DRAFT Measure Specifications: Potentially Preventable Hospital Readmission Measures for Post-Acute Care

Project Title:

Development of Potentially Preventable Readmission Measures for Post-Acute Care

Project Overview:

The Centers for Medicare & Medicaid Services (CMS) has contracted with RTI International and Abt Associates to develop potentially preventable readmission measures, in alignment with the Improving Post-Acute Care Transformation Act of 2014 (known as the IMPACT Act) and the Protecting Access to Medicare Act of 2014 (PAMA). The contract names are: Development and Maintenance of Symptom Management Measures (HHSM-500-2013-13015I; Task Order HHSM-500-T0001) and Outcome and Assessment Information Set (OASIS) Quality Measure Development and Maintenance (HHSM-500-2013-13001I; Task Order HHSM-500-T0002J).

Date:

October 2015

Measure Names:

1) Potentially Preventable 30-Day Post-Discharge Readmission Measure for Skilled Nursing Facilities (IMPACT)

2) Potentially Preventable 30-Day Post-Discharge Readmission Measure for Inpatient Rehabilitation Facilities (IMPACT)

3) Potentially Preventable 30-Day Post-Discharge Readmission Measure for Long-Term Care Hospitals (IMPACT)

4) Potentially Preventable 30-Day Post-Discharge Readmission Measure for Home Health Agencies (IMPACT)

5) Skilled Nursing Facility 30-Day Potentially Preventable Readmission Measure (SNFPPR) (PAMA)

6) Potentially Preventable Within Stay Readmission Measure for Inpatient Rehabilitation Facilities

Background:

Hospital readmissions among the Medicare population are common, costly, and often preventable.[1,2] The Medicare Payment Advisory Commission (MedPAC) and a study by Jencks et al. estimated that 17-20 percent of Medicare beneficiaries discharged from the hospital were readmitted within 30 days. Among these hospital readmissions, MedPAC has estimated that 76 percent were considered potentially avoidable--associated with $12 billion in Medicare expenditures.[2,3]

The Centers for Medicare & Medicaid Services (CMS) has addressed the high rates of hospital readmissions for the acute care hospital setting and more recently, among post-acute care providers. For example, CMS developed the following all-cause readmission measures: Rehospitalization During the First 30 Days of Home Health (HHs), All-Cause Unplanned Readmission Measure for 30 days Post Discharge from Inpatient Rehabilitation Facilities (IRFs) and All-Cause Unplanned Readmission Measure for 30 days Post Discharge from Long-Term Care Hospitals (LTCHs), and the Skilled Nursing Facility (SNF) 30-Day All-Cause Readmission Measure (NQF #2380, #2502, #2512, and #2510, respectively).[4] These measures were endorsed by the National Quality Forum (NQF). The IRF, LTCH, and HH measures were adopted for their respective quality reporting programs for public reporting, and the SNF measure was adopted for value-based purchasing. The NQF-endorsed measures focus on all-cause readmissions and are not cross-setting in that the specifications differ by measure.

Current work is focused on the development of potentially preventable hospital readmission measures for post-acute care, as directed by Congress through the *Improving Medicare Post-Acute Care Transformation Act of 2014* (IMPACT Act) and the *Protecting Access to Medicare Act of 2014* (PAMA). The IMPACT Act requires the development and submission of standardized data from post-acute care settings with the intent for cross-setting quality comparison to promote patient-centeredness.[5] This includes the requirement to develop and implement measures to reflect all-condition risk-adjusted potentially preventable hospital readmission rates. Separately, section 215a of PAMA requires that a resource use measure reflecting an all-condition risk-adjusted potentially preventable hospital readmission rate for skilled nursing facilities, which must be developed and implemented by October 1, 2016, to be used in the SNF Value-Based Purchasing program.[6]

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[1] Friedman, B. and J. Basu, *The rate and cost of hospital readmissions for preventable conditions.* Med Care Res Rev, 2004. **61**(2): p. 225-40.
[2] Jencks, S.F., M.V. Williams, and E.A. Coleman, *Rehospitalizations among Patients in the Medicare Fee-for-Service Program.* New England Journal of Medicine, 2009. **360**(14): p. 1418-1428.
[2] *Ibid.*
[3] MedPAC, *Payment policy for inpatient readmissions*, in *Report to the Congress: Promoting Greater Efficiency in Medicare*. 2007: Washington D.C. p. 103-120.
[4] National Quality Forum., *All-Cause Admissions and Readmissions Measures*. April 2015. p. 1-319.
[5] United States Congress., H.R. 4994. *IMPACT Act of 2014*. 2014: United States of America. p. 1-19
[6] United States Congress., H.R. 4302. *Protecting Access to Medicare Act of 2014*. 2014.

Descriptive Information:

Measure Type

- Outcome

Brief Description of Measures

This set of potentially preventable readmission (PPR) measures for post-acute care (PAC) estimates the risk-standardized rate of unplanned, potentially preventable readmissions for patients (Medicare fee-for-service [FFS] beneficiaries) who receive services in one of the following post-acute care provider types: skilled nursing facilities (SNFs), inpatient rehabilitation facilities (IRFs), long-term care hospitals (LTCH), and home health agencies (HHA).

These outcome measures reflect readmission rates for patients who are readmitted to a short-stay acute-care hospital or an LTCH with a principal diagnosis considered to be *unplanned* and *potentially preventable*.

Six PPR PAC measures are being developed.

- Four of these measures assess PPR within a 30-day window following discharge from PAC—one measure for each PAC setting (i.e. SNF, IRF, LTCH, and HH)—and are being developed to meet the requirements of the IMPACT Act.
- An additional SNF measure (SNFPPR), which is being developed to meet the PAMA requirements, assesses PPR during the 30-day period following a hospital discharge to a SNF setting.
- An additional IRF measure assesses PPR during the IRF stay (referred to as the within-stay window) which is being developed for use in the IRF Quality Reporting Program.

Each measure calculates a risk-adjusted PPR rate for each PAC provider. This is derived by first calculating a standardized risk ratio -- the predicted number of readmissions at the PAC provider (facility or agency) divided by the expected number of readmissions for the same patients if treated at the average PAC provider. The standardized risk ratio is then multiplied by the mean rate of readmission in the population (i.e., all Medicare FFS patients included in the measure) to generate the PAC provider-level standardized readmission rate of potentially preventable readmissions.

For these PPR measures, readmissions that are usually for planned procedures are not counted as being potentially preventable (see details below).

Crosscutting Areas

- Care Coordination: Readmissions

Measure Specifications:

Numerator Statement and Details

The numerators of these measures are mathematically related to the number of patients in the target population who have the event of a potentially preventable, unplanned readmission (PPR definitions and planned readmissions are further described below) during the specific readmission window (i.e. 30-day post-PAC discharge, 30-day post prior hospital discharge, or within the PAC stay). Each measure includes only one readmission window, as described above.

The measures do not have a simple form for the numerator and denominator—that is, the risk adjustment method used does not make the observed number of readmissions the numerator and a predicted number the denominator. Instead, the numerator is the risk-adjusted estimate of the number of unplanned readmissions that occurred within 30 days from discharge. This estimate starts with the observed readmissions and is risk adjusted for patient characteristics and a statistical estimate of the PAC provider effect beyond patient mix.

The prediction equations are based on a logistic statistical model with a 2-level hierarchical structure. The patient stays in the model have an indicator as to which PAC provider they are discharged from and the effect of the provider is measured as a positive or negative shift in the intercept term of the equation. The facility effects are modeled as belonging to a normal (Gaussian) distribution centered at 0, and are estimated along with the effects of patient characteristics in the model.

The data are from Medicare FFS inpatient claims and eligibility and enrollment data. See below for more details on the data sources.

Note: These measures were developed with ICD-9 procedure and diagnosis codes. CMS will update the PPR definition and planned readmission lists with ICD-10 codes in the future.

Numerator Details: Readmissions Counted in Measures

PPR Definitions:

Some general methods and algorithms have been developed assessing potentially avoidable or preventable hospitalizations and readmissions for the general Medicare population, such as the Agency for Health Care Research and Quality's Prevention Quality Indicators, approaches developed by and for MedPAC, and proprietary approaches, such as the 3M™ algorithm for Potentially Preventable Readmissions.[7,8,9] However, there is no consensus on how to define potentially avoidable or preventable readmissions, especially among Medicare beneficiaries who utilize PAC services including HH, SNF, IRF, and LTCH. Recent work led by Kramer et al. for

[7] Goldfield, N.M., Elizabeth; Hughes, John; Tang, Ana; Eastman, Beth; Rawlins, Lisa; Averill, Richard, *Identifying Potentially Preventable Readmissions.* Health Care Financing Review, 2008. **30**(1): p. 75-91.
[8] Agency for Healthcare Research and Quality., *Prevention Quality Indicators Overview.* 2008.
[9] MedPAC, *Online Appendix C: Medicare Ambulatory Care Indicators for the Elderly*, in *Report to the Congress: Medicare Payment Policy*. 2011. p. 7-11.

MedPAC identified 13 conditions that were deemed as potentially preventable among the SNF and IRF populations;[10,11] however, these conditions did not differ by PAC setting or readmission window (i.e. during the PAC stay or post-PAC discharge). To support the development of potentially preventable hospital readmission measures among beneficiaries who use PAC, measure development contractors (RTI International and Abt Associates) have developed an approach to defining potentially preventable readmissions, building on existing research in this area, and are developing measures to address this high priority area.

The literature shows that some hospital readmissions can be prevented, and that many of these readmissions occur in the context of PAC, including SNF, IRF, LTCH, and HH.[12,13] For certain diagnoses, proper care and management of patient conditions (in the facility or by primary care following discharge) along with appropriate, clearly explained and implemented discharge instructions and referrals, can often prevent a patient's readmission to the hospital. Identifying these PPR conditions will assist healthcare providers' efforts to improve quality of care and coordination across the care continuum.

In order to develop PPR definitions for PAC, we conducted a comprehensive environmental scan to identify studies and previously published methodologies related to potentially preventable hospitalizations and hospital readmissions. The evidence specific to PAC is limited, and we found substantial variation across methodologies for defining potentially preventable hospitalizations or readmissions. Based on this scan, we compiled a list of all PPR conditions described in the literature. This list had considerable overlap with the Ambulatory Care Sensitive Conditions (ACSC)/Prevention Quality Indicators (PQI), developed by the Agency for Healthcare Research and Quality (AHRQ).

Next, we developed a working conceptual definition for potentially preventable hospital readmissions for PAC. The conceptual definition for PPR hinges on the readmission window timeframe. We considered two readmission windows in this work: 1) within-PAC stay and 2) 30 days post-PAC discharge. Because the SNFPPR measure (the 30-days post prior hospitalization measure) may include patients who are in both windows, we apply the within-stay list before SNF discharge and the post-discharge list for the remainder of the 30 days, if any.

For the within-PAC stay window, potentially preventable readmissions should be avoidable with sufficient medical monitoring and appropriate patient treatment. For patients in the 30-day post-PAC discharge period, a potentially preventable readmission refers to a readmission that should be avoidable with adequately planned, explained, and implemented post discharge instructions including establishment of appropriate follow-up ambulatory care.

[10] Kramer, A.L., Michael; Fish, Ron; Min, Sung-Joon, *Development of Potentially Avoidable Readmission and Functional Outcome SNF Quality Measures*. 2014. p. 1-75.
[11] Kramer, A.L., Michael; Fish, Ron; Min, Sung-joon, *Development of Inpatient Rehabilitation Facility Quality Measures: Potentially Avoidable Readmissions, Community Discharge, and Functional Improvement*. 2014. p. 1-42.
[12] Vest, J.R., et al., *Determinants of preventable readmissions in the United States: a systematic review.* Implement Sci, 2010. **5**: p. 88.
[13] van Walraven, C., A. Jennings, and A.J. Forster, *A meta-analysis of hospital 30-day avoidable readmission rates.* Journal of Evaluation in clinical practice, 2012. **18**(6): p. 1211-1218.

Table 1 below summarizes the specific readmission windows that are being developed for each PAC potentially preventable hospital readmission measure:

Table 1: PAC Readmission Windows for Potentially Preventable Hospital Readmission Measure Development*

PAC	30-days post prior hospitalization†	Within stay	30-days post PAC discharge
HHA			X
IRF		X	X
LTCH			X
SNF	X		X

* Note these are the initial readmission windows being considered. Additional windows may be considered in future measure development work.
† This window may span the PAC stay and post-PAC discharge period, depending on the patient's length of stay.

We used the ACSC approach as the starting point for this work. Given clinical evidence that these conditions can be avoided with appropriate access to high quality ambulatory care, we found a majority of these conditions reflect reasons for readmissions that would be considered potentially preventable.[14] We extended this logic to both the within-PAC stay readmission window and 30 day post-PAC discharge window.

In addition, this PPR definition was informed by empirical analyses. Specifically, we analyzed Medicare claims data to identify the most frequent diagnoses associated with hospital readmissions among beneficiaries that received post-acute care. We evaluated whether these common causes for readmission could also be considered potentially preventable, by applying the working conceptual definition for PPR explained above, to each of the diagnoses found in the claims analysis. Some conditions such as pressure ulcers, were not on either the ACSC list or in the preliminary data analyses. However, the literature strongly recommends that readmissions for these conditions can be prevented with close monitoring from healthcare providers and under appropriate ambulatory care.

In developing these sets of PPR conditions, we grouped them based on our clinical rationale which included the following:

- Inadequate management of chronic conditions
- Inadequate management of infections
- Inadequate management of other unplanned events
- Inadequate prophylaxis
- Inadequate injury prevention

[14] AHRQ Quality Indicators—Guide to Prevention Quality Indicators: Hospital Admission for Ambulatory Care Sensitive Conditions. Rockville, MD: Agency for Healthcare Research and Quality, 2001. AHRQ Pub. No. 02-R0203.

