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Trends in 30-Day Readmission Rates for Medicare and Non-Medicare Patients in the Era of the Affordable Care Act

Suveen Angraal, MD, Rohan Khera, MD, Shengfan Zhou, MS, Yongfei Wang, MS, Zhenqiu Lin, PhD, Kumar Dharmarajan, MD, MBA, Nihar R. Desai, MD, MPH, Susannah M. Bernheim, MD, MHS, Elizabeth E. Drye, MD, SM, Khurram Nasir, MD, MPH, Leora I. Horwitz, MD, MHS, Harlan M. Krumholz, MD, SM

ABSTRACT

BACKGROUND: Temporal changes in the readmission rates for patient groups and conditions that were not directly under the purview of the Hospital Readmissions Reduction Program (HRRP) can help assess whether efforts to lower readmissions extended beyond targeted patients and conditions.

METHODS: Using the Nationwide Readmissions Database (2010-2015), we assessed trends in all-cause readmission rates for 1 of the 3 HRRP conditions (acute myocardial infarction, heart failure, pneumonia) or conditions not targeted by the HRRP in age-insurance groups defined by age group (≥65 years or <65 years) and payer (Medicare, Medicaid, or private insurance).

RESULTS: In the group aged ≥65 years, readmission rates for those covered by Medicare, Medicaid, and private insurance decreased annually for acute myocardial infarction (risk-adjusted odds ratio [OR; 95% confidence interval] among Medicare patients, 0.94 [0.94-0.95], among Medicaid patients, 0.93 [0.90-0.97], and among patients with private-insurance, 0.95 [0.93-0.97]); heart failure (ORs, 0.96 [0.96-0.97], 0.96 [0.94-0.98], and 0.97 [0.96-0.99], for the 3 payers, respectively), and pneumonia (ORs, 0.96 [0.96-0.97], 0.94 [0.92-0.96], and 0.96 [0.95-0.97], respectively). Readmission rates also decreased in the group aged <65 years for acute myocardial infarction (ORs: Medicare 0.97 [0.96-0.98], Medicaid 0.94 [0.92-0.95], and private insurance 0.93 [0.92-0.94]), heart failure (ORs, 0.98 [0.97-0.98], 0.98 [0.96-0.97], and 0.97 [0.95-0.98], for the 3 payers, respectively), and pneumonia (ORs, 0.98 [0.97-0.99], 0.98 [0.97-0.99], and 0.98 [0.97-1.00], respectively). Further, readmission rates decreased significantly for non-target conditions.

CONCLUSIONS: There appears to be a systematic improvement in readmission rates for patient groups beyond the population of fee-for-service, older, Medicare beneficiaries included in the HRRP.

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KEYWORDS: Medicaid; Medicare; Private insurance; Readmissions; Trends

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Requests for reprints should be addressed to Harlan M. Krumholz, MD, SM, Department of Internal Medicine, Section of Cardiovascular Medicine, Yale School of Medicine, 1 Church Street, Suite 200, New Haven, CT 06510.

E-mail address: harlan.krumholz@yale.edu
BACKGROUND

The Hospital Readmissions Reduction Program (HRRP) has been associated with substantial reductions in readmission within 30 days of discharge among fee-for-service Medicare beneficiaries aged ≥65 years who are hospitalized with acute myocardial infarction, heart failure, or pneumonia—the target population for this program. There have been suggestions that hospitals might have pursued reductions in readmissions through efforts mainly directed toward Medicare beneficiaries aged ≥65 years without pursuing systematic improvements in the care of patients. Other reports have suggested an inconsistent cross-sectional association between hospital-level readmission rates for Medicare beneficiaries for conditions covered under the HRRP compared with other patient groups. However, an assessment of the temporal association between the HRRP’s introduction and changes in readmissions for patient groups other than the Medicare beneficiaries targeted in the program is essential to assess how rates of readmission have evolved in an era with emphasis on readmission reduction for patients who were not directly being targeted for quality improvement nationally.

Accordingly, we used the Healthcare Cost and Utilization Project’s Nationwide Readmissions Database (NRD), a nationally representative all-payer database, for 2010-2015 to assess temporal trends in 30-day readmission rates for the 3 HRRP target conditions (acute myocardial infarction, heart failure, and pneumonia) and other conditions not targeted by the HRRP, across age-insurance groups.

CLINICAL SIGNIFICANCE

- Between 2010 and 2015, all-cause 30-day readmission rates for acute myocardial infarction, heart failure, and pneumonia, the three conditions originally targeted under the Hospital Readmissions Reduction Program (HRRP), decreased significantly across three payer groups of Medicare, Medicaid and Private Insurance.
- For hospitalizations not targeted by HRRP, there was a modest decrease in readmission rates.

METHODS

Data Source and Variables

We used the NRD for the years 2010-2015. The NRD is a nationally representative, all-payer dataset that has been constructed using discharge-level data for all hospitalizations from the Healthcare Cost and Utilization Project’s State Inpatient Databases of geographically dispersed participating states (18-27 states during 2010-2015). The sample includes nearly half of all US hospitalizations each year. In 2015, for example, the NRD included 56.6% of hospitalizations in the United States, representing all hospitalizations for 57.8% of the total population. The NRD uses a year-specific, patient-level identifier that allows tracking of patients across hospitalizations in a state within a calendar year.

The NRD includes clinical and demographic variables for each hospitalization and information on the primary insurance payer for each hospitalization. To ensure the uniformity of coding across different data sources, the payer in NRD is classified into broad insurance groups of Medicare, Medicaid, private insurance, self-pay, no charge, other, and missing or invalid. For this study, we included the patients with Medicare, Medicaid, or private insurance as the payers of the hospitalization; Medicare and Medicaid both include fee-for-service and managed care patients, and private insurance includes commercial insurance providers. Given the variability in reporting across participating states, only 1 payer is associated with each person in the NRD. In patients with more than 1 source of insurance coverage, only the insurance program expected to reimburse the hospital for the clinical encounter (the primary payer) is included in the NRD.

Study Population

We included all hospitalizations among adults (≥18 years) with a primary discharge diagnosis of acute myocardial infarction, heart failure, and pneumonia, identified using the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes for discharges between January 2010 and September 2015, and the International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM) codes for discharges between October and December 2015. These definitions are consistent with those used by the Centers for Medicare & Medicaid Services (CMS) for its readmission metrics for the respective conditions. We also identified nontarget conditions, representing hospitalizations for conditions that were not subject to financial penalties under the HRRP. To define index hospitalizations for nontarget conditions, we excluded the hospitalizations for the 3 target conditions (acute myocardial infarction, heart failure, and pneumonia). We also excluded hospitalizations for chronic obstructive pulmonary disease and hip and knee arthroplasty because these types were included in the HRRP toward the end of the study period. The ICD-9-CM and ICD-10-CM codes used to identify each of these conditions are included in Supplementary Tables 1-10 (available online). We stratified all hospitalizations into age-insurance subgroups defined by age (≥65 years or <65 years) and insurance payer (Medicare, Medicaid, or private insurance).

For each of the 4 conditions (acute myocardial infarction, heart failure, pneumonia, and nontarget hospitalizations), there were 6 age-insurance groups based on age and insurance payer: ≥65 years with Medicare, Medicaid, or
private insurance, and <65 years with Medicare, Medicaid, or private insurance.

Outcome
The outcome of interest was all-cause 30-day readmission. Readmission was defined as any hospitalization within 30 days of the discharge after an index hospitalization to the same or a different hospital within the state. A hospitalization classified as a readmission was not an index hospitalization for a subsequent readmission event. Data in the NRD are restricted to calendar years, without an ability to track patients across years. Therefore, as recommended by the Agency for Healthcare Research and Quality, we used data for 11 months (January-November) to allow 30-day follow-up for all patients for each year in the analyses.11

Statistical Analysis
We defined an index hospitalization as one in which patients were discharged alive and did not leave the hospital against medical advice. Further, hospitalizations with missing information on either the date of admission or hospital length of stay were excluded because that information was required for the assessment of postdischarge, 30-day events. Multiple index admissions were possible for each patient, regardless of the time elapsed between 2 hospitalizations.

To account for the complex survey design of the NRD, we used survey-specific methodology with hospital as cluster, NRD stratum as strata, and discharge-level weights as weight to obtain weighted nationwide, annual 30-day readmission rates and further evaluate the risk-adjusted annual trends in readmission.11-13 For risk adjustment, we created a patient-level survey logistic regression model with 30-day readmission as the outcome and risk factors that are part of the risk adjustment in the CMS publicly reported measure for acute myocardial infarction, heart failure, and pneumonia (age, gender, and comorbidities) based on the secondary diagnoses in the index hospitalization as independent variables. For nontarget conditions, we used the set of risk factors that are included in the CMS hospital-wide readmission measure.14 In contrast to the CMS measures, where risk factors are defined based on the diagnoses in the index hospitalization as well as a preceding 12-month period before the index event, the comorbidities used in our survey logistic regression were defined in the index event. To allow assessment of risk-adjusted odds of readmission over years, we assessed calendar year as a dummy coded continuous variable in the model, allowing for an assessment of odds of annual changes in readmission stratified by the 6 age-insurance groups. To further evaluate the differences in annual trends of readmission between older Medicare and other patient groups, we tested the interaction between the calendar year and age-payer patient groups with Medicare patients aged ≥65 years as the reference group.

