April 2019

Skilled Nursing Facility 30-Day All-Cause Readmission Measure (SNFRM) NQF #2510: All-Cause Risk-Standardized Readmission Measure

Technical Report Supplement—2019 Update

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SKILLED NURSING FACILITY 30-DAY ALL-CAUSE READMISSION MEASURE
(SNFRM) NQF #2510: ALL-CAUSE RISK-STANDARDIZED READMISSION MEASURE
TECHNICAL REPORT SUPPLEMENT

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CMS Contract **No. HHSM-500- 2013-13015I** Task Order HHSM-500-T0001

April 2019

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SECTION 1.
INTRODUCTION

The Centers for Medicare & Medicaid Services (CMS) contracted with RTI International to develop the Skilled Nursing Facility 30-Day All-Cause Readmission Measure (SNFRM; National Quality Forum [NQF] #2510), which estimates the risk-standardized rate of all-cause, unplanned hospital readmissions. The SNFRM was subsequently adopted for use in the Skilled Nursing Facility Value-Based Purchasing (SNF VBP) Program (80 Federal Register 46419). The SNF VBP Program, authorized by the Protecting Access to Medicare Act of 2014, began affecting payment determination in Fiscal Year (FY) 2019. More information on how the SNFRM is used in the SNF VBP Program is provided on the CMS website.[1]

This technical report supplement provides updated analytic and risk-adjustment model results for the SNFRM. Specifically, we present (1) measure specifications and documentation for the SNFRM as well as (2) measure results from FY 2016 and calendar year (CY) 2017.[2] Previous SNFRM technical reports presented full testing and measure results based on earlier data.[3]

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[1] Available at https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/Value-Based-Programs/Other-VBPs/SNF-VBP.html

[2] In the FY 2017 SNF PPS Final Rule, the SNF VBP program finalized a policy wherein the program moved from calculating readmission measures on calendar years to fiscal years to mitigate operational concerns. The FY 2019 SNF VBP program year used a baseline period of CY 2015 and a performance period of CY 2017. The FY 2020 program year uses a baseline period of FY 2016 and a performance period of FY 2018. Fiscal years will be used in all subsequent years.

[3] SNFRM NQF #2510: All-Cause Risk-Standardized Readmission Measure Draft Technical Report (March 2015): https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/NursingHomeQualityInits/Downloads/SNFRM-Technical-Report-3252015.pdf. SNFRM NQF #2510: All-Cause Risk-Standardized Readmission Measure Technical Report Supplement (April 2017): https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/Value-Based-Programs/Other-VBPs/Technical-Report-Supplement.pdf.

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SECTION 2.
MEASURE SPECIFICATIONS

In this section, we describe in detail how the SNFRM is specified and calculated. We first provide an overview of the measure and subsequently, in Section 2.2, we describe the data sources used to calculate the measure. Section 2.3 discusses the eligible populations and how we defined the measure outcome (unplanned readmissions), including a definition of the risk window (Section 2.3.1) and an overview of the Planned Readmissions Algorithm (Section 2.3.2). Section 2.4 is an overview of the SNFRM inclusion and exclusion criteria. Finally, in Section 2.5, we discuss the SNFRM risk-adjustment model and statistical calculation of the measure.

Please note that no changes have been made to the SNFRM's technical specifications or risk-adjustment model since the April 2017 Technical Report Supplement. However, for our readers' convenience, we include a summary of both the model and measure specifications in this document.

2.1   Measure Overview

The SNFRM estimates the risk-standardized rate of all-cause, unplanned hospital readmissions for SNF Medicare fee-for-service (FFS) beneficiaries within 30 days of discharge from a prior proximal acute hospitalization. The measure is risk-adjusted for patient demographics, principal diagnosis from the prior hospitalization, comorbidities, and other health status variables that affect the probability of a hospital readmission. The SNFRM includes Medicare FFS beneficiaries who were admitted to a SNF within 1 day of discharge from a hospital. The measure is calculated annually using a 12-month period.

2.2   Data Sources

The SNFRM applies only to Medicare Part A FFS beneficiaries and is calculated using Medicare eligibility and inpatient claims data. The eligibility files include information on date of birth, sex, reasons for Medicare eligibility, duration of Part A coverage, and enrollment periods in the FFS program. Medicare FFS claims include information on the dates of admission and discharge, relevant diagnoses and procedures, and indicators of dialysis use. Inpatient claims data files contain beneficiary-level SNF and hospital records. No additional information or data are needed from providers beyond what is present in claims and Medicare eligibility files (i.e., no additional data collection is required). Following are the specific files used:

- Medicare Provider Analysis and Review (MedPAR) files

  Documentation available at http://www.resdac.org/cms-data/files/medpar-rif/data-documentation

- Medicare Denominator files

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

2.3   Eligible Population and Outcome Definition

The SNFRM includes Medicare Part A FFS beneficiaries who were admitted to a SNF within 1 day of discharge from an inpatient prospective payment system hospital, critical access hospital (CAH), or PPS-exempt psychiatric or cancer hospital. The measure assesses the facility-level rate of all-cause unplanned hospital inpatient readmissions that occur within 30 days of discharge from a prior proximal hospitalization.

Planned readmissions are not counted as readmissions. In order to define whether a readmission is planned or unplanned, we use the RTI-modified version of the CMS Planned Readmission Algorithm, which includes additional procedures specific to post-acute care (PAC) settings (see Section 2.5 below and *Appendix A*).

This measure is based on data for 12 months of SNF admissions. Because the measure denominator is based on SNF admissions, it is possible that Medicare beneficiaries with more than one eligible admission may be included in the measure multiple times within a given year.

2.4   Thirty-Day Readmission Window

The SNFRM's "readmission window" extends 30 days from the day a beneficiary is discharged from the prior proximal hospitalization. **Figure 1** below illustrates this window. If the readmission occurs within 30 days of discharge from the prior proximal hospitalization, it will be counted in the numerator of the measure. This is true both for beneficiaries that are readmitted directly from the SNF and for those that are readmitted after SNF discharge.

Figure 1
Risk window for the SNFRM
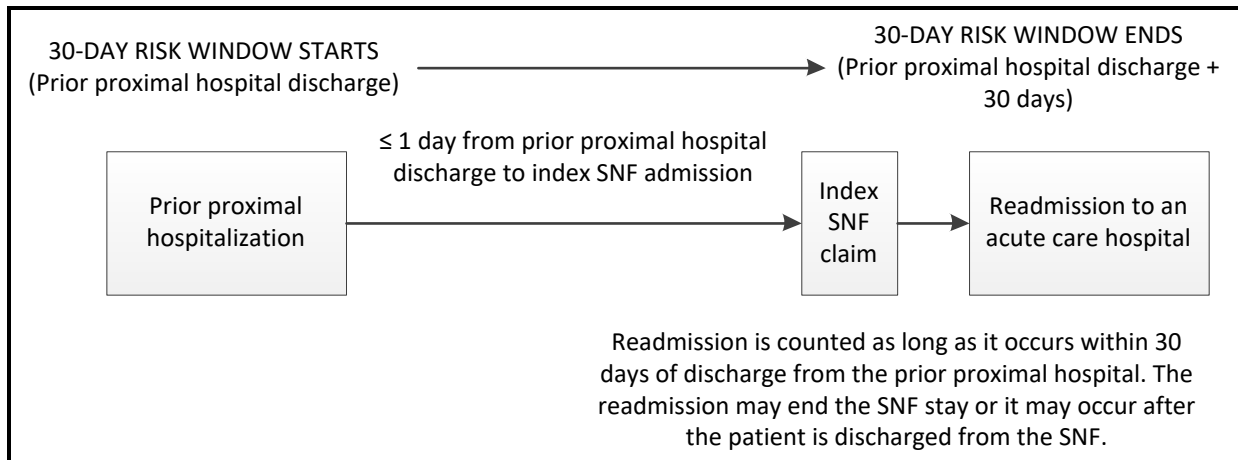
2.5   Planned Readmissions

The SNFRM uses a modified version of CMS's Planned Readmissions Algorithm[4] to identify readmissions that are classified as planned and should therefore not be counted as readmissions. Planned readmissions are not counted against facilities because they are not indicative of poor quality of care. A planned readmission is defined as any non-acute readmission in which one of a set of typically planned procedures or diagnoses occurred. The Planned Readmission Algorithm is based on two main principles:

1. Some diagnoses and procedures should *always* be considered planned.
2. A separate, larger group of procedures should also be considered planned except in the presence of a disqualifying diagnosis. That is, if any of the procedures in this group occurs in conjunction with a diagnosis that disqualifies a readmission from being considered planned, the readmission will be considered *un*planned. The rationale is that the readmission would likely have been necessitated by the acute diagnosis even if the planned procedure was not performed.

Unless a readmission meets the algorithm's definition of planned, it is considered unplanned and counted in the numerator of the measure calculation. Note that admissions for acute illness or for complications of care are classified as unplanned.

The algorithm developed to identify planned readmissions uses procedure codes and discharge diagnosis categories coded using the Agency for Healthcare Research and Quality (AHRQ) Clinical Classification Software (CCS).[5] Per feedback from a technical expert panel convened by RTI, we added procedures to the CMS Planned Readmission Algorithm that are specific to PAC settings. These additional procedures were codified by a certified nosologist before use.

For additional detail, including a list of codes used to define planned readmissions, please see *Appendix A*.

2.6   Eligible Stays: Exclusion Criteria

SNF stays may be excluded from the SNFRM for a number of reasons. We exclude stays if they are clinically different than most SNF stays, stays for which it would be inappropriate to

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[4] The algorithm we used is adapted from Appendix E, Planned Readmission Algorithm, of *2018 All-Cause Hospital Wide Measure Updates and Specifications Report: Hospital-Level 30-Day Risk-Standardized Readmission Measure – Version 7.0*, written by the Yale New Haven Health Services Corporation, Center for Outcomes Research & Evaluation. The report is available at: http://qualitynet.org/dcs/BlobServer?blobkey=id&blobnocache=true&blobwhere=1228890804653&blobheader=multipart%2Foctet-stream&blobheadername1=Content-Disposition&blobheadervalue1=attachment%3Bfilename%3DHospWide_Readmission_AUS_Report_2018_3-28.pdf&blobcol=urldata&blobtable=MungoBlobs

[5] AHRQ CCS Groups: Documentation available at https://www.hcup-us.ahrq.gov/toolssoftware/ccs10/ccs10.jsp

hold SNFs accountable for possible readmissions, and stays for which the data are insufficient to track readmissions or apply risk adjustment.

To ensure the SNFRM sample aligns with the population of SNFs eligible for the SNF VBP Program, stays at CAH swing beds are excluded from the denominator. Given CAH swing beds are not paid on the SNF Prospective Payment System (PPS), they are not eligible for the SNF VBP Program. However, it should be noted that because the SNF VBP Program includes all SNFs paid on the SNF PPS, SNFs in U.S. territories are included.

The following SNF stays are not considered eligible for inclusion in the measure (denominator exclusions):

1. SNF stays where the patient had one or more intervening PAC admissions (such as inpatient rehabilitation facility [IRF] or long-term care hospital [LTCH] admissions) that occurred either between the prior proximal hospital discharge and SNF admission or after the SNF discharge within the 30-day risk window. Thus, care trajectories where the patient had multiple SNF admissions after the prior proximal hospitalization and within the 30-day risk window are excluded.
2. SNF stays with a gap of greater than 1 day between discharge from the prior proximal hospitalization and the SNF admission.
3. SNF stays where the patient did not have at least 12 months of Medicare Part A FFS enrollment before the proximal hospital discharge and throughout the entire risk period (measured as enrollment during the 11 months before the month of proximal hospital discharge, the month of proximal hospital discharge, and the month after the month of discharge)
4. SNF stays where the patient was discharged from the SNF against medical advice.
5. SNF stays in which the principal diagnosis for the prior proximal hospitalization was for the medical treatment of cancer. Please note that patients with cancer whose principal diagnosis from the prior proximal hospitalization was for other diagnoses or who had surgical treatment of their cancer remain in the measure.
6. SNF stays in which the principal diagnosis for the prior proximal hospitalization was for "rehabilitation care; fitting of prostheses; and adjustment of devices" (CCS 254)
7. SNF stays in which the prior proximal hospitalization was for pregnancy.
8. SNF stays in which data were missing or problematic on any covariate or variable used in the SNFRM construction.
9. SNF stays that took place in a CAH swing bed.

Table 1 summarizes the frequency of exclusions from the denominator of this measure for data from FY 2016 and CY 2017.

Table 1
Frequency of denominator exclusions, FY 2016, CY 2017[a]

Individual exclusions (not mutually exclusive)	FY 2016 frequency (%)	CY 2017 frequency (%)
Exclusion 1: SNF stays where the patient had one or more PAC admissions (IRF or LTCH) between the prior proximal hospital discharge and SNF admission, or one or more PAC admissions (SNF, IRF, or LTCH) after the SNF discharge within the 30-day risk window	188,280 (7.9%)	183,188 (7.7%)
Exclusion 2: Gap of greater than 1 day between prior proximal hospital discharge and SNF admission[b]	136,250 (5.7%)	132,041 (5.6%)
Exclusion 3: Not continuously enrolled in Medicare FFS for the year before prior proximal hospital discharge, the month of the prior proximal hospitalization, and 1 month after the hospitalization	429,708 (18.1%)	387,686 (16.4%)
Exclusion 4: Discharged from SNF against medical advice	13,190 (0.6%)	15,701 (0.7%)
Exclusion 5: Principal diagnosis in prior proximal hospitalization for medically treated cancer	29,347 (1.2%)	28,170 (1.2%)
Exclusion 6: Principal diagnosis in prior proximal hospitalization for rehabilitation care	34 (0.0%)	28 (< 0.1 %)
Exclusion 7: Principal diagnosis in prior proximal hospitalization for pregnancy	9 (0.0%)	9 (0.0%)
Exclusion 8: Missing data on variables used for measure construction or other problematic data elements	247,689 (10.4%)	265,964 (11.2%)
Exclusion 9: CAH swing beds	85,184 (3.6%)	84,637 (3.6%)
Total excluded for any reason[c]	753,111 (31.65%) (68.4%)	704,953 (29.8%) (70.2%)

[a] Before applying exclusion criteria, the initial analytic file for FY 2016 included 2,379,324 index SNF stays across 16,709 SNFs. After applying exclusions, 1,626,213 index SNF stays across 15,409 SNFs remained. The initial analytic file for CY 2017 included 2,365,357 index SNF stays across 16,719 SNFs. After applying exclusions, 1,660,404 index SNF stays across 15,421 SNFs remained.

[b] This exclusion includes cases where PAC stays occur during the gap between the prior acute hospital discharge and the SNF admission.

[c] Exclusions shown in this table are not mutually exclusive. Patients may be counted in more than one excluded category.

SOURCE: RTI International analysis of Medicare claims (RTI programming reference: MS15 and MS15_001_pt1.xls [FY 2016]; MS07, MS07_001.xls, and allstay40_lk2017_001.xls [CY 2017])

2.7   Risk Adjustment and Statistical Approach to Measure Calculation

The SNFRM risk-adjustment model accounts for variation across SNFs in case mix and patient characteristics. Specifically, the measure risk-adjusts for the following: age, sex, length of stay during prior proximal hospitalization, time spent in the intensive care unit (ICU) during the prior proximal hospitalization, disabled as original reason for Medicare coverage, ESRD, number of acute care hospitalizations in the 365 days before prior proximal hospitalization, principal diagnosis, system-specific surgical indicators, individual comorbidities based on Hierarchical

Condition Categories (HCCs),[6] and the presence of multiple comorbidities. The way in which covariates were selected and the rationale for their selection is described in detail in the March 2015 SNFRM Technical Report.[7]

Full risk-adjustment model results for FY 2016 and CY 2017 are reported in ***Appendix B***.

