



Home Health Claims-Based Rehospitalization Measures Preliminary Technical Specifications

1 METHODS

The home health rehospitalization measures evaluate the outcomes of rehospitalization and emergency department use without readmission for home health patients who were recently discharged from the hospital. These measures are titled “Home Health Claims-Based Rehospitalization During the First 30 Days of Home Health” and “Home Health Claims-Based ED Use without Hospital Readmission During the First 30 Days of Home Health” (referred to in the remainder of this report as “rehospitalization” and “ED use without hospital readmission,” respectively). These measures include home health stays beginning within 5 days of an inpatient hospital discharge and measure rehospitalization or use of the ED without readmission during the 30 days following the beginning of home health care.

1.1 Construction of Home Health Stays

The home health rehospitalization measures are calculated for each qualifying home health stay, where a home health stay is defined as a sequence of home health payment episodes separated from other home health payment episodes by at least 60 days. Each home health payment episode is associated with a Medicare home health (HH) claim, so home health stays are constructed from claims data using the following steps:

1. First, retrieve HH claims with a “from” date during the 12-month observation period or the 120 days prior to the beginning of the observation period and sequence these claims by “from” date for each beneficiary.
2. Second, drop claims with the same “from” date and “through” date and claims listing no visits and no payment. Additionally, if multiple claims have the same “from” date, keep only the claim with the most recent process date.
3. Third, set Stay_Start_Date(1) equal to the “from” date on the beneficiary’s first claim. Step through the claims sequentially to determine which claims begin new home health stays. If the claim “from” date is more than 60 days after the “through” date on the

previous claim, then the claim begins a new stay. If the claim “from” date is within 60 days of the “through” date on the previous claim, then the claim continues the stay associated with the previous claim.

4. Fourth, for each stay, set Stay_Start_Date(n) equal to the “from” date of the first claim in the sequence of claims defining that stay. Set Stay_End_Date(n) equal to the “through” date on the last claim in that stay. Confirm that Stay_Start_Date(n+1) minus Stay_End_Date(n) is greater than 60 days for all adjacent stays.
5. Finally, drop stays that begin before the 12-month observation window.

1.2 Outcome Definition

The home health rehospitalization measures evaluate the outcomes of acute care rehospitalization and ED use without readmission for home health patients who were recently discharged from the hospital. Observation stays that begin in a hospital emergency department will be captured in the ED use without hospital readmission measure.

1.2.1 Rehospitalization Measure

The rehospitalization measure numerator includes inpatient stays for patients who have a Medicare claim for an admission to an acute care hospital in the 30 days following the start of home health stay. The 30-day time window is calculated by adding 30 days to the “from” date in the first home health claim in the series of home health claims that comprise the HH stay. If the patient has at least one Medicare IP claim from short-term or critical access hospitals during the 30 day window, then the stay is included in the measure numerator.¹

Because planned hospitalizations do not necessarily reflect the quality of home health care, inpatient claims for planned hospitalizations are excluded from the rehospitalization measure numerator. Planned hospitalizations are defined using the same criteria as the Hospital-Wide All-Cause Unplanned Readmission (HWR) measure.²

1.2.2 ED Use without Hospital Readmission Measure

For the ED use without hospital readmission measure, the measure numerator includes inpatient stays for patients who have a Medicare claim for outpatient emergency use and no claims for acute care hospitalization in the 30 days following the start of the home health stay. The 30-day time window is calculated by adding 30 days to the “from” date in the first HH claim in the series of HH claims that comprise the HH stay. If the patient has any Medicare outpatient

¹ Short-term and critical access hospitals are identified by a CMS Certification Number ending in 0001-0879, 0800-0899, or 1300-1399.

² Details of the HWR measure may be found on the *QualityNet* page here: <http://www.qualitynet.org/dcs/ContentServer?c=Page&pagename=OnetPublic%2FPage%2FOnetTier4&cid=1228772504318>

claims with an ER revenue center code during the 30 day window and if the patient has no Medicare inpatient claims for admission to an acute care hospital during the 30 day window, then the stay is included in the measure numerator.³ There are no numerator exclusions for the ED use without hospital readmission measure.