We sought technical expert and detailed clinical input on these definitions and overall approach. The Technical Expert Panel (TEP) consensus was that it is feasible to develop uniform definitions that may be applied to all PAC providers. Based on TEP feedback, we substantially revised the definitions to remove several proposed PPR conditions (for example, we excluded several chronic conditions included based on the ACSC approach, such as readmissions for long-term complications of diabetes) and, in some cases, added new PPR conditions based on TEP input, such as influenza. In instances where no clear consensus was reached among TEP members (e.g., urinary tract infection, septicemia) we deferred to clinical expertise on the measure development team along with results from our environmental scan which suggested that these conditions were appropriate to consider as potentially preventable.

Appendix A summarizes the set of conditions we considered potentially preventable for the 30-day post-PAC discharge readmission window based on TEP input. **Appendix B** summarizes the larger set of conditions we considered potentially preventable for the within-stay readmission window. Both lists of PPR conditions are organized by the clinical rationale for each condition's inclusion on this list. As noted, the readmission window associated with the SNFPPR (PAMA) measure is 30 days following discharge from the prior hospitalization which may span the SNF stay and the post-SNF discharge period, depending on SNF length of stay. For this measure, the PPR definition is based on the patient's setting at time of readmission—if the PPR occurs while the patient is in the SNF, the within-stay definition (Appendix B) would be used, and if the PPR occurs after the patient was discharged from the SNF, the post-discharge definition (Appendix A) would be applied. Note the within-stay window was developed for inpatient PAC only and is not intended for use in home health.

In order for a readmission to be considered potentially preventable, it must be coded as the principal diagnosis on the readmission claim. However, there are some exceptions based on the PQI specifications, as noted in the appendices (see dehydration conditions).

Planned Readmissions:

These measures are focused on readmissions that are potentially preventable and *unplanned*. Thus, planned readmissions are not counted in the numerator—PPRs are only counted in the numerator if the readmission is considered unplanned. Planned readmissions are defined largely by the definition used for the CMS Hospital-Wide Readmission (HWR) measure (NQF #1789), and were revised to include additional procedures determined as suitable for PAC with input from a Technical Expert Panel convened by CMS contractors (RTI International and Abt Associates). Both are described in greater detail below.

International Classification of Diseases (ICD-9) codes for these additional procedures were identified by a certified coder. The definition is based on the claim from the readmission having a code for a procedure that is frequently planned, but if a principal diagnosis in a specified list of acute diagnoses is present, the readmission is reclassified as unplanned.

Appendix D presents the list of codes for procedures identified as "planned" for PAC, which were not included in the CMS Planned Readmission Algorithm at the time of their creation.

These procedures and diagnoses are currently defined by ICD-9 procedure and diagnosis codes grouped by the Clinical Classification Software (CCS), developed by the AHRQ. They are included as full CCS classes where appropriate, or by individual codes, if necessary. Readmissions to psychiatric hospitals or units are also classified as planned readmissions.

The Appendix includes details on the planned readmission definitions, including the CMS Planned Readmission Algorithm version 3.0 (**Appendix C**) and a table summarizing the additional planned readmissions added for PAC (**Appendix D**). Note this approach is consistent with that used for the NQF-endorsed SNF, IRF, and LTCH all-cause readmission measures (NQF #2510, 2502, and 2512, respectively).

Denominator Statement and Details: PAC Stays included in Measures

The denominator for the PPR measures is computed in the same way as the numerator but the facility effect is set at the average. The details of the readmission types counted in the numerator and the patients who are included in the measures are given below.

For the includable PAC stays at each provider, the measure denominator is the risk-adjusted expected number of readmissions. This estimate includes risk adjustment for patient characteristics with the facility effect removed. The "expected" number of readmissions is the predicted number of risk-adjusted readmissions if the patients were treated at the average PAC provider appropriate to the measure.

This population, like that for the numerator, is the group of Medicare FFS PAC patients who are not excluded for the reasons below.

Denominator Details: PAC Stays Included in Measures

Medicare patients with FFS coverage are the basis for inclusions, subject to the following exclusions:

SNF, IRF, LTCH & HH Post Discharge Measure Exclusions:

The post-PAC discharge PPR measures are based on Medicare FFS claims data and include PAC discharges to non-hospital post-acute levels of care or to the community. The observation window is 30-days after being discharged from a PAC provider; this window of observation excludes the day of discharge and the day thereafter (the 30 days starts on discharge day plus 2). Stays ending in transfers to the same level of care or acute hospitals are excluded.

1) SNF/IRF/LTCH/HH patients who died during the SNF/IRF/LTCH/HH stay.
   Rationale: The PPR measures are not relevant for patients who died during their PAC stay.

2) SNF/IRF/LTCH/HH patients less than 18 years old.

   Rationale: Patients under 18 years old are not included in the target population for this measure. Pediatric patients are relatively few and may have different patterns of care from adults.

3) SNF/IRF/LTCH/HH patients who were transferred at the end of a stay to another SNF/IRF/LTCH or short-term acute care hospital.

   Rationale: SNF, IRF or LTCH patients who were transferred to another SNF/IRF/LTCH or short-term acute-care hospital, and HH patients who were transferred to another HHA/IRF/LTCH or short-term acute-care hospital, are excluded from this measure because the transfer suggests that either their SNF/IRF/LTCH/HH treatment has not been completed or that their condition worsened, requiring a transfer (i.e. readmission) back to the acute care setting. The intent of the measure is to follow patients deemed well enough to be discharged to a less intensive care setting (i.e., discharged to less intense levels of care or to the community).

4) Patients who were not continuously enrolled in Part A FFS Medicare for the 12 months prior to the SNF/IRF/LTCH/HH stay (HH episode) admission date, and at least 30 days after SNF/IRF/LTCH/HH stay (HH episode) discharge date.

   Rationale: The adjustment for certain comorbid conditions in the measure requires information on acute inpatient claims for one year prior to the SNF/IRF/LTCH/HH admission, and readmissions must be observable in the observation window following discharge. Patients without Part A coverage or who are enrolled in Medicare Advantage plans will not have complete inpatient claims in the system.

5) Patients who did not have a short-term acute-care stay within 30 days prior to a SNF/IRF/LTCH/HH stay (HH episode) admission date.

   Rationale: This measure requires information from the prior short-term acute-care stay in the elements used for risk adjustment.

6) SNF/IRF/LTCH/HH patients discharged against medical advice (AMA).

   Rationale: Patients discharged AMA are excluded because these patients have not completed their full course of treatment in the opinion of the facility.

7) SNF/IRF/LTCH/HH patients for whom the prior short-term acute-care stay was for nonsurgical treatment of cancer.

   Rationale: Consistent with the HWR Measure, patients for whom the prior short-term acute-care stay was for nonsurgical treatment of cancer are excluded because these patients were identified as following a very different trajectory after discharge, with a particularly high mortality rate.

8) HH patients for whom the prior short-term acute-care stay was for primary psychiatric diseases, or rehabilitation care; fitting of prostheses and for the adjustment of devices.

   Rationale: Consistent with the HWR Measure, HH patients for whom the prior short-term acute-care stay was for primary psychiatric diseases, or rehabilitation care; fitting of prostheses and for the adjustment of devices are excluded because these HH patients

were identified as following a very different trajectory after discharge, with a particularly high mortality rate, and hospital admissions for these conditions are not for acute care.

9) SNF/IRF/LTCH patients who were transferred to a federal hospital from the PAC facility

   Rationale: Patients who are transferred to federal hospitals will not have complete inpatient claims in the system.

10) SNF/IRF/LTCH patients who received care from a provider located outside of the United States, Puerto Rico or a U.S. territory

    Rationale: Patients who received care from foreign providers may not have complete inpatient claims in the system, and these providers may not be subject to policy decisions related to readmissions.

11) HH episodes where the payment authorization code is missing.

    Rationale: This measure requires the payment authorization code for information used in the risk adjustment model.

12) SNF/IRF/LTCH stays with data that are problematic (e.g., anomalous records for hospital stays that overlap wholly or in part or are otherwise erroneous or contradictory).

    Rationale: This measure requires accurate information from the SNF/IRF/LTCH stay and prior short-term acute-care stays in the elements used for risk adjustment. No-pay PAC stays involving exhaustion of Part A benefits are also excluded.

IRF Within-Stay Measure Exclusions:

Like the post-IRF discharge PPR measure, the IRF within-Stay measure is based on 2 years of Medicare FFS claims data and includes all IRF discharges after exclusions. All exclusions listed above (1-8) apply to the IRF within-stay measure *except* for Exclusion 3 related to transfers/readmissions at the end of the IRF stay which are the focus of the within-stay measure. The observation window is limited to a patient's length of stay in the IRF, including the day of discharge and the day after. Given the post-IRF discharge measure excludes the day of IRF discharge and the day thereafter (the 30 days starts on discharge day plus 2), the within stay observation window includes the period from admission through the day of IRF discharge and the day after. The within-stay measure is intended to capture readmissions during the IRF stay (i.e. program interruptions where the patient is readmitted to the acute care setting) and readmissions (i.e. acute care transfers) at the end of the IRF stay. Note: The post-IRF discharge window for the PPR measure and the all-cause measure post-IRF discharge measure (NQF #2502) do not overlap with this within-stay window.

SNF 30-Day Post-Hospital Discharge (SNFPPR) Measure Exclusions:

The following are excluded from the denominator:

1) SNF stays where the patient had one or more intervening post-acute care (PAC) admissions (inpatient rehabilitation facility [IRF] or long-term care hospital [LTCH])

which occurred either between the prior proximal hospital discharge and SNF admission or after the SNF discharge, within the 30-day risk window. Also excluded are SNF admissions where the patient had multiple SNF admissions after the prior proximal hospitalization, within the 30-day risk window.

Rationale: For patients who have IRF or LTCH admissions prior to their first SNF admission, these patients are starting their SNF admission later in the 30-day risk window and receiving other additional types of services as compared to patients admitted directly to the SNF from the prior proximal hospitalization. They are clinically different and their risk for readmission is different than the rest of SNF admissions. Additionally, when patients have multiple PAC admissions, evaluating quality of care coordination is confounded and even controversial in terms of attributing responsibility for a readmission among multiple PAC providers. Similarly, assigning responsibility for a readmission for patients who have multiple SNF admissions subsequent to their prior proximal hospitalization is also controversial.

2) SNF stays with a gap of greater than 1 day between discharge from the prior proximal hospitalization and the SNF admission.

   Rationale: These patients are starting their SNF admissions later in the 30-day risk window than patients admitted directly to the SNF from the prior proximal hospitalization. They are clinically different and their risk for readmission is different than the rest of SNF admissions.

3) SNF stays where the patient did not have at least 12 months of FFS Medicare enrollment prior to the proximal hospital discharge (measured as enrollment during the month of proximal hospital discharge and the 11 months prior to that discharge).

   Rationale: FFS Medicare claims are used to identify comorbidities during the 12-month period prior to the proximal hospital discharge for risk adjustment. Multiple studies have shown that using lookback scans of a year or more of claims data provide superior predictive power for outcomes including rehospitalization as compared to using data from a single hospitalization (e.g., Klabunde et al., 2000; Preen et al, 2006; Zhang et al., 1999).

4) SNF stays in which the patient did not have FFS Medicare enrollment for the entire risk period (measured as enrollment during the month of proximal hospital discharge and the month following the month of discharge).

   Rationale: Readmissions occurring within the 30-day risk window when the patient does not have FFS Medicare coverage cannot be detected using claims.

5) SNF stays in which the principal diagnosis for the prior proximal hospitalization was for the medical treatment of cancer. Patients with cancer whose principal diagnosis from the prior proximal hospitalization was for other diagnoses or for surgical treatment of their cancer remain in the measure.

   Rationale: These admissions have a very different mortality and readmission risk than the rest of the Medicare population, and outcomes for these admissions do not correlate well with outcomes for other admissions.

6) SNF stays where the patient was discharged from the SNF against medical advice.
   Rationale: The SNF was not able to complete care as needed.
7) SNF stays in which the principal primary diagnosis for the prior proximal hospitalization was for "rehabilitation care; fitting of prostheses and for the adjustment of devices".
   Rationale: Hospital admissions for these conditions are not for acute care.
8) SNF stays in which the prior proximal hospitalization was for pregnancy.
   Rationale: This is a very atypical reason for beneficiaries to be admitted to SNFs.

Risk Adjustment Type

- Statistical risk model

Statistical Risk Model and Variables

The statistical methods, including risk adjustment, were developed to harmonize with the HWR measure (NQF #1789) as well as the SNF, IRF, and LTCH all-cause readmission measures. The following section summarizes the risk adjustment approach for all PPR measures.

A hierarchical regression method using a logistic regression predicting the probability of a countable (potentially preventable, unplanned) readmission is implemented. The risk adjusters are predictor variables. The patient characteristics related to each discharge and a marker for the specific discharging PAC provider are included in the equation. The equation is hierarchical in that both individual patient characteristics are accounted for as well as the clustering of patients into PAC providers. The statistical model estimates both the average predictive effect of the patient characteristics across all providers and the degree to which each provider has an effect on readmissions that differs from that of the average provider. The provider effects are assumed to be randomly distributed around the average (according to a normal distribution). When computing the facility effect, hierarchical modeling accounts for the known predictors of readmissions, on average, such as patient characteristics, the observed provider rate, and the number of provider stays eligible for the measure. The estimated provider effect is determined mostly by the provider's own data if the number of patient discharges is relatively large (as the estimate would be relatively precise), but is adjusted toward the average if the number of patient discharges is small (as that would yield an estimate of lower precision).