2.8 Model Definition

The SNFRM employs a hierarchical logistic regression model to model the log odds of readmission for each index SNF stay. The hierarchical model is used to account for the clustering of observations within SNFs. We modeled "readmission within 30 days" as a function of patient-level demographic and clinical characteristics with a random SNF-level intercept. The use of a random intercept accounts for within-SNF correlation of the observed outcomes and the underlying differences in quality among the SNF facilities being evaluated.

We estimate the hierarchical logistic regression model as follows. Let Y_{ij}, denote the outcome (equal to 1 if patient is readmitted within 30 days, 0 otherwise) for a patient i at SNF_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:

$$\text{logit}(\text{Prob}(Y_{ij}=1)) = \alpha_j + \beta*Z_{ij} + \varepsilon_{ij} \tag{1}$$

$$\alpha_j = \mu + \omega_j \; ; \; \omega_j \sim N(0, \tau^2)$$

where $Z_{ij} = (Z_1, Z_2, ... Z_k)$, a set of k patient-level covariates, α_j represents the SNF-specific intercept, μ is the adjusted average outcome over all SNFs, τ^2 is the between-SNF variance component, and $\varepsilon \sim N(0,\sigma^2)$ captures any over- or under-dispersion.

The hierarchical logistic regression model was estimated using the SAS software (SAS GLIMMIX: SAS/STAT User's Guide, SAS Institute Inc.).

2.9 Calculating the Risk-Standardized Readmission Rate (RSRR)

We specified and estimated the risk-adjustment model using hierarchical logistic regression to calculate a standardized risk ratio (SRR) for each SNF. To calculate this ratio, we used the results from the hierarchical logistic regression model to calculate the *predicted* and *expected* number of readmissions for each SNF. The predicted number of readmissions takes into account the unique impact of each SNF on the likelihood of readmission (quality), whereas the expected number of readmissions is based on the average SNF. The predicted number of readmissions for each SNF was calculated as the sum of the predicted probability of readmission

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[6] CMS's HCC mappings. Mappings are included in the software at the following website: http://www.cms.gov/Medicare/Health-Plans/MedicareAdvtgSpecRateStats/Risk-Adjustors.html.

[7] SNFRM NQF #2510: All-Cause Risk-Standardized Readmission Measure Draft Technical Report (March 2015): https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/NursingHomeQualityInits/Downloads/SNFRM-Technical-Report-3252015.pdf

for each patient in the facility, including the SNF-specific (random) effect. The expected number of readmissions for each SNF was calculated as the sum of the predicted probability of readmission for each patient in the facility, *not* including the SNF-specific (random) effect.

Using the notation of the previous section, the RSRR for each SNF is calculated as follows. To calculate the predicted number of readmissions, pred_j, for index SNF stays at SNF_j, we used

$$\text{pred}_j = \Sigma\text{logit}^{-1}(\mu + \omega_i + \beta*Z_{ij}) \tag{2}$$

where the sum is over all stays in SNF_j, and ω_i is the random intercept. To calculate the expected number, exp_j, we used

$$\text{exp}_j = \Sigma\text{logit}^{-1}(\mu + \beta*Z_{ij}) \tag{3}$$

As a measure of excess or reduced readmissions among index stays at SNF_j, we calculated the standardized risk ratio SRR_j as

$$SRR_j = \text{pred}_j/\text{exp}_j \tag{4}$$

This value, SRR_j, is the standardized risk ratio for SNF_j. The standardized risk ratio, SRR_j, is multiplied by the overall national raw readmission rate for all SNF stays, $\bar{Y}$, to produce $RSRR_j$.

$$RSRR_j = SRR_j*\bar{Y} \tag{5}$$

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SECTION 3.
RESULTS

3.1   Overview

In this section, we summarize key results from the SNFRM for FY 2016 and CY 2017. We summarize descriptive statistics on the observed readmission rates and RSRRs for FY 2016 and CY 2017. Similar to our analyses for prior years,[8] the interquartile ranges show clustering in the middle of the distribution. This is in part attributable to the shrinkage of RSRR scores towards the mean, though the risk adjustment itself can also reduce the range of RSRRs. Full risk-adjustment model results for each year are included in *Appendix B*.

3.2   Results from FY 2016

Next, we report the results of analyses on facilities' readmission rates in FY 2016. The distribution of the observed readmission rates and RSRRs for FY 2016 is shown in *Table 2*. The observed readmission rates range from 0.00 to 100.00 percent with an interquartile range of 13.56 to 23.00 percent. The RSRR, compared with the observed unadjusted rate, has a narrower range, from 11.50 to 29.71 percent, a tighter interquartile range of 17.75 to 19.87 percent, and a much smaller standard deviation (SD) (1.77 vs. 8.38). The mean and median RSRR (18.87 and 18.71 percent, respectively) were slightly higher than the mean and median observed rate (18.42 and 18.18 percent, respectively).

The distributions of the observed readmission rates and RSRRs for FY 2016 are illustrated in *Figure 2*. The vertical axis indicates the percentage of SNFs, and the horizontal axis indicates the readmission rate.

Table 2
Distribution of SNFs' observed readmission rates and RSRRs, FY 2016

	Mean	Std dev	Min	10th percentile	25th percentile	Median	75th percentile	90th percentile	Max
Observed	18.42	8.38	0.00	9.00	13.56	18.18	23.00	27.96	100.00
Risk-standardized	18.87	1.77	11.50	16.79	17.75	18.71	19.87	21.13	29.71
Count of SNF stays	106	111	1	16	35	72	136	236	1,876

NOTE: There were 15,409 SNFs.

SOURCE: RTI International analysis of FY 2016 MedPAR data (RTI programming reference: MS15, idxSNF02_lk2016_003_facility.xls, and idxSNF02_lk2016_003_FORMATTED.xls)

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[8] SNFRM NQF #2510: All-Cause Risk-Standardized Readmission Measure Technical Report Supplement (April 2017): https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/Value-Based-Programs/Other-VBPs/Technical-Report-Supplement.pdf

**Figure 2
Distribution of SNFs' observed readmission rates and
RSRRs, FY 2016**
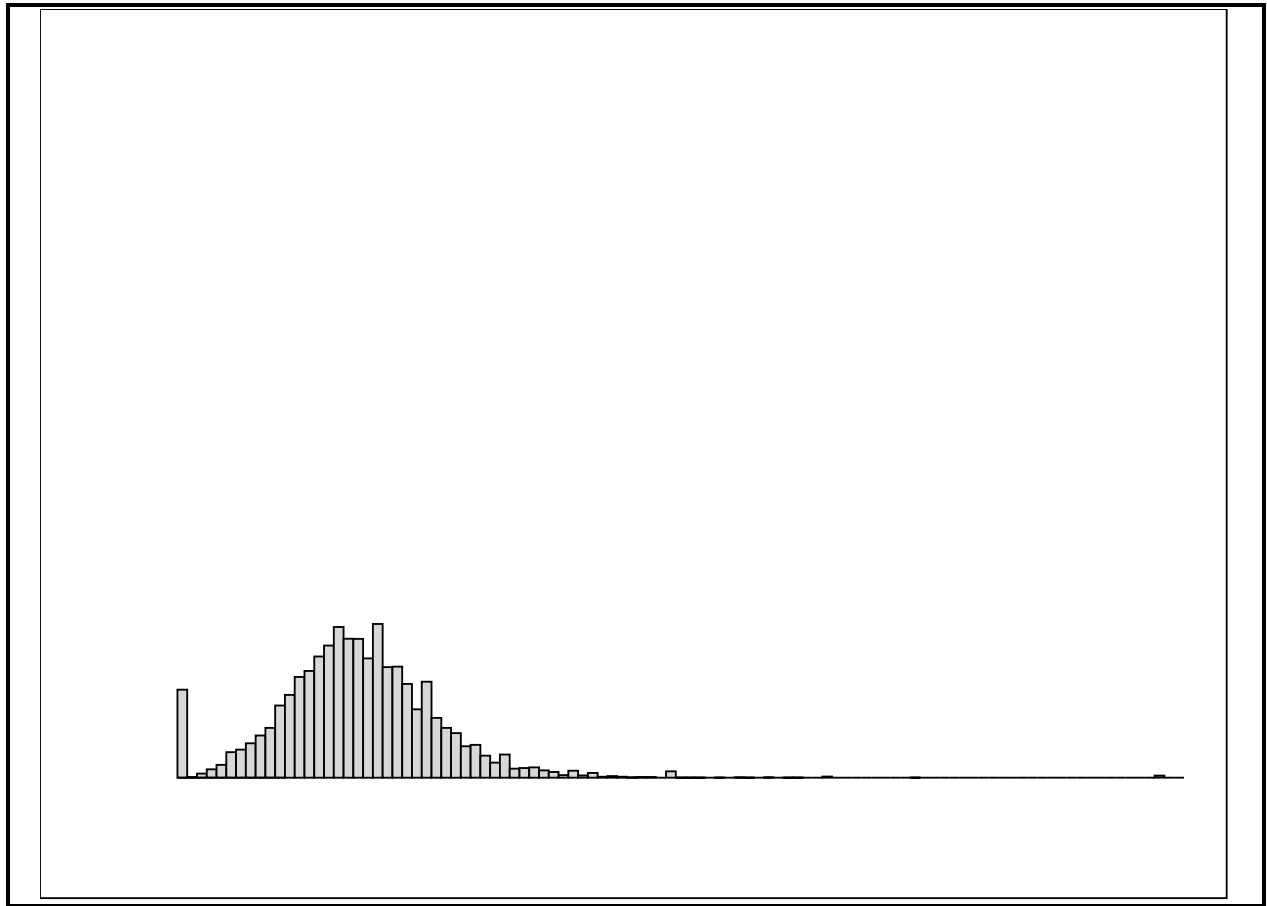
NOTE: There were 15,409 SNFs. Observed mean (SD): 18.42 (8.38); risk-standardized mean (SD): 18.87 (1.77)

SOURCE: RTI International analysis of FY 2016 MedPAR data (RTI programming reference: MS15 and MS15_001_pt2_dualplotsALL.rtf)

3.3   Results from CY 2017

Next we report the results of analyses on facilities' readmission rates in CY 2017. The distribution of the observed readmission rates and RSRRs for CY 2017 is shown in ***Table 3***. The observed readmission rates range from 0.00 to 100.00 percent, with an interquartile range of 14.20 to 23.44 percent. The RSRR, compared with the observed unadjusted rate, had a narrower range, from 12.80 to 33.13 percent, a tighter interquartile range of 18.35 to 20.36 percent, and a much smaller SD (1.70 vs. 8.15). The mean and median RSRR (19.42 and 19.27 percent, respectively) were slightly higher than the mean and median observed rate (18.87 and 18.70 percent, respectively).

The distributions of the observed readmission rates and RSRRs for FY 2016 are illustrated in ***Figure 3***. The vertical axis indicates the percentage of SNFs and the horizontal axis indicates the readmission rate.

Table 3
Distribution of SNFs' observed readmission rates and RSRRs, CY 2017

	Mean	Std dev	Min	10th percentile	25th percentile	Median	75th percentile	90th percentile	Max
Observed	18.87	8.15	0.00	9.52	14.20	18.70	23.44	28.26	100.00
Risk-standardized	19.42	1.70	12.80	17.43	18.35	19.27	20.36	21.60	33.13
Count of SNF stays	108	113	1	17	35	73	139	240	1,802

NOTE: There were 15,421 SNFs.

SOURCE: RTI International analysis of CY 2017 MedPAR data (RTI programming reference: CK69, av33_CY_002_summmeans2.xls, and idxSNF04_lk2017_CY_001_FORMATTED.xls)

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Figure 3
Distribution of SNFs' observed readmission rates and
RSRRs, CY 2017
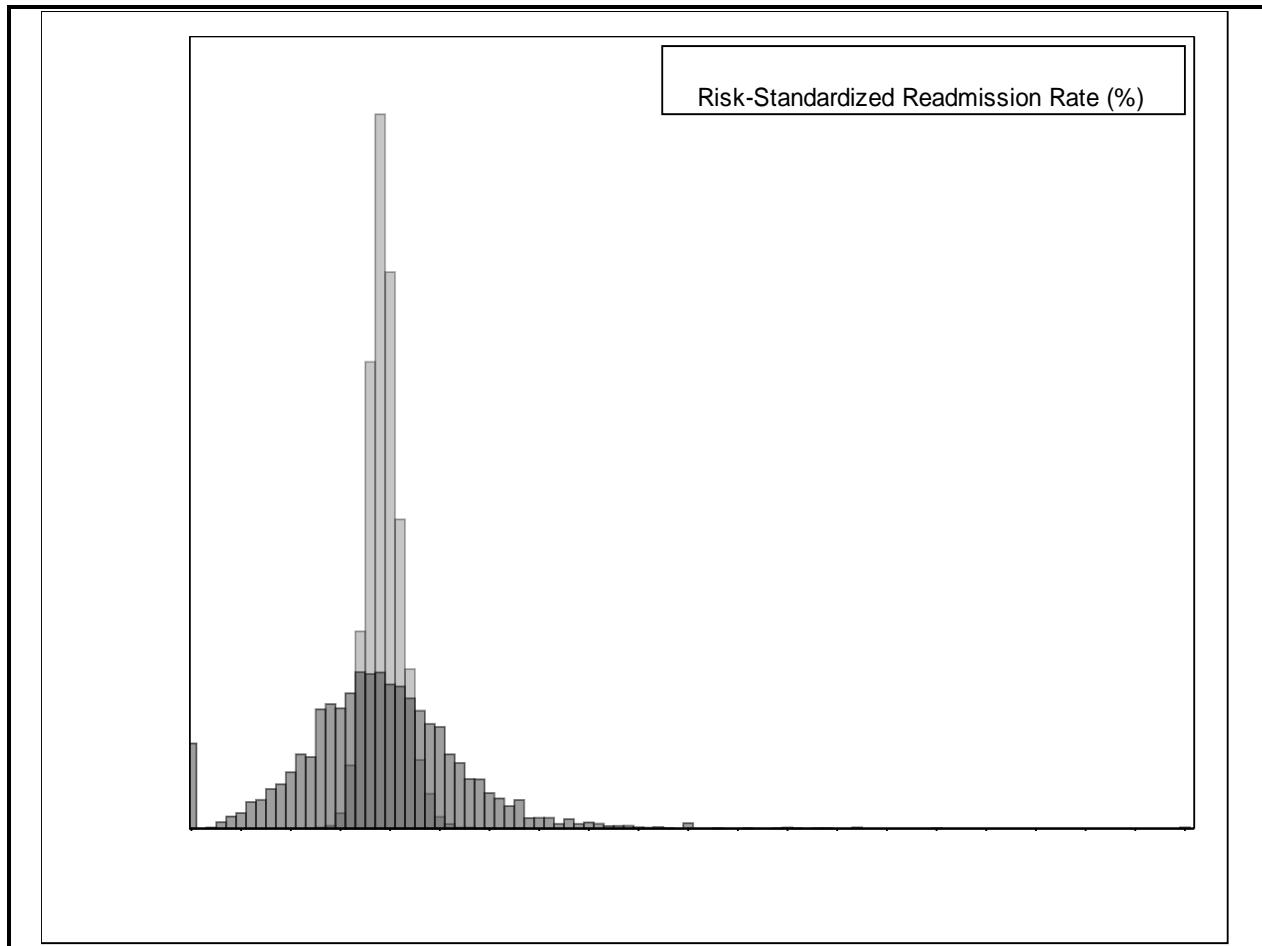
NOTE: There were 15,421 SNFs. Observed mean (SD): 18.87 (8.15); risk-standardized mean (SD): 19.42 (1.70)

SOURCE: RTI International analysis of CY 2017 MedPAR data (N = 15,421 facilities) (RTI programming reference: MS05 and idxSNF04_lk2017_CY_001_MS05_rsrrplots_DualAll.rtf)

3.4   Model Fit in FY 2016 and CY 2017

The c-statistics for the FY 2016 and CY 2017 risk models were 0.674 and 0.673, respectively (***Table 4***). These results are comparable to results from models in previous years.[9]

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[9] SNFRM NQF #2510: All-Cause Risk-Standardized Readmission Measure Technical Report Supplement (April 2017): https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/Value-Based-Programs/Other-VBPs/Technical-Report-Supplement.pdf

Table 4
C-statistics for FY 2016 and CY 2017 risk-adjustment models

Year	FY 2016	CY 2017
C-statistic	0.674	0.673

SOURCE: RTI International analysis of Medicare claims (RTI programming reference: CK26 and idxSNF02_lk2016_003.xls [FY 2016]; MS05 and idxSNF04_lk2017_CY_001_logreg_MS05.xls [CY 2017])

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APPENDIX A:
PLANNED READMISSION ALGORITHM

List of Tables in Appendix A

The Planned Readmissions Algorithm version 3.0 was updated for the FY 2019 SNF VBP Program using FY 2018 ICD-10 codes.