All analyses were conducted using SAS 9.4 software (SAS Institute, Cary, NC), and the level of significance was set at 0.05. The study was exempted by the institutional review board at Yale University (New Haven, Conn) because the data were de-identified. The data are available publicly through the Agency for Healthcare Research and Quality.

RESULTS
Between 2010 and 2015, there were 1,051,140 hospitalizations for acute myocardial infarction, 2,128,140 for heart failure, 2,067,240 for pneumonia, and 53,734,220 for nontarget conditions in the NRD, representing an estimated 2,364,371, 4,795,327, 4,900,012, and 121,093,299 hospitalizations nationally for acute myocardial infarction, heart failure, pneumonia, and non-target conditions, respectively (Supplementary Figure 1, available online). Overall, there were an estimated 349,139 readmissions nationally for acute myocardial infarction (14.8%), 1,111,593 for heart failure (23.2%), 817,431 for pneumonia (16.7%), and 16,290,748 for nontarget conditions (13.5%). The selected characteristics of index hospitalizations in the 6 patient age-insurance groups for acute myocardial infarction, heart failure, pneumonia, and nontarget conditions are included in Table 1, and the characteristics of the patients hospitalized for target conditions are included in Supplementary Table 11 (available online).

Readmission Trends for Target Conditions
Over the 6 years of the study period (2010-2015), 30-day readmission rates for acute myocardial infarction decreased for all 6 age-insurance groups (Figures 1A and 2A) (Supplementary Table 12, available online). The baseline characteristics of the patients hospitalized for acute myocardial infarction are shown in Supplementary Table 13 (available online). In those who were aged ≥65 years and covered by Medicare, readmission rates decreased from 19.2% in 2010 to 15.8% in 2015 (risk-adjusted odds ratio [OR] for yearly change in readmission, 0.94; 95% confidence interval [CI], 0.94-0.95) (Table 2 and Supplementary Figure 2 [available online]). In those aged ≥65 years, readmission rates decreased from 14.6% to 12.4% (risk-adjusted OR, 0.95; 95% CI, 0.93-0.97) for the privately insured, and from 23.4% to 18.3% (risk-adjusted OR, 0.93; 95% CI, 0.90-0.97) for those insured by Medicaid. Privately insured and Medicaid patients aged <65 years had a relative decline in readmission rates (privately insured: risk-adjusted OR, 0.93, 95% CI, 0.92-0.94; Medicaid: risk-adjusted OR, 0.94, 95% CI, 0.92-0.95) similar to that of the Medicare population aged ≥65 years. Medicare patients aged <65 years also observed a decrease in readmission rates (19.7% to 18.6%; risk-adjusted OR, 0.97, 95% CI, 0.96-0.98), but the decrease was lower than that of the reference group of Medicare aged ≥65 years (P for calendar-year*age-insurance group interaction, .001).

Similar to acute myocardial infarction, all-cause 30-day readmission rates for heart failure decreased in all age-insurance groups between 2010 and 2015, with a similar relative decline in all groups (P for calendar-year*age-insurance
Table 1  Characteristics of Patients Hospitalized for Acute Myocardial Infarction, Heart Failure, Pneumonia, and Nontarget Conditions Stratified by Age/Insurance Groups

| Patient Characteristics, % (SE) | Patients Aged ≥65 years | Patients Aged <65 years |
|----------------------------------|--------------------------|-------------------------|
|                                  | Medicare | Medicaid | Private Insurance | Medicare | Medicaid | Private Insurance |
| **Acute Myocardial Infarction**   |           |          |                   |           |          |                   |
| Age, mean (SE)                   | 77.8 (0.03) | 74.4 (0.1) | 72.7 (0.07)       | 56.2 (0.03) | 52.3 (0.04) | 54.1 (0.02)       |
| Female                           | 47.4 (0.11) | 52.9 (0.64) | 33.1 (0.33)       | 35.9 (0.21) | 37.3 (0.24) | 25.4 (0.12)       |
| History of coronary artery bypass graft surgery | 11.3 (0.08) | 7.5 (0.32) | 9.2 (0.17)       | 9.8 (0.14) | 5.2 (0.1)   | 3.2 (0.05)        |
| Diabetes mellitus or diabetes mellitus complications | 38 (0.12) | 49 (0.61) | 36.4 (0.3)       | 51.2 (0.24) | 40.8 (0.24) | 27.9 (0.13)       |
| Iron deficiency or other/unspecified anemias and blood disease | 28.6 (0.16) | 33.1 (0.6) | 23 (0.29)        | 25.3 (0.25) | 20.8 (0.22) | 13.2 (0.14)       |
| Chronic obstructive pulmonary disease | 20.3 (0.11) | 17 (0.5)  | 15.8 (0.23)      | 24.8 (0.24) | 18.4 (0.23) | 7.4 (0.09)        |
| Renal failure                    | 35.4 (0.16) | 35.6 (0.63) | 27.2 (0.34)      | 33 (0.32)   | 19.3 (0.24) | 9.5 (0.11)        |
| **Heart Failure**                |           |          |                   |           |          |                   |
| Age, mean (SE)                   | 79.9 (0.02) | 75.6 (0.09) | 76.1 (0.07)       | 55.3 (0.04) | 51.7 (0.04) | 54.3 (0.04)       |
| Female                           | 54.2 (0.09) | 61.5 (0.46) | 43.2 (0.3)        | 41.1 (0.18) | 42.7 (0.23) | 37.6 (0.2)        |
| History of coronary artery bypass graft surgery | 18.2 (0.1)  | 13.5 (0.3) | 17.9 (0.24)      | 12.2 (0.13) | 7.6 (0.1)   | 9.2 (0.12)        |
| Diabetes mellitus or diabetes mellitus complications | 43.4 (0.1)  | 52.8 (0.43) | 46.6 (0.29)      | 58.1 (0.21) | 48.2 (0.21) | 47.9 (0.21)       |
| Iron deficiency or other/unspecified anemias and blood disease | 35.2 (0.14) | 38.4 (0.41) | 31.1 (0.28)      | 34.7 (0.23) | 29.7 (0.2)  | 26.5 (0.21)       |
| Chronic obstructive pulmonary disease | 34 (0.11)  | 28.7 (0.46) | 31.9 (0.29)      | 35.8 (0.22) | 31.3 (0.23) | 20 (0.18)         |
| Renal failure                    | 52.6 (0.14) | 51.9 (0.44) | 50.7 (0.32)      | 57.1 (0.24) | 44.3 (0.28) | 41 (0.26)         |
| **Pneumonia**                    |           |          |                   |           |          |                   |
| Age, mean (SE)                   | 79.8 (0.02) | 76.5 (0.09) | 75.6 (0.09)       | 53.5 (0.04) | 47.1 (0.06) | 49.9 (0.05)       |
| Female                           | 53.1 (0.08) | 58.3 (0.51) | 44.4 (0.33)      | 49.3 (0.18) | 55 (0.19)   | 52 (0.16)         |
| History of coronary artery bypass graft surgery | 8.2 (0.06)  | 4.6 (0.19) | 7.6 (0.15)       | 3.4 (0.06)   | 1.8 (0.05)  | 1.9 (0.04)        |
| Diabetes mellitus or diabetes mellitus complications | 31 (0.09)   | 39.3 (0.47) | 31.2 (0.27)      | 34.4 (0.18) | 26.5 (0.17) | 22.7 (0.13)       |
| Iron deficiency or other/unspecified anemias and blood disease | 33.5 (0.16) | 36.1 (0.48) | 29.7 (0.3)       | 31.7 (0.22) | 28.9 (0.2)  | 24.9 (0.18)       |
| Chronic obstructive pulmonary disease | 41.2 (0.13) | 35.2 (0.53) | 40.8 (0.32)      | 39.6 (0.25) | 33.8 (0.25) | 21.5 (0.17)       |
| Renal failure                    | 30.1 (0.12) | 28.4 (0.46) | 26.4 (0.31)      | 25.3 (0.19) | 14.7 (0.16) | 12.1 (0.12)       |
| **Nontarget Conditions**         |           |          |                   |           |          |                   |
| Age, mean                        | 77.7 (0.02) | 74.4 (0.05) | 73.1 (0.05)       | 51.1 (0.03) | 36.4 (0.06) | 42 (0.06)         |
| Female                           | 57.3 (0.05) | 60.9 (0.34) | 47 (0.15)        | 50.8 (0.07) | 72.8 (0.18) | 67.8 (0.19)       |
| Other significant endocrine and metabolic disorders; disorders of fluid/electrolyte/acid-base balance | 32.7 (0.1)  | 32.8 (0.24) | 27.4 (0.12)      | 30.7 (0.13) | 15.3 (0.1)  | 14 (0.08)         |
| Diabetes mellitus                | 31.7 (0.07) | 40.2 (0.22) | 30.4 (0.1)       | 34.6 (0.1)  | 14.1 (0.07) | 12.6 (0.07)       |
| Iron deficiency or other/unspecified anemias and blood disease | 31.3 (0.12) | 32.1 (0.25) | 26.5 (0.14)      | 27.3 (0.18) | 18.7 (0.13) | 15.7 (0.11)       |
| Chronic obstructive pulmonary disease | 18.1 (0.06) | 14.5 (0.21) | 14.6 (0.1)       | 16.4 (0.1)  | 6 (0.06)    | 3.2 (0.03)        |
| Renal failure                    | 28 (0.1)    | 27.7 (0.23) | 22.2 (0.14)      | 25.4 (0.15) | 7.4 (0.07)  | 5.9 (0.06)        |