We used the following model:

Let Y_{ij}, denote the outcome (equal to 1 if patient *i* is readmitted within 30 days, zero otherwise) for a patient *i* at PAC *j*; Z_{ij} denotes a set of risk factors. We assume the outcome is related linearly to the covariates via a logit function with dispersion:

$$\text{logit}(\text{Prob}(Y_{ij}=1)) = \alpha_j + \beta * Z_{ij} + \varepsilon_{ij} \quad (1)$$
$$\alpha_j = \mu + \omega_j ; \ \omega_j \sim N(0, \tau^2)$$

where $Z_{ij} = (Z_1, Z_2, \ldots Z_k)$ is a set of *k* patient-level covariates. α_j represents the PAC specific intercept; μ is the adjusted average outcome over all PAC providers; and τ^2 is the between PAC variance component and $\varepsilon \sim N(0,\sigma^2)$ is the error term. The hierarchical logistic regression model is estimated using SAS software (PROC GLIMMIX: SAS/STAT User's Guide, SAS Institute Inc.)

Note: The description above refers to the method used for each measure applied to each PAC provider type and readmission window.

The estimated equation is used twice in the measure. The sum of the probabilities of readmission of all patients in the provider measure, including both the effects of patient characteristics and the provider, is the "predicted number" of readmissions after adjusting for the provider's case mix. The same equation is used without the provider effect to compute the "expected number" of potentially preventable readmissions for the same patients at the average provider. The ratio of the predicted-to-expected number of readmissions is a measure of the degree to which the readmissions are higher or lower than what would otherwise be expected. This standardized risk ratio is then multiplied by the mean readmission rate for all provider stays for the measure to get the risk-standardized readmission rate for each provider. This estimation procedure is recalculated for each measurement period. Estimating the equations for each measurement period allows the estimated effects of the patient characteristics to vary over time as medical treatment patterns change.

Risk-adjustment variables include demographic and eligibility characteristics; principal diagnoses; types of surgery or procedure from the prior short-term stay; comorbidities; length of stay and ICU/CCU utilization from the immediately prior short-term stay; and number of admissions in the year preceding the PAC admission.

The risk adjustment variables include the following:

- Age/sex categories
- Original reason for Medicare entitlement (age, disability or ESRD)
- Surgery category if present (e.g., cardiothoracic, orthopedic), defined as in the HWR model software; the procedures are grouped using the CCS classes for ICD-9 procedures developed by AHRQ
- Receiving dialysis in prior short-term stay, defined by presence of revenue code
- Principal diagnosis on prior short-term claim as in the HWR measure. The ICD-9 codes are grouped clinically using the CCS for ICD-9 diagnoses developed by AHRQ.
- Comorbidities from secondary diagnoses on the prior short-term claim and diagnoses from earlier short-term stays up to one year before PAC admission (these are clustered using the Hierarchical Condition Categories [HCC] groups used by CMS)

Prior Utilization Measures (vary by measure):

- Length of stay in the prior short-term hospital stay (categorical to account for nonlinearity)
- Prior acute ICU/CCU utilization (days) (categorical)
- Count of prior short-term discharges in the prior year

PAC-Specific Risk Adjusters:

- IRF: Aggregates of the IRF Case-Mix Groups (CMGs) for IRF patients
- LTCH: Ventilator use — prolonged ventilation in LTCH
- HH: Activity of Daily Living Severity Scores. Note. We may also test prior PAC utilization and Emergency Department (ED) use for HH only.

Risk Adjustment for Sociodemographic Status (SDS):

Based on recommendations of the Consensus Standards Approval Committee, the National Quality Forum (NQF) has recently called for adjusting performance measures for sociodemographic status (SDS) when appropriate. CMS is currently conducting empirical testing to construct specific variables that capture aspects of SDS in order to account for this factor in the risk-adjustment models for the NQF-endorsed PAC readmission measures. This issue is also relevant for the potentially preventable hospital readmission measures that are currently under development. At this time, CMS plans to test dual eligibility and race as SDS risk adjusters; however, additional variables may be tested as a result of the work being conducted for the all-cause measures.

Type of Score

- Rate/proportion

Interpretation of Score

Lower scores indicate better quality

Calculation Algorithm/Measure Logic

The Medicare PAC claims are matched to prior acute hospital stays, hospital stays post PAC discharge and patient eligibility data to determine which stays remain in the measure (not excluded per the exclusions described above) and which have potentially preventable, unplanned readmissions.

The measures are calculated according to the following steps:

Step 1: Identify patients meeting the denominator (measure inclusion) criteria.

Step 2: Identify patients meeting the numerator (unplanned PPR) criteria taking into account the planned readmission algorithm.

Step 3: Identify presence or absence of risk adjustment variables for each patient.

Step 4: Calculate the predicted and expected number of readmissions for each PAC provider using hierarchical logistic regression model.

The predicted number of readmissions for each PAC provider is calculated as the sum of the predicted probability of readmission for each patient included in the measure discharged from the provider, including the provider-specific effect. The model specific risk standardized readmission ratio for each PAC provider is calculated as follows.

To calculate the predicted number of readmissions $pred_j$ for index PAC provider stays at $provider_j$, we used

$$pred_j = \Sigma logit^{-1}(\mu + \omega_i + \beta * Z_{ij}) \quad (2)$$

where the sum is over all stays in $provider_j$, and ω_i is the random intercept. To calculate the expected number exp_j use

$$exp_j = \Sigma logit^{-1}(\mu + \beta * Z_{ij}) \quad (3)$$

Then, as a measure of excess or reduced readmissions among index stays at PAC $provider_j$, calculate the provider-wide standardized risk ratio, SRR_j, as

$$SRR_j = pred_j / exp_j \quad (4)$$

Step 5: Calculate the risk-standardized PAC potentially preventable readmission rate
The value obtained from equation (4) above, the SRR_j, is the PAC provider-wide standardized risk ratio for $provider_j$. To aid interpretation, the provider-wide standardized risk ratio, SRR_j, is then multiplied by the overall national raw readmission rate for all provider stays, $\bar{Y}$, to produce the provider-wide risk-standardized readmission rate ($RSRR_j$).

$$RSRR_j = SRR_j * \bar{Y} \quad (5)$$

Missing Data

Observations with missing data for any of the covariates in the risk adjustment model will be excluded from the sample; however, given the data sources are claims data, issues with missing data are minimal.

Data Sources

All measures are based on administrative claims data.

SNF Measures:

This measure is for Medicare beneficiaries and uses the data in the Medicare eligibility files and inpatient claims data. The eligibility files provide information on date of birth, sex, reasons for Medicare eligibility, periods of Part A coverage and periods in the fee-for-service program. The data elements from the Medicare FFS claims are those basic to the operation of the Medicare payment systems and include date of admission, date of discharge, diagnoses, procedures, indicators for use of dialysis services and indicators of whether the Part A benefit is exhausted. The inpatient claims data files contain beneficiary-level SNF and other hospital records. No data beyond the bills submitted in the normal course of business are required from the providers for the calculation of this measure.

The measure uses one year of data to calculate the SNF PPR measures which we believe is sufficient to calculate this measure in a statistically reliable manner. This is because the reliability of a SNF's measure rate is related to its sample size. Data from calendar year 2013 data were used to develop the PPR measures.

Following are the specific files and links to the documentation:

Medicare Inpatient Claims (MedPAR RIF), Index SNF Claims:

Documentation for the Medicare claims data is provided online by the CMS contractor, Research Data Assistance Center (ResDAC) at the University of Minnesota. The following web page includes data dictionaries for the MedPAR RIF: http://www.resdac.org/cms-data/files/medpar-rif

Medicare Denominator files - Documentation available at:

http://www.cms.gov/Research-Statistics-Data-and-Systems/Files-for-Order/IdentifiableDataFiles/DenominatorFile.html

IRF & LTCH Measures:

The IRF and LTCH measures are based on pooling two consecutive calendar years of data; data from 2012-2013 were used for measure development.

Rationale: Through the analytic work to develop these and previously developed measures, we found that one year of claims data provided a somewhat limited sample size at the provider level. In order to have a more sufficient sample size, we expanded the data to include two consecutive years of claims data. In this way, the IRF and LTCH PPR measures diverge from the SNF measures which have substantially larger samples sizes compared to the IRF and LTCH settings. Pooling two years of data provides more reliable and stable estimates

Following are the specific files and links to the documentation:

- Medicare Inpatient claims - standard analytical files, index PAC claims

- Documentation for the Medicare claims data is provided online by ResDAC. The following web page includes data dictionaries for these files: Standard analytical files (Inpatient RIF): http://www.resdac.org/cms-data/files/ip-rif/data-documentation
- Medicare Enrollment Database - Information about the Enrollment Database may be found here: http://aspe.hhs.gov/datacncl/datadir/cms.htm
- Medicare Denominator files - Documentation available at: http://www.cms.gov/Research-Statistics-Data-and-Systems/Files-for-Order/IdentifiableDataFiles/DenominatorFile.html

HH Measure:

The HH measure is based on three consecutive calendar years of data; data from 2011-2013 were used for measure development.

Rationale: Through the analytic work to develop this and previously developed measures, we found that one or two years of claims data provided a somewhat limited sample size. In order to have a more sufficient sample size, we expanded the data to include three consecutive years of claims data. In this way, the HH PPR measure diverges from the SNF measure (based on one year of data) and the IRF and LTCH measures (based on two years of data) which have substantially larger samples sizes compared to the HH setting. Pooling three years of data provides more reliable and stable estimates.

Following are the specific files and links to the documentation:

Medicare Claims – Common Working Files:

- Documentation for the Medicare claims data is provided online by ResDAC. The following web page includes data dictionaries for these files: http://www.resdac.org/cms-data/files
- Medicare Enrollment Database - Information about the Enrollment Database may be found here: http://aspe.hhs.gov/datacncl/datadir/cms.htm
- Medicare Denominator files - Documentation available at: http://www.cms.gov/Research-Statistics-Data-and-Systems/Files-for-Order/IdentifiableDataFiles/DenominatorFile.html

Other Documentation

AHRQ CCS groupings of ICD-9 codes - Documentation available at: http://www.hcup-us.ahrq.gov/toolssoftware/ccs/ccs.jsp

CMS-HCC Mappings of ICD-9 Codes:

Mappings are included in the software at the following website: http://www.cms.gov/Medicare/Health-Plans/MedicareAdvtgSpecRateStats/Risk-Adjustors.html

Level of Analysis

- Facility / Agency

Care Settings

- Home Health
- Post-Acute/Long Term Care Facility: Nursing Home/Skilled Nursing Facility
- Post-Acute/Long Term Care Facility: Inpatient Rehabilitation Facility
- Post-Acute/Long Term Care Facility: Long Term Acute Care Hospital

Feasibility

The creation of these measures requires Medicare Part A claims data for both PAC and acute care hospital inpatient stays. The inpatient claims are electronically available from CMS and can be used to define and track the measures in a timely fashion. However, allowing a lag of up to six months after the end of the service year is applied to account for delays in claims submissions, and adjustments to submitted claims. Data are already collected as part of Medicare payment process, so these measures pose no additional data collection burden on providers, and, because claims are used for payment, data are complete and subject to audit. In addition to the claims the electronic Medicare enrollment and eligibility data are used.

Usability and Use

Planned Use:

The Centers for Medicare & Medicaid Services is developing this set of potentially preventable hospital readmission measures for future public reporting in post-acute care. One of the SNF (SNFPPR) measures is being developed for future use in value-based purchasing. These measures are not currently in use, and there is no available information relevant to progress on improvement. Similarly, there is no information yet available related to unintended or negative consequences given these measures are not currently in use. However, one potential unintended consequence that should be monitored is that PAC providers may be deterred from admitting certain patients or types of patients with higher acuity or greater complexity, as they may be more likely to have a subsequent readmission; this behavior might occur despite the risk adjustment. If so, this could result in barriers to access for some Medicare beneficiaries who may otherwise benefit from post-acute care. We intend to conduct ongoing monitoring and evaluation for these potential unintended consequences.

Related and Competing Measures

Relation to Other NQF-Endorsed Measures:

The set of potentially preventable hospital readmission measures for post-acute care that are under development are related to a set of all-cause readmission measures that were endorsed by the National Quality Forum in December 2014. These include the following measures:

- NQF #2510: Skilled Nursing Facility 30-Day All-Cause Readmission Measure (SNFRM)
- NQF #2502: All-Cause Unplanned Readmission Measure for 30 Days Post Discharge from Inpatient Rehabilitation Facilities
- NQF #2512: All-Cause Unplanned Readmission Measure for 30 Days Post Discharge from Long Term Care Hospitals
- NQF #2380: Rehospitalization During the First 30 Days of Home Health
- NQF #0171: Acute Care Hospitalization during the First 60 Days of Home Health

In addition, NQF # 1789 Hospital-Wide All-Cause Unplanned Readmission Measure was developed by Yale New Haven Health Services Corporation/Center for Outcomes Research and Evaluation (YNHHSC/CORE) for the Centers for Medicare & Medicaid Services

(Measure Steward). This measure was used as a basis for the All-Cause Unplanned Readmission Measures cited above for SNF, IRF, and LTCH.

There are no existing hospital readmission measures for post-acute care that identify *potentially preventable readmissions*.