When calculating the SNFRM, planned readmissions are distinguished from unplanned readmissions. Only unplanned readmissions are counted in the numerator of the measure. Whether a readmission is planned or unplanned is determined by the algorithm shown in Figure A-1. Table A-1 lists the procedures that automatically qualify a readmission as planned. Similarly, Table A-2 lists diagnoses that automatically qualify a readmission as planned. If a readmission contains a procedure listed in Table A-3, it is a *potentially* planned readmission and will be considered planned only if it does *not* contain a diagnosis listed in Table A-4. In other words, if a readmission contains a procedure listed in Table A-3 but also contains a diagnosis from Table A-4, the readmission is considered unplanned. Please see the algorithm in Figure A-1 below for further detail on how planned readmissions are defined.

For both the procedures in Table A-3 and the diagnoses in Table A-4, we list "Panel A" and "Panel B." In Panel A of Table A-3, *all* ICD-10 codes for each listed AHRQ CCS group are considered potentially planned procedures that may be disqualified if coupled with an acute diagnosis listed in Table A-4. In Panel B, *some, but not all,* ICD-10 codes for each listed AHRQ CCS group are considered potentially planned procedures that may be disqualified if coupled with an acute diagnosis listed in Table A-4. ICD-10 codes for each AHRQ CCS group are in the supplementary Excel file: Tab 3a for Panel A and Tab 3b for Panel B.

In Panel A of Table A-4, *all* ICD-10 codes for each listed AHRQ CCS group are considered disqualifying diagnoses if coupled with a procedure listed in Table A-3. In Panel B, *some, but not all,* ICD-10 codes for each listed AHRQ CCS group are considered disqualifying diagnoses if coupled with a procedure listed in Table A-3. ICD-10 codes for each AHRQ CCS group are in the supplementary Excel file: Tab 4a for Panel A and Tab 4b for Panel B.

Figure A-1
Planned Readmission Algorithm[10]
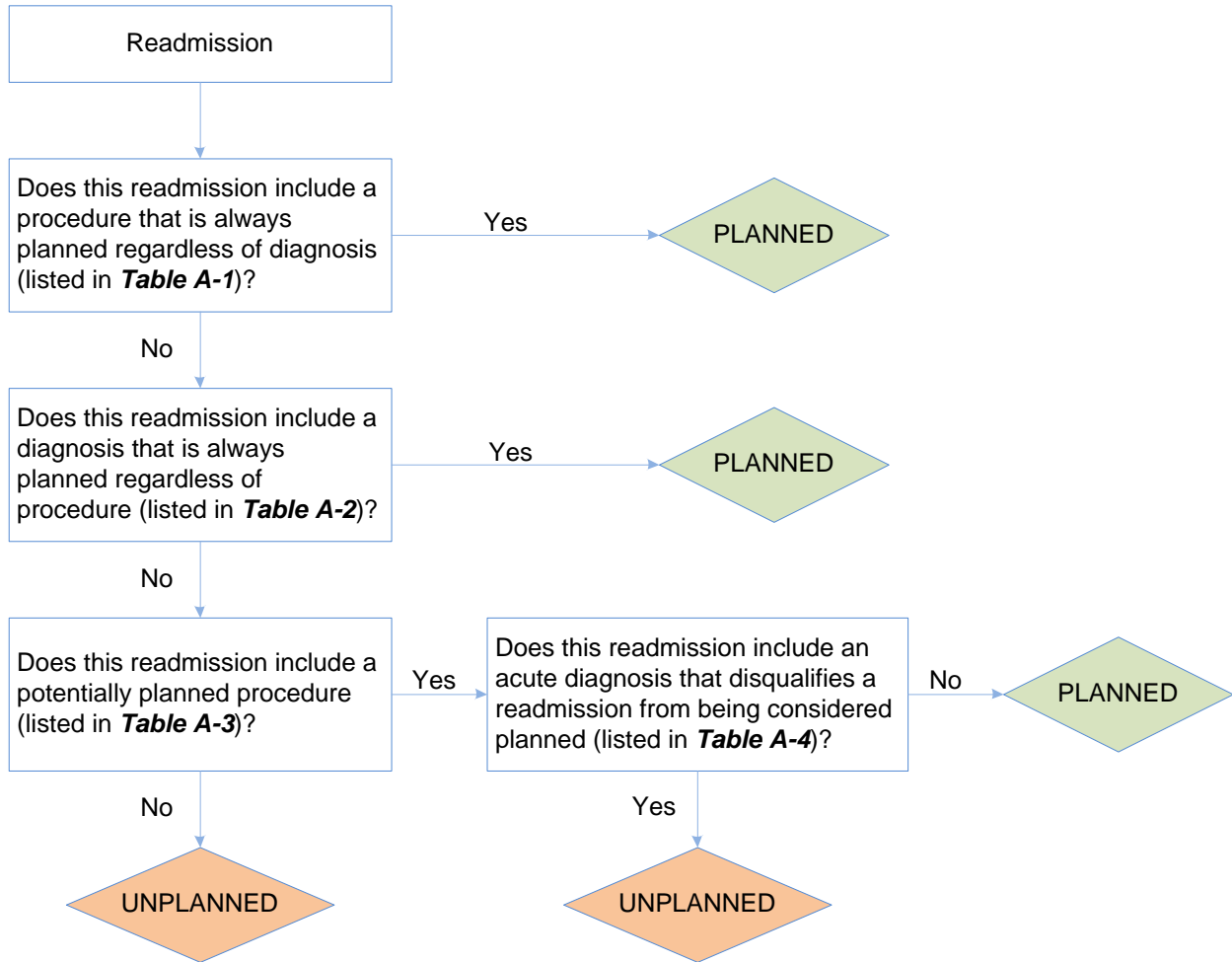
Table A-1
Procedure categories that are always planned

AHRQ CCS	CCS description	# of ICD codes in this CCS
64	Bone marrow transplant	88
105	Kidney transplant	6
134	Cesarean section	3
135	Forceps; vacuum; and breech delivery	4
176	Organ transplantation (other than bone marrow corneal or kidney)	76

NOTE: ICD-10 codes under each AHRQ CCS are included in the supplementary Excel file, Tab 1.

Table A-2
Diagnosis categories that are always planned

AHRQ CCS	CCS description	# of ICD codes in this CCS
45	Maintenance chemotherapy; radiotherapy	3
194	Forceps delivery	1
196	Other pregnancy and delivery including normal	119
254	Rehabilitation care; fitting of prostheses; and adjustment of devices	37

NOTE: ICD-10 codes under each AHRQ CCS are included in the supplementary Excel file, Tab 2.

Table A-3
Potentially planned procedure that may be disqualified

Panel A: AHRQ CCS procedure categories in entirety		
AHRQ CCS	CCS description	# of ICD codes in this CCS
3	Excision destruction or resection of intervertebral disc	42
5	Insertion of catheter or spinal stimulator and injection into spinal canal	42
9	Other OR therapeutic nervous system procedures	1,980
10	Thyroidectomy; partial or complete	24
12	Therapeutic endocrine procedures	621
33	Other OR procedures on mouth and throat	924
36	Lobectomy or pneumonectomy	74
37	Diagnostic bronchoscopy and biopsy of bronchus	173
38	Other diagnostic procedures on lung and bronchus	48
40	Other diagnostic procedures on the respiratory system and mediastinum	120
43	Heart valve procedures	307
44	Coronary artery bypass graft (CABG)	296
45	Percutaneous transluminal coronary angioplasty (PTCA) with or without stent placement	176
47	Diagnostic cardiac catheterization; coronary arteriography	88
48	Insertion; revision; replacement; removal of cardiac pacemaker or cardioverter/defibrillator	118
49	Other OR heart procedures	963
51	Endarterectomy; vessel of head and neck	84
52	Aortic resection; replacement or anastomosis	15
53	Varicose vein stripping; lower limb	27
55	Peripheral vascular bypass	2,322
56	Other vascular bypass and shunt; not heart	800
59	Other OR procedures on vessels of head and neck	2,082
62	Other diagnostic cardiovascular procedures	832
66	Procedures on spleen	51
67	Other procedures; hemic and lymphatic systems	1,478
71	Gastrostomy; temporary and permanent	16
74	Gastrectomy; partial and total	27
78	Colorectal resection	40
79	Excision (partial) of large intestine (not endoscopic)	13
82	Fluoroscopy of the biliary and pancreatic ducts (ERCP ERC and ERP)	9
84	Cholecystectomy and common duct exploration	5
85	Inguinal and femoral hernia repair	54
86	Other hernia repair	24
87	Laparoscopy (GI only)	9
89	Exploratory laparotomy	7

(continued)

	Panel A: AHRQ CCS procedure categories in entirety	
AHRQ CCS	CCS description	# of ICD codes in this CCS
99	Other OR gastrointestinal therapeutic procedures	1,527
104	Nephrectomy; partial or complete	34
106	Genitourinary incontinence procedures	12
107	Extracorporeal lithotripsy; urinary	43
109	Procedures on the urethra	227
112	Other OR therapeutic procedures of urinary tract	1,214
113	Transurethral resection of prostate (TURP)	6
114	Open prostatectomy	8
119	Oophorectomy; unilateral and bilateral	15
120	Other operations on ovary	142
124	Hysterectomy; abdominal and vaginal	10
129	Repair of cystocele and rectocele; obliteration of vaginal vault	4
132	Other OR therapeutic procedures; female organs	589
142	Partial excision bone	260
152	Arthroplasty knee	68
153	Hip replacement; total and partial	120
154	Arthroplasty other than hip or knee	574
157	Amputation of lower extremity	81
158	Spinal fusion	577
159	Other diagnostic procedures on musculoskeletal system	1,809
160	Other therapeutic procedures on muscles and tendons	2,510
164	Other OR therapeutic procedures on musculoskeletal system	2,145
166	Lumpectomy; quadrantectomy of breast	16
167	Mastectomy	3
171	Repair of skin subcutaneous tissue and fascia	67
172	Skin graft	191
175	Other OR therapeutic procedures on skin subcutaneous tissue fascia and breast	1,069

		# of ICD codes in this CCS considered potentially planned	Total # of ICD
AHRQ CCS	CCS description	procedures	codes in this CCS

Panel B: Partial AHRQ CCS procedure categories

AHRQ CCS	CCS description	# of ICD codes in this CCS considered potentially planned procedures	Total # of ICD codes in this CCS
2	Insertion; replacement; or removal of extracranial ventricular shunt	6	133
8	Other non-OR or closed therapeutic nervous system procedures	5	290
21	Other extraocular muscle and orbit therapeutic procedures	8	298
26	Other therapeutic procedures on the ear nose and sinus	26	1,584
32	Other non-OR procedures on mouth and throat	48	392
34	Tracheostomy; temporary and permanent	6	6
35	Tracheoscopy and laryngoscopy with biopsy	3	86
41	Other non-OR therapeutic procedures on respiratory system and mediastinum	53	658
42	Other OR Rx procedures on respiratory system and mediastinum	84	1,621
60	Embolectomy and endarterectomy of lower limbs	102	102
61	Other OR procedures on vessels other than head and neck	3,759	9,067
63	Other non-OR therapeutic cardiovascular procedures	4	905
73	Ileostomy and other enterostomy	7	25
93	Other non-OR upper GI therapeutic procedures	14	287
94	Other OR upper GI therapeutic procedures	31	1,104
95	Other non-OR lower GI therapeutic procedures	62	322
96	Other OR lower GI therapeutic procedures	54	1,714
97	Other gastrointestinal diagnostic procedures	26	324
98	Other non-OR gastrointestinal therapeutic procedures	56	646
103	Nephrotomy and nephrostomy	4	16
111	Other non-OR therapeutic procedures of urinary tract	2	260
117	Other non-OR therapeutic procedures; male genital	19	629
146	Fracture treatment including reposition with or without fixation; hip or femur fracture or dislocation	18	330
147	Fracture treatment including reposition with or without fixation; lower extremity fracture or dislocation (other than hip or femur)	36	560
148	Fracture treatment including reposition with or without fixation of other fracture or dislocation	9	995
161	Other OR therapeutic procedures on bone	181	4,321

Table A-3 (continued)
Potentially planned procedure that may be disqualified

Panel B: Partial AHRQ CCS procedure categories

AHRQ CCS	CCS description	# of ICD codes in this CCS considered potentially planned procedures	Total # of ICD codes in this CCS
162	Other OR therapeutic procedures on joints	175	3,660
163	Other non-OR therapeutic procedures on musculoskeletal system	278	2,635
174	Other non-OR therapeutic procedures on skin subcutaneous tissue fascia and breast	209	983
211	Radiation therapy	5	2,369
218	Psychological and psychiatric evaluation and therapy	5	31
224	Cancer chemotherapy	10	166
226	Other diagnostic radiology and related techniques	5	769

Table A-4
Acute diagnoses that disqualify potentially planned procedures

Panel A: AHRQ CCS diagnosis categories in entirety

AHRQ CCS	CCS description	# of ICD codes in this CCS
1	Tuberculosis	58
2	Septicemia (except in labor)	43
3	Bacterial infection; unspecified site	142
4	Mycoses	87
5	HIV infection	4
7	Viral infection	149
8	Other infections; including parasitic	210
9	Sexually transmitted infections (not HIV or hepatitis)	131
54	Gout and other crystal arthropathies	460
55	Fluid and electrolyte disorders	13
60	Acute posthemorrhagic anemia	1
61	Sickle cell anemia	17
63	Diseases of white blood cells	27
76	Meningitis (except that caused by tuberculosis or sexually transmitted disease)	41

(continued)