1.3 Eligible Patient Population

The rehospitalization and ED use without hospital readmission measures evaluate the outcomes of rehospitalization and emergency department use without readmission, respectively, for home health patients who were recently discharged from the hospital. The rehospitalization and ED use without hospital readmission measures only include home health patients who were discharged from an acute inpatient hospital within five days of the start of home care.

1.3.1 Exclusions from the Measure Denominators

The following types of home health stays are excluded from the measure denominators of both the rehospitalization and ED use without hospital readmission measures:

- (1) Stays in which the patient's enrollment does not meet the requirements for the measure. This includes stays in which the patient is not continuously enrolled in Medicare fee-for-service during the 30 days after the start of home health care, has no recorded age, or has no recorded sex.
- (2) Stays that begin with a Low-Utilization Payment Adjustment (LUPA). Stays with four or fewer visits to the beneficiary qualify for LUPAs.
- (3) Stays in which the patient is transferred to another home health agency within a home health payment episode (60 days).
- (4) Stays in which the patient is not continuously enrolled in Medicare fee-for-service during the previous six months.
- (5) Stays in which there is no hospitalization occurring within 5 days of the start of home health care.
- (6) Stays in which the hospitalization occurring within 5 days of the start of home health care is not a qualifying inpatient stay. Hospitalizations that do not qualify as index hospitalizations include admissions for the treatment of cancer, psychiatric disease, or rehabilitation, and admissions ending in patient discharge against medical advice.
- (7) Stays in which the patient receives treatment in another setting in the 5 days between hospital discharge and the start of home health.

³ ER revenue center codes include 0450-0459 and 0981. Short-term and critical access hospitals are identified by a CMS Certification Number ending in 0001-0879, 0800-0899, or 1300-1399.

1.4 Risk Adjustment

To account for beneficiary factors that may affect rates of hospitalization but are outside of the home health agency's control, the rehospitalization and ED use without hospital readmission measures use a multinomial logistic model. Because these measures evaluate two different but related outcomes, one multinomial logistic framework models the three disjoint outcomes: no acute care use (no event), ED use without hospital readmission, and rehospitalization. The risk adjustment model uses six months of claims prior to the start of home health care to obtain information about the beneficiary.

The multinomial logistic model for the rehospitalization and ED use without hospital readmission measures incorporate five categories of risk factors, including (i) prior care setting, (ii) age and sex interactions, (iii) health status, (iv) End Stage Renal Disease (ESRD) and disability status, and (v) interaction terms.

1.4.1 Prior Care Setting

Because beneficiaries who enter home health care from different prior care settings may have different health statuses, this model takes into account beneficiaries' immediate prior care setting. This variable is defined by examining Medicare claims for the 30 days prior to the start of the home health stay. The main categories are community (i.e., no prior care setting), SNF, and multiple prior inpatient stays (as all beneficiaries had at least one prior inpatient stay to be included in the measures). In the case of both a prior SNF and inpatient stay, the hierarchy of setting assigns prior care to SNF because it is the highest level of care and implies an inpatient stay occurred directly before the SNF stay. The inpatient category is further segregated into care in an inpatient rehabilitation facility, long term care facility, and psychiatric facility settings.

1.4.2 Age and Sex Interactions

To account for the differing effects of age on the outcomes for each gender, the risk adjustment model also includes age and sex as covariates. Age is subdivided into 12 bins for each sex: aged 0 to 34, 35 to 44, 45 to 54, five-year age bins from 55 to 95, and a 95 and older category. Age is determined based on the patient's age at the start of the home health stay.

1.4.3 Health Status

To account for beneficiary health status, the risk adjustment model uses three measures of health status: (i) CMS' Hierarchical Condition Categories (HCCs), (ii) Diagnosis-Related Groupings (DRGs), (iii) and Activities of Daily Living (ADLs).

First, the risk adjustment uses CMS' HCCs. HCCs were developed for the risk adjustment model used in determining capitation payments to Medicare Advantage plans and are

calculated using Part A and B Medicare claims.⁴ While the CMS-HHC model uses a full year of claims data to calculate HCCs,⁵ these measures use only six months of data to limit the number of home health stays excluded due to missing HCC data. All HCCs and CCs from the 2008 CMS HCC model that are not hierarchically ranked and that were statistically significant predictors of rehospitalization or emergency department use without readmission are included in the model.