Harmonization:

The set of potentially preventable hospital readmission measures for post-acute care are harmonized with existing NQF-endorsed measures to the greatest extent possible. For example, the IRF and LTCH 30-day post-discharge PPR measures were harmonized with the all-cause, unplanned measures noted above (NQF #2502 and 2510), and these were developed to harmonize with the Hospital-Wide All-Cause Unplanned Readmission Measure (NQF #1789) used in the Inpatient Quality Reporting program. Similarly, the 30-day potentially preventable SNF readmission measure is harmonized with the SNFRM (NQF #2510). Though the general approach for developing the PPR 30-day post SNF-discharge measure harmonizes with these measures as well, there are no existing readmission measures for SNF that focus on a 30-day post SNF discharge window. In addition, there are no readmission measures that focus on the within-stay window for IRFs, but the general approach for calculating this measure aligns closely with the 30-day post-IRF discharge measure (NQF #2502).

The HH 30-day post-discharge PPR measure was developed to harmonize with Hospital-Wide All-Cause Unplanned Readmission Measure (NQF #1789) and includes the planned readmission algorithm utilized in the unplanned readmission measures for the other PAC settings. While

there is currently no readmission measure that focuses on the 30-day post HH discharge window, the general approach for constructing a home health episode of care aligns closely with the Rehospitalization During the First 30 Days of HH measure (NQF #2380).

Competing Measures:

None

APPENDIX A:
TABLE A1. LIST OF CONDITIONS FOR DEFINING POTENTIALLY PREVENTABLE HOSPITAL READMISSIONS FOR 30-DAYS POST-PAC DISCHARGE WITH ICD-9 CODES[15]

(These conditions will apply to the post-discharge measures)

Conditions	Diagnosis	ICD-9- CM	30 day post-PAC discharge	Clinical Rationale
Adult asthma*	*Extrinsic asthma NOS	493.00	X	Inadequate management of chronic conditions
	*Ext asthma w/ status asth	493.01	X	
	*Ext asthma w(acute) exac	492.02	X	
	*Intrinsic asthma NOS	493.10	X	
	*Int asthma w status asth	493.11	X	
	*Int asthma w (ac) exac	493.12	X	
	*Chronic obst asthma NOS	493.20	X	
	*Ch ob asthma w stat asth	493.21	X	
	*Ch obst asth w (ac) exac	493.22	X	
	*Exercise ind bronchospasm	493.81	X	
	*Cough variant asthma	493.82	X	
	*Asthma NOS	493.90	X	
	*Asthma w status asth mat	493.91	X	
	*Asthma NOS w (ac) exac	493.92	X	
Chronic obstructive pulmonary disease (COPD)*	*Simple Chr Bronchitis	491.0	X	Inadequate management of chronic conditions
	*Mucopurul Chr Bronchitis	491.1	X	
	*Obs Chr Brnc w/o act exa	491.20	X	
	*Obs Chr Brnc w/ act exa	491.21	X	
	*Obs Chr Bronc w/ ac Bronc	491.22	X	
	*Chronic Bronchitis NEC	491.8	X	
	*Chronic Bronchitis NOS	491.9	X	
	*Emphysematous Bleb	492.0	X	
	*Emphysema NEC	492.8	X	
	*Bronchiectasis	494	X	
	*Bronchiectas w/o ac exac	494.0	X	

[15] Does not take into account any exclusions of diagnoses/ICD-9-CM code for any condition listed.

NOTE: [###] indicates Clinical Classifications Software (CCS) code
* Ambulatory Care Sensitive Conditions (ACSCs)/ Performance Quality Indicators (PQIs)
** Primary diagnosis with dehydration as secondary diagnosis

Conditions	Diagnosis	ICD-9- CM	30 day post-PAC discharge	Clinical Rationale
	*Bronchiectasis w/ ac exac	494.1	X	
	*Chr airway obstruct NEC	496	X	
Congestive heart failure (CHF)*	*Rheumatic Heart Failure	398.91	X	Inadequate management of chronic conditions
	*Mal hypert hrt dis w/ CHF	402.01	X	
	*Benign hyp hrt dis w CHF	402.11	X	
	*Hyperten heart dis w CHF	402.91	X	
	*Mal hyper hrt/ren w/ CHF	404.01	X	
	*Mal hyp hrt/ren w CHF/RF	404.03	X	
	*Ben hyper hrt/ren w CHF	404.11	X	
	*Ben hyp hrt/ren w CHF/RF	404.13	X	
	*Hyper hrt/ren NOS w CHF	404.91	X	
	*Hyp Ht/Ren NOS w CHR	404.93	X	
	*Congestive Heart Failure	428.0	X	
	*Left heart failure	428.1	X	
	*Systolic hrt failure NOS	428.20	X	
	*AC systolic hrt failure	428.21	X	
	*Chr systolic hrt failure	428.22	X	
	*AC on chr syst hrt fail	428.23	X	
	*Diastolic hrt failure NOS	428.30	X	
	*AC diastolic hrt failure	428.31	X	
	*Chr diastolic hrt fail	428.32	X	
	*AC on chr diast hrt fail	428.33	X	
	*Syst/diast hrt fail NOS	428.40	X	
	*AC syst/diastole hrt fail	428.41	X	
	*Chr syst/diastl hrt fail	428.42	X	
	*AC/CHR syst/dia hrt fail	428.43	X	
	*Heart Failure NOS	428.9	X	
	Acute lung edema NOS	518.4	X	
Diabetes short-term complication*	Secondary diabetes mellitus with ketoacidosis	249.1X	X	Inadequate management of chronic conditions
	Secondary diabetes mellitus with hyperosmolarity	249.2X	X	
	Secondary diabetes mellitus with other coma	249.3X	X	

NOTE: [###] indicates Clinical Classifications Software (CCS) code
* Ambulatory Care Sensitive Conditions (ACSCs)/ Performance Quality Indicators (PQIs)
** Primary diagnosis with dehydration as secondary diagnosis

Conditions	Diagnosis	ICD-9- CM	30 day post-PAC discharge	Clinical Rationale
	Secondary diabetes mellitus with other specified manifestations (hypoglycemia)	249.8X	X	
	Diabetes with other specified manifestations (hypoglycemia)	250.8X	X	
	*DM Keto T2, DM Cont	250.10	X	
	*DM Keto T1, DM Cont	250.11	X	
	*DM Keto T2, DM Uncont	250.12	X	
	*DM Keto T1, DM Uncont	250.13	X	
	*DM W/ Hyprosm T2, DM Cont	250.20	X	
	*DM W/ Hyprosm T1, DM Cont	250.21	X	
	*DM W/ Hyprosm T2, DM Uncnt	250.22	X	
	*DM W/ Hyprosm T1, DM Uncnt	250.23	X	
	*DM Coma Nec Typ Ii, DM Cnt	250.30	X	
	*DM Coma Nec T1, DM Cont	250.31	X	
	*DM Coma Nec T2, DM Uncont	250.32	X	
	*DM Coma Nec T1, DM Uncont	250.33	X	
Hypertension*/ Hypotension	*Malignant Hypertension	401.0	X	Inadequate management of chronic conditions
	*Hypertension NOS	401.9	X	
	*Mal Hyperten hrt dis NOS	402.00	X	
	*Benign hyp ht dis w/o hf	402.10	X	
	*Hyp hrt dis NOS w/o hf	402.90	X	
	*Mal hyp ren w/o ren fail	403.00	X	
	*Ben hy kid w cr kid I-IV	403.10	X	
	*Hy kid NOS w cr kid I-IV	403.90	X	
	*Mal hy ht/ren w/o chf/rf	404.00	X	
	*Ben hy ht/ren w/o chf/rf	404.10	X	
	*Hy ht/ren NOS w/o chf/rf	404.90	X	
	Orthostatic hypotension	458.0	X	
	Chronic hypotension	458.1	X	
	Iatrogenic hypotension NEC	458.29	X	
	Hypotension NEC	458.8	X	
	Hypotension NOS	458.9	X	

NOTE: [###] indicates Clinical Classifications Software (CCS) code
* Ambulatory Care Sensitive Conditions (ACSCs)/ Performance Quality Indicators (PQIs)
** Primary diagnosis with dehydration as secondary diagnosis

Conditions	Diagnosis	ICD-9- CM	30 day post-PAC discharge	Clinical Rationale
Influenza	Influenza	487.X	X	Inadequate management of infection
	Influenza due to identified avian influenza virus	488.X	X	
Bacterial pneumonia*	*Pneumococcal Pneumonia	481	X	Inadequate management of infection
	*H.Influenzae Pneumonia	482.2	X	
	*Strep Pneumonia Unspec	482.30	X	
	*Grp A Strep Pneumonia	482.31	X	
	*Grp B Strep Pneumonia	482.32	X	
	*Oth Strep Pneumonia	482.39	X	
	*Meth Sus Pneum D/T Staph	482.41	X	
	*Meth Res Pneu D/T Staph	482.42	X	
	*Bacterial Pneumonia Nos	482.9	X	
	*Mycoplasma Pneumonia	483.0	X	
	*Chlamydia Pneumonia	483.1	X	
	*Oth Spec Org Pneumonia	483.8	X	
	*Broncopneumonia Org Nos	485	X	
	*Pneumonia, Organism Nos	486	X	
Urinary tract infection*/Kidney infection	*Ac pyelonephritis NOS	590.10	X	Inadequate management of infection
	*Ac pyelonephr w med necr	590.11	X	
	*Renal/perirenal abscess	590.2	X	
	*Pyeloureteritis cystica	590.3	X	
	*Pyelonephritis NOS	590.80	X	
	*Pyelonephrit in oth dis	590.81	X	
	*Infection of kidney NOS	590.9	X	
	*Acute cystitis	595.0	X	
	Urethral abscess	597.0	X	
	*Urin tract infection NOS	599.0	X	
C. difficile infection [135 subset]	Intestinal infection due to Clostridium difficile	008.45	X	Inadequate management of infection

NOTE: [###] indicates Clinical Classifications Software (CCS) code
* Ambulatory Care Sensitive Conditions (ACSCs)/ Performance Quality Indicators (PQIs)
** Primary diagnosis with dehydration as secondary diagnosis

Conditions	Diagnosis	ICD-9- CM	30 day post-PAC discharge	Clinical Rationale
Septicemia (except in labor) [2]	Salmonella septicemia	003.1	X	Inadequate management of infection
	Septicemic plague	020.2	X	
	Anthrax septicemia	022.3	X	
	Meningococcemia	036.2	X	
	Streptococcal septicemia	038.0	X	
	Staphylococcal septicemia	038.1	X	
	Staphylococcal septicemia, unspecified	038.10	X	
	Methicillin susceptible Staphylococcus aureus septicemia	038.11	X	
	Methicillin resistant Staphylococcus aureus septicemia	038.12	X	
	Other staphylococcal septicemia	038.19	X	
	Pneumococcal septicemia [Streptococcus pneumoniae septicemia]	038.2	X	
	Septicemia due to anaerobes	038.3	X	
	Septicemia due to gram-negative organism, unspecified	038.40	X	
	Septicemia due to hemophilus influenzae [H. influenzae]	038.41	X	
	Septicemia due to escherichia coli [E. coli]	038.42	X	
	Septicemia due to pseudomonas	038.43	X	
	Septicemia due to serratia	038.44	X	
	Other septicemia due to gram-negative organisms	038.49	X	
	Other specified septicemias	038.8	X	
	Unspecified septicemia	038.9	X	
	Herpetic septicemia	054.5	X	
	Septic arterial embolism	449	X	
	Sepsis	995.91	X	
	Severe sepsis	995.92	X	

NOTE: [###] indicates Clinical Classifications Software (CCS) code
* Ambulatory Care Sensitive Conditions (ACSCs)/ Performance Quality Indicators (PQIs)
** Primary diagnosis with dehydration as secondary diagnosis

Conditions	Diagnosis	ICD-9- CM	30 day post-PAC discharge	Clinical Rationale
Skin and subcutaneous tissue infections [197]	Cellulitis and abscess of finger, unspecified	681.00	X	Inadequate management of infection
	Cellulitis and abscess of toe, unspecified	681.10	X	
	Cellulitis and abscess of unspecified digit	681.9	X	
	Cellulitis and abscess of face	682.0	X	
	Cellulitis and abscess of neck	682.1	X	
	Cellulitis and abscess of trunk	682.2	X	
	Cellulitis and abscess of upper arm and forearm	682.3	X	
	Cellulitis and abscess of hand, except fingers and thumb	682.4	X	
	Cellulitis and abscess of buttock	682.5	X	
	Cellulitis and abscess of leg, except foot	682.6	X	
	Cellulitis and abscess of foot, except toes	682.7	X	
	Cellulitis and abscess of other specified sites	682.8	X	
	Cellulitis and abscess of unspecified sites	682.9	X	
	Other specified local infections of skin and subcutaneous tissue	686.8	X	
	Unspecified local infection of skin and subcutaneous tissue	686.9	X	
Dehydration*/ Electrolyte imbalance [55]	*Hypovolemia	276.5	X	Inadequate management of other unplanned events
	Hypopotassemia	276.8	X	
	**Hyperosmolality and/or hypernatremia	276.0	X	
	Hyposmolality and/or hyponatremia	276.1	X	
	Acidosis	276.2	X	
	Alkalosis	276.3	X	
	Mixed acid-base balance disorder	276.4	X	

NOTE: [###] indicates Clinical Classifications Software (CCS) code
* Ambulatory Care Sensitive Conditions (ACSCs)/ Performance Quality Indicators (PQIs)
** Primary diagnosis with dehydration as secondary diagnosis