25

Panel A: AHRQ CCS diagnosis categories in entirety		
AHRQ CCS	CCS description	# of ICD codes in this CCS
77	Encephalitis (except that caused by tuberculosis or sexually transmitted disease)	52
78	Other CNS infection and poliomyelitis	28
82	Paralysis	56
83	Epilepsy; convulsions	51
84	Headache; including migraine	80
85	Coma; stupor; and brain damage	104
87	Retinal detachments; defects; vascular occlusion; and retinopathy	291
89	Blindness and vision defects	176
90	Inflammation; infection of eye (except that caused by tuberculosis or sexually transmitted disease)	486
91	Other eye disorders	1,255
92	Otitis media and related conditions	278
93	Conditions associated with dizziness or vertigo	57
99	Hypertension with complications and secondary hypertension	18
102	Nonspecific chest pain	4
104	Other and ill-defined heart disease	20
107	Cardiac arrest and ventricular fibrillation	5
109	Acute cerebrovascular disease	188
112	Transient cerebral ischemia	7
116	Aortic and peripheral arterial embolism or thrombosis	21
118	Phlebitis; thrombophlebitis and thromboembolism	163
120	Hemorrhoids	8
122	Pneumonia (except that caused by tuberculosis or sexually transmitted disease)	54
123	Influenza	18
124	Acute and chronic tonsillitis	13
125	Acute bronchitis	14
126	Other upper respiratory infections	42
127	Chronic obstructive pulmonary disease and bronchiectasis	16
128	Asthma	18
129	Aspiration pneumonitis; food/vomitus	1
130	Pleurisy; pneumothorax; pulmonary collapse	23
131	Respiratory failure; insufficiency; arrest (adult)	18
135	Intestinal infection	72

(continued)

	Panel A: AHRQ CCS diagnosis categories in entirety	
AHRQ CCS	CCS description	# of ICD codes in this CCS
137	Diseases of mouth; excluding dental	43
139	Gastroduodenal ulcer (except hemorrhage)	21
140	Gastritis and duodenitis	16
142	Appendicitis and other appendiceal conditions	12
145	Intestinal obstruction without hernia	19
146	Diverticulosis and diverticulitis	24
148	Peritonitis and intestinal abscess	11
153	Gastrointestinal hemorrhage	22
154	Noninfectious gastroenteritis	9
157	Acute and unspecified renal failure	6
159	Urinary tract infections	35
165	Inflammatory conditions of male genital organs	23
168	Inflammatory diseases of female pelvic organs	38
172	Ovarian cyst	16
197	Skin and subcutaneous tissue infections	156
198	Other inflammatory condition of skin	124
225	Joint disorders and dislocations; trauma-related	1,985
226	Fracture of neck of femur (hip)	1,130
227	Spinal cord injury	313
228	Skull and face fractures	450
229	Fracture of upper limb	6,651
230	Fracture of lower limb	6,888
232	Sprains and strains	1,364
233	Intracranial injury	571
234	Crushing injury or internal injury	2,736
235	Open wounds of head; neck; and trunk	1,302
237	Complication of device; implant or graft	1,558
238	Complications of surgical procedures or medical care	749
239	Superficial injury; contusion	2,211
240	Burns	2,584
241	Poisoning by psychotropic agents	157
242	Poisoning by other medications and drugs	1,312
243	Poisoning by nonmedicinal substances	1,206
244	Other injuries and conditions due to external causes	3,126

AHRQ CCS	Panel A: AHRQ CCS diagnosis categories in entirety	
	CCS description	# of ICD codes in this CCS
245	Syncope	1
246	Fever of unknown origin	2
247	Lymphadenitis	13
249	Shock	5
250	Nausea and vomiting	6
251	Abdominal pain	28
252	Malaise and fatigue	6
253	Allergic reactions	138
259	Residual codes; unclassified	354
650	Adjustment disorders	9
651	Anxiety disorders	51
652	Attention-deficit conduct and disruptive behavior disorders	21
653	Delirium dementia and amnestic and other cognitive disorders	24
656	Impulse control disorders NEC	8
658	Personality disorders	12
660	Alcohol-related disorders	68
661	Substance-related disorders	499
662	Suicide and intentional self-inflicted injury	1,071
663	Screening and history of mental health and substance abuse codes	19
670	Miscellaneous mental health disorders	88

Table A-4 (continued)
Acute diagnoses that disqualify potentially planned procedures

	Panel B: Partial AHRQ CCS procedure categories		
AHRQ CCS	CCS description	# of ICD codes in this CCS considered disqualifying diagnoses	Total # of ICD codes in this CCS
96	Heart valve disorders	1	51
97	Peri-; endo-; and myocarditis; cardiomyopathy (except that caused by tuberculosis or sexually transmitted disease)	37	57
105	Conduction disorders	20	27
106	Cardiac dysrhythmias	7	22
108	Congestive heart failure; nonhypertensive	24	24
149	Biliary tract disease	23	61
152	Pancreatic disorders (not diabetes)	21	33

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APPENDIX B:
RISK-ADJUSTMENT MODEL RESULTS

List of Tables in Appendix B

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Table B-1
Risk-adjustment model results, FY 2016

Covariate	FY 2016 count with variable	FY 2016 % with variable	FY 2016 count with readmission	FY 2016 % with readmission	FY 2016 odds ratio	FY 2016 LCL	FY 2016 UCL
Readmission	306,149	18.8	—	—	—	—	—
Age-Sex Groups (Reference group: Females 65-69)							
Male age 0_34	1,009	0.1	231	22.9	1.025	0.878	1.197
Male age 35_44	3,750	0.2	879	23.4	1.025	0.945	1.112
Male age 45_54	15,365	0.9	3,555	23.1	0.979	0.937	1.022
Male age 55_59	19,374	1.2	4,440	22.9	0.955	0.918	0.994
Male age 60_64	28,083	1.7	6,477	23.1	0.955	0.923	0.988
Male age 65_69	73,571	4.5	18,296	24.9	0.987	0.964	1.011
Male age 70_74	81,933	5.0	17,143	20.9	1.027	1.002	1.053
Male age 75_79	96,185	5.9	20,346	21.2	1.063	1.038	1.089
Male age 80_84	107,760	6.6	22,224	20.6	1.064	1.039	1.090
Male age 85_89	106,991	6.6	21,773	20.4	1.068	1.042	1.095
Male age 90_94	66,175	4.1	12,778	19.3	1.036	1.008	1.066
Male age GT 95	20,586	1.3	3,745	18.2	1.006	0.965	1.048
Female age 0_34	832	0.1	230	27.6	1.271	1.081	1.493
Female age 35_44	3,316	0.2	762	23.0	0.992	0.909	1.082
Female age 45_54	14,040	0.9	3,270	23.3	1.039	0.993	1.086
Female age 55_59	18,532	1.1	4,033	21.8	0.982	0.943	1.022
Female age 60_64	29,763	1.8	6,611	22.2	1.005	0.972	1.039
Female age 70_74	116,202	7.1	20,472	17.6	0.979	0.956	1.002
Female age 75_79	145,492	8.9	25,230	17.3	0.975	0.953	0.998
Female age 80_84	176,963	10.9	29,738	16.8	0.961	0.940	0.983

(continued)

Table B-1 (continued)
Risk-adjustment model results, FY 2016

Covariate	FY 2016 count with variable	FY 2016 % with variable	FY 2016 count with readmission	FY 2016 % with readmission	FY 2016 odds ratio	FY 2016 LCL	FY 2016 UCL
Female age 85_89	199,166	12.2	32,176	16.2	0.936	0.915	0.957
Female age 90_94	148,266	9.1	22,161	14.9	0.883	0.861	0.904
Female age GT 95	61,122	3.8	8,666	14.2	0.868	0.842	0.894
Prior Length of Stay (Reference group: LOS 1-3 Days)							
LOS btwn 4 & 7 days (based on proximal IPPS)	727,147	44.7	131,236	18.0	1.137	1.124	1.149
LOS btwn 8 & 14 days (based on proximal IPPS)	330,838	20.3	80,637	24.4	1.368	1.350	1.386
LOS GT 14 days (based on proximal IPPS)	118,696	7.3	33,756	28.4	1.525	1.498	1.552
Originally disabled (Reference group: not originally disabled)							
Originally disabled: based on origreas from denominator	370,844	22.8	81,169	21.9	1.042	1.030	1.055
End Stage Renal Disease Indicator (ESRD) (Reference group: no end stage renal disease)							
End Stage Renal Disease Indicator (ESRD recoded)	62,719	3.9	21,684	34.6	1.141	1.099	1.184
Surgical Groups (Reference group: no surgery or only ophthalmology surgery)							
Vascular Surgery	16,479	1.0	4,308	26.1	1.096	1.053	1.141
Orthopedics Surgery	307,241	18.9	35,113	11.4	0.949	0.930	0.969
General Surgery	92,201	5.7	21,205	23.0	1.002	0.982	1.022
Cardio Thoracic Surgery	41,569	2.6	9,828	23.6	0.907	0.881	0.933
Urologic surgery	12,066	0.7	2,997	24.8	1.088	1.033	1.146
Neurosurgery	13,610	0.8	2,784	20.5	1.183	1.129	1.240
Plastic Surgery	35,148	2.2	7,189	20.5	0.982	0.954	1.011

Table B-1 (continued)
Risk-adjustment model results, FY 2016

Covariate	FY 2016 count with variable	FY 2016 % with variable	FY 2016 count with readmission	FY 2016 % with readmission	FY 2016 odds ratio	FY 2016 LCL	FY 2016 UCL
Otolaryngology Surgery	3,194	0.2	730	22.9	1.067	0.972	1.171
Obstetrics/Gynecology Surgery	5,507	0.3	1,198	21.8	1.027	0.953	1.107
Prior Care Utilization - Count of Prior Stays (reference group: zero prior stays)							
Count IPPS stays 365 days prior to discharge from proximal stay: 1-3	773,148	47.5	160,338	20.7	1.071	1.060	1.083
Count IPPS stays 365 days prior to discharge from proximal stay: 4-6	120,259	7.4	38,724	32.2	1.266	1.243	1.289
Count IPPS stays 365 days prior to discharge from proximal stay: 7-9	21,623	1.3	9,032	41.8	1.543	1.494	1.594
Count IPPS stays 365 days prior to discharge from proximal stay: 10+	6,377	0.4	3,248	50.9	2.043	1.936	2.156
At least one day in ICU (reference group: no prior days in ICU)							
At least one day in ICU	625,857	38.5	145,699	23.3	1.104	1.094	1.115
CCS Groupings - based on principal diagnosis (Reference group: Osteoarthritis [203] + Immunizations and screening for infectious disease [1] + Menstrual disorders [171] + Administrative/social admission [255] + Medical examination/evaluation [256] + Adverse effects of medical drugs [2617] + Disorders of lipid metabolism [53] + Disorders usually diagnosed in infancy [655] + Impulse control disorders [656] + Mood disorders [657])							

(continued)

Table B-1 (continued)
Risk-adjustment model results, FY 2016

Covariate	FY 2016 count with variable	FY 2016 % with variable	FY 2016 count with readmission	FY 2016 % with readmission	FY 2016 odds ratio	FY 2016 LCL	FY 2016 UCL
2 Septicemia (except in labor)	170,201	10.5	40,578	23.8	1.881	1.819	1.946
4 Mycoses	1,494	0.1	406	27.2	2.340	2.074	2.640
5 HIV infection	533	0.0	171	32.1	2.339	1.921	2.849
6 Hepatitis	634	0.0	230	36.3	2.815	2.372	3.340
Infections_1_3_7_8_9	3,605	0.2	703	19.5	1.814	1.659	1.984
11 Cancer of head and neck	668	0.0	141	21.1	1.708	1.389	2.100
GIcancers_12_13_14_15	6,786	0.4	1,389	20.5	1.781	1.659	1.911
GIother_cancers_16_17_18	1,356	0.1	340	25.1	2.088	1.833	2.379
RespiratoryCancer_19_20	1,793	0.1	379	21.1	1.975	1.748	2.231
21 Cancer of bone and connective tissue	373	0.0	72	19.3	2.142	1.645	2.788
SkinCancer_22_23	329	0.0	46	14.0	1.394	1.014	1.917
24 Cancer of breast	456	0.0	57	12.5	1.464	1.103	1.942
FemaleGenitalCancer_25_26_27_28	1,285	0.1	276	21.5	2.275	1.948	2.656
MaleGenitalCancer_29_30_31	324	0.0	67	20.7	1.667	1.261	2.202
32 Cancer of bladder	1,534	0.1	461	30.1	2.723	2.400	3.089
KidneyUrinaryCancer_33_34	1,081	0.1	194	17.9	1.510	1.276	1.787
35 Cancer of brain and nervous system	410	0.0	97	23.7	2.216	1.749	2.807
ThyroidCancerDisorders_36_48	986	0.1	201	20.4	2.053	1.747	2.411
HodgkinLeukemia_37_38_39_40	821	0.1	263	32.0	2.977	2.554	3.471
42 Secondary malignancies	2,060	0.1	558	27.1	2.316	2.085	2.573
otherCancerNeoplasms_41_43_44	579	0.0	134	23.1	2.130	1.745	2.601

Table B-1 (continued)
Risk-adjustment model results, FY 2016

Covariate	FY 2016 count with variable	FY 2016 % with variable	FY 2016 count with readmission	FY 2016 % with readmission	FY 2016 odds ratio	FY 2016 LCL	FY 2016 UCL
45 Maintenance chemotherapy; radiotherapy	49	0.0	11	22.4	1.433	0.727	2.824
BenignNeoplasms_46_47	2,614	0.2	507	19.4	1.950	1.757	2.164
Diabetes_49_50	23,336	1.4	4,948	21.2	1.695	1.620	1.774
51 Other endocrine disorders	5,040	0.3	964	19.1	1.918	1.774	2.073
52 Nutritional deficiencies	1,223	0.1	265	21.7	2.123	1.841	2.447
54 Gout and other crystal arthropathies	1,780	0.1	280	15.7	1.648	1.444	1.882
55 Fluid and electrolyte disorders	25,476	1.6	4,826	18.9	1.913	1.829	2.000
CysticFibrosisCOPD_56_127	30,596	1.9	7,210	23.6	2.206	2.117	2.299
ImmunityWhtBloodDisorders_57_63	1,130	0.1	301	26.6	2.243	1.953	2.576
58 Other nutritional; endocrine; and metabolic disorders	4,767	0.3	974	20.4	1.955	1.808	2.113
59 Deficiency and other anemia	8,067	0.5	2,094	26.0	2.373	2.235	2.519
60 Acute posthemorrhagic anemia	3,863	0.2	910	23.6	2.056	1.893	2.232
BloodDisorders_61_62_64	1,460	0.1	365	25.0	2.084	1.838	2.361
653 Delirium	25,995	1.6	2,779	10.7	1.151	1.094	1.211
BehvrDevelDis650_651_652_654_662	1,025	0.1	143	14.0	1.250	1.043	1.499
MentalIllness_658_659	8,119	0.5	817	10.1	0.973	0.898	1.054
SubstanceAbuse_660_661_663	5,900	0.4	1,167	19.8	1.662	1.544	1.788
670 Miscellaneous disorders	342	0.0	39	11.4	1.133	0.809	1.586
76 Meningitis (except that caused by tuberculosis or sexually transmitted disease)	517	0.0	108	20.9	1.922	1.546	2.390
77 Encephalitis (except that caused by tuberculosis or sexually transmitted disease)	652	0.0	153	23.5	2.116	1.756	2.548
78 Other CNS infection and poliomyelitis	611	0.0	147	24.1	2.063	1.702	2.501

(continued)