SE = standard error.
group interaction, .056) (Figures 1B and 2B) (Supplementary Table 11, available online). The baseline characteristics of the patients hospitalized for heart failure are shown in Supplementary Table 14 (available online). In patients aged ≥65 years, readmission rates decreased from 23.6% in 2010 to 21.8% in 2015 in those covered by Medicare (risk-adjusted OR for yearly change in readmission, 0.96; 95% CI, 0.96-0.98), from 26.4% to 24.1% in those covered by Medicaid (risk-adjusted OR, 0.96; 95% CI, 0.94-0.98), and from 20.5% to 20.2% in those privately insured (risk-adjusted OR, 0.97; 95% CI, 0.96-0.99) (Table 2 and Supplementary Figure 2 [available online]). For those aged <65 years and covered by Medicare, readmission rates increased from 28.9% in 2010 to 29.2% in 2011 and decreased to 28.0% in 2015 (risk-adjusted OR, 0.98; 95% CI, 0.97-0.98). In this age group, readmissions decreased uniformly across the study period for both Medicaid (risk-adjusted OR, 0.97; 95% CI, 0.96-0.98) and privately insured (risk-adjusted OR, 0.97; 95% CI, 0.95-0.98) patients.

Readmission rates for pneumonia decreased across age-insurance groups, but with differences in relative decline across the groups (P for calendar year*age-insurance group interaction <.001) (Figures 1C and 2C) (Supplementary Table 11, available online). The baseline characteristics of the patients hospitalized for pneumonia are shown in Supplementary Table 15 (available online). Among those aged ≥65 years, readmission rates decreased from 18.1% in 2010 to 16.1% in 2015 in those covered by Medicare (risk-adjusted OR for yearly change in readmission, 0.96; 95% CI, 0.96-0.97), from 20.6% to 17.1% in those covered by Medicaid (risk-adjusted OR, 0.94; 95% CI, 0.92-0.96), and from 16.5% to 14.7% in the privately insured (risk-adjusted OR, 0.96; 95% CI, 0.96-0.97) (Table 2 and Supplementary Figure 2 [available online]). There was a much smaller relative decrease in readmission rates for all insurance groups in the aged <65 years age group, relative to the trends in the reference group of those covered by Medicare and who were aged ≥65 years (P for calendar year*age-insurance interaction <.05 for all groups aged <65 years). Specifically, in this age group, readmission rates decreased from 20.1% in 2010 to 19.4% in 2015 for those covered by Medicare (risk-adjusted OR, 0.98; 95% CI, 0.97-0.99), from 18.2% to 17.4% for Medicaid patients (risk-adjusted OR, 0.98; 95% CI, 0.97-0.99), and from 11.0% to 10.9% for the privately insured (risk-adjusted OR, 0.98; 95% CI, 0.97-1.00).

Figure 1 Trends of readmission rates in patients aged ≥65 years by different payer types.
Readmission Trends for Nontarget Conditions

Patients hospitalized for nontarget conditions who were covered by either Medicare or Medicaid were more frequently readmitted than patients who were privately insured; this was found in patients both aged >65 and <65 years. Further, there was a small decrease in observed readmission rates in most age-insurance groups (Figures 1D and 2D) (Supplementary Table 12, available online). In patients aged ≥65 years who were covered by Medicare, readmission rates decreased from 16.3% in 2010 to 15.5% in 2015 (risk-adjusted OR for yearly change in readmission rates, 0.97; 95% CI, 0.97-0.97) (Table 2 and Supplementary Figure 2 [available online]). Those covered by Medicaid followed a similar pattern (risk-adjusted OR, 0.98; 95% CI, 0.96-0.99). Among the privately insured, readmission rates decreased from 14.0% in 2010 to 13.5% in 2013, then increased to 13.8% in 2015 (risk-adjusted OR, 0.97; 95% CI, 0.97-0.98). In contrast, there was a small relative decrease in readmission rates in patients aged <65 years over the study period: 20.8% to 20.5% for those covered by Medicare (risk-adjusted OR, 0.98; 95% CI, 0.98-0.99), 13.1% to 12.9% for those covered by Medicaid (risk-adjusted OR, 0.97; 95% CI, 0.96-0.99), and 8.6% to 8.4% for those privately insured (risk-adjusted OR, 0.98; 95% CI, 0.97-0.98).

Overall, the decrease in readmission rates was significantly higher for target conditions than for nontarget conditions ($P < .001$). A similar pattern of a larger decrease in readmission rates for target vs nontarget conditions was observed across age-insurance groups ($P < .05$ for all).

DISCUSSION

From 2010-2015, 30-day all-cause readmission rates for acute myocardial infarction, heart failure, and pneumonia declined across all age-insurance groups. Readmission rates decreased modestly for conditions not targeted by the HRRP in all age-payer groups, with larger declines among Medicare patients aged ≥65 years. These results are consistent with the hypothesis that interventions designed to reduce readmissions due to the HRRP were implemented broadly rather than exclusively applied to older Medicare fee-for-service beneficiaries.

Under the HRRP, hospitals are financially incentivized to lower excess readmissions among fee-for-service beneficiaries.
after discharge. Adoption of these programs may have led to much wider improvements in readmission rates through improved healthcare delivery, patient education, and improved follow-up, which were not limited to the patients covered under the HRRP directly. This information also represents critical feedback to health policy makers, since health policy interventions may have wider implications for patient health and wellness.

The findings of the study should be interpreted in light of certain limitations. First, we used serial cross-sectional data and assessed secular trends. Therefore, the findings cannot be interpreted to represent a direct causal relationship between health policy implementation and changes in readmission outcomes. Second, hospitalizations are included in the NRD at the time of discharge and cannot be tracked across years. To assess 30-day readmission rates, data from December were excluded. However, this exclusion was consistent across study years and has been recommended by the Agency for Healthcare Research and Quality. Third, we are unable to specifically account for the competing risk of posthospitalization mortality. However, our analysis compares temporal trends in specific insurance groups, and therefore trends may be consistent across study years. Fourth, changing trends may be subject to directional changes in coding practices. However, it is unclear if such coding changes would disproportionately affect certain patient groups. Fifth, insurance categories defined in the study rely on those reported as the primary payer in the NRD. Moreover, individuals reported as covered under Medicare include both fee-for-service and managed care beneficiaries. Therefore, trends may vary if payers are defined differently. Last, the hospitals cannot be tracked across years, precluding an assessment of hospital-specific readmission rates.

**CONCLUSIONS**

There was a significant decline in readmission rates for the 3 conditions targeted by the HRRP across age and payer groups. Readmission rates also declined modestly for conditions not targeted by the HRRP. These patterns are consistent with the hypothesis that implementation of the HRRP was associated with systematic changes in the care of patients and reduced readmission risk beyond the HRRP's target population of fee-for-service Medicare beneficiaries.