Conditions	Diagnosis	ICD-9- CM	30 day post-PAC discharge	Clinical Rationale
	*Volume depletion, unspecified	276.50	X	
	*Dehydration	276.51	X	
	*Hypovolemia	276.52	X	
	Fluid overload disorder	276.6	X	
	Other fluid overload	276.69	X	
	Hyperpotassemia	276.7	X	
	Hypopotassemia	276.8	X	
	Electrolyte and fluid disorders not elsewhere classified	276.9	X	
	**Intes Infec Rotavirus	008.61	X	
	**Intes Infec Adenovirus	008.62	X	
	**Int Inf Norwalk Virus	008.63	X	
	**Int Inf Oth Sml Rnd Vrus	008.64	X	
	**Intes Infec Calcivirus	008.65	X	
	**Intes Infec Astrovirus	008.66	X	
	**Int Inf Enterovirus NEC	008.67	X	
	**Enteritis NOS	008.69	X	
	**Viral Enteritis NOS	008.8	X	
	**Infectious Enteritis NOS	009.0	X	
	**Enteritis of Infect Orig	009.1	X	
	**Infectious Diarrhea NOS	009.2	X	
	**Diarrhea of Infect Orig	009.3	X	
	**Noninf Gastroenterit NEC	558.9	X	
Aspiration pneumonitis; food/vomitus [129]	Pneumonitis due to inhalation of food or vomitus	507.0	X	Inadequate management of other unplanned events
Acute renal failure*	*Acute kidney failure with lesion of tubular necrosis	584.5	X	Inadequate management of other unplanned events
	*Acute kidney failure with lesion of renal cortical necrosis	584.6	X	
	*Acute kidney failure with lesion of renal medullary [papillary] necrosis	584.7	X	

NOTE: [###] indicates Clinical Classifications Software (CCS) code
* Ambulatory Care Sensitive Conditions (ACSCs)/ Performance Quality Indicators (PQIs)
** Primary diagnosis with dehydration as secondary diagnosis

Conditions	Diagnosis	ICD-9- CM	30 day post-PAC discharge	Clinical Rationale
	*Acute kidney failure with other specified pathological lesion in kidney	585.8	X	
	*Acute kidney failure, unspecified	584.9	X	
	*Renal Failure NOS	586	X	
	*Surg Compl-Urinary Tract	997.5	X	
Adverse drug events	Poisoning by antibiotics	960	X	Inadequate management of other unplanned events
	Poisoning by other anti-infectives	961	X	
	Poisoning by hormones and synthetic substitutes	962	X	
	Poisoning by primarily systemic agents	963	X	
	Poisoning by agents primarily affecting blood constituents	964	X	
	Poisoning by analgesics antipyretics and antiheumatics	965	X	
	Poisoning by anticonvulsants and anti-parkinsonism drugs	966	X	
	Poisoning by sedatives and hypnotics	967	X	
	Poisoning by other central nervous system depressants and anesthetics	968	X	
	Poisoning by psychotropic agents	969	X	
	Poisoning by central nervous system stimulants	970	X	
	Poisoning by drugs primarily affecting the autonomic nervous system	971	X	
	Poisoning by affecting the cardiovascular system	972	X	
	Poisoning by affecting the gastrointestinal system	973	X	
	Poisoning by water mineral and uric acid metabolism drugs	974	X	
	Poisoning by agents primarily acting on the smooth and skeletal muscles respiratory system	975	X	

NOTE: [###] indicates Clinical Classifications Software (CCS) code
* Ambulatory Care Sensitive Conditions (ACSCs)/ Performance Quality Indicators (PQIs)
** Primary diagnosis with dehydration as secondary diagnosis

Conditions	Diagnosis	ICD-9- CM	30 day post-PAC discharge	Clinical Rationale
	Poisoning by agents primarily affecting skin and mucous membrane ophthalmological otorhinolaryngological and dental drugs	976	X	
	Poisoning by other and unspecified drugs and medicinal substances	977	X	
	Poisoning by bacterial vaccines	978	X	
	Poisoning by other vaccines and biological substances	979	X	
Arrhythmia	Atrial fibrillation and flutter	427.30	X	Inadequate management of other unplanned events
	Atrial fibrillation	427.31	X	
	Atrial flutter	427.32	X	
Intestinal impaction [145 subset]	Impaction of intestine, unspecified	560.30	X	Inadequate prophylaxis
	Fecal impaction	560.32	X	
	Other impaction of intestine	560.39	X	
Pressure ulcers	Chronic ulcer of skin	707.xx	X	Inadequate prophylaxis

SOURCE: Proposed list of potentially preventable readmission conditions from RTI International with ICD-9-CM (version: 10/28/2015).

NOTE: [###] indicates Clinical Classifications Software (CCS) code
* Ambulatory Care Sensitive Conditions (ACSCs)/ Performance Quality Indicators (PQIs)
** Primary diagnosis with dehydration as secondary diagnosis

APPENDIX B:
TABLE B1. LIST OF CONDITIONS FOR DEFINING POTENTIALLY PREVENTABLE HOSPITAL READMISSIONS FOR WITHIN-PAC STAY WITH ICD-9 CODES[16]

(These conditions will apply to the within-stay measures)

Conditions	Diagnosis	ICD-9-CM	Within Stay	Clinical Rationale
Adult asthma*	*Extrinsic asthma NOS	493.00	X	Inadequate management of chronic conditions
	*Ext asthma w/ status asth	493.01	X	
	*Ext asthma w(acute) exac	492.02	X	
	*Intrinsic asthma NOS	493.10	X	
	*Int asthma w status asth	493.11	X	
	*Int asthma w (ac) exac	493.12	X	
	*Chronic obst asthma NOS	493.20	X	
	*Ch ob asthma w stat asth	493.21	X	
	*Ch obst asth w (ac) exac	493.22	X	
	*Exercise ind bronchospasm	493.81	X	
	*Cough variant asthma	493.82	X	
	*Asthma NOS	493.90	X	
	*Asthma w status asth mat	493.91	X	
	*Asthma NOS w (ac) exac	493.92	X	
Chronic obstructive pulmonary disease (COPD)*	*Simple Chr Bronchitis	491.0	X	Inadequate management of chronic conditions
	*Mucopurul Chr Bronchitis	491.1	X	
	*Obs Chr Brnc w/o act exa	491.20	X	
	*Obs Chr Brnc w/ act exa	491.21	X	
	*Obs Chr Bronc w/ ac Bronc	491.22	X	
	*Chronic Bronchitis NEC	491.8	X	
	*Chronic Bronchitis NOS	491.9	X	
	*Emphysematous Bleb	492.0	X	
	*Emphysema NEC	492.8	X	
	*Bronchiectasis	494	X	
	*Bronchiectas w/o ac exac	494.0	X	

[16] Does not take into account any exclusions of diagnoses/ICD-9-CM code for any condition listed.

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* Ambulatory Care Sensitive Conditions (ACSCs)/ Performance Quality Indicators (PQIs)
** Primary diagnosis with dehydration as secondary diagnosis

Conditions	Diagnosis	ICD-9-CM	Within Stay	Clinical Rationale
	*Bronchiectasis w/ ac exac	494.1	X	
	*Chr airway obstruct NEC	496	X	
Congestive heart failure (CHF)*	*Rheumatic Heart Failure	398.91	X	Inadequate management of chronic conditions
	*Mal hypert hrt dis w/ CHF	402.01	X	
	*Benign hyp hrt dis w CHF	402.11	X	
	*Hyperten heart dis w CHF	402.91	X	
	*Mal hyper hrt/ren w/ CHF	404.01	X	
	*Mal hyp hrt/ren w CHF/RF	404.03	X	
	*Ben hyper hrt/ren w CHF	404.11	X	
	*Ben hyp hrt/ren w CHF/RF	404.13	X	
	*Hyper hrt/ren NOS w CHF	404.91	X	
	*Hyp Ht/Ren NOS w CHR	404.93	X	
	*Congestive Heart Failure	428.0	X	
	*Left heart failure	428.1	X	
	*Systolic hrt failure NOS	428.20	X	
	*AC systolic hrt failure	428.21	X	
	*Chr systolic hrt failure	428.22	X	
	*AC on chr syst hrt fail	428.23	X	
	*Diastolic hrt failure NOS	428.30	X	
	*AC diastolic hrt failure	428.31	X	
	*Chr diastolic hrt fail	428.32	X	
	*AC on chr diast hrt fail	428.33	X	
	*Syst/diast hrt fail NOS	428.40	X	
	*AC syst/diastole hrt fail	428.41	X	
	*Chr syst/diastl hrt fail	428.42	X	
	*AC/CHR syst/dia hrt fail	428.43	X	
	*Heart Failure NOS	428.9	X	
	Acute lung edema NOS	518.4	X	
Diabetes short-term complication*	Secondary diabetes mellitus with ketoacidosis	249.1X	X	Inadequate management of chronic conditions
	Secondary diabetes mellitus with hyperosmolarity	249.2X	X	
	Secondary diabetes mellitus with other coma	249.3X	X	

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** Primary diagnosis with dehydration as secondary diagnosis

Conditions	Diagnosis	ICD-9-CM	Within Stay	Clinical Rationale
	Secondary diabetes mellitus with other specified manifestations (hypoglycemia)	249.8X	X	
	Diabetes with other specified manifestations (hypoglycemia)	250.8X	X	
	*DM Keto T2, DM Cont	250.10	X	
	*DM Keto T1, DM Cont	250.11	X	
	*DM Keto T2, DM Uncont	250.12	X	
	*DM Keto T1, DM Uncont	250.13	X	
	*DM W/ Hyprosm T2, DM Cont	250.20	X	
	*DM W/ Hyprosm T1, DM Cont	250.21	X	
	*DM W/ Hyprosm T2, DM Uncnt	250.22	X	
	*DM W/ Hyprosm T1, DM Uncnt	250.23	X	
	*DM Coma Nec Typ Ii, DM Cnt	250.30	X	
	*DM Coma Nec T1, DM Cont	250.31	X	
	*DM Coma Nec T2, DM Uncont	250.32	X	
	*DM Coma Nec T1, DM Uncont	250.33	X	
Hypertension*/ Hypotension	*Malignant Hypertension	401.0	X	Inadequate management of chronic conditions
	*Hypertension NOS	401.9	X	
	*Mal Hyperten hrt dis NOS	402.00	X	
	*Benign hyp ht dis w/o hf	402.10	X	
	*Hyp hrt dis NOS w/o hf	402.90	X	
	*Mal hyp ren w/o ren fail	403.00	X	
	*Ben hy kid w cr kid I-IV	403.10	X	
	*Hy kid NOS w cr kid I-IV	403.90	X	
	*Mal hy ht/ren w/o chf/rf	404.00	X	
	*Ben hy ht/ren w/o chf/rf	404.10	X	
	*Hy ht/ren NOS w/o chf/rf	404.90	X	
	Orthostatic hypotension	458.0	X	
	Chronic hypotension	458.1	X	
	Iatrogenc hypotnsion NEC	458.29	X	
	Hypotension NEC	458.8	X	
	Hypotension NOS	458.9	X	

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** Primary diagnosis with dehydration as secondary diagnosis

Conditions	Diagnosis	ICD-9-CM	Within Stay	Clinical Rationale
Influenza	Influenza	487.X	X	Inadequate management of infection
	Influenza due to identified avian influenza virus	488.X	X	
Bacterial pneumonia*	*Pneumococcal Pneumonia	481	X	Inadequate management of infection
	*H.Influenzae Pneumonia	482.2	X	
	*Strep Pneumonia Unspec	482.30	X	
	*Grp A Strep Pneumonia	482.31	X	
	*Grp B Strep Pneumonia	482.32	X	
	*Oth Strep Pneumonia	482.39	X	
	*Meth Sus Pneum D/T Staph	482.41	X	
	*Meth Res Pneu D/T Staph	482.42	X	
	*Bacterial Pneumonia Nos	482.9	X	
	*Mycoplasma Pneumonia	483.0	X	
	*Chlamydia Pneumonia	483.1	X	
	*Oth Spec Org Pneumonia	483.8	X	
	*Broncopneumonia Org Nos	485	X	
	*Pneumonia, Organism Nos	486	X	
Urinary tract infection*/ Kidney infection	*Ac pyelonephritis NOS	590.10	X	Inadequate management of infection
	*Ac pyelonephr w med necr	590.11	X	
	*Renal/perirenal abscess	590.2	X	
	*Pyeloureteritis cystica	590.3	X	
	*Pyelonephritis NOS	590.80	X	
	*Pyelonephrit in oth dis	590.81	X	
	*Infection of kidney NOS	590.9	X	
	*Acute cystitis	595.0	X	
	Chr interstit cystitis	595.1	X	
	Chronic cystitis NEC	595.2	X	
	Cystitis in oth dis	595.4	X	
	Cystitis NEC	595.89	X	
	*Cystitis NOS	595.9	X	

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** Primary diagnosis with dehydration as secondary diagnosis

Conditions	Diagnosis	ICD-9-CM	Within Stay	Clinical Rationale
	Urethral abscess	597.0	X	
	*Urin tract infection NOS	599.0	X	
C. difficile infection [135 subset]	Intestinal infection due to Clostridium difficile	008.45	X	Inadequate management of infection
Septicemia (except in labor) [2]	Salmonella septicemia	003.1	X	Inadequate management of infection
	Septicemic plague	020.2	X	
	Anthrax septicemia	022.3	X	
	Meningococcemia	036.2	X	
	Streptococcal septicemia	038.0	X	
	Staphylococcal septicemia	038.1	X	
	Staphylococcal septicemia, unspecified	038.10	X	
	Methicillin susceptible Staphylococcus aureus septicemia	038.11	X	
	Methicillin resistant Staphylococcus aureus septicemia	038.12	X	
	Other staphylococcal septicemia	038.19	X	
	Pneumococcal septicemia [Streptococcus pneumoniae septicemia]	038.2	X	
	Septicemia due to anaerobes	038.3	X	
	Septicemia due to gram-negative organism, unspecified	038.40	X	
	Septicemia due to hemophilus influenzae [H. influenzae]	038.41	X	
	Septicemia due to escherichia coli [E. coli]	038.42	X	
	Septicemia due to pseudomonas	038.43	X	
	Septicemia due to serratia	038.44	X	
	Other septicemia due to gram-negative organisms	038.49	X	
	Other specified septicemias	038.8	X	
	Unspecified septicemia	038.9	X	
	Herpetic septicemia	054.5	X	
	Septic arterial embolism	449	X	
	Sepsis	995.91	X	