Table B-1 (continued)
Risk-adjustment model results, FY 2016

Covariate	FY 2016 count with variable	FY 2016 % with variable	FY 2016 count with readmission	FY 2016 % with readmission	FY 2016 odds ratio	FY 2016 LCL	FY 2016 UCL
79 Parkinson`s disease	3,221	0.2	356	11.1	1.341	1.196	1.504
80 Multiple sclerosis	798	0.0	102	12.8	1.638	1.326	2.023
81 Other hereditary and degenerative nervous system conditions	1,858	0.1	260	14.0	1.485	1.296	1.701
82 Paralysis	557	0.0	86	15.4	1.659	1.313	2.097
83 Epilepsy; convulsions	10,468	0.6	1,815	17.3	1.659	1.562	1.762
84 Headache; including migraine	412	0.0	66	16.0	1.687	1.290	2.206
85 Coma; stupor; and brain damage	175	0.0	34	19.4	1.604	1.094	2.351
93 Conditions associated with dizziness or vertigo	2,155	0.1	190	8.8	1.094	0.939	1.274
EyeEarSensoryDsord_86_to_92_94	1,033	0.1	181	17.5	1.845	1.562	2.179
95 Other nervous system disorders	24,533	1.5	4,521	18.4	1.805	1.725	1.888
96 Heart valve disorders	10,775	0.7	2,246	20.8	1.832	1.722	1.949
97 Peri- endo- & myocarditis cardiomyopathy (except caused by tuberculosis or sexually transmitted disease)	2,085	0.1	592	28.4	2.284	2.061	2.532
98 Essential hypertension	1,962	0.1	225	11.5	1.400	1.214	1.615
99 Hypertension with complications and secondary hypertension	16,075	1.0	4,362	27.1	1.959	1.868	2.055
100 Acute myocardial infarction	27,177	1.7	6,350	23.4	2.095	2.007	2.187
101 Coronary atherosclerosis and other heart disease	10,954	0.7	2,168	19.8	1.784	1.681	1.893
102 Nonspecific chest pain	3,845	0.2	702	18.3	1.621	1.482	1.772
103 Pulmonary heart disease	9,884	0.6	1,950	19.7	1.827	1.722	1.939
104 Other and ill-defined heart disease	417	0.0	80	19.2	1.697	1.324	2.177

(continued)

Table B-1 (continued)
Risk-adjustment model results, FY 2016

Covariate	FY 2016 count with variable	FY 2016 % with variable	FY 2016 count with readmission	FY 2016 % with readmission	FY 2016 odds ratio	FY 2016 LCL	FY 2016 UCL
105 Conduction disorders	4,233	0.3	660	15.6	1.541	1.409	1.686
106 Cardiac dysrhythmias	31,871	2.0	6,774	21.3	2.064	1.980	2.152
107 Cardiac arrest and ventricular fibrillation	574	0.0	132	23.0	1.402	1.148	1.712
108 Congestive heart failure; nonhypertensive	77,873	4.8	19,873	25.5	2.112	2.038	2.189
109 Acute cerebrovascular disease	52,377	3.2	9,339	17.8	1.989	1.914	2.068
110 Occlusion or stenosis of precerebral arteries	1,518	0.1	248	16.3	1.518	1.315	1.752
111 Other and ill-defined cerebrovascular disease	771	0.0	130	16.9	1.558	1.282	1.893
112 Transient cerebral ischemia	6,298	0.4	830	13.2	1.503	1.387	1.628
113 Late effects of cerebrovascular disease	2,499	0.2	393	15.7	1.561	1.394	1.748
114 Peripheral and visceral atherosclerosis	8,409	0.5	2,059	24.5	2.130	2.004	2.265
115 Aortic; peripheral; and visceral artery aneurysms	3,417	0.2	741	21.7	1.870	1.711	2.045
116 Aortic and peripheral arterial embolism or thrombosis	1,960	0.1	513	26.2	2.309	2.068	2.578
117 Other circulatory disease	8,208	0.5	1,542	18.8	1.737	1.629	1.852
118 Phlebitis; thrombophlebitis and thromboembolism	7,949	0.5	1,500	18.9	1.855	1.738	1.979
VeinLymphDisease_119_120_121_247	2,657	0.2	550	20.7	1.937	1.751	2.142
122 Pneumonia (except that caused by tuberculosis or sexually transmitted disease)	62,902	3.9	13,040	20.7	1.916	1.846	1.988
123 Influenza	2,361	0.1	383	16.2	1.522	1.356	1.707
125 Acute bronchitis	2,537	0.2	331	13.0	1.431	1.269	1.614
UpperRespInfect_Tons_124_126	704	0.0	106	15.1	1.577	1.276	1.949
128 Asthma	1,060	0.1	177	16.7	1.788	1.514	2.110

Table B-1 (continued)
Risk-adjustment model results, FY 2016

Covariate	FY 2016 count with variable	FY 2016 % with variable	FY 2016 count with readmission	FY 2016 % with readmission	FY 2016 odds ratio	FY 2016 LCL	FY 2016 UCL
129 Aspiration pneumonitis; food/vomitus	22,433	1.4	5,013	22.3	1.935	1.849	2.024
130 Pleurisy; pneumothorax; pulmonary collapse	5,248	0.3	1,329	25.3	1.993	1.856	2.140
131 Respiratory failure; insufficiency; arrest (adult)	30,274	1.9	8,662	28.6	2.270	2.179	2.365
LungExtAgentOthLowRespDis132_133	3,807	0.2	868	22.8	2.061	1.896	2.241
134 Other upper respiratory disease	988	0.1	224	22.7	1.903	1.628	2.224
135 Intestinal infection	12,557	0.8	3,007	23.9	2.154	2.044	2.270
Mouth_DisordersDiseases_136_137	918	0.1	174	19.0	1.798	1.516	2.133
138 Esophageal disorders	4,541	0.3	983	21.6	1.912	1.768	2.069
139 Gastroduodenal ulcer (except hemorrhage)	1,585	0.1	327	20.6	1.896	1.669	2.155
140 Gastritis and duodenitis	2,671	0.2	588	22.0	1.924	1.744	2.124
141 Other disorders of stomach and duodenum	2,408	0.1	662	27.5	2.197	1.994	2.421
142 Appendicitis and other appendiceal conditions	936	0.1	161	17.2	1.785	1.498	2.126
143 Abdominal hernia	7,299	0.4	1,310	17.9	1.730	1.613	1.856
144 Regional enteritis and ulcerative colitis	1,187	0.1	348	29.3	2.832	2.481	3.233
145 Intestinal obstruction without hernia	14,540	0.9	2,992	20.6	1.854	1.760	1.954
146 Diverticulosis and diverticulitis	10,185	0.6	2,165	21.3	2.072	1.956	2.196
147 Anal and rectal conditions	1,884	0.1	368	19.5	1.816	1.609	2.048
148 Peritonitis and intestinal abscess	783	0.0	233	29.8	2.127	1.811	2.498
149 Biliary tract disease	9,576	0.6	1,780	18.6	1.802	1.694	1.917
151 Other liver diseases	5,594	0.3	1,982	35.4	2.596	2.426	2.778
152 Pancreatic disorders (not diabetes)	3,860	0.2	840	21.8	1.986	1.825	2.161
153 Gastrointestinal hemorrhage	23,803	1.5	5,537	23.3	1.970	1.885	2.059

Table B-1 (continued)
Risk-adjustment model results, FY 2016

Covariate	FY 2016 count with variable	FY 2016 % with variable	FY 2016 count with readmission	FY 2016 % with readmission	FY 2016 odds ratio	FY 2016 LCL	FY 2016 UCL
154 Noninfectious gastroenteritis	3,328	0.2	624	18.8	1.899	1.729	2.086
155 Other gastrointestinal disorders	8,878	0.5	2,070	23.3	2.068	1.948	2.194
156 Nephritis; nephrosis; renal sclerosis	251	0.0	68	27.1	2.158	1.623	2.868
157 Acute and unspecified renal failure	55,764	3.4	12,351	22.1	2.039	1.964	2.116
158 Chronic renal failure	612	0.0	177	28.9	1.869	1.558	2.242
159 Urinary tract infections	64,715	4.0	10,443	16.1	1.755	1.690	1.822
160 Calculus of urinary tract	810	0.0	149	18.4	1.655	1.374	1.993
161 Other diseases of kidney and ureters	2,042	0.1	437	21.4	1.979	1.768	2.216
162 Other diseases of bladder and urethra	1,068	0.1	234	21.9	1.932	1.660	2.249
163 Genitourinary symptoms and ill-defined conditions	1,935	0.1	418	21.6	1.992	1.776	2.234
164 Hyperplasia of prostate	1,252	0.1	226	18.1	1.640	1.410	1.908
165 Inflammatory conditions of male genital organs	688	0.0	124	18.0	1.491	1.220	1.822
166 Other male genital disorders	198	0.0	53	26.8	2.342	1.694	3.239
Female_167_to_170_172_173_175	1,179	0.1	220	18.7	1.830	1.569	2.135
197 Skin and subcutaneous tissue infections	26,583	1.6	4,401	16.6	1.671	1.597	1.748
199 Chronic ulcer of skin	5,727	0.4	1,058	18.5	1.679	1.557	1.811
SkinDisorders_198_200	764	0.0	184	24.1	2.435	2.049	2.894
201 Infective arthritis and osteomyelitis (except that caused by tuberculosis or sexually transmitted disease)	8,176	0.5	1,520	18.6	1.650	1.548	1.759
202 Rheumatoid arthritis and related disease	821	0.1	100	12.2	1.513	1.223	1.873
204 Other non-traumatic joint disorders	3,732	0.2	456	12.2	1.526	1.377	1.692

(continued)

Table B-1 (continued)
Risk-adjustment model results, FY 2016

Covariate	FY 2016 count with variable	FY 2016 % with variable	FY 2016 count with readmission	FY 2016 % with readmission	FY 2016 odds ratio	FY 2016 LCL	FY 2016 UCL
SpondyDiscDisordersOsteo_205_206	26,405	1.6	3,231	12.2	1.566	1.496	1.641
207 Pathological fracture	14,098	0.9	2,017	14.3	1.714	1.623	1.811
FootOtherDeformities_208_209	5,101	0.3	533	10.4	1.535	1.397	1.685
210 Systemic lupus erythematosus and connective tissue disorders	497	0.0	130	26.2	2.310	1.878	2.842
211 Other connective tissue disease	10,748	0.7	1,370	12.7	1.477	1.385	1.576
212 Other bone disease and musculoskeletal deformities	2,047	0.1	244	11.9	1.522	1.326	1.746
CongenitalAnomomalies_213_to_217	840	0.1	197	23.5	2.096	1.775	2.475
225 Joint disorders and dislocations; trauma-related	1,334	0.1	187	14.0	1.946	1.662	2.279
226 Fracture of neck of femur (hip)	104,269	6.4	13,855	13.3	1.729	1.674	1.785
227 Spinal cord injury	361	0.0	79	21.9	2.278	1.763	2.943
228 Skull and face fractures	1,846	0.1	238	12.9	1.533	1.332	1.764
229 Fracture of upper limb	16,689	1.0	2,005	12.0	1.578	1.495	1.665
230 Fracture of lower limb	29,647	1.8	3,978	13.4	1.730	1.658	1.805
231 Other fractures	44,253	2.7	5,477	12.4	1.550	1.488	1.615
232 Sprains and strains	2,101	0.1	239	11.4	1.487	1.294	1.709
233 Intracranial injury	16,191	1.0	3,159	19.5	2.148	2.041	2.260
234 Crushing injury or internal injury	2,966	0.2	538	18.1	1.890	1.710	2.088
235 Open wounds of head; neck; and trunk	1,206	0.1	167	13.8	1.561	1.319	1.846
236 Open wounds of extremities	1,231	0.1	195	15.8	1.765	1.506	2.068
237 Complication of device; implant or graft	54,752	3.4	11,678	21.3	1.986	1.918	2.057

Table B-1 (continued)
Risk-adjustment model results, FY 2016

Covariate	FY 2016 count with variable	FY 2016 % with variable	FY 2016 count with readmission	FY 2016 % with readmission	FY 2016 odds ratio	FY 2016 LCL	FY 2016 UCL
238 Complications of surgical procedures or medical care	23,688	1.5	5,960	25.2	2.044	1.957	2.135
SuperficialInjuryBurns_239_240	5,683	0.3	865	15.2	1.652	1.526	1.789
Poisoning_241_242_243	4,569	0.3	813	17.8	1.531	1.409	1.664
244 Other injuries and conditions due to external causes	5,950	0.4	859	14.4	1.545	1.427	1.673
245 Syncope	7,204	0.4	928	12.9	1.427	1.322	1.539
246 Fever of unknown origin	1,060	0.1	223	21.0	2.003	1.717	2.336
248 Gangrene	4,790	0.3	1,233	25.7	1.986	1.842	2.142
249 Shock	1,171	0.1	326	27.8	1.834	1.604	2.097
250 Nausea and vomiting	944	0.1	206	21.8	2.111	1.797	2.479
251 Abdominal pain	1,276	0.1	250	19.6	1.848	1.599	2.136
252 Malaise and fatigue	5,247	0.3	752	14.3	1.602	1.473	1.743
253 Allergic reactions	439	0.0	85	19.4	1.847	1.449	2.356
257 Other aftercare	1,154	0.1	175	15.2	1.572	1.333	1.854
ScreeningResidUnclassifd_258_259	6,238	0.4	1,072	17.2	1.773	1.647	1.908
Comorbidities - Hierarchical Condition Categories (HCCs) (Reference group: NONE of the listed comorbidities.)							
HCC1 HIV/AIDS	4,745	0.3	1,308	27.6	1.077	1.004	1.155
HCC6 Opportunistic Infections	14,864	0.9	4,823	32.4	1.121	1.081	1.162
HCC8 Metastatic Cancer and Acute Leukemia	45,416	2.8	12,552	27.6	1.362	1.331	1.393
HCC9 Lung and Other Severe Cancers	28,674	1.8	7,903	27.6	1.237	1.204	1.272
HCC10 Lymphoma and Other Cancers	24,300	1.5	5,995	24.7	1.204	1.167	1.241

Table B-1 (continued)
Risk-adjustment model results, FY 2016

Covariate	FY 2016 count with variable	FY 2016 % with variable	FY 2016 count with readmission	FY 2016 % with readmission	FY 2016 odds ratio	FY 2016 LCL	FY 2016 UCL
HCC11 Colorectal, Bladder, and Other Cancers	19,477	1.2	4,984	25.6	1.097	1.060	1.135
HCC12 Breast, Prostate, and Other Cancers and Tumors	31,482	1.9	6,665	21.2	1.033	1.004	1.062
HCC_DigestUrinaryNeoplasm_14_15	44,293	2.7	10,865	24.5	1.015	0.991	1.038
HCC_DiabetesChronicComp_17_18	335,630	20.6	84,658	25.2	1.099	1.086	1.111
HCC19 Diabetes without Complication	293,432	18.0	55,434	18.9	1.043	1.032	1.055
HCC20 Type I Diabetes Mellitus	17,635	1.1	5,419	30.7	1.140	1.101	1.180
HCC21 Protein-Calorie Malnutrition	252,106	15.5	65,955	26.2	1.096	1.084	1.109
HCC23 Other Significant Endocrine and Metabolic Disorders	108,774	6.7	31,073	28.6	1.069	1.052	1.085
HCC24 Disorders of Fluid/Electrolyte/Acid-Base Balance	947,386	58.3	212,769	22.5	1.077	1.066	1.088
HCC27 End-Stage Liver Disease	24,300	1.5	8,496	35.0	1.407	1.365	1.451
HCC28 Cirrhosis of Liver	21,625	1.3	5,869	27.1	1.152	1.116	1.189
HCC29 Chronic Hepatitis	8,578	0.5	2,312	27.0	1.078	1.025	1.134
HCC31 Other Hepatitis and Liver Disease	35,813	2.2	8,586	24.0	1.009	0.984	1.035
HCC33 Intestinal Obstruction/Perforation	87,397	5.4	23,318	26.7	1.043	1.026	1.061
HCC34 Chronic Pancreatitis	8,147	0.5	2,369	29.1	1.042	0.991	1.096
HCC35 Inflammatory Bowel Disease	16,355	1.0	4,150	25.4	1.102	1.062	1.144
HCC36 Peptic Ulcer, Hemorrhage, Other Specified Gastrointestinal Disorders	238,351	14.7	64,529	27.1	1.067	1.055	1.080
HCC40 Rheumatoid Arthritis and Inflammatory Connective Tissue Disease	102,018	6.3	21,812	21.4	1.086	1.069	1.104
HCC46 Severe Hematological Disorders	16,253	1.0	4,956	30.5	1.369	1.321	1.419