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**SUPPLEMENTARY APPENDIX**

Supplementary Material accompanying this article can be found in the online version at 10.1016/j.amjmed.2018.06.013

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### Supplementary Table 1: ICD-9 Codes Used to Define AMI Cohort

| ICD-9-CM Diagnosis Codes | Description |
|--------------------------|-------------|
| 410.00                   | Acute myocardial infarction of anterolateral wall, episode of care unspecified |
| 410.01                   | Acute myocardial infarction of anterolateral wall, initial episode of care |
| 410.10                   | Acute myocardial infarction of other anterior wall, episode of care unspecified |
| 410.11                   | Acute myocardial infarction of other anterior wall, initial episode of care |
| 410.20                   | Acute myocardial infarction of inferolateral wall, episode of care unspecified |
| 410.21                   | Acute myocardial infarction of inferolateral wall, initial episode of care |
| 410.30                   | Acute myocardial infarction of inferoposterior wall, episode of care unspecified |
| 410.31                   | Acute myocardial infarction of inferoposterior wall, initial episode of care |
| 410.40                   | Acute myocardial infarction of other inferior wall, episode of care unspecified |
| 410.41                   | Acute myocardial infarction of other inferior wall, initial episode of care |
| 410.50                   | Acute myocardial infarction of other lateral wall, episode of care unspecified |
| 410.51                   | Acute myocardial infarction of other lateral wall, initial episode of care |
| 410.60                   | True posterior wall infarction, episode of care unspecified |
| 410.61                   | True posterior wall infarction, initial episode of care |
| 410.70                   | Subendocardial infarction, episode of care unspecified |
| 410.71                   | Subendocardial infarction, initial episode of care |
| 410.80                   | Acute myocardial infarction of other specified sites, episode of care unspecified |
| 410.81                   | Acute myocardial infarction of other specified sites, initial episode of care |
| 410.90                   | Acute myocardial infarction of unspecified site, episode of care unspecified |
| 410.91                   | Acute myocardial infarction of unspecified site, initial episode of care |

### Supplementary Table 2: ICD-9 Codes Used to Define Heart Failure Cohort

| ICD-9-CM Diagnosis Codes | Description |
|--------------------------|-------------|
| 402.01                   | Malignant hypertensive heart disease with heart failure |
| 402.11                   | Benign hypertensive heart disease with heart failure |
| 402.91                   | Unspecified hypertensive heart disease with heart failure |
| 404.01                   | Hypertensive heart and chronic kidney disease, malignant, with heart failure and with chronic kidney disease stage I through stage IV, or unspecified |
| 404.03                   | Hypertensive heart and chronic kidney disease, malignant, with heart failure and with chronic kidney disease stage V or end stage renal disease |
| 404.11                   | Hypertensive heart and chronic kidney disease, benign, with heart failure and with chronic kidney disease stage I through stage IV, or unspecified |
| 404.13                   | Hypertensive heart and chronic kidney disease, benign, with heart failure and chronic kidney disease stage I through stage IV, or unspecified |
| 404.91                   | Hypertensive heart and chronic kidney disease, unspecified, with heart failure and with chronic kidney disease stage I through stage IV, or unspecified |
| 404.93                   | Hypertensive heart and chronic kidney disease, unspecified, with heart failure and chronic kidney disease stage V or end stage renal disease |
| 428.0                    | Congestive heart failure, unspecified |
| 428.1                    | Left heart failure |
| 428.20                   | Systolic heart failure, unspecified |
| 428.21                   | Acute systolic heart failure |
| 428.22                   | Chronic systolic heart failure |
| 428.23                   | Acute on chronic systolic heart failure |
| 428.30                   | Diastolic heart failure, unspecified |
| 428.31                   | Acute diastolic heart failure |
| 428.32                   | Chronic diastolic heart failure |
| 428.33                   | Acute on chronic diastolic heart failure |
| 428.40                   | Combined systolic and diastolic heart failure, unspecified |
| 428.41                   | Acute combined systolic and diastolic heart failure |
| 428.42                   | Chronic combined systolic and diastolic heart failure |
| 428.43                   | Acute on chronic combined systolic and diastolic heart failure |
| 428.9                    | Heart failure, unspecified |
### Supplementary Table 3: ICD-9 Codes Used to Define Pneumonia Cohort

| ICD-9-CM Diagnosis Codes | Description |
|--------------------------|-------------|
| 480.0                    | Pneumonia due to adenovirus |
| 480.1                    | Pneumonia due to respiratory syncytial virus |
| 480.2                    | Pneumonia due to parainfluenza virus |
| 480.3                    | Pneumonia due to SARS-associated coronavirus |
| 480.8                    | Pneumonia due to other virus not elsewhere classified |
| 480.9                    | Viral pneumonia, unspecified |
| 481                      | Pneumococcal pneumonia [Streptococcus pneumoniae pneumonia] |
| 482.0                    | Pneumonia due to Klebsiella pneumoniae |
| 482.1                    | Pneumonia due to Pseudomonas |
| 482.2                    | Pneumonia due to Hemophilus influenzae [H. influenzae] |
| 482.30                   | Pneumonia due to Streptococcus, unspecified |
| 482.31                   | Pneumonia due to Streptococcus, group A |
| 482.32                   | Pneumonia due to Streptococcus, group B |
| 482.39                   | Pneumonia due to other Streptococcus |
| 482.40                   | Pneumonia due to Staphylococcus, unspecified |
| 482.41                   | Methicillin susceptible pneumonia due to Staphylococcus aureus |
| 482.42                   | Methicillin resistant pneumonia due to Staphylococcus aureus |
| 482.49                   | Other Staphylococcus pneumonia |
| 482.81                   | Pneumonia due to anaerobes |
| 482.82                   | Pneumonia due to escherichia coli [E. coli] |
| 482.83                   | Pneumonia due to other gram-negative bacteria |
| 482.84                   | Pneumonia due to Legionnaires’ disease |
| 482.89                   | Pneumonia due to other specified bacteria |
| 482.9                    | Bacterial pneumonia, unspecified |
| 483.0                    | Pneumonia due to mycoplasma pneumoniae |
| 483.1                    | Pneumonia due to chlamydia |
| 483.8                    | Pneumonia due to other specified organism |
| 485                      | Bronchopneumonia, organism unspecified |
| 486                      | Pneumonia, organism unspecified |
| 487.0                    | Influenza with pneumonia |
| 488.11                   | Influenza due to identified 2009 H1N1 influenza virus with pneumonia |
| 507.0                    | Pneumonitis due to inhalation of food or vomitus |

### Supplementary Table 4: ICD-9 Codes Used to Define Chronic Obstructive Pulmonary Disease Cohort

| ICD-9-CM Diagnosis Codes | Description |
|--------------------------|-------------|
| 491.21                   | Obstructive chronic bronchitis with (acute) exacerbation |
| 491.22                   | Obstructive chronic bronchitis with acute bronchitis |
| 491.8                    | Other chronic bronchitis |
| 491.9                    | Unspecified chronic bronchitis |
| 492.8                    | Other emphysema |
| 493.20                   | Chronic obstructive asthma, unspecified |
| 493.21                   | Chronic obstructive asthma with status asthmaticus |
| 493.22                   | Chronic obstructive asthma with (acute) exacerbation |
| 496                      | Chronic airway obstruction, not elsewhere classified |

Principal discharge diagnosis codes included in cohort if combined with a secondary diagnosis of COPD with exacerbation (491.21, 491.22, 493.21, or 493.22)

| ICD-9-CM Diagnosis Codes | Description |
|--------------------------|-------------|
| 518.81                   | Acute respiratory failure |
| 518.82                   | Other pulmonary insufficiency, not elsewhere classified |
| 518.84                   | Acute and chronic respiratory failure |
| 799.1                    | Respiratory arrest |
### Supplementary Table 5: ICD-9 Codes Used to Define Hip/Knee Arthroplasty Cohort

| ICD-9-CM Procedure Codes | Description               |
|--------------------------|---------------------------|
| 81.51                    | Total hip replacement     |
| 81.54                    | Total knee replacement    |

### Supplementary Table 6: ICD-10 Codes Used to Define Acute Myocardial Infarction

| ICD-10-CM Codes | Description                                                                 |
|-----------------|------------------------------------------------------------------------------|
| I21.01          | ST elevation (STEMI) myocardial infarction involving left main coronary artery |
| I21.02          | ST elevation (STEMI) myocardial infarction involving left anterior descending coronary artery |
| I21.09          | ST elevation (STEMI) myocardial infarction involving other coronary artery of anterior wall |
| I21.11          | ST elevation (STEMI) myocardial infarction involving right coronary artery    |
| I21.19          | ST elevation (STEMI) myocardial infarction involving other coronary artery of inferior wall |
| I21.21          | ST elevation (STEMI) myocardial infarction involving left circumflex coronary artery |
| I21.29          | ST elevation (STEMI) myocardial infarction involving other sites              |
| I21.3           | ST elevation (STEMI) myocardial infarction of unspecified site               |
| I21.4           | Non-ST elevation (NSTEMI) myocardial infarction                             |