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** Primary diagnosis with dehydration as secondary diagnosis

Conditions	Diagnosis	ICD-9-CM	Within Stay	Clinical Rationale
	Severe sepsis	995.92	X	
Skin and subcutaneous tissue infections [197]	Cellulitis and abscess of finger, unspecified	681.00	X	Inadequate management of infection
	Cellulitis and abscess of toe, unspecified	681.10	X	
	Cellulitis and abscess of unspecified digit	681.9	X	
	Cellulitis and abscess of face	682.0	X	
	Cellulitis and abscess of neck	682.1	X	
	Cellulitis and abscess of trunk	682.2	X	
	Cellulitis and abscess of upper arm and forearm	682.3	X	
	Cellulitis and abscess of hand, except fingers and thumb	682.4	X	
	Cellulitis and abscess of buttock	682.5	X	
	Cellulitis and abscess of leg, except foot	682.6	X	
	Cellulitis and abscess of foot, except toes	682.7	X	
	Cellulitis and abscess of other specified sites	682.8	X	
	Cellulitis and abscess of unspecified sites	682.9	X	
	Other specified local infections of skin and subcutaneous tissue	686.8	X	
	Unspecified local infection of skin and subcutaneous tissue	686.9	X	
Dehydration*/ Electrolyte imbalance [55]	*Hypovolemia	276.5	X	Inadequate management of other unplanned events
	Hypopotassemia	276.8	X	
	**Hyperosmolality and/or hypernatremia	276.0	X	
	Hyposmolality and/or hyponatremia	276.1	X	
	Acidosis	276.2	X	
	Alkalosis	276.3	X	
	Mixed acid-base balance disorder	276.4	X	
	*Volume depletion, unspecified	276.50	X	

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** Primary diagnosis with dehydration as secondary diagnosis

Conditions	Diagnosis	ICD-9-CM	Within Stay	Clinical Rationale
	*Dehydration	276.51	X	
	*Hypovolemia	276.52	X	
	Fluid overload disorder	276.6	X	
	Other fluid overload	276.69	X	
	Hyperpotassemia	276.7	X	
	Hypopotassemia	276.8	X	
	Electrolyte and fluid disorders not elsewhere classified	276.9	X	
	**Intes Infec Rotavirus	008.61	X	
	**Intes Infec Adenovirus	008.62	X	
	**Int Inf Norwalk Virus	008.63	X	
	**Int Inf Oth Sml Rnd Vrus	008.64	X	
	**Intes Infec Calcivirus	008.65	X	
	**Intes Infec Astrovirus	008.66	X	
	**Int Inf Enterovirus NEC	008.67	X	
	**Enteritis NOS	008.69	X	
	**Viral Enteritis NOS	008.8	X	
	**Infectious Enteritis NOS	009.0	X	
	**Enteritis of Infect Orig	009.1	X	
	**Infectious Diarrhea NOS	009.2	X	
	**Diarrhea of Infect Orig	009.3	X	
	**Noninf Gastroenterit NEC	558.9	X	
Aspiration pneumonitis; food/vomitus [129]	Pneumonitis due to inhalation of food or vomitus	507.0	X	Inadequate management of other unplanned events
Anticoagulant complications	Phlebitis and thrombophlebitis	451.X	X	Inadequate management of other unplanned events
	Acute cor pulmonale	415.0	X	
	Pulmonary embolism and infarction	415.1X	X	
	Other venous embolism and thrombosis	453.X	X	
Acute delirium	Senile Dementia with delirium	290.3	X	Inadequate management of other unplanned events
	Vascular dementia, with delirium	290.41	X	
	Other specified senile psychotic condition	290.8	X	

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** Primary diagnosis with dehydration as secondary diagnosis

Conditions	Diagnosis	ICD-9-CM	Within Stay	Clinical Rationale
	Delirium due to conditions classified elsewhere	293.0	X	
	Subacute delirium	293.1	X	
	Delusional disorders	297.X	X	
	Other nonorganic psychoses	298.X	X	
Acute renal failure (* with Dehydration)	*Acute kidney failure with lesion of tubular necrosis	584.5	X	Inadequate management of other unplanned events
	*Acute kidney failure with lesion of renal cortical necrosis	584.6	X	
	*Acute kidney failure with lesion of renal medullary [papillary] necrosis	584.7	X	
	*Acute kidney failure with other specified pathological lesion in kidney	585.8	X	
	*Acute kidney failure, unspecified	584.9	X	
	*Renal Failure NOS	586	X	
	*Surg Compl-Urinary Tract	997.5	X	
Adverse drug events	Poisoning by antibiotics	960	X	Inadequate management of other unplanned events
	Poisoning by other anti- infectives	961	X	
	Poisoning by hormones and synthetic substitutes	962	X	
	Poisoning by primarily systemic agents	963	X	
	Poisoning by agents primarily affecting blood constituents	964	X	
	Poisoning by analgesics antipyretics and antiheumatics	965	X	
	Poisoning by anticonvulsants and anti-parkinsonism drugs	966	X	
	Poisoning by sedatives and hypnotics	967	X	
	Poisoning by other central nervous system depressants and anesthetics	968	X	
	Poisoning by psychotropic agents	969	X	
	Poisoning by central nervous system stimulants	970	X	

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** Primary diagnosis with dehydration as secondary diagnosis

Conditions	Diagnosis	ICD-9-CM	Within Stay	Clinical Rationale
	Poisoning by drugs primarily affecting the autonomic nervous system	971	X	
	Poisoning by affecting the cardiovascular system	972	X	
	Poisoning by affecting the gastrointestinal system	973	X	
	Poisoning by water mineral and uric acid metabolism drugs	974	X	
	Poisoning by agents primarily acting on the smooth and skeletal muscles respiratory system	975	X	
	Poisoning by agents primarily affecting skin and mucous membrane ophthalmological otorhinolaryngological and dental drugs	976	X	
	Poisoning by other and unspecified drugs and medicinal substances	977	X	
	Poisoning by bacterial vaccines	978	X	
	Poisoning by other vaccines and biological substances	979	X	
Arrhythmia	Atrial fibrillation and flutter	427.30	X	Inadequate management of other unplanned events
	Atrial fibrillation	427.31	X	
	Atrial flutter	427.32	X	
Deficiency and other anemia [59]	Other vitamin B12 deficiency anemia	281.1	X	Inadequate prophylaxis
	Folate-deficiency anemia	281.2	X	
	Protein-deficiency anemia	281.4	X	
	Iron deficiency anemias	280	X	
Intestinal impaction	Impaction of intestine, unspecified	560.30	X	Inadequate prophylaxis
	Fecal impaction	560.32	X	
	Other impaction of intestine	560.39	X	
Pressure ulcers	Chronic ulcer of skin	707.X	X	Inadequate prophylaxis

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** Primary diagnosis with dehydration as secondary diagnosis

Conditions	Diagnosis	ICD-9-CM	Within Stay	Clinical Rationale
Deep vein thrombosis/ Pulmonary embolism	Other venous embolism and thrombosis of inferior vena cava	453.2	X	Inadequate prophylaxis
	Acute venous embolism and thrombosis of deep vessels of lower extremity	453.4	X	
	Acute venous embolism and thrombosis of unspecified deep vessels of lower extremity	453.40	X	
	Acute venous embolism and thrombosis of deep vessels of proximal lower extremity	453.41	X	
	Acute venous embolism and thrombosis of deep vessels of distal lower extremity	453.42	X	
	Acute venous embolism and thrombosis of deep veins of upper extremity	453.82	X	
	Acute venous embolism and thrombosis of upper extremity, unspecified	453.83	X	
	Acute venous embolism and thrombosis of axillary veins	453.84	X	
	Acute venous embolism and thrombosis of other specified veins	453.89	X	
	Other venous embolism and thrombosis of unspecified site	453.9	X	
	Other pulmonary embolism and infarction	415.19	X	
Head injury	Concussion with no loss of consciousness	850.0	X	Inadequate injury prevention
	Concussion, with loss of consciousness of 30 minutes or less	850.11	X	
	Concussion, with loss of consciousness from 31 to 59 minutes	850.12	X	
	Concussion with moderate loss of consciousness	850.2	X	
	Concussion with prolonged loss of consciousness and return to pre-existing conscious level	850.3	X	

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** Primary diagnosis with dehydration as secondary diagnosis

Conditions	Diagnosis	ICD-9-CM	Within Stay	Clinical Rationale
	Concussion with prolonged loss of consciousness, without return to pre-existing conscious level	850.4	X	
	Concussion with loss of consciousness of unspecified duration	850.5	X	
	Concussion, unspecified	850.9	X	
	Cortex (cerebral) contusion without mention of open intracranial wound	851.0X (X=0,1,2,3,4,5, 6,9)	X	
	Cortex (cerebral) contusion with open intracranial wound	851.1X (X=0,1,2,3,4,5, 6,9)	X	
	Cortex (cerebral) laceration without mention of open intracranial wound	851.2X (X=0,1,2,3,4,5, 6,9)	X	
	Cortex (cerebral) laceration with open intracranial wound	851.3X (X=0,1,2,3,4,5, 6,9)	X	
	Cerebellar or brain stem contusion without mention of open intracranial wound	851.4X (X=0,1,2,3,4,5, 6,9)	X	
	Cerebellar or brain stem contusion with open intracranial wound	851.5X (X=0,1,2,3,4,5, 6,9)	X	
	Cerebellar or brain stem laceration without mention of open intracranial wound	851.6X (X=0,1,2,3,4,5, 6,9)	X	
	Cerebellar or brain stem laceration with open intracranial wound	851.7X (X=0,1,2,3,4,5, 6,9)	X	
	Other and unspecified cerebral laceration and contusion without mention of open intracranial wound	851.8X (X=0,1,2,3,4,5, 6,9)	X	
	Other and unspecified cerebral laceration and contusion with open intracranial wound	851.9X (X=0,1,2,3,4,5, 6,9)	X	
	Subarachnoid hemorrhage following injury without mention of open intracranial wound	852.0X (X=0,1,2,3,4,5, 6,9)	X	
	Subarachnoid hemorrhage following injury with open intracranial wound	852.1X (X=0,1,2,3,4,5, 6,9)	X	

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** Primary diagnosis with dehydration as secondary diagnosis

Conditions	Diagnosis	ICD-9-CM	Within Stay	Clinical Rationale
	Subdural hemorrhage following injury without mention of open intracranial wound	852.2X (X=0,1,2,3,4,5, 6,9)	X	
	Subdural hemorrhage following injury with open intracranial wound	852.3X (X=0,1,2,3,4,5, 6,9)	X	
	Extradural hemorrhage following injury without mention of open intracranial wound	852.4X (X=0,1,2,3,4,5, 6,9)	X	
	Extradural hemorrhage following injury with open intracranial wound	852.5X (X=0,1,2,3,4,5, 6,9)	X	
	Other and unspecified intracranial hemorrhage following injury without mention of open intracranial wound	853.0X (X=0,1,2,3,4,5, 6,9)	X	
	Other and unspecified intracranial hemorrhage following injury with open intracranial wound	853.1X (X=0,1,2,3,4,5, 6,9)	X	
	Intracranial injury of other and unspecified nature without mention of open intracranial wound	854.0X (X=0,1,2,3,4,5, 6,9)	X	
	Intracranial injury of other and unspecified nature with open intracranial wound	854.1X (X=0,1,2,3,4,5, 6,9)	X	
Upper extremity fracture	Closed fracture of clavicle	810.0X (X=0,1,2,3)	X	Inadequate injury prevention
	Open fracture of clavicle	810.1X (X=0,1,2,3)	X	
	Closed fracture of scapula	811.0X (X=0,1,2,3,9)	X	
	Open fracture of scapula	811.1X (X=0,1,2,3,9)	X	
	Fracture of upper end of humerus closed	812.0X (X=0,1,2,3,9)	X	
	Fracture of upper end of humerus open	812.1X (X=0,1,2,3,9)	X	
	Closed fracture of shaft or unspecified part of humerus	812.2X (X=0,1)	X	
	Fracture of shaft or unspecified part of humerus open	812.3X (X=0,1)	X	
	Fracture of lower end of humerus closed	812.4X (X=0,1,2,3,4,9)	X	

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** Primary diagnosis with dehydration as secondary diagnosis

Conditions	Diagnosis	ICD-9-CM	Within Stay	Clinical Rationale
	Fracture of lower end of humerus open	812.5X (X=0,1,2,3,4,9)	X	
	Fracture of upper end of radius and ulna closed	813.0X (X=0,1,2,3,4,5, 6,7,8)	X	
	Fracture of upper end of radius and ulna open	813.1X (X=0,1,2,3,4,5, 6,7,8)	X	
	Fracture of shaft of radius and ulna closed	813.2X (X=0,1,2,3)	X	
	Fracture of shaft of radius and ulna open	813.3X (X=0,1,2,3)	X	
	Fracture of lower end of radius and ulna closed	813.4X (X=0,1,2,3,4,5, 6,7)	X	
	Fracture of lower end of radius and ulna open	813.5X (X=0,1,2,3,4)	X	
	Fracture of unspecified part of radius with ulna closed	813.8X (X=0,1,2,3)	X	
	Fracture of unspecified part of radius with ulna open	813.9X (X=0,1,2,3)	X	
	Closed fractures of carpal bones	814.0X (X=0,1,2,3,4,5, 6,7,8,9)	X	
	Open fractures of carpal bones	814.1X (X=0,1,2,3,4,5, 6,7,8,9)	X	
	Closed fracture of metacarpal bones	815.0X (X=0,1,2,3,4,9)	X	
	Open fracture of metacarpal bones	815.1X (X=0,1,2,3,4,9)	X	
	Closed fracture of one or more phalanges of hand	816.0X (X=0,1,2,3)	X	
	Open fracture of one or more phalanges of hand	816.1X (X=0,1,2,3)	X	
	Multiple closed fractures of hand bones	817.0	X	
	Multiple open fractures of hand bones	817.1	X	
	Ill-defined closed fractures of upper limb	818.0	X	
	Ill-defined open fractures of upper limb	818.1	X	