Table B-1 (continued)
Risk-adjustment model results, FY 2016

Covariate	FY 2016 count with variable	FY 2016 % with variable	FY 2016 count with readmission	FY 2016 % with readmission	FY 2016 odds ratio	FY 2016 LCL	FY 2016 UCL
HCC47 Disorders of Immunity	49,989	3.1	15,287	30.6	1.128	1.104	1.153
HCC48 Coagulation Defects and Other Specified Hematological Disorders	203,291	12.5	52,050	25.6	1.108	1.093	1.123
HCC49 Iron Deficiency and Other/Unspecified Anemias and Blood Disease	699,908	43.0	145,645	20.8	1.095	1.084	1.106
HCC50 Delirium and Encephalopathy	382,441	23.5	89,804	23.5	1.030	1.020	1.041
HCC60 Personality Disorders	2,557	0.2	555	21.7	1.037	0.941	1.144
HCC63 Other Psychiatric Disorders	134,539	8.3	26,866	20.0	1.030	1.015	1.045
HCC365MentalRetardation_64_65	2,404	0.1	553	23.0	1.064	0.964	1.175
HCC66 Moderate Mental Retardation/Developmental Disability	1,122	0.1	211	18.8	1.003	0.860	1.170
HCC69 Attention Deficit Disorder	2,180	0.1	414	19.0	0.917	0.821	1.025
HCC70 Quadriplegia	16,004	1.0	4,214	26.3	1.053	1.014	1.093
HCC71 Paraplegia	10,479	0.6	2,441	23.3	0.993	0.946	1.042
HCC72 Spinal Cord Disorders/Injuries	13,193	0.8	2,774	21.0	1.050	1.005	1.098
HCC73 Amyotrophic Lateral Sclerosis and Other Motor Neuron Disease	966	0.1	236	24.4	1.170	1.005	1.362
HCC75 Polyneuropathy	11,360	0.7	2,771	24.4	1.057	1.011	1.106
HCC79 Seizure Disorders and Convulsions	113,237	7.0	25,016	22.1	0.997	0.981	1.013
HCC80 Coma, Brain Compression/Anoxic Damage	24,436	1.5	6,494	26.6	1.066	1.033	1.100
HCC82 Respirator Dependence/Tracheostomy Status	12,379	0.8	4,474	36.1	1.265	1.215	1.317
HCC83 Respiratory Arrest	1,140	0.1	354	31.1	1.121	0.985	1.276
HCC84 Cardio-Respiratory Failure and Shock	368,737	22.7	100,202	27.2	1.115	1.103	1.127

Table B-1 (continued)
Risk-adjustment model results, FY 2016

Covariate	FY 2016 count with variable	FY 2016 % with variable	FY 2016 count with readmission	FY 2016 % with readmission	FY 2016 odds ratio	FY 2016 LCL	FY 2016 UCL
HCC85 Congestive Heart Failure	622,342	38.3	154,685	24.9	1.149	1.138	1.161
HCC86 Acute Myocardial Infarction	96,083	5.9	26,411	27.5	1.070	1.052	1.088
HCC87 Unstable Angina and Other Acute Ischemic Heart Disease	56,463	3.5	14,627	25.9	1.075	1.053	1.098
HCC88 Angina Pectoris	17,741	1.1	4,279	24.1	1.067	1.029	1.106
HCC89 Coronary Atherosclerosis/Other Chronic Ischemic Heart Disease	505,228	31.1	108,788	21.5	1.045	1.035	1.055
HCC90 Heart Infection/Inflammation, Except Rheumatic	24,028	1.5	6,910	28.8	1.007	0.977	1.037
HCC91 Valvular and Rheumatic Heart Disease	257,317	15.8	61,044	23.7	1.038	1.026	1.050
HCC96 Specified Heart Arrhythmias	611,977	37.6	140,794	23.0	1.109	1.099	1.119
HCC99 Cerebral Hemorrhage	18,425	1.1	4,473	24.3	1.030	0.993	1.068
HCC100 Ischemic or Unspecified Stroke	59,878	3.7	14,167	23.7	1.051	1.030	1.072
HCC106 Atherosclerosis of the Extremities with Ulceration or Gangrene	36,222	2.2	10,162	28.1	1.017	0.990	1.045
HCC107 Vascular Disease with Complications	54,160	3.3	14,157	26.1	1.067	1.045	1.090
HCC108 Vascular Disease	268,922	16.5	65,235	24.3	1.059	1.047	1.071
HCC109 Other Circulatory Disease	226,618	13.9	49,192	21.7	1.011	0.999	1.023
HCC111 Chronic Obstructive Pulmonary Disease	474,125	29.2	114,928	24.2	1.134	1.123	1.145
HCC112 Fibrosis of Lung and Other Chronic Lung Disorders	20,590	1.3	4,434	21.5	1.075	1.038	1.112
HCC114 Aspiration and Specified Bacterial Pneumonias	127,300	7.8	36,096	28.4	1.083	1.067	1.099
HCC116 Viral and Unspecified Pneumonia, Pleurisy	253,074	15.6	64,226	25.4	1.063	1.051	1.075

Table B-1 (continued)
Risk-adjustment model results, FY 2016

Covariate	FY 2016 count with variable	FY 2016 % with variable	FY 2016 count with readmission	FY 2016 % with readmission	FY 2016 odds ratio	FY 2016 LCL	FY 2016 UCL
HCC117 Pleural Effusion/Pneumothorax	115,494	7.1	32,992	28.6	1.070	1.055	1.086
HCC122 Proliferative Diabetic Retinopathy and Vitreous Hemorrhage	1,982	0.1	580	29.3	0.961	0.869	1.063
HCC124 Exudative Macular Degeneration	508	0.0	95	18.7	0.954	0.759	1.198
HCC132 Kidney Transplant Status	9,112	0.6	3,209	35.2	1.586	1.509	1.666
HCC134 Dialysis Status	63,130	3.9	21,791	34.5	1.409	1.358	1.462
HCC135 Acute Renal Failure	524,036	32.2	128,317	24.5	1.221	1.208	1.233
HCC136 Chronic Kidney Disease, Stage 5	5,244	0.3	1,350	25.7	1.368	1.281	1.461
HCC137 Chronic Kidney Disease, Severe (Stage 4)	18,055	1.1	3,807	21.1	1.349	1.300	1.400
HCC138 Chronic Kidney Disease, Moderate (Stage 3)	89,414	5.5	15,595	17.4	1.117	1.096	1.138
HCC139 Chronic Kidney Disease, Mild or Unspecified (Stages 1-2 or Unspecified)	62,377	3.8	11,150	17.9	1.112	1.088	1.137
HCC140 Unspecified Renal Failure	1,254	0.1	240	19.1	1.178	1.021	1.359
HCC141 Nephritis	3,204	0.2	622	19.4	1.062	0.971	1.161
HCC142 Urinary Obstruction and Retention	243,356	15.0	56,266	23.1	1.058	1.045	1.070
HCC144 Urinary Tract Infection	530,540	32.6	116,515	22.0	0.999	0.989	1.008
HCC145 Other Urinary Tract Disorders	161,490	9.9	39,122	24.2	1.018	1.005	1.032
HCC148 Other Female Genital Disorders	13,723	0.8	3,384	24.7	1.048	1.006	1.092
HCC157 Pressure Ulcer of Skin with Necrosis Through to Muscle, Tendon, or Bone	15,235	0.9	4,477	29.4	1.144	1.101	1.188
HCC158 Pressure Ulcer of Skin with Full Thickness Skin Loss	37,084	2.3	10,560	28.5	1.124	1.097	1.152

Table B-1 (continued)
Risk-adjustment model results, FY 2016

Covariate	FY 2016 count with variable	FY 2016 % with variable	FY 2016 count with readmission	FY 2016 % with readmission	FY 2016 odds ratio	FY 2016 LCL	FY 2016 UCL
HCC159 Pressure Ulcer of Skin with Partial Thickness Skin Loss	48,564	3.0	12,981	26.7	1.102	1.078	1.126
HCC160 Pressure Pre-Ulcer Skin Changes or Unspecified Stage	37,131	2.3	9,162	24.7	1.036	1.010	1.062
HCC169 Vertebral Fractures without Spinal Cord Injury	60,427	3.7	11,788	19.5	0.994	0.973	1.016
HCC173 Traumatic Amputations and Complications	8,647	0.5	1,658	19.2	0.921	0.872	0.973
HCC177 Other Complications of Medical Care	132,390	8.1	35,745	27.0	1.037	1.023	1.052
HCC178 Major Symptoms, Abnormalities	929,652	57.2	196,662	21.2	1.002	0.993	1.012
HCC186 Major Organ Transplant or Replacement Status	4,798	0.3	1,584	33.0	1.096	1.029	1.169
HCC187 Other Organ Transplant Status/ Replacement	19,342	1.2	4,985	25.8	1.078	1.043	1.116
HCC188 Artificial Openings for Feeding or Elimination	57,985	3.6	17,452	30.1	1.211	1.187	1.236
HCC189 Amputation Status, Lower Limb/Amputation Complications	30,934	1.9	8,031	26.0	0.992	0.965	1.020
HCC190 Amputation Status, Upper Limb	2,812	0.2	685	24.4	1.002	0.916	1.095
Two or more HCCs	1,520,118	93.5	299,368	19.7	1.270	1.236	1.305

NOTE:LCL = lower confidence limit; UCL = upper confidence limit

SOURCE: RTI International analysis of FY 2016 MedPAR data (RTI programming reference: CK 26 and idxSNF02_lk2016_003_FORMATTED.xls)

Table B-2
Risk-adjustment model results, CY 2017

Covariate	CY 2017 count with variable	CY 2017 % with variable	CY 2017 count with readmission	CY 2017 % with readmission	CY 2017 odds ratio	CY 2017 LCL	CY 2017 UCL
<u>Readmission</u>	321,757	19.4	—	—	—	—	—
<u>Age-Sex Groups</u> (Reference group: Females 65-69)							
Male age 0_34	1,025	0.1	235	22.9	1.039	0.890	1.214
Male age 35_44	4,061	0.2	927	22.8	0.988	0.913	1.070
Male age 45_54	16,016	1.0	3,849	24.0	0.984	0.943	1.026
Male age 55_59	20,947	1.3	4,922	23.5	0.964	0.928	1.001
Male age 60_64	31,435	1.9	7,449	23.7	0.983	0.952	1.016
Male age 65_69	84,964	5.1	21,079	24.8	0.971	0.949	0.993
Male age 70_74	84,966	5.1	18,237	21.5	1.036	1.011	1.061
Male age 75_79	99,338	6.0	21,420	21.6	1.069	1.044	1.094
Male age 80_84	108,136	6.5	22,885	21.2	1.074	1.049	1.100
Male age 85_89	106,123	6.4	22,021	20.8	1.084	1.059	1.111
Male age 90_94	68,035	4.1	13,490	19.8	1.064	1.035	1.093
Male age GT 95	22,359	1.3	4,183	18.7	1.037	0.997	1.078
Female age 0_34	858	0.1	216	25.2	1.076	0.912	1.269
Female age 35_44	3,564	0.2	896	25.1	1.061	0.977	1.152
Female age 45_54	14,285	0.9	3,341	23.4	1.026	0.981	1.072
Female age 55_59	19,486	1.2	4,348	22.3	0.983	0.945	1.023
Female age 60_64	31,945	1.9	7,287	22.8	1.005	0.974	1.038
Female age 70_74	119,241	7.2	21,993	18.4	0.997	0.974	1.019
Female age 75_79	146,882	8.8	26,396	18.0	0.989	0.967	1.011
Female age 80_84	173,199	10.4	29,838	17.2	0.973	0.952	0.995

(continued)

Table B-2 (continued)
Risk-adjustment model results, CY 2017

Covariate	CY 2017 count with variable	CY 2017 % with variable	CY 2017 count with readmission	CY 2017 % with readmission	CY 2017 odds ratio	CY 2017 LCL	CY 2017 UCL
Female age 85_89	191,436	11.5	31,377	16.4	0.941	0.920	0.962
Female age 90_94	147,783	8.9	23,111	15.6	0.927	0.905	0.949
Female age GT 95	64,205	3.9	9,121	14.2	0.863	0.838	0.889
Prior Length of Stay (Reference group: LOS 1-3 Days)							
LOS btwn 4 & 7 days (based on proximal IPPS)	745,639	44.9	138,427	18.6	1.130	1.117	1.142
LOS btwn 8 & 14 days (based on proximal IPPS)	336,926	20.3	83,382	24.7	1.342	1.325	1.359
LOS GT 14 days (based on proximal IPPS)	121,071	7.3	35,536	29.4	1.535	1.508	1.562
Originally disabled (Reference group: not originally disabled)							
Originally disabled: based on origreas from denominator	391,459	23.6	87,072	22.2	1.032	1.020	1.044
End Stage Renal Disease Indicator (ESRD) (Reference group: no end stage renal disease)							
End Stage Renal Disease Indicator (ESRD recoded)	78,954	4.8	27,753	35.2	1.346	1.303	1.390
Surgical Groups (Reference group: no surgery or only ophthalmology surgery)							
Vascular Surgery	17,704	1.1	4,639	26.2	1.083	1.041	1.125
Orthopedics Surgery	300,043	18.1	35,766	11.9	0.943	0.924	0.962
General Surgery	83,925	5.1	19,517	23.3	1.001	0.980	1.023
Cardio Thoracic Surgery	31,015	1.9	6,987	22.5	0.859	0.829	0.891
Urologic surgery	13,359	0.8	3,321	24.9	1.036	0.988	1.087
Neurosurgery	13,872	0.8	2,887	20.8	1.149	1.096	1.203
Plastic Surgery	40,345	2.4	8,529	21.1	0.986	0.960	1.013

(continued)

Table B-2 (continued)
Risk-adjustment model results, CY 2017

Covariate	CY 2017 count with variable	CY 2017 % with variable	CY 2017 count with readmission	CY 2017 % with readmission	CY 2017 odds ratio	CY 2017 LCL	CY 2017 UCL
Otolaryngology Surgery	2,900	0.2	632	21.8	0.967	0.873	1.072
Obstetrics/Gynecology Surgery	3,217	0.2	651	20.2	0.932	0.834	1.042
Prior Care Utilization - Count of Prior Stays (reference group: zero prior stays)							
Count IPPS stays 365 days prior to discharge from proximal stay: 1-3	793,526	47.8	168,790	21.3	1.083	1.071	1.095
Count IPPS stays 365 days prior to discharge from proximal stay: 4-6	127,085	7.7	41,516	32.7	1.278	1.255	1.302
Count IPPS stays 365 days prior to discharge from proximal stay: 7-9	23,277	1.4	9,873	42.4	1.581	1.532	1.632
Count IPPS stays 365 days prior to discharge from proximal stay: 10+	7,209	0.4	3,741	51.9	2.098	1.993	2.209
At least one day in ICU (reference group: no prior days in ICU)							
At least one day in ICU	654,073	39.4	154,846	23.7	1.097	1.087	1.107
CCS Groupings - based on principal diagnosis (Reference group: Osteoarthritis [203] + Immunizations and screening for infectious disease [1] + Menstrual disorders [171] + Administrative/social admission [255] + Medical examination/evaluation [256] + Adverse effects of medical drugs [2,617] + Disorders of lipid metabolism [53] + Disorders usually diagnosed in infancy [655] + Impulse control disorders [656] + Mood disorders [657])							