### Supplementary Table 7: ICD-10 Codes Used to Define Heart Failure

| ICD-10-CM Codes | Description                                                                 |
|-----------------|------------------------------------------------------------------------------|
| I11.0           | Hypertensive heart disease with heart failure                                |
| I13.0           | Hypertensive heart and chronic kidney disease with heart failure and stage 1 through stage 4 chronic kidney disease, or unspecified chronic kidney disease |
| I13.2           | Hypertensive heart and chronic kidney disease with heart failure and with stage 5 chronic kidney disease, or end stage renal disease |
| I50.1           | Left ventricular failure                                                    |
| I50.20          | Unspecified systolic (congestive) heart failure                             |
| I50.21          | Acute systolic (congestive) heart failure                                   |
| I50.22          | Chronic systolic (congestive) heart failure                                 |
| I50.23          | Acute on chronic systolic (congestive) heart failure                        |
| I50.30          | Unspecified diastolic (congestive) heart failure                            |
| I50.31          | Acute diastolic (congestive) heart failure                                  |
| I50.32          | Chronic diastolic (congestive) heart failure                               |
| I50.33          | Acute on chronic diastolic (congestive) heart failure                      |
| I50.40          | Unspecified combined systolic (congestive) and diastolic (congestive) heart failure |
| I50.41          | Acute combined systolic (congestive) and diastolic (congestive) heart failure |
| I50.42          | Chronic combined systolic (congestive) and diastolic (congestive) heart failure |
| I50.43          | Acute on chronic combined systolic (congestive) and diastolic (congestive) heart failure |
| I50.9           | Heart failure, unspecified                                                   |
### Supplementary Table 8: ICD-10 Codes Used to Define Pneumonia

| ICD-10-CM Codes | Description |
|-----------------|-------------|
| A48.1           | Legionnaires’ disease |
| J10.00          | Influenza due to other identified influenza virus with unspecified type of pneumonia |
| J10.01          | Influenza due to other identified influenza virus with the same other identified influenza virus pneumonia |
| J10.08          | Influenza due to other identified influenza virus with other specified pneumonia |
| J11.00          | Influenza due to unidentified influenza virus with unspecified type of pneumonia |
| J11.08          | Influenza due to unidentified influenza virus with specified pneumonia |
| J12.0           | Adenoviral pneumonia |
| J12.1           | Respiratory syncytial virus pneumonia |
| J12.2           | Parainfluenza virus pneumonia |
| J12.3           | Human metapneumovirus pneumonia |
| J12.81          | Pneumonia due to SARS-associated coronavirus |
| J12.89          | Other viral pneumonia |
| J12.9           | Viral pneumonia, unspecified |
| J13             | Pneumonia due to Streptococcus pneumoniae |
| J14             | Pneumonia due to Hemophilus influenzae |
| J15.0           | Pneumonia due to Klebsiella pneumoniae |
| J15.1           | Pneumonia due to Pseudomonas |
| J15.20          | Pneumonia due to staphylococcus, unspecified |
| J15.211         | Pneumonia due to Methicillin susceptible Staphylococcus aureus |
| J15.212         | Pneumonia due to Methicillin resistant Staphylococcus aureus |
| J15.29          | Pneumonia due to other staphylococcus |
| J15.3           | Pneumonia due to streptococcus, group B |
| J15.4           | Pneumonia due to other streptococci |
| J15.5           | Pneumonia due to Escherichia coli |
| J15.6           | Pneumonia due to other aerobic Gram-negative bacteria |
| J15.7           | Pneumonia due to Mycoplasma pneumoniae |
| J15.8           | Pneumonia due to other specified bacteria |
| J15.9           | Unspecified bacterial pneumonia |
| J16.0           | Chlamydial pneumonia |
| J16.8           | Pneumonia due to other specified infectious organisms |
| J18.0           | Bronchopneumonia, unspecified organism |
| J18.1           | Lobar pneumonia, unspecified organism |
| J18.8           | Other pneumonia, unspecified organism |
| J18.9           | Pneumonia, unspecified organism |
| J69.0           | Pneumonitis due to inhalation of food and vomit |
## Supplementary Table 9: ICD-10 Codes Used to Define Chronic Obstructive Pulmonary Disease

| ICD-10-CM Codes | Description                                                                 |
|-----------------|-----------------------------------------------------------------------------|
| J41.8           | Mixed simple and mucopurulent chronic bronchitis                             |
| J42             | Unspecified chronic bronchitis                                               |
| J43.0           | Unilateral pulmonary emphysema [MacLeod’s syndrome]                         |
| J43.1           | Panlobular emphysema                                                         |
| J43.2           | Centrilobular emphysema                                                     |
| J43.8           | Other emphysema                                                              |
| J43.9           | Emphysema, unspecified                                                       |
| J44.0           | Chronic obstructive pulmonary disease with acute lower respiratory infection |
| J44.1           | Chronic obstructive pulmonary disease with (acute) exacerbation              |
| J44.9           | Chronic obstructive pulmonary disease, unspecified                           |

Principal discharge diagnosis codes included in cohort if combined with a secondary diagnosis of J44.0 or J44.1:

| Code            | Description                                                                 |
|-----------------|-----------------------------------------------------------------------------|
| J96.00          | Acute respiratory failure, unspecified whether with hypoxia or hypercapnia |
| J96.01          | Acute respiratory failure with hypoxia                                       |
| J96.02          | Acute respiratory failure with hypercapnia                                   |
| J96.20          | Acute and chronic respiratory failure, unspecified whether with hypoxia or hypercapnia |
| J96.21          | Acute and chronic respiratory failure with hypoxia                           |
| J96.22          | Acute and chronic respiratory failure with hypercapnia                        |
| J96.90          | Respiratory failure, unspecified, unspecified whether with hypoxia or hypercapnia |
| J96.91          | Respiratory failure, unspecified with hypoxia                                |
| J96.92          | Respiratory failure, unspecified with hypercapnia                             |
| R09.2           | Respiratory arrest                                                           |
## Supplementary Table 10: ICD-10 Codes Used to Define Hip/Knee Arthroplasty

| ICD-10-PCS Codes | Description |
|------------------|-------------|
| 0SR9019          | Replacement of Right Hip Joint with Metal Synthetic Substitute, Cemented, Open Approach |
| 0SR901A          | Replacement of Right Hip Joint with Metal Synthetic Substitute, Uncemented, Open Approach |
| 0SR901Z          | Replacement of Right Hip Joint with Metal Synthetic Substitute, Open Approach |
| 0SR9029          | Replacement of Right Hip Joint with Metal on Polyethylene Synthetic Substitute, Cemented, Open Approach |
| 0SR902A          | Replacement of Right Hip Joint with Metal on Polyethylene Synthetic Substitute, Uncemented, Open Approach |
| 0SR902Z          | Replacement of Right Hip Joint with Metal on Polyethylene Synthetic Substitute, Open Approach |
| 0SR9039          | Replacement of Right Hip Joint with Ceramic Synthetic Substitute, Cemented, Open Approach |
| 0SR903A          | Replacement of Right Hip Joint with Ceramic Synthetic Substitute, Uncemented, Open Approach |
| 0SR903Z          | Replacement of Right Hip Joint with Ceramic Synthetic Substitute, Open Approach |
| 0SRB019          | Replacement of Left Hip Joint with Metal Synthetic Substitute, Cemented, Open Approach |
| 0SRB01A          | Replacement of Left Hip Joint with Metal Synthetic Substitute, Uncemented, Open Approach |
| 0SRB01Z          | Replacement of Left Hip Joint with Metal Synthetic Substitute, Open Approach |
| 0SRB029          | Replacement of Left Hip Joint with Metal on Polyethylene Synthetic Substitute, Cemented, Open Approach |
| 0SRB02A          | Replacement of Left Hip Joint with Metal on Polyethylene Synthetic Substitute, Uncemented, Open Approach |
| 0SRB02Z          | Replacement of Left Hip Joint with Metal on Polyethylene Synthetic Substitute, Open Approach |
| 0SRB039          | Replacement of Left Hip Joint with Ceramic Synthetic Substitute, Cemented, Open Approach |
| 0SRB03A          | Replacement of Left Hip Joint with Ceramic Synthetic Substitute, Uncemented, Open Approach |
| 0SRB03Z          | Replacement of Left Hip Joint with Ceramic Synthetic Substitute, Open Approach |
| 0SRC0J9          | Replacement of Right Knee Joint with Synthetic Substitute, Cemented, Open Approach |
| 0SRC0JA          | Replacement of Right Knee Joint with Synthetic Substitute, Uncemented, Open Approach |
| 0SRC0JZ          | Replacement of Right Knee Joint with Synthetic Substitute, Open Approach |
| 0SRD0J9          | Replacement of Left Knee Joint with Synthetic Substitute, Cemented, Open Approach |
| 0SRD0JA          | Replacement of Left Knee Joint with Synthetic Substitute, Uncemented, Open Approach |
| 0SRD0JZ          | Replacement of Left Knee Joint with Synthetic Substitute, Open Approach |
### Supplementary Table 11: Characteristics of Patients Hospitalized for Acute Myocardial Infarction, Heart Failure and Pneumonia According to the Primary Payer