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** Primary diagnosis with dehydration as secondary diagnosis

Conditions	Diagnosis	ICD-9-CM	Within Stay	Clinical Rationale
	Multiple closed fractures involving both upper limbs, and upper limb with rib(s) and sternum	819.0	X	
	Multiple open fractures involving both upper limbs, and upper limb with rib(s) and sternum	819.1	X	
Lower extremity fracture	Transcervical fracture closed	820.0X (X=0,1,2,3,9)	X	Inadequate injury prevention
	Transcervical fracture open	820.1X (X=0,1,2,3,9)	X	
	Pertrochanteric fracture of femur closed	820.2X (X=0,1,2)	X	
	Pertrochanteric fracture of femur open	820.3X (X=0,1,2)	X	
	Closed fracture of unspecified part of neck of femur	820.8	X	
	Open fracture of unspecified part of neck of femur	820.9	X	
	Fracture of shaft or unspecified part of femur closed	821.0X (X=0,1)	X	
	Fracture of shaft or unspecified part of femur open	821.1X (X-0,1)	X	
	Fracture of lower end of femur closed	821.2X (X=0,1,2,3,9)	X	
	Fracture of lower end of femur open	821.3X (X=0,1,2,3,9)	X	
	Closed fracture of patella	822.0	X	
	Open fracture of patella	822.1	X	
	Fracture of upper end of tibia and fibula closed	823.0X (X=0,1,2)	X	
	Fracture of upper end of tibia and fibula open	823.1X (X=0,1,2)	X	
	Fracture of shaft of tibia and fibula open	823.3X (X=0,1,2)	X	
	Fracture of tibia and fibula, torus fracture	823.4X (X=0,1,2)	X	
	Fracture of unspecified part of tibia and fibula closed	823.8X (X=0,1,2)	X	
	Fracture of unspecified part of tibia and fibula open	823.9X (X=0,1,2)	X	

NOTE: [###] indicates Clinical Classifications Software (CCS) code
* Ambulatory Care Sensitive Conditions (ACSCs)/ Performance Quality Indicators (PQIs)
** Primary diagnosis with dehydration as secondary diagnosis

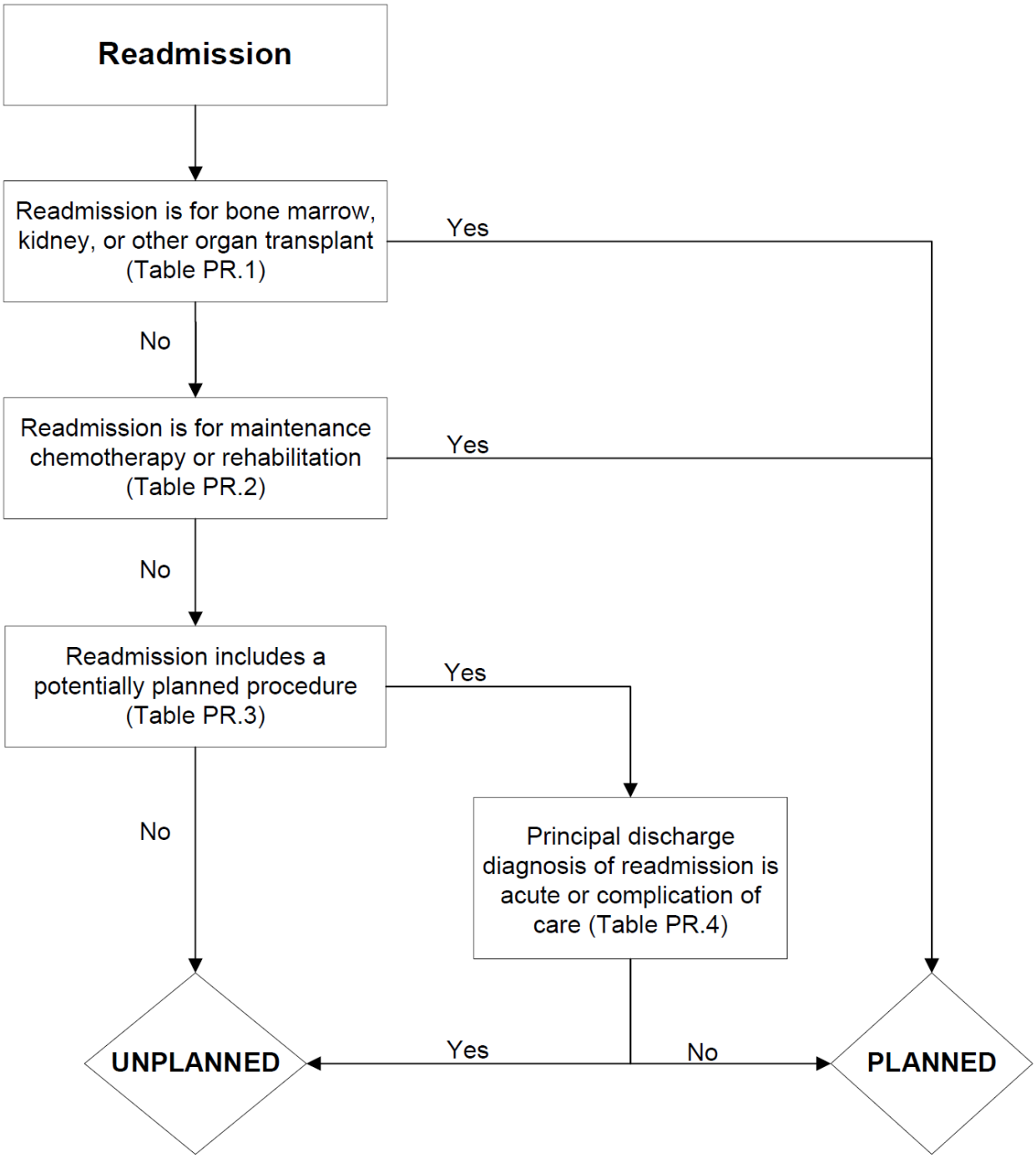
Conditions	Diagnosis	ICD-9-CM	Within Stay	Clinical Rationale
	Fracture of ankle	824.X (X=0,1,2,3,4,5, 6,7,8,9)	X	
	Fracture of calcaneus, closed	825.0	X	
	Fracture of calcaneus, open	825.1	X	
	Fracture of other tarsal and metatarsal bones closed	825.2X (X=0,1,2,3,4,5, 9)	X	
	Fracture of other tarsal and metatarsal bones open	825.3X (X=0,1,2,3,4,5, 9)	X	
	Closed fracture of one or more phalanges of foot	826.0	X	
	Open fracture of one or more phalanges of foot	826.1	X	
	Other, multiple and ill-defined fractures of lower limb, closed	827.0	X	
	Other, multiple and ill-defined fractures of lower limb, open	827.1	X	
	Closed multiple fractures involving both lower limbs, lower with upper limb, and lower limb(s) with rib(s) and sternum	828.0	X	
	Open multiple fractures involving both lower limbs, lower with upper limb, and lower limb(s) with rib(s) and sternum	828.1	X	
	Fracture of unspecified bone, closed	829.0	X	
	Fracture of unspecified bone, open	829.1	X	

SOURCE: Proposed list of potentially preventable readmission conditions from RTI International with ICD-9-CM (version: 10/28/2015).

NOTE: [###] indicates Clinical Classifications Software (CCS) code
* Ambulatory Care Sensitive Conditions (ACSCs)/ Performance Quality Indicators (PQIs)
** Primary diagnosis with dehydration as secondary diagnosis

APPENDIX C:
CMS PLANNED READMISSION ALGORITHM

Planned Readmission Algorithm Version 3.0 Flowchart



Source: 2015 Version of the HWR Planned Readmission Algorithm

Planned Readmission Algorithm Version 3.0 Tables – Hospital Wide Readmission Measure

Table C1. Procedure Categories that are Always Planned (Version 3.0)

Procedure CCS	Description
64	Bone marrow transplant
105	Kidney transplant
134	Cesarean section**
135	Forceps; vacuum; and breech delivery††
176	Other organ transplantation

Table C2. Diagnosis Categories that are Always Planned (Version 3.0)

Diagnosis CCS	Description
45	Maintenance chemotherapy
194	Forceps delivery‡‡
196	Normal pregnancy and/or delivery§§
254	Rehabilitation

Table C3. Potentially Planned Procedure Categories (Version 3.0)

Procedure CCS	Description
3	Laminectomy; excision intervertebral disc
5	Insertion of catheter or spinal stimulator and injection into spinal
9	Other OR therapeutic nervous system procedures
10	Thyroidectomy; partial or complete
12	Other therapeutic endocrine procedures
33	Other OR therapeutic procedures on nose; mouth and pharynx
36	Lobectomy or pneumonectomy
38	Other diagnostic procedures on lung and bronchus
40	Other diagnostic procedures of respiratory tract and mediastinum
43	Heart valve procedures
44	Coronary artery bypass graft (CABG)
45	Percutaneous transluminal coronary angioplasty (PTCA)

Procedure CCS	Description
47	Diagnostic cardiac catheterization; coronary arteriography
48	Insertion; revision; replacement; removal of cardiac pacemaker or cardioverter/defibrillator
49	Other OR heart procedures
51	Endarterectomy; vessel of head and neck
52	Aortic resection; replacement or anastomosis
53	Varicose vein stripping; lower limb
55	Peripheral vascular bypass
56	Other vascular bypass and shunt; not heart
59	Other OR procedures on vessels of head and neck
62	Other diagnostic cardiovascular procedures
66	Procedures on spleen
67	Other therapeutic procedures; hemic and lymphatic system
74	Gastrectomy; partial and total
78	Colorectal resection
79	Local excision of large intestine lesion (not endoscopic)
84	Cholecystectomy and common duct exploration
85	Inguinal and femoral hernia repair
86	Other hernia repair
99	Other OR gastrointestinal therapeutic procedures
104	Nephrectomy; partial or complete
106	Genitourinary incontinence procedures
107	Extracorporeal lithotripsy; urinary
109	Procedures on the urethra
112	Other OR therapeutic procedures of urinary tract
113	Transurethral resection of prostate (TURP)
114	Open prostatectomy
119	Oophorectomy; unilateral and bilateral
120	Other operations on ovary
124	Hysterectomy; abdominal and vaginal
129	Repair of cystocele and rectocele; obliteration of vaginal vault
132	Other OR therapeutic procedures; female organs
142	Partial excision bone
152	Arthroplasty knee

Procedure CCS	Description
153	Hip replacement; total and partial
154	Arthroplasty other than hip or knee
157	Amputation of lower extremity
158	Spinal fusion
159	Other diagnostic procedures on musculoskeletal system
166	Lumpectomy; quadrantectomy of breast
167	Mastectomy
169	Debridement of wound; infection or burn
170	Excision of skin lesion
172	Skin graft
ICD-9 Codes	**Description**
30.1, 30.29, 30.3, 30.4, 31.74, 34.6	Laryngectomy, revision of tracheostomy, scarification of pleura (from Proc CCS 42- Other OR Rx procedures on respiratory system and mediastinum)
38.18	Endarterectomy leg vessel (from Proc CCS 60- Embolectomy and endarterectomy of lower limbs)
55.03, 55.04	Percutaneous nephrostomy with and without fragmentation (from Proc CCS 103- Nephrotomy and nephrostomy)
94.26, 94.27	Electroshock therapy (from Proc CCS 218- Psychological and psychiatric evaluation and therapy)

Table C4. Acute Diagnosis Categories (Version 3.0)

Diagnosis CCS	Description
1	Tuberculosis
2	Septicemia (except in labor)
3	Bacterial infection; unspecified site
4	Mycoses
5	HIV infection
7	Viral infection
8	Other infections; including parasitic
9	Sexually transmitted infections (not HIV or hepatitis)
54	Gout and other crystal arthropathies
55	Fluid and electrolyte disorders
60	Acute posthemorrhagic anemia

Diagnosis CCS	Description
61	Sickle cell anemia
63	Diseases of white blood cells
76	Meningitis (except that caused by tuberculosis or sexually transmitted disease)
77	Encephalitis (except that caused by tuberculosis or sexually transmitted disease)
78	Other CNS infection and poliomyelitis
82	Paralysis
83	Epilepsy; convulsions
84	Headache; including migraine
85	Coma; stupor; and brain damage
87	Retinal detachments; defects; vascular occlusion; and retinopathy
89	Blindness and vision defects
90	Inflammation; infection of eye (except that caused by tuberculosis or sexually transmitted disease)
91	Other eye disorders
92	Otitis media and related conditions
93	Conditions associated with dizziness or vertigo
99	Hypertension with complications
100	Acute myocardial infarction (with the exception of ICD-9 codes 410.x2)
102	Nonspecific chest pain
104	Other and ill-defined heart disease
107	Cardiac arrest and ventricular fibrillation
109	Acute cerebrovascular disease
112	Transient cerebral ischemia
116	Aortic and peripheral arterial embolism or thrombosis
118	Phlebitis; thrombophlebitis and thromboembolism
120	Hemorrhoids
122	Pneumonia (except that caused by TB or sexually transmitted disease)
123	Influenza
124	Acute and chronic tonsillitis
125	Acute bronchitis
126	Other upper respiratory infections
127	Chronic obstructive pulmonary disease and bronchiectasis