(continued)

Table B-2 (continued)
Risk-adjustment model results, CY 2017

Covariate	CY 2017 count with variable	CY 2017 % with variable	CY 2017 count with readmission	CY 2017 % with readmission	CY 2017 odds ratio	CY 2017 LCL	CY 2017 UCL
2 Septicemia (except in labor)	189,689	11.4	45,551	24.0	1.855	1.792	1.920
4 Mycoses	1,326	0.1	355	26.8	2.252	1.978	2.564
5 HIV infection	497	0.0	140	28.2	1.986	1.605	2.458
6 Hepatitis	408	0.0	129	31.6	2.373	1.905	2.955
Infections_1_3_7_8_9	3,677	0.2	708	19.3	1.754	1.603	1.920
11 Cancer of head and neck	668	0.0	151	22.6	1.850	1.501	2.281
GIcancers_12_13_14_15	6,235	0.4	1,371	22.0	1.872	1.740	2.013
GIother_cancers_16_17_18	1,287	0.1	369	28.7	2.432	2.136	2.770
RespiratoryCancer_19_20	1,645	0.1	351	21.3	2.029	1.783	2.309
21 Cancer of bone and connective tissue	328	0.0	69	21.0	2.229	1.693	2.935
SkinCancer_22_23	313	0.0	52	16.6	1.704	1.253	2.318
24 Cancer of breast	391	0.0	50	12.8	1.561	1.151	2.118
FemaleGenitalCancer_25_26_27_28	1,259	0.1	256	20.3	2.102	1.763	2.506
MaleGenitalCancer_29_30_31	308	0.0	64	20.8	1.694	1.270	2.259
32 Cancer of bladder	1,435	0.1	432	30.1	2.711	2.381	3.087
KidneyUrinaryCancer_33_34	1,019	0.1	192	18.8	1.637	1.380	1.941
35 Cancer of brain and nervous system	409	0.0	97	23.7	2.243	1.767	2.847
ThyroidCancerDisorders_36_48	1,017	0.1	219	21.5	2.125	1.816	2.486
HodgkinLeukemia_37_38_39_40	712	0.0	237	33.3	3.082	2.616	3.631
42 Secondary malignancies	2,158	0.1	631	29.2	2.423	2.187	2.684
otherCancerNeoplasms_41_43_44	516	0.0	118	22.9	2.164	1.747	2.682

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Table B-2 (continued)
Risk-adjustment model results, CY 2017

Covariate	CY 2017 count with variable	CY 2017 % with variable	CY 2017 count with readmission	CY 2017 % with readmission	CY 2017 odds ratio	CY 2017 LCL	CY 2017 UCL
45 Maintenance chemotherapy; radiotherapy	30	0.0	*	26.7	1.613	0.701	3.712
BenignNeoplasms_46_47	2,467	0.1	496	20.1	1.959	1.760	2.181
Diabetes_49_50	32,927	2.0	7,250	22.0	1.693	1.623	1.767
51 Other endocrine disorders	5,207	0.3	1,058	20.3	2.002	1.855	2.161
52 Nutritional deficiencies	1,358	0.1	284	20.9	1.914	1.666	2.199
54 Gout and other crystal arthropathies	1,727	0.1	302	17.5	1.823	1.600	2.077
55 Fluid and electrolyte disorders	26,157	1.6	5,164	19.7	1.907	1.823	1.994
CysticFibrosisCOPD_56_127	43,576	2.6	10,422	23.9	2.117	2.034	2.202
ImmunityWhtBloodDisorders_57_63	1,092	0.1	276	25.3	1.944	1.682	2.246
58 Other nutritional; endocrine; and metabolic disorders	5,055	0.3	1,025	20.3	1.899	1.757	2.051
59 Deficiency and other anemia	7,851	0.5	2,006	25.6	2.217	2.085	2.358
60 Acute posthemorrhagic anemia	3,708	0.2	910	24.5	2.057	1.892	2.236
BloodDisorders_61_62_64	3,027	0.2	779	25.7	2.058	1.881	2.252
653 Delirium	24,350	1.5	2,661	10.9	1.136	1.079	1.197
BehvrDevelDis650_651_652_654_662	1,031	0.1	137	13.3	1.206	1.001	1.453
MentalIllness_658_659	8,225	0.5	942	11.5	1.088	1.007	1.176
SubstanceAbuse_660_661_663	7,028	0.4	1,402	19.9	1.657	1.546	1.776
670 Miscellaneous disorders	355	0.0	46	13.0	1.276	0.928	1.755
76 Meningitis (except that caused by tuberculosis or sexually transmitted disease)	475	0.0	94	19.8	1.815	1.436	2.294
77 Encephalitis (except that caused by tuberculosis or sexually transmitted disease)	659	0.0	154	23.4	2.108	1.747	2.545
78 Other CNS infection and poliomyelitis	643	0.0	171	26.6	2.300	1.913	2.765

(continued)

Table B-2 (continued)
Risk-adjustment model results, CY 2017

Covariate	CY 2017 count with variable	CY 2017 % with variable	CY 2017 count with readmission	CY 2017 % with readmission	CY 2017 odds ratio	CY 2017 LCL	CY 2017 UCL
79 Parkinson`s disease	3,517	0.2	398	11.3	1.327	1.188	1.481
80 Multiple sclerosis	797	0.0	99	12.4	1.534	1.236	1.905
81 Other hereditary and degenerative nervous system conditions	1,937	0.1	269	13.9	1.398	1.221	1.601
82 Paralysis	492	0.0	86	17.5	1.884	1.481	2.395
83 Epilepsy; convulsions	11,050	0.7	1,946	17.6	1.641	1.546	1.743
84 Headache; including migraine	466	0.0	74	15.9	1.613	1.248	2.085
85 Coma; stupor; and brain damage	168	0.0	38	22.6	1.963	1.349	2.857
93 Conditions associated with dizziness or vertigo	2,060	0.1	192	9.3	1.135	0.974	1.324
EyeEarSensoryDsord_86_to_92_94	1,105	0.1	172	15.6	1.569	1.323	1.861
95 Other nervous system disorders	25,888	1.6	4,869	18.8	1.773	1.695	1.855
96 Heart valve disorders	9,404	0.6	2,025	21.5	1.918	1.793	2.050
97 Peri- endo- & myocarditis cardiomyopathy (except caused by tuberculosis or sexually transmitted disease)	2,065	0.1	546	26.4	2.048	1.841	2.278
98 Essential hypertension	420	0.0	61	14.5	1.858	1.407	2.453
99 Hypertension with complications and secondary hypertension	88,673	5.3	23,583	26.6	2.008	1.937	2.082
100 Acute myocardial infarction	27,249	1.6	6,475	23.8	2.082	1.993	2.176
101 Coronary atherosclerosis and other heart disease	10,475	0.6	2,131	20.3	1.870	1.757	1.991
102 Nonspecific chest pain	3,359	0.2	633	18.8	1.613	1.467	1.773
103 Pulmonary heart disease	9,938	0.6	1,941	19.5	1.752	1.650	1.861
104 Other and ill-defined heart disease	396	0.0	82	20.7	1.920	1.494	2.467

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Table B-2 (continued)
Risk-adjustment model results, CY 2017

Covariate	CY 2017 count with variable	CY 2017 % with variable	CY 2017 count with readmission	CY 2017 % with readmission	CY 2017 odds ratio	CY 2017 LCL	CY 2017 UCL
105 Conduction disorders	4,337	0.3	651	15.0	1.408	1.286	1.542
106 Cardiac dysrhythmias	30,609	1.8	6,547	21.4	2.010	1.926	2.098
107 Cardiac arrest and ventricular fibrillation	559	0.0	129	23.1	1.375	1.121	1.688
108 Congestive heart failure; nonhypertensive	16,420	1.0	3,964	24.1	2.021	1.924	2.123
109 Acute cerebrovascular disease	52,395	3.2	9,428	18.0	1.936	1.861	2.015
110 Occlusion or stenosis of precerebral arteries	1,549	0.1	287	18.5	1.736	1.513	1.991
111 Other and ill-defined cerebrovascular disease	684	0.0	118	17.3	1.527	1.242	1.878
112 Transient cerebral ischemia	5,816	0.4	773	13.3	1.485	1.366	1.614
113 Late effects of cerebrovascular disease	2,403	0.1	393	16.4	1.568	1.397	1.759
114 Peripheral and visceral atherosclerosis	7,077	0.4	1,756	24.8	2.190	2.050	2.338
115 Aortic; peripheral; and visceral artery aneurysms	3,275	0.2	723	22.1	1.903	1.737	2.084
116 Aortic and peripheral arterial embolism or thrombosis	1,847	0.1	462	25.0	2.250	2.005	2.526
117 Other circulatory disease	8,576	0.5	1,618	18.9	1.673	1.569	1.784
118 Phlebitis; thrombophlebitis and thromboembolism	7,087	0.4	1,378	19.4	1.829	1.708	1.958
VeinLymphDisease_119_120_121_247	2,839	0.2	588	20.7	1.919	1.738	2.118
122 Pneumonia (except that caused by tuberculosis or sexually transmitted disease)	46,975	2.8	9,297	19.8	1.849	1.777	1.924
123 Influenza	9,894	0.6	1,380	13.9	1.395	1.306	1.491
125 Acute bronchitis	2,803	0.2	402	14.3	1.572	1.406	1.759
UpperRespInfect_Tons_124_126	889	0.1	143	16.1	1.735	1.441	2.089
128 Asthma	1,034	0.1	175	16.9	1.786	1.508	2.113

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Table B-2 (continued)
Risk-adjustment model results, CY 2017

Covariate	CY 2017 count with variable	CY 2017 % with variable	CY 2017 count with readmission	CY 2017 % with readmission	CY 2017 odds ratio	CY 2017 LCL	CY 2017 UCL
129 Aspiration pneumonitis; food/vomitus	21,916	1.3	5,028	22.9	1.959	1.871	2.052
130 Pleurisy; pneumothorax; pulmonary collapse	5,031	0.3	1,360	27.0	2.116	1.969	2.275
131 Respiratory failure; insufficiency; arrest (adult)	34,081	2.1	9,803	28.8	2.269	2.179	2.364
LungExtAgentOthLowRespDis132_133	3,710	0.2	901	24.3	2.141	1.969	2.328
134 Other upper respiratory disease	976	0.1	238	24.4	1.953	1.672	2.282
135 Intestinal infection	11,922	0.7	2,886	24.2	2.119	2.008	2.237
Mouth_DisordersDiseases_136_137	917	0.1	166	18.1	1.688	1.416	2.013
138 Esophageal disorders	4,613	0.3	1,019	22.1	1.893	1.750	2.048
139 Gastroduodenal ulcer (except hemorrhage)	1,531	0.1	345	22.5	2.168	1.908	2.462
140 Gastritis and duodenitis	2,623	0.2	578	22.0	1.830	1.655	2.023
141 Other disorders of stomach and duodenum	2,423	0.1	681	28.1	2.169	1.968	2.391
142 Appendicitis and other appendiceal conditions	951	0.1	170	17.9	1.816	1.527	2.159
143 Abdominal hernia	6,882	0.4	1,345	19.5	1.891	1.761	2.030
144 Regional enteritis and ulcerative colitis	1,231	0.1	379	30.8	2.943	2.584	3.352
145 Intestinal obstruction without hernia	13,994	0.8	2,999	21.4	1.903	1.804	2.007
146 Diverticulosis and diverticulitis	9,759	0.6	2,116	21.7	2.068	1.949	2.194
147 Anal and rectal conditions	1,909	0.1	432	22.6	2.129	1.896	2.389
148 Peritonitis and intestinal abscess	798	0.0	260	32.6	2.427	2.075	2.839
149 Biliary tract disease	9,154	0.6	1,759	19.2	1.804	1.693	1.922
151 Other liver diseases	6,494	0.4	2,374	36.6	2.564	2.404	2.736
152 Pancreatic disorders (not diabetes)	3,782	0.2	811	21.4	1.885	1.729	2.055
153 Gastrointestinal hemorrhage	23,248	1.4	5,694	24.5	2.026	1.937	2.118

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Table B-2 (continued)
Risk-adjustment model results, CY 2017

Covariate	CY 2017 count with variable	CY 2017 % with variable	CY 2017 count with readmission	CY 2017 % with readmission	CY 2017 odds ratio	CY 2017 LCL	CY 2017 UCL
154 Noninfectious gastroenteritis	3,367	0.2	665	19.8	1.920	1.749	2.106
155 Other gastrointestinal disorders	8,923	0.5	2,087	23.4	1.976	1.861	2.099
156 Nephritis; nephrosis; renal sclerosis	270	0.0	84	31.1	2.566	1.965	3.349
157 Acute and unspecified renal failure	56,745	3.4	12,762	22.5	2.005	1.930	2.083
158 Chronic renal failure	294	0.0	88	29.9	1.859	1.432	2.415
159 Urinary tract infections	64,614	3.9	10,547	16.3	1.721	1.656	1.788
160 Calculus of urinary tract	758	0.0	157	20.7	1.861	1.548	2.237
161 Other diseases of kidney and ureters	1,983	0.1	422	21.3	1.932	1.721	2.169
162 Other diseases of bladder and urethra	1,023	0.1	239	23.4	2.049	1.758	2.390
163 Genitourinary symptoms and ill-defined conditions	1,813	0.1	419	23.1	2.186	1.945	2.457
164 Hyperplasia of prostate	1,248	0.1	252	20.2	1.879	1.623	2.175
165 Inflammatory conditions of male genital organs	771	0.0	141	18.3	1.563	1.292	1.889
166 Other male genital disorders	195	0.0	48	24.6	2.058	1.469	2.885
Female_167_to_170_172_173_175	1,148	0.1	239	20.8	2.078	1.782	2.422
197 Skin and subcutaneous tissue infections	25,709	1.5	4,291	16.7	1.651	1.576	1.729
199 Chronic ulcer of skin	5,384	0.3	1,013	18.8	1.671	1.545	1.807
SkinDisorders_198_200	788	0.0	187	23.7	2.368	1.993	2.813
201 Infective arthritis and osteomyelitis (except that caused by tuberculosis or sexually transmitted disease)	6,606	0.4	1,218	18.4	1.651	1.539	1.772
202 Rheumatoid arthritis and related disease	744	0.0	88	11.8	1.339	1.065	1.682
204 Other non-traumatic joint disorders	3,331	0.2	423	12.7	1.517	1.362	1.691

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Table B-2 (continued)
Risk-adjustment model results, CY 2017