Second, the risk adjustment model includes the DRG of the qualifying inpatient stay. DRGs are used for Medicare payment to classify inpatient stays that are clinically related and are expected to have similar levels of resource use.⁶

Finally, risk adjustment for these measures also takes into account agglomerated functional data measured using Activities of Daily Living (ADL) fields on the OASIS assessment matched to the initial home health stay after the index hospitalization. The four separate measures indicate scores for whether or not a home health episode is early or later and whether or not a beneficiary had less than 14 or more than 14 therapy visits.

To get a maximum level of granularity in including the ADL fields on the home health stay, all four scores are used for risk adjustment. (This differs from the ADL score included in the HHRG, which is a categorization of one of the four ADL scores.)⁷

1.4.4 ESRD and Disability Status

The model employs both end stage renal disease (ESRD) status and disability status as covariates. Additionally, the model includes interactions between originally disabled and sex.

1.4.5 Interaction Terms

Interaction terms account for the additional effect two risk factors may have when present simultaneously. All interaction terms included in the 2008 and 2012 HCC risk adjustment models that were statistically significant predictors of rehospitalization or emergency department use without readmission were included.

⁴ A description of the development of the CMS-HCC model can be found here:

<https://www.cms.gov/HealthCareFinancingReview/Downloads/04Summerpg119.pdf>

⁵ Details of the CMS-HCC model and the code lists for defining the HCCs can be found here:

https://www.cms.gov/MedicareAdvtgSpecRateStats/06_Risk_adjustment.asp

⁶ Details of the DRG system can be found here:

<http://www.cms.gov/Outreach-and-Education/Medicare-Learning-Network-MLN/MLNProducts/downloads/AcutePaymtSysfctsht.pdf>

⁷ Further information can be found at: <http://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/HomeHealthPPS/CaseMixGrouperSoftware.html>

APPENDIX A: ALGORITHM FOR CALCULATING REHOSPITALIZATION MEASURES

The following algorithm is used to compute the “Rehospitalization During the First 30 Days of Home Health” measure and the “Emergency Department Use without Hospital Readmission During the First 30 Days of Home Health” measure:

1. Construct home health stays from HH claims.
2. Link stays to enrollment data by beneficiary.
3. Identify numerator window (30 days following Stay_Start_Date) for each stay and exclude stays for patients who are not continuously enrolled in fee-for-service Medicare during the numerator window or until patient death.
4. Exclude stays that begin with a LUPA or that involve a provider change during the numerator window.
5. Exclude stays for patients who are not continuously enrolled in fee-for-service Medicare during the 6 months prior to Stay_Start_Date.
6. Link to Part A and Part B claims for 6 months prior to Stay_Start_Date for each beneficiary.
7. Calculate demographic risk factors for each stay (age, sex, etc.) using enrollment data.
8. Limit to home health stays where the Stay_Start_Date minus the Thru_Dt of an Inpatient (IP) claims is equal to or less than 5. Exclude stays where the IP claim has an AHRQ CCS or stus_cd that excludes it from being an index admission. Retain the DRG of the index admission as a risk factor.
9. Calculate prior care setting indicators, ADLs from OASIS-home health payment authorization variable on prior home health claims, HCCs, and HCC interactions.
10. Exclude stays that have prior care setting indicators whose claim Thru_Dt is in between the Thru_Dt of the index hospitalization and the Stay_Start_Dt.
11. Link to Inpatient (IP) claims from Short Stay and Critical Access hospitals for numerator window (30 days following Stay_Start_Date).
12. Link to Outpatient claims with revenue center codes indicating emergency department use for the numerator window (30 days following Stay_Start_Date).
13. Calculate measure flags for each stay:
 - a. Set Hospital Admission indicator (Hosp_Admit = 1) if any IP claims are linked to the stay in step 11.