Diagnosis CCS	Description
128	Asthma
129	Aspiration pneumonitis; food/vomitus
130	Pleurisy; pneumothorax; pulmonary collapse
131	Respiratory failure; insufficiency; arrest (adult)
135	Intestinal infection
137	Diseases of mouth; excluding dental
139	Gastroduodenal ulcer (except hemorrhage)
140	Gastritis and duodenitis
142	Appendicitis and other appendiceal conditions
145	Intestinal obstruction without hernia
146	Diverticulosis and diverticulitis
148	Peritonitis and intestinal abscess
153	Gastrointestinal hemorrhage
154	Noninfectious gastroenteritis
157	Acute and unspecified renal failure
159	Urinary tract infections
165	Inflammatory conditions of male genital organs
168	Inflammatory diseases of female pelvic organs
172	Ovarian cyst
197	Skin and subcutaneous tissue infections
198	Other inflammatory condition of skin
225	Joint disorders and dislocations; trauma-related
226	Fracture of neck of femur (hip)
227	Spinal cord injury
228	Skull and face fractures
229	Fracture of upper limb
230	Fracture of lower limb
232	Sprains and strains
233	Intracranial injury
234	Crushing injury or internal injury
235	Open wounds of head; neck; and trunk
237	Complication of device; implant or graft
238	Complications of surgical procedures or medical care
239	Superficial injury; contusion

Diagnosis CCS	Description
240	Burns
241	Poisoning by psychotropic agents
242	Poisoning by other medications and drugs
243	Poisoning by nonmedicinal substances
244	Other injuries and conditions due to external causes
245	Syncope
246	Fever of unknown origin
247	Lymphadenitis
249	Shock
250	Nausea and vomiting
251	Abdominal pain
252	Malaise and fatigue
253	Allergic reactions
259	Residual codes; unclassified
650	Adjustment disorders
651	Anxiety disorders
652	Attention-deficit, conduct, and disruptive behavior disorders
653	Delirium, dementia, and amnestic and other cognitive disorders
656	Impulse control disorders, NEC
658	Personality disorders
660	Alcohol-related disorders
661	Substance-related disorders
662	Suicide and intentional self-inflicted injury
663	Screening and history of mental health and substance abuse codes
670	Miscellaneous disorders
ICD-9 Codes	**Description**
Acute ICD-9 codes within Dx CCS 97: Peri-; endo-; and myocarditis; cardiomyopathy	
03282	Diphtheritic myocarditis
03640	Meningococcal carditis nos
03641	Meningococcal pericarditis
03642	Meningococcal endocarditis
03643	Meningococcal myocarditis
07420	Coxsackie carditis nos
07421	Coxsackie pericarditis

Diagnosis CCS	Description
07422	Coxsackie endocarditis
07423	Coxsackie myocarditis
11281	Candidal endocarditis
11503	Histoplasma capsulatum pericarditis
11504	Histoplasma capssulatum endocarditis
11513	Histoplasma duboisii pericarditis
11514	Histoplasma duboisii endocarditis
11593	Histoplasmosis pericarditis
11594	Histoplasmosis endocarditis
1303	Toxoplasma myocarditis
3910	Acute rheumatic pericarditis
3911	Acute rheumatic endocarditis
3912	Acute rheumatic myocarditis
3918	Acute rheumatic heart disease nec
3919	Acute rheumatic heart disease nos
3920	Rheumatic chorea w heart involvement
3980	Rheumatic myocarditis
39890	Rheumatic heart disease nos
39899	Rheumatic heart disease nec
4200	Acute pericarditis in other disease
42090	Acute pericarditis nos
42091	Acute idiopath pericarditis
42099	Acute pericarditis nec
4210	Acute/subacute bacterial endocarditis
4211	Acute endocarditis in other diseases
4219	Acute/subacute endocarditis nos
4220	Acute myocarditis in other diseases
42290	Acute myocarditis nos
42291	Idiopathic myocarditis
42292	Septic myocarditis
42293	Toxic myocarditis
42299	Acute myocarditis nec
4230	Hemopericardium
4231	Adhesive pericarditis

Diagnosis CCS	Description
4232	Constrictive pericarditis
4233	Cardiac tamponade
4290	Myocarditis nos
Acute ICD-9 codes within Dx CCS 105: Conduction disorders	
4260	Atrioventricular
42610	Atrioventricular block nos
42611	Atrioventricular block-1st degree
42612	Atrioventricular block-mobitz ii
42613	Atrioventricular block-2nd degree nec
4262	Left bundle branch hemiblock
4263	Left bundle branch block nec
4264	Right bundle branch block
42650	Bundle branch block nos
42651	Right bundle branch block/left posterior fascicular block
42652	Right bundle branch block/left ant fascicular block
42653	Bilateral bundle branch block nec
42654	Trifascicular block
4266	Other heart block
4267	Anomalous atrioventricular excitation
42681	Lown-ganong-levine syndrome
42682	Long qt syn
4269	Conduction
Acute ICD-9 codes within Dx CCS 106: Dysrhythmia	
4272	Paroxysmal tachycardia nos
7850	Tachycardia nos
42789	Cardiac dysrhythmias nec
4279	Cardiac dysrhythmia noc
42769	Premature beats nec
Acute ICD-9 codes within Dx CCS 108: Congestive heart failure; nonhypertensive	
39891	Rheumatic heart failure
4280	Congestive heart failure
4281	Left heart failure
42820	Unspecified systolic heart failure
42821	Acute systolic heart failure

Diagnosis CCS	Description
42823	Acute on chronic systolic heart failure
42830	Unspecified diastolic heart failure
42831	Acute diastolic heart failure
42833	Acute on chronic diastolic heart failure
42840	Unspec combined syst & dias heart failure
42841	Acute combined systolic & diastolic heart failure
42843	Acute on chronic combined systolic & diastolic heart failure
4289	Heart failure nos
Acute ICD-9 codes within Dx CCS 149: Biliary tract disease	
5740	Calculus of gallbladder with acute cholecystitis
57400	Calculus of gallbladder with acute cholecystitis without mention of obstruction
57401	Calculus of gallbladder with acute cholecystitis with obstruction
5743	Calculus of bile duct with acute cholecystitis
57430	Calculus of bile duct with acute cholecystitis without mention of obstruction
57431	Calculus of bile duct with acute cholecystitis with obstruction
5746	Calculus of gallbladder and bile duct with acute cholecystitis
57460	Calculus of gallbladder with acute cholecystitis without mention of obstruction
57461	Calculus of gallbladder and bile duct with acute cholecystitis with obstruction
5748	Calculus of gallbladder and bile duct with acute and chronic cholecystitis
57480	Calculus of gallbladder obstruction and bile duct with acute and chronic cholecystitis without mention of obstruction
57481	Calculus of gallbladder and bile duct with acute and chronic cholecystitis with obstruction
5750	Acute cholecystitis
57512	Acute and chronic cholecystitis
5761	Cholangitis
Acute ICD-9 codes with Dx CCS 152: Pancreatic disorders	
5770	Acute pancreatitis

Source: 2015 Version of the HWR Planned Readmission Algorithm

APPENDIX D:
TABLE D1. AHRQ CCS SINGLE LEVEL PROCEDURE CODES AND ICD-9 PROCEDURE CODES ADDED TO YALE'S PLANNED READMISSION ALGORITHM, FOR THE POST-ACUTE CARE SETTING

AHRQ CCS Single Level Procedures Codes	Description	Comment
37	Diagnostic Bronchoscopy and Biopsy of Bronchus	
71	Gastrostomy: temporary and permanent	
82	Endoscopic retrograde cannulation of pancreases (ERCP)	
87	Laparoscopy (GI only)	
89	Exploratory Laparotomy	
160	Other therapeutic procedure on muscles and tendons	
164	Other OR therapeutic procedures on musculoskeletal system	
171	Suture of skin and subcutaneous tissue ICD-9	

ICD-9 Procedure Codes	Description	Comment
Topic: Amputation of Lower Extremity		
83.82	Graft of muscle or fascia	
86.87	Fat graft of skin and subcutaneous tissue	Required, Diagnosis V58.41, encounter for planned postoperative wound closure
Topic: Amputation of Upper Extremity		
84.1	Upper limb amputation, not otherwise specified	
84.2	Amputation and disarticulation of finger	
84.3	Amputation and disarticulation of thumb	
84.4	Amputation through hand	
84.5	Disarticulation of wrist	

ICD-9 Procedure Codes	Description	Comment
84.6	Amputation through forearm	
84.7	Disarticulation of elbow	
84.8	Amputation through humerus	
84.9	Disarticulation of shoulder	
84.10	Interthoracoscapular amputation	
Topic: Removal of Vascular Obstruction, Non-Coronary		
38.18	Endarterectomy, lower limb vessels	
38.08	Embolectomy, lower limb arteries	
39.50	Angioplasty or atherectomy of other non- coronary vessels	
00.55	Insertion of drug-eluting stent(s) of other peripheral vessel(s)	
00.60	Insertion of drug-eluting stent(s) of superficial femoral artery	
39.90	Insertion of non-drug-eluting peripheral (non-coronary) vessel stent(s)	
Topic: Colon and Rectal Procedures, Selected		
46.85	Dilation of intestine (includes endosopic approach)	
96.8	Insertion of naso-intestinal tube (includes for decompression)	
96.9	Insertion of rectal tube	
46.50	Closure of intestinal stoma, not otherwise specified	Required, Diagnosis code V55.2, attention to ileostomy, and V55.3, attention to colostomy
46.51	Closure of stoma of small intestine	Required, Diagnosis code V55.2, attention to ileostomy, and V55.3, attention to colostomy
46.52	Closure of stoma of large intestine	Required, Diagnosis code V55.2, attention to ileostomy, and V55.3, attention to colostomy

ICD-9 Procedure Codes	Description	Comment
46.86	Endoscopic insertion of colonic stent(s)	
46.87	Other insertion of colonic stent (s)	
Topic: Insertion of Feeding Tubes		
44.39	Other gastroenterostomy (GJ-tube)	
46.39	Other enterostomy (J-tube)	
Topic: Routine Device Replacement		
86.06	Insertion of totally implanted infusion pump	
Topic: Routine Removal of Devices		
84.57	Removal of (cement) spacer (includes antibiotic impregnated spacer)	
97.41	Removal of thoracotomy tube or pleural cavity drain (non-incisional)	
02.43	Removal of ventricular shunt	
97.37	Removal of tracheostomy tube (non-incisional)	
01.27	removal of catheter(s) from cranial cavity or tissue	
86.05	Incision with removal of foreign body or device from skin and subcutaneous tissue	
02.95	Removal of skull tongs or halo traction device	
78.60-78.69	Removal of implanted devices from bone (includes internal and external fixation	
80.00-80.09	Orthopedic implants arthrotomy for removal of prosthesis without replacement	
Topic: Pleurosclerosis		
34.6	Scarification of pleura	
34.92	Injection into thoracic cavity	
Topic: Colon and Rectal Procedures, Selected		
51.14	Other close (endoscopic) biopsy of biliary duct or sphincter of Oddi	
51.64	Endoscopic excision or destruction of lesion of biliary ducts or sphincter of Oddi	
51.84	Endoscopic dilation of ampulla and biliary duct	This code became available in CY 2010
51.84	Endoscopic sphincterotomy and papillotomy	
51.85	Endoscopic insertion of nasobiliary drainage tube	

ICD-9 Procedure Codes	Description	Comment
51.86	Endoscopic insertion of stent (tube) into bile duct	
51.87	Endoscopic removal of stone(s)from biliary tract	
Topic: Fistula		
42.84	Repair of esophageal fistula, not elsewhere classified	
44.63	Closure of other gastric fistula (include gastrocolic, gastrojejunocolic fistula)	
46.72	Closure of fistula of duodenum	
46.74	Closure of fistula of small intestine, except duodenum (includes enterocutaneous)	
46.76	Closure of fistula of large intestine	
47.92	Closure of appendiceal fistula	
48.73	Closure of other rectal fistula	
48.93	Repair of perirectal fistula	
49.11	Anal fistulotomy	
49.12	Anal fistulectomy	
49.73	Closure of anal fistula	
19.9	Other repair of middle ear (includes closure of mastoid fistula	
20.93	Repair of oval and round windows (includes closure of fistula)	
21.82	Closure of nasal fistula	
31.62	Closure of fistula of larynx (includes laryngotracheal)	
31.73	Closure of other fistula of trachea (includes tracheoesophageal)	
33.42	Closure of bronchial fistula (includes bronchocutaneous, bronchoesophageal, bronchovisceral)	
34.73	Closure of other fistula of thorax (includes bronchopleural, bronchopleurocutaneous, bronchopleuromediastinal)	
34.83	Closure of fistula of diaphragm (includes thoracicoabdominal, thoracicogastric, thoracicointestinal)	

ICD-9 Procedure Codes	Description	Comment
34.93	Repair of pleura (includes closure of unspecified pleural fistula)	
61.42	Repair of scrotal fistula	
Topic: Tendon Repair (eye)		
15.7	Repair of injury of extraocular muscle (includes repair of tendon)	
Topic: Aneurysm		
39.51	Clipping of aneurysm	

NOTE: December, 2012 Yale added several additional AHRQ CCS Single-Level Procedure Codes. Two of these codes 169 (Debridement of wound; infection or burn) and 172 (Skin graft) had been on the prior RTI developed list.