| Patient Characteristics, % (SE) | Medicare No. of Index Admissions, weighted (SD) | Medicaid No. of Index Admissions, weighted (SD) | Private Insurance No. of Index Admissions, weighted (SD) | Medicare Patients aged ≥65 years | Medicaid Patients aged ≥65 years | Private Insurance Patients aged ≥65 years |
|---------------------------------|-----------------------------------------------|-----------------------------------------------|-------------------------------------------------|---------------------------------|---------------------------------|-----------------------------------|
| Acute Myocardial Infarction     | 1310180 (13862)                                | 17337 (417)                                   | 98738 (1767)                                   | 186158 (2625)                   | 165828 (2406)                   | 586130 (7136)                     |
| Congestive Heart Failure        | 3354561 (27782)                                | 49455 (1149)                                  | 169540 (3221)                                  | 487817 (6787)                   | 386078 (6437)                   | 347967 (4435)                     |
| Pneumonia                       | 3159930 (26032)                                | 42646 (829)                                   | 166229 (3083)                                  | 541983 (5010)                   | 401560 (4333)                   | 587665 (5549)                     |
| No. of Index Admissions, weighted (SD) | 7824671 (63563)                                | 109437 (2181)                                 | 434416 (7463)                                  | 1215957 (12753)                 | 953466 (12010)                  | 1521762 (14695)                   |
| Age, mean (SE)                  | 79.5 (0.02)                                    | 75.8 (0.07)                                   | 75.1 (0.07)                                    | 54.7 (0.03)                     | 49.9 (0.03)                     | 52.5 (0.02)                       |
| Female                          | 52.6 (0.06)                                    | 58.9 (0.34)                                   | 41.4 (0.23)                                    | 44 (0.11)                       | 46.9 (0.15)                     | 38.5 (0.12)                       |
| History of coronary artery bypass graft (CABG) surgery | 13 (0.07)                                     | 9 (0.18)                                      | 12 (0.13)                                      | 7.9 (0.07)                      | 4.7 (0.05)                      | 4.1 (0.04)                        |
| Diabetes mellitus (DM) or DM complications | 37.5 (0.09)                                   | 46.9 (0.31)                                   | 38.4 (0.19)                                    | 46.6 (0.14)                     | 37.8 (0.13)                     | 30.5 (0.1)                        |
| Protein-calorie malnutrition    | 6.2 (0.06)                                     | 6.2 (0.18)                                    | 5.1 (0.11)                                     | 5.1 (0.07)                      | 4.6 (0.07)                      | 2.7 (0.04)                        |
| Other significant endocrine and metabolic disorders; disorders of fluid/electrolyte/acid-base balance | 34.3 (0.11)                                   | 34.8 (0.3)                                    | 30.5 (0.18)                                    | 35.8 (0.16)                     | 31.2 (0.15)                     | 25.3 (0.12)                       |
| Iron deficiency or other/unspecified anemias and blood disease | 33.3 (0.13)                                   | 36.6 (0.31)                                   | 28.6 (0.19)                                    | 31.9 (0.18)                     | 27.8 (0.15)                     | 20.8 (0.13)                       |
| Dementia or other specified brain disorders | 17.3 (0.07)                                   | 14.8 (0.24)                                   | 9.8 (0.13)                                     | 2.7 (0.03)                      | 1.6 (0.03)                      | 0.5 (0.01)                        |
| Hemiplegia, paraplegia, paralysis, functional disability | 3.8 (0.02)                                    | 5.9 (0.13)                                    | 3 (0.05)                                       | 9.1 (0.07)                      | 6.1 (0.06)                      | 2.1 (0.03)                        |
| Congestive heart failure        | 55.7 (0.13)                                    | 54.8 (0.36)                                   | 49.1 (0.25)                                    | 49.1 (0.24)                     | 46.1 (0.25)                     | 29.6 (0.19)                       |
| Acute coronary syndrome         | 3.8 (0.04)                                     | 4 (0.11)                                      | 3.6 (0.07)                                     | 2.7 (0.04)                      | 2.7 (0.05)                      | 2.3 (0.03)                        |
| Valvular and rheumatic heart disease | 18.4 (0.11)                                   | 14.6 (0.25)                                   | 14.8 (0.17)                                    | 9 (0.09)                        | 9 (0.1)                         | 7.6 (0.08)                        |
| Specified arrhythmias and other heart rhythm disorders | 45.2 (0.11)                                   | 35.3 (0.29)                                   | 40.2 (0.23)                                    | 23.5 (0.15)                     | 20.4 (0.14)                     | 21.5 (0.14)                       |
| Stroke                          | 0.6 (0.01)                                     | 0.6 (0.04)                                    | 0.5 (0.02)                                     | 0.4 (0.01)                      | 0.5 (0.01)                      | 0.4 (0.01)                        |
| Vascular or circulatory disease | 21.1 (0.1)                                     | 16.4 (0.23)                                   | 19.2 (0.18)                                    | 18.6 (0.11)                     | 13.7 (0.09)                     | 12.2 (0.08)                       |
| Chronic obstructive pulmonary disease (COPD) | 34.6 (0.1)                                    | 29.6 (0.34)                                   | 31.7 (0.21)                                    | 35.9 (0.18)                     | 30.2 (0.17)                     | 15.8 (0.1)                        |
| Asthma                          | 3.2 (0.02)                                     | 5.5 (0.13)                                    | 3.8 (0.06)                                     | 6.4 (0.06)                      | 9.2 (0.09)                      | 7.8 (0.06)                        |
| Pneumonia                       | 10.2 (0.05)                                    | 9.9 (0.16)                                    | 8.7 (0.1)                                      | 8.2 (0.06)                      | 7.5 (0.06)                      | 5.7 (0.04)                        |
| Dialysis status                | 2.3 (0.02)                                     | 4.6 (0.12)                                    | 1.6 (0.04)                                     | 9.1 (0.11)                      | 2.6 (0.04)                      | 1.2 (0.02)                        |
| Renal failure                   | 40.7 (0.12)                                    | 40.3 (0.33)                                   | 36.1 (0.25)                                    | 39.3 (0.23)                     | 27.6 (0.22)                     | 17.7 (0.14)                       |
| Other urinary tract disorders   | 5.4 (0.04)                                     | 4.9 (0.12)                                    | 5 (0.08)                                       | 3.7 (0.04)                      | 3.4 (0.04)                      | 3.1 (0.04)                        |
| Decubitus ulcer or chronic skin ulcer | 5 (0.03)                                     | 4.8 (0.12)                                    | 3.7 (0.06)                                     | 5 (0.05)                        | 3.5 (0.04)                      | 1.6 (0.02)                        |
**Supplementary Table 12: Annual Readmission Rates of Acute Myocardial Infarction, Heart Failure, Pneumonia, and Non-Target Conditions.**

| Condition                        | Readmission Rates (%) | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|----------------------------------|------------------------|------|------|------|------|------|------|
| **Acute Myocardial Infarction**  |                        |      |      |      |      |      |      |
| Medicare patients aged ≥65 years |                        | 19.2 | 19.0 | 17.3 | 16.7 | 16.1 | 15.8 |
| Medicaid patients aged ≥65 years |                        | 23.4 | 21.7 | 16.7 | 18.3 | 18.2 | 18.3 |
| Private Insurance patients aged ≥65 years |                | 14.6 | 14.1 | 13.8 | 12.6 | 12.5 | 12.4 |
| Medicare patients aged <65 years |                        | 19.7 | 19.0 | 18.5 | 18.0 | 18.1 | 18.6 |
| Medicaid patients aged <65 years |                        | 17.6 | 17.0 | 16.5 | 16.4 | 13.8 | 14.1 |
| Private Insurance patients aged <65 years |                | 9.0  | 8.4  | 7.8  | 7.6  | 6.8  | 7.0  |
| **Heart Failure**                |                        |      |      |      |      |      |      |
| Medicare patients aged ≥65 years |                        | 23.6 | 23.6 | 22.8 | 21.9 | 21.6 | 21.8 |
| Medicaid patients aged ≥65 years |                        | 26.6 | 25.8 | 26.4 | 24.4 | 24.2 | 24.1 |
| Private Insurance patients aged ≥65 years |                | 20.5 | 21.5 | 20.6 | 20.0 | 20.1 | 20.2 |
| Medicare patients aged <65 years |                        | 28.9 | 29.2 | 28.7 | 28.2 | 27.4 | 28.0 |
| Medicaid patients aged <65 years |                        | 29.3 | 28.9 | 28.2 | 27.7 | 26.9 | 27.2 |
| Private Insurance patients aged <65 years |                | 18.9 | 17.9 | 18.0 | 17.1 | 17.5 | 17.1 |
| **Pneumonia**                    |                        |      |      |      |      |      |      |
| Medicare patients aged ≥65 years |                        | 18.1 | 17.7 | 17.5 | 16.6 | 16.5 | 16.1 |
| Medicaid patients aged ≥65 years |                        | 20.6 | 19.7 | 19.9 | 16.5 | 16.5 | 17.1 |
| Private Insurance patients aged ≥65 years |                | 16.5 | 15.8 | 15.5 | 14.3 | 15.1 | 14.7 |
| Medicare patients aged <65 years |                        | 20.1 | 20.1 | 19.8 | 19.7 | 19.5 | 19.4 |
| Medicaid patients aged <65 years |                        | 18.2 | 18.4 | 18.8 | 18.2 | 17.3 | 17.4 |
| Private Insurance patients aged <65 years |                | 11.0 | 10.4 | 10.8 | 10.8 | 10.4 | 10.9 |
| **Non-Target Conditions**        |                        |      |      |      |      |      |      |
| Medicare patients aged ≥65 years |                        | 16.3 | 16.3 | 15.8 | 15.5 | 15.5 | 15.5 |
| Medicaid patients aged ≥65 years |                        | 18.0 | 17.6 | 17.9 | 17.0 | 17.2 | 17.6 |
| Private Insurance patients aged ≥65 years |                | 14.0 | 14.2 | 13.8 | 13.5 | 13.5 | 13.8 |
| Medicare patients aged <65 years |                        | 20.8 | 20.6 | 20.3 | 20.3 | 20.5 | 20.5 |
| Medicaid patients aged <65 years |                        | 13.1 | 13.2 | 13.3 | 12.9 | 12.7 | 12.9 |
| Private Insurance patients aged <65 years |                | 8.6  | 8.6  | 8.5  | 8.3  | 8.3  | 8.4  |
**Supplementary Table 13:** Characteristics of Patients Hospitalized for Acute Myocardial Infarction According to the Primary Payer