- b. Set Outpatient ED Use indicator ($OP_ED = 1$) if any outpatient claims are linked to the stay in step 12.
 - c. Set ED Use without Hospitalization indicator ($ED_noHosp = 1$) if $OP_ED = 1$ and $NOT Hosp_Admit = 1$.
14. Using coefficients from the multinomial logit risk model and risk factors calculated in steps 7 through 9, calculate the predicted probability of being included in the measure numerator, for each stay ($Pred_Hosp$ and $Pred_ED_noHosp$). Additionally calculate the average of $Pred_Hosp$ and $Pred_ED_noHosp$ across all stays that are included in the measure denominator (not excluded in steps 3 to 5) and call these values $National_pred_Hosp$ and $National_pred_ED_noHosp$.
15. Calculate observed and risk-adjusted rates for the measure at each home health agency ($Initial_Provider$):
- a. Observed Rates:
 - i. Calculate the observed rate of acute care hospitalization as the fraction all (non-excluded) HH stays with that agency as $Initial_Provider$ that are also included in the measure numerator ($Hosp_Admit = 1$ and $ED_noHosp = 1$ respectively). Call the values $Agency_obs_Hosp$ and $Agency_obs_ED$.
 - b. Predicted Rates:
 - i. Calculate the agency predicted rate of acute care hospitalization by taking the average of $Pred_Hosp$ and $Pred_ED_noHosp$ across all (non-excluded) stays with that agency as $Initial_Provider$. Call these values $Agency_pred_Hosp$ and $Agency_pred_ED$.
 - c. Risk-Adjusted Rates:
 - i. $Agency_riskadj_Hosp = National_pred_Hosp + (Agency_obs_Hosp - Agency_pred_Hosp)$
 - ii. $Agency_riskadj_ED = National_pred_ED + (Agency_obs_ED - Agency_pred_ED)$

APPENDIX B: MEASURE DENOMINATOR EXCLUSION ALGORITHM

The following four types of prior admissions are excluded from being the index hospitalization:

- (1) Exclude admissions with discharge diagnosis for treatment of cancer. AHRQ Diagnosis CCS considered cancer include:

AHRQ CCS	Description
11	Cancer of head and neck
12	Cancer of esophagus
13	Cancer of stomach
14	Cancer of colon
15	Cancer of rectum and anus
16	Cancer of liver and intrahepatic bile duct
17	Cancer of pancreas
18	Cancer of other GI organs; peritoneum
19	Cancer of bronchus; lung
20	Cancer; other respiratory and intrathoracic
21	Cancer of bone and connective tissue
22	Melanomas of skin
23	Other non-epithelial cancer of skin
24	Cancer of breast
25	Cancer of uterus
26	Cancer of cervix
27	Cancer of ovary
28	Cancer of other female genital organs
29	Cancer of prostate
30	Cancer of testis
31	Cancer of other male genital organs
32	Cancer of bladder
33	Cancer of kidney and renal pelvis
34	Cancer of other urinary organs
35	Cancer of brain and nervous system
36	Cancer of thyroid
37	Hodgkin's disease
38	Non-Hodgkin's lymphoma
39	Leukemias
40	Multiple myeloma
41	Cancer; other and unspecified primary
42	Secondary Malignancies
43	Malignant neoplasm without specification of site
44	Neoplasms of unspecified nature or uncertain behavior
45	Maintenance chemotherapy; radiotherapy

- (2) Admissions for the treatment of psychiatric diseases. Exclude admissions with discharge diagnosis for treatment of psychiatric disease. AHRQ Diagnosis CCS are used to define psychiatric disease discharge condition categories. AHRQ Diagnosis CCS considered psychiatric disease include:

AHRQ CCS	Description
650	Adjustment disorders
651	Anxiety disorders
652	Attention-deficit, conduct, and disruptive behavior disorders
654	Developmental disorders
655	Disorders usually diagnosed in infancy, childhood, or adolescence
656	Impulse control disorders, NEC
657	Mood disorders
658	Personality disorders
659	Schizophrenia and other psychotic disorders
662	Suicide and intentional self-inflicted injury
670	Miscellaneous disorders

- (3) Admissions for rehabilitation care and the fitting of prostheses and adjustment devices. Exclude admissions with admitting diagnosis of “rehabilitation care; fitting of prostheses and adjustment devices.” The AHRQ Diagnosis CCS 254 is used to define rehabilitation care.
- (4) Admission ending in patient discharge against medical advice. Exclude admissions with “Stus_cd”=07.