Covariate	CY 2017 count with variable	CY 2017 % with variable	CY 2017 count with readmission	CY 2017 % with readmission	CY 2017 odds ratio	CY 2017 LCL	CY 2017 UCL
SpondyDiscDisordersOsteo_205_206	26,555	1.6	3,477	13.1	1.652	1.577	1.731
207 Pathological fracture	16,052	1.0	2,375	14.8	1.765	1.674	1.860
FootOtherDeformities_208_209	4,860	0.3	504	10.4	1.471	1.335	1.622
210 Systemic lupus erythematosus and connective tissue disorders	558	0.0	144	25.8	2.105	1.725	2.570
211 Other connective tissue disease	10,791	0.6	1,425	13.2	1.474	1.382	1.573
212 Other bone disease and musculoskeletal deformities	1,905	0.1	255	13.4	1.606	1.400	1.843
CongenitalAnomomalies_213_to_217	752	0.0	142	18.9	1.624	1.342	1.965
225 Joint disorders and dislocations; trauma-related	1,320	0.1	184	13.9	1.836	1.563	2.157
226 Fracture of neck of femur (hip)	104,785	6.3	13,867	13.2	1.690	1.635	1.747
227 Spinal cord injury	450	0.0	107	23.8	2.526	2.018	3.163
228 Skull and face fractures	1,774	0.1	258	14.5	1.680	1.463	1.929
229 Fracture of upper limb	16,453	1.0	2,014	12.2	1.576	1.492	1.665
230 Fracture of lower limb	31,960	1.9	4,303	13.5	1.699	1.629	1.773
231 Other fractures	45,954	2.8	5,931	12.9	1.563	1.500	1.629
232 Sprains and strains	2,211	0.1	241	10.9	1.370	1.191	1.575
233 Intracranial injury	17,069	1.0	3,436	20.1	2.175	2.068	2.288
234 Crushing injury or internal injury	3,495	0.2	636	18.2	1.887	1.718	2.072
235 Open wounds of head; neck; and trunk	1,190	0.1	159	13.4	1.473	1.238	1.751
236 Open wounds of extremities	1,121	0.1	206	18.4	1.965	1.676	2.302
237 Complication of device; implant or graft	53,719	3.2	12,209	22.7	1.962	1.892	2.035

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Table B-2 (continued)
Risk-adjustment model results, CY 2017

Covariate	CY 2017 count with variable	CY 2017 % with variable	CY 2017 count with readmission	CY 2017 % with readmission	CY 2017 odds ratio	CY 2017 LCL	CY 2017 UCL
238 Complications of surgical procedures or medical care	29,649	1.8	7,214	24.3	2.016	1.934	2.102
SuperficialInjuryBurns_239_240	5,463	0.3	865	15.8	1.677	1.547	1.818
Poisoning_241_242_243	4,596	0.3	824	17.9	1.439	1.323	1.565
244 Other injuries and conditions due to external causes	6,756	0.4	950	14.1	1.494	1.384	1.614
245 Syncope	6,510	0.4	851	13.1	1.395	1.288	1.512
246 Fever of unknown origin	1,025	0.1	209	20.4	1.916	1.634	2.248
248 Gangrene	3,451	0.2	903	26.2	2.113	1.938	2.304
249 Shock	502	0.0	138	27.5	1.901	1.550	2.331
250 Nausea and vomiting	842	0.1	180	21.4	1.949	1.640	2.316
251 Abdominal pain	1,028	0.1	202	19.6	1.758	1.496	2.067
252 Malaise and fatigue	5,220	0.3	752	14.4	1.545	1.419	1.682
253 Allergic reactions	413	0.0	74	17.9	1.720	1.327	2.228
257 Other aftercare	1,435	0.1	184	12.8	1.219	1.038	1.431
ScreeningResidUnclassifd_258_259	5,108	0.3	871	17.1	1.720	1.586	1.865
Comorbidities - Hierarchical Condition Categories (HCCs) (Reference group: NONE of the listed comorbidities.)							
HCC1 HIV/AIDS	4,827	0.3	1,283	26.6	1.015	0.946	1.089
HCC6 Opportunistic Infections	15,171	0.9	4,957	32.7	1.101	1.062	1.141
HCC8 Metastatic Cancer and Acute Leukemia	47,715	2.9	14,043	29.4	1.451	1.419	1.483
HCC9 Lung and Other Severe Cancers	30,108	1.8	8,523	28.3	1.250	1.217	1.284
HCC10 Lymphoma and Other Cancers	24,704	1.5	6,164	25.0	1.209	1.172	1.246

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Table B-2 (continued)
Risk-adjustment model results, CY 2017

Covariate	CY 2017 count with variable	CY 2017 % with variable	CY 2017 count with readmission	CY 2017 % with readmission	CY 2017 odds ratio	CY 2017 LCL	CY 2017 UCL
HCC11 Colorectal, Bladder, and Other Cancers	20,274	1.2	5,351	26.4	1.127	1.090	1.165
HCC12 Breast, Prostate, and Other Cancers and Tumors	32,924	2.0	7,121	21.6	1.035	1.007	1.064
HCC_DigestUrinaryNeoplasm_14_15	45,006	2.7	11,281	25.1	1.010	0.987	1.034
HCC_DiabetesChronicComp_17_18	478,679	28.8	120,915	25.3	1.108	1.097	1.120
HCC19 Diabetes without Complication	182,751	11.0	30,939	16.9	1.035	1.021	1.050
HCC20 Type I Diabetes Mellitus	18,194	1.1	5,670	31.2	1.121	1.083	1.160
HCC21 Protein-Calorie Malnutrition	287,163	17.3	76,151	26.5	1.103	1.091	1.115
HCC23 Other Significant Endocrine and Metabolic Disorders	117,750	7.1	34,235	29.1	1.067	1.051	1.083
HCC24 Disorders of Fluid/Electrolyte/Acid-Base Balance	993,185	59.8	228,107	23.0	1.082	1.072	1.093
HCC27 End-Stage Liver Disease	27,461	1.7	9,876	36.0	1.459	1.417	1.502
HCC28 Cirrhosis of Liver	24,754	1.5	6,880	27.8	1.169	1.135	1.204
HCC29 Chronic Hepatitis	9,843	0.6	2,679	27.2	1.069	1.020	1.121
HCC31 Other Hepatitis and Liver Disease	40,752	2.5	10,119	24.8	1.041	1.016	1.066
HCC33 Intestinal Obstruction/Perforation	91,394	5.5	24,904	27.2	1.040	1.023	1.057
HCC34 Chronic Pancreatitis	9,140	0.6	2,763	30.2	1.067	1.018	1.119
HCC35 Inflammatory Bowel Disease	17,080	1.0	4,314	25.3	1.086	1.047	1.127
HCC36 Peptic Ulcer, Hemorrhage, Other Specified Gastrointestinal Disorders	244,695	14.7	67,857	27.7	1.058	1.046	1.070
HCC40 Rheumatoid Arthritis and Inflammatory Connective Tissue Disease	106,741	6.4	23,670	22.2	1.107	1.089	1.124
HCC46 Severe Hematological Disorders	16,336	1.0	5,209	31.9	1.426	1.376	1.477

(continued)

Table B-2 (continued)
Risk-adjustment model results, CY 2017

Covariate	CY 2017 count with variable	CY 2017 % with variable	CY 2017 count with readmission	CY 2017 % with readmission	CY 2017 odds ratio	CY 2017 LCL	CY 2017 UCL
HCC47 Disorders of Immunity	55,123	3.3	17,128	31.1	1.118	1.095	1.142
HCC48 Coagulation Defects and Other Specified Hematological Disorders	225,256	13.6	59,051	26.2	1.100	1.086	1.115
HCC49 Iron Deficiency and Other/Unspecified Anemias and Blood Disease	697,197	42.0	148,851	21.3	1.093	1.082	1.103
HCC50 Delirium and Encephalopathy	435,587	26.2	103,812	23.8	1.021	1.011	1.030
HCC60 Personality Disorders	2,494	0.2	564	22.6	1.035	0.938	1.143
HCC63 Other Psychiatric Disorders	143,160	8.6	29,606	20.7	1.037	1.022	1.051
HCC365MentalRetardation_64_65	2,432	0.1	613	25.2	1.188	1.079	1.307
HCC66 Moderate Mental Retardation/Developmental Disability	1,097	0.1	225	20.5	1.060	0.910	1.234
HCC69 Attention Deficit Disorder	2,393	0.1	466	19.5	0.969	0.871	1.078
HCC70 Quadriplegia	18,970	1.1	5,116	27.0	1.080	1.043	1.119
HCC71 Paraplegia	11,381	0.7	2,742	24.1	1.004	0.959	1.052
HCC72 Spinal Cord Disorders/Injuries	14,782	0.9	3,111	21.0	0.997	0.956	1.039
HCC73 Amyotrophic Lateral Sclerosis and Other Motor Neuron Disease	1,113	0.1	224	20.1	0.934	0.802	1.087
HCC75 Polyneuropathy	13,115	0.8	3,149	24.0	1.004	0.962	1.047
HCC79 Seizure Disorders and Convulsions	120,464	7.3	27,148	22.5	0.998	0.982	1.013
HCC80 Coma, Brain Compression/Anoxic Damage	32,570	2.0	8,695	26.7	1.069	1.040	1.099
HCC82 Respirator Dependence/Tracheostomy Status	13,513	0.8	4,915	36.4	1.268	1.219	1.318
HCC83 Respiratory Arrest	856	0.1	259	30.3	1.128	0.970	1.312
HCC84 Cardio-Respiratory Failure and Shock	416,807	25.1	113,500	27.2	1.105	1.094	1.117

(continued)

Table B-2 (continued)
Risk-adjustment model results, CY 2017

Covariate	CY 2017 count with variable	CY 2017 % with variable	CY 2017 count with readmission	CY 2017 % with readmission	CY 2017 odds ratio	CY 2017 LCL	CY 2017 UCL
HCC85 Congestive Heart Failure	674,369	40.6	169,217	25.1	1.128	1.116	1.139
HCC86 Acute Myocardial Infarction	107,469	6.5	30,233	28.1	1.088	1.070	1.105
HCC87 Unstable Angina and Other Acute Ischemic Heart Disease	71,354	4.3	18,779	26.3	1.079	1.059	1.100
HCC88 Angina Pectoris	19,133	1.2	4,760	24.9	1.068	1.031	1.106
HCC89 Coronary Atherosclerosis/Other Chronic Ischemic Heart Disease	499,249	30.1	109,895	22.0	1.057	1.047	1.067
HCC90 Heart Infection/Inflammation, Except Rheumatic	27,171	1.6	8,199	30.2	1.053	1.024	1.083
HCC91 Valvular and Rheumatic Heart Disease	263,859	15.9	64,305	24.4	1.051	1.040	1.063
HCC96 Specified Heart Arrhythmias	636,929	38.4	150,128	23.6	1.119	1.109	1.129
HCC99 Cerebral Hemorrhage	20,020	1.2	5,082	25.4	1.063	1.026	1.101
HCC100 Ischemic or Unspecified Stroke	61,050	3.7	14,700	24.1	1.038	1.017	1.059
HCC106 Atherosclerosis of the Extremities with Ulceration or Gangrene	41,338	2.5	11,803	28.6	1.029	1.003	1.056
HCC107 Vascular Disease with Complications	59,198	3.6	15,522	26.2	1.051	1.030	1.072
HCC108 Vascular Disease	279,215	16.8	69,126	24.8	1.058	1.046	1.070
HCC109 Other Circulatory Disease	243,146	14.6	54,073	22.2	1.013	1.001	1.025
HCC111 Chronic Obstructive Pulmonary Disease	488,107	29.4	121,294	24.8	1.140	1.129	1.151
HCC112 Fibrosis of Lung and Other Chronic Lung Disorders	21,586	1.3	4,837	22.4	1.115	1.079	1.154
HCC114 Aspiration and Specified Bacterial Pneumonias	139,954	8.4	40,220	28.7	1.078	1.062	1.093
HCC116 Viral and Unspecified Pneumonia, Pleurisy	266,159	16.0	67,998	25.5	1.046	1.034	1.058

Table B-2 (continued)
Risk-adjustment model results, CY 2017

Covariate	CY 2017 count with variable	CY 2017 % with variable	CY 2017 count with readmission	CY 2017 % with readmission	CY 2017 odds ratio	CY 2017 LCL	CY 2017 UCL
HCC117 Pleural Effusion/Pneumothorax	119,743	7.2	35,200	29.4	1.074	1.059	1.090
HCC122 Proliferative Diabetic Retinopathy and Vitreous Hemorrhage	2,668	0.2	826	31.0	1.032	0.946	1.125
HCC124 Exudative Macular Degeneration	864	0.1	172	19.9	1.050	0.884	1.248
HCC132 Kidney Transplant Status	9,581	0.6	3,428	35.8	1.500	1.430	1.574
HCC134 Dialysis Status	70,253	4.2	24,107	34.3	1.165	1.126	1.207
HCC135 Acute Renal Failure	563,436	33.9	140,001	24.8	1.205	1.193	1.218
HCC136 Chronic Kidney Disease, Stage 5	5,191	0.3	1,394	26.9	1.278	1.197	1.366
HCC137 Chronic Kidney Disease, Severe (Stage 4)	18,294	1.1	3,819	20.9	1.295	1.248	1.344
HCC138 Chronic Kidney Disease, Moderate (Stage 3)	95,275	5.7	16,730	17.6	1.099	1.079	1.120
HCC139 Chronic Kidney Disease, Mild or Unspecified (Stages 1-2 or Unspecified)	59,617	3.6	10,647	17.9	1.077	1.053	1.102
HCC140 Unspecified Renal Failure	1,122	0.1	199	17.7	0.998	0.853	1.167
HCC141 Nephritis	3,317	0.2	630	19.0	1.006	0.920	1.100
HCC142 Urinary Obstruction and Retention	256,919	15.5	61,357	23.9	1.070	1.058	1.082
HCC144 Urinary Tract Infection	539,484	32.5	122,221	22.7	1.009	1.000	1.019
HCC145 Other Urinary Tract Disorders	157,589	9.5	39,072	24.8	1.015	1.001	1.028
HCC148 Other Female Genital Disorders	14,157	0.9	3,514	24.8	1.022	0.982	1.065
HCC157 Pressure Ulcer of Skin with Necrosis Through to Muscle, Tendon, or Bone	17,200	1.0	5,048	29.3	1.122	1.082	1.164
HCC158 Pressure Ulcer of Skin with Full Thickness Skin Loss	42,787	2.6	12,383	28.9	1.129	1.103	1.155

Table B-2 (continued)
Risk-adjustment model results, CY 2017

Covariate	CY 2017 count with variable	CY 2017 % with variable	CY 2017 count with readmission	CY 2017 % with readmission	CY 2017 odds ratio	CY 2017 LCL	CY 2017 UCL
HCC159 Pressure Ulcer of Skin with Partial Thickness Skin Loss	51,621	3.1	14,248	27.6	1.107	1.084	1.131
HCC160 Pressure Pre-Ulcer Skin Changes or Unspecified Stage	37,502	2.3	9,372	25.0	1.037	1.011	1.063
HCC169 Vertebral Fractures without Spinal Cord Injury	65,050	3.9	13,015	20.0	1.000	0.980	1.021
HCC173 Traumatic Amputations and Complications	12,586	0.8	2,391	19.0	0.891	0.851	0.933
HCC177 Other Complications of Medical Care	129,885	7.8	35,943	27.7	1.024	1.009	1.038
HCC178 Major Symptoms, Abnormalities	979,105	59.0	211,112	21.6	1.009	1.000	1.018
HCC186 Major Organ Transplant or Replacement Status	5,495	0.3	1,764	32.1	1.061	0.999	1.128
HCC187 Other Organ Transplant Status/ Replacement	35,755	2.2	9,452	26.4	1.049	1.023	1.076
HCC188 Artificial Openings for Feeding or Elimination	59,718	3.6	18,104	30.3	1.178	1.155	1.202
HCC189 Amputation Status, Lower Limb/Amputation Complications	33,793	2.0	8,796	26.0	0.982	0.956	1.009
HCC190 Amputation Status, Upper Limb	2,810	0.2	724	25.8	1.033	0.945	1.129
Two or more HCCs	1,563,805	94.2	315,434	20.2	1.251	1.216	1.287

* Suppressed number because of small cell sizes.

SOURCE: RTI International analysis of FY 2016 MedPAR data (RTI programming reference: CK69 and idxSNF04_lk2017_CY_001_FORMATTED.xls)