window
6,378
% of Hospital Discharges from Provider 210XXX (n=7,600)
83.9%

Beneficiaries for Whom Medicare is Not the Primary Payer

Objective	Exclude hospital discharges if the patient had one or more claims with service dates during the hospitalization or episode window that were primarily covered by a payer other than Medicare.
File Types	All Fee-For-Service (FFS) Claims
Required Variables	Primary payer claim paid amount (PRPAYAMT), Claim service dates (CLM_FROM_DT / CLM_THRU_DT), Hospital admission / discharge dates (ADMSN_DT / DSCHRG_DT)
Logic	1) Exclude hospital discharge claims if the patient/beneficiary had one or more Medicare FFS claims (of any type) where: ✓ $ADMSN\_DT^* \leq CLM\_THRU\_DT$ ✓ $CLM\_FROM\_DT \leq (DSCHRG\_DT^* + Episode\ Length - 1\ day)$ ✓ $PRPAYAMT > 0$

Target Period
Maryland Fiscal Year 2018
Number of Hospital Discharges from Previous Output
6,378
Number of Hospital Discharges After Excluding Patients with Claims for Which Medicare is Not the Primary Payer
6,059
% of Hospital Discharges from Provider 210XXX (n=7,600)
79.7%

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

Procedure Codes & Maryland Primary Care Practitioner Taxonomy Codes

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

G-codes are obsolete as of 12-31-2017