| Patient Characteristics, N (%) | Medicare      | Medicaid      | Private Insurance | Medicare      | Medicaid      | Private Insurance |
|--------------------------------|---------------|---------------|-------------------|---------------|---------------|-------------------|
| No. of Index Admissions, weighted (SD) | 1310180 (13862) | 17337 (417) | 98738 (1767) | 186158 (2625) | 165828 (2406) | 586130 (7136) |
| Age, mean (SE)                  | 77.8 (0.03)   | 74.4 (0.1)   | 72.7 (0.07)      | 56.2 (0.03)   | 52.3 (0.04)   | 54.1 (0.02)      |
| Female                          | 47.4 (0.11)   | 52.9 (0.64)  | 33.1 (0.33)      | 35.9 (0.21)   | 37.3 (0.24)   | 25.4 (0.12)      |
| Anterior myocardial infarction  | 7.6 (0.06)    | 9 (0.33)     | 10 (0.18)        | 8.5 (0.12)    | 13 (0.17)     | 15 (0.11)        |
| Other location of myocardial infarction | 12.1 (0.1)  | 10.5 (0.37)  | 16.5 (0.23)      | 15.3 (0.19)   | 18.2 (0.22)   | 24.4 (0.15)      |
| History of coronary artery bypass graft (CABG) surgery | 11.3 (0.08) | 7.5 (0.32)   | 9.2 (0.17)       | 9.8 (0.14)    | 5.2 (0.1)     | 3.2 (0.05)       |
| History of percutaneous transluminal coronary angioplasty (PTCA) | 15.7 (0.12) | 12.1 (0.45)  | 16 (0.26)        | 21 (0.23)     | 15.8 (0.2)    | 12.4 (0.12)      |
| Severe infection; other infectious diseases | 5.6 (0.05)  | 6.7 (0.3)    | 3.8 (0.12)       | 5.3 (0.1)     | 4.4 (0.1)     | 1.9 (0.04)       |
| Metastatic cancer or acute leukemia | 1.1 (0.02)  | 0.9 (0.13)   | 0.9 (0.06)       | 0.6 (0.04)    | 0.6 (0.03)    | 0.4 (0.02)       |
| Cancer                          | 4.7 (0.04)    | 3.6 (0.32)   | 4.1 (0.13)       | 2.6 (0.08)    | 2.2 (0.07)    | 1.6 (0.03)       |
| Diabetes mellitus (DM) or DM complications | 38 (0.12)   | 49 (0.61)    | 36.4 (0.3)       | 51.2 (0.24)   | 40.8 (0.24)   | 27.9 (0.13)      |
| Protein-calorie malnutrition    | 3.4 (0.05)    | 3.9 (0.26)   | 2.2 (0.09)       | 2.3 (0.07)    | 1.9 (0.07)    | 0.7 (0.02)       |
| Other significant endocrine and metabolic disorders; disorders of fluid/electrolyte/acid-base balance | 24.9 (0.14) | 28.1 (0.55)  | 19.8 (0.26)      | 25.3 (0.25)   | 20.4 (0.22)   | 13.3 (0.13)      |
| Iron deficiency or other/unspecified anemias and blood disease | 28.6 (0.16) | 33.1 (0.6)   | 23 (0.29)        | 25.3 (0.25)   | 20.8 (0.22)   | 13.2 (0.14)      |
| Dementia or other specified brain disorders | 12.1 (0.08) | 9.9 (0.36)   | 5.4 (0.15)       | 1.5 (0.05)    | 0.8 (0.04)    | 0.2 (0.01)       |
| Hemiplegia, paraplegia, paralysis, functional disability | 3.1 (0.03)  | 4.7 (0.24)   | 2.1 (0.08)       | 6.9 (0.13)    | 3.7 (0.08)    | 0.9 (0.02)       |
| Congestive heart failure        | 43 (0.16)     | 46.1 (0.67)  | 32.4 (0.32)      | 36.5 (0.27)   | 29.7 (0.25)   | 15.2 (0.14)      |
| Acute coronary syndrome         | 2.4 (0.04)    | 2.7 (0.21)   | 2.6 (0.1)        | 2.6 (0.07)    | 2.9 (0.08)    | 2.5 (0.06)       |
| Angina pectoris                 | 1.1 (0.03)    | 1.1 (0.14)   | 1 (0.06)         | 1.2 (0.05)    | 1.2 (0.06)    | 1.2 (0.04)       |
| Coronary atherosclerosis/other chronic ischemic heart disease | 81 (0.16)   | 79.3 (0.53)  | 84.5 (0.26)      | 85.2 (0.2)    | 82.4 (0.21)   | 85.8 (0.15)      |
| Valvular and rheumatic heart disease | 17.8 (0.13) | 14.7 (0.55)  | 13 (0.21)        | 8.5 (0.14)    | 7.3 (0.13)    | 5.6 (0.08)       |
| Specified arrhythmias and other heart rhythm disorders | 41.5 (0.14) | 34.2 (0.61)  | 36.7 (0.28)      | 24.5 (0.21)   | 22.2 (0.21)   | 22.5 (0.15)      |
| Stroke                          | 1.2 (0.02)    | 1.6 (0.16)   | 1 (0.05)         | 0.9 (0.04)    | 1.2 (0.05)    | 0.5 (0.02)       |
| Cerebrovascular disease         | 6.4 (0.06)    | 5.6 (0.27)   | 4.7 (0.12)       | 4.9 (0.1)     | 3.4 (0.1)     | 1.6 (0.04)       |
| Vascular or circulatory disease | 24.3 (0.13)   | 20.5 (0.52)  | 20.7 (0.26)      | 23.6 (0.2)    | 16.7 (0.18)   | 12.2 (0.11)      |
| Chronic obstructive pulmonary disease (COPD) | 20.3 (0.11) | 17 (0.5)     | 15.8 (0.23)      | 24.8 (0.24)   | 18.4 (0.23)   | 7.4 (0.09)       |
| Asthma                          | 2.6 (0.03)    | 4 (0.22)     | 2.9 (0.1)        | 3.8 (0.09)    | 4.8 (0.1)     | 3.3 (0.05)       |
| Pneumonia                       | 10.1 (0.08)   | 11.9 (0.39)  | 7.6 (0.16)       | 7.6 (0.12)    | 6.7 (0.11)    | 3.5 (0.05)       |
| Dialysis status                 | 2 (0.03)      | 3.4 (0.21)   | 1.1 (0.06)       | 8 (0.16)      | 1.6 (0.06)    | 0.5 (0.02)       |
| Renal failure                   | 35.4 (0.16)   | 35.6 (0.63)  | 27.2 (0.34)      | 33 (0.32)     | 19.3 (0.24)   | 9.5 (0.11)       |
| Other urinary tract disorders   | 5.3 (0.05)    | 5.1 (0.26)   | 4.7 (0.12)       | 3.2 (0.08)    | 2.7 (0.07)    | 2.2 (0.04)       |
| Decubitus ulcer or chronic skin ulcer | 2.5 (0.03) | 2.9 (0.22)   | 1.5 (0.07)       | 2.9 (0.07)    | 1.6 (0.05)    | 0.5 (0.02)       |
### Supplementary Table 14: Characteristics of Patients Hospitalized for Heart Failure According to the Primary Payer

| Patient Characteristics, N (%) | Medicare (27782) | Medicaid (1149) | Private Insurance (3221) | Medicare (36437) | Medicaid (6437) | Private Insurance (4435) |
|-------------------------------|------------------|----------------|--------------------------|------------------|----------------|--------------------------|
| No. of Index Admissions, weighted (SD) | 3354651 | 49455 (6787) | 169450 (3221) | 487817 (6787) | 386078 (6437) | 347967 (4435) |
| Age, mean (SE)                | 79.9 (0.02) | 75.6 (0.09) | 76.1 (0.07) | 55.3 (0.04) | 51.7 (0.04) | 54.3 (0.04) |
| Female                        | 54.2 (0.09) | 61.5 (0.46) | 43.2 (0.3) | 41.1 (0.18) | 42.7 (0.23) | 37.6 (0.2) |
| History of coronary artery bypass graft (CABG) surgery | 18.2 (0.1) | 13.5 (0.3) | 17.9 (0.24) | 12.2 (0.13) | 7.6 (0.1) | 9.2 (0.12) |
| Metastatic cancer or acute leukemia | 1 (0.01) | 0.6 (0.07) | 1.1 (0.05) | 0.5 (0.02) | 0.5 (0.02) | 1 (0.04) |
| Cancer                        | 5.1 (0.03) | 3.5 (0.15) | 5.2 (0.1) | 2.6 (0.05) | 2.2 (0.05) | 3.7 (0.07) |
| Diabetes mellitus (DM) or DM complications | 43.4 (0.1) | 52.8 (0.43) | 46.6 (0.29) | 58.1 (0.21) | 48.2 (0.21) | 47.9 (0.21) |
| Other significant endocrine and metabolic disorders; disorders of fluid/electrolyte/acid-base balance | 32.4 (0.12) | 32.1 (0.38) | 29.5 (0.24) | 36.1 (0.22) | 30.9 (0.2) | 30 (0.21) |
| Liver or biliary disease      | 3.4 (0.03) | 6.4 (0.25) | 3.9 (0.1) | 9.3 (0.15) | 12.1 (0.16) | 7.4 (0.12) |
| Peptic ulcer, hemorrhage, other specified gastrointestinal disorders | 3.5 (0.02) | 3.2 (0.14) | 3.1 (0.08) | 2.8 (0.05) | 2.4 (0.05) | 2.3 (0.05) |
| Severe hematological disorders | 27.7 (0.14) | 25.1 (0.37) | 23.9 (0.29) | 26.2 (0.24) | 21.2 (0.23) | 20.4 (0.21) |
| Iron deficiency or other/unspecified anemias and blood disease | 1.3 (0.02) | 0.8 (0.07) | 1.1 (0.05) | 0.9 (0.03) | 0.6 (0.03) | 0.7 (0.03) |
| Dementia or other specified brain disorders | 35.2 (0.14) | 38.4 (0.41) | 31.1 (0.28) | 34.7 (0.23) | 29.7 (0.2) | 26.5 (0.21) |
| Drug/alcohol abuse/dependence/psychosis | 6.8 (0.05) | 9.6 (0.31) | 8.8 (0.15) | 24.7 (0.21) | 37 (0.3) | 20.6 (0.19) |
| Major psychiatric disorders   | 2.2 (0.03) | 3.4 (0.16) | 1.8 (0.08) | 6.8 (0.08) | 6.1 (0.11) | 2.4 (0.06) |
| Depression                    | 9.6 (0.07) | 6.4 (0.21) | 7.9 (0.15) | 12.8 (0.13) | 9.7 (0.12) | 9 (0.13) |
| Other psychiatric disorders   | 6.7 (0.05) | 4.4 (0.15) | 5.8 (0.12) | 8.4 (0.1) | 7.4 (0.1) | 6.9 (0.12) |
| Hemiplegia, paraplegia, paralysis, functional disability | 3.2 (0.03) | 4.8 (0.17) | 3 (0.08) | 6.5 (0.09) | 4.1 (0.07) | 2.6 (0.05) |
| Cardio-respiratory failure and shock | 25 (0.17) | 20 (0.35) | 23.3 (0.34) | 24.1 (0.22) | 18.3 (0.2) | 19.9 (0.19) |
| Congestive heart failure      | 81.1 (0.18) | 80.3 (0.42) | 79.7 (0.33) | 86.1 (0.21) | 85 (0.23) | 86.2 (0.18) |
| Acute coronary syndrome       | 5.5 (0.06) | 6 (0.19) | 5.5 (0.13) | 4.3 (0.07) | 4.5 (0.09) | 4.8 (0.08) |
| Coronary atherosclerosis or angina | 56.8 (0.15) | 53.2 (0.46) | 55.7 (0.32) | 48.1 (0.23) | 39.3 (0.22) | 39.9 (0.22) |
| Valvular and rheumatic heart disease | 28.6 (0.17) | 22.8 (0.39) | 24.5 (0.3) | 15.4 (0.16) | 16.6 (0.18) | 19.5 (0.2) |
| Specified arrhythmias and other heart rhythm disorders | 57.8 (0.13) | 45.9 (0.43) | 53.8 (0.32) | 34.9 (0.24) | 30.8 (0.21) | 38.4 (0.26) |
| Other and unspecified heart disease | 3.7 (0.05) | 4.2 (0.17) | 3.7 (0.09) | 3.7 (0.08) | 5 (0.11) | 5.2 (0.1) |
| Stroke                        | 0.4 (0.01) | 0.4 (0.03) | 0.4 (0.02) | 0.3 (0.01) | 0.4 (0.02) | 0.4 (0.02) |
| Vascular or circulatory disease | 23.7 (0.12) | 18.2 (0.32) | 22.1 (0.26) | 22.2 (0.16) | 16.4 (0.14) | 17.6 (0.16) |
| Chronic obstructive pulmonary disease (COPD) | 36 (0.11) | 28.7 (0.46) | 31.9 (0.29) | 35.8 (0.22) | 31.3 (0.23) | 20 (0.18) |
| Fibrosis of lung or other chronic lung disorders | 3.3 (0.03) | 2.3 (0.11) | 2.9 (0.08) | 2.5 (0.06) | 1.7 (0.04) | 2.4 (0.06) |
| Asthma                        | 2.9 (0.03) | 4.8 (0.16) | 3.1 (0.08) | 5.3 (0.08) | 7.2 (0.11) | 6.4 (0.09) |
| Pneumonia                     | 15.8 (0.08) | 14.5 (0.28) | 13.8 (0.18) | 11.6 (0.11) | 10.2 (0.1) | 10.1 (0.11) |
| Dialysis status               | 2.8 (0.03) | 5.7 (0.19) | 2.3 (0.07) | 12 (0.16) | 3.9 (0.08) | 2.6 (0.06) |
| Renal failure                 | 52.6 (0.14) | 51.9 (0.44) | 50.7 (0.32) | 57.1 (0.24) | 44.3 (0.28) | 41 (0.26) |
| Nephritis                     | 2.2 (0.03) | 3.3 (0.14) | 2.6 (0.09) | 5.1 (0.08) | 4.2 (0.08) | 4.2 (0.07) |
| Other urinary tract disorders | 5.8 (0.05) | 5.1 (0.16) | 5.5 (0.12) | 4.3 (0.07) | 4.4 (0.08) | 4.7 (0.09) |
| Decubitus ulcer or chronic skin ulcer | 5.1 (0.04) | 4 (0.15) | 4.6 (0.1) | 5.5 (0.07) | 4.1 (0.07) | 3.5 (0.06) |
### Supplementary Table 15: Characteristics of Patients Hospitalized for Pneumonia According to the Primary Payer

| Patient Characteristics, N (%)                              | Patients aged ≥65 years | Patients aged <65 years |
|-------------------------------------------------------------|-------------------------|-------------------------|
|                                                             | Medicare | Medicaid | Private Insurance | Medicare | Medicaid | Private Insurance |
| No. of Index Admissions, weighted (SD)                      | 3159930 (26032) | 42646 (829) | 166229 (3083) | 541983 (5010) | 401560 (4333) | 587665 (5549) |
| Age, mean (SE)                                              | 79.8 (0.02) | 76.5 (0.08) | 75.6 (0.08) | 53.5 (0.03) | 47.2 (0.05) | 49.9 (0.04) |
| Female                                                      | 53.1 (0.07) | 58.4 (0.48) | 44.4 (0.3) | 49.3 (0.16) | 55 (0.17) | 52.1 (0.14) |
| History of coronary artery bypass graft (CABG) surgery      | 8.3 (0.06) | 4.4 (0.16) | 7.6 (0.14) | 3.4 (0.05) | 1.8 (0.04) | 1.9 (0.04) |
| Severe infection; other infectious diseases                 | 11.4 (0.05) | 12.2 (0.27) | 10.2 (0.15) | 12.9 (0.11) | 13.2 (0.14) | 9.7 (0.09) |
| Septicemia, sepsis, systemic inflammatory response syndrome/shock | 2.4 (0.03) | 3.3 (0.15) | 2.4 (0.08) | 3.2 (0.06) | 3.3 (0.07) | 2.6 (0.05) |
| Metastatic cancer or acute leukemia                         | 2.8 (0.03) | 2.5 (0.14) | 4 (0.11) | 2.5 (0.06) | 3.9 (0.09) | 5 (0.11) |
| Lung and other severe cancers                               | 4.5 (0.03) | 3.9 (0.18) | 6.1 (0.13) | 3.3 (0.06) | 4.4 (0.09) | 4.9 (0.08) |
| Lymphoma; other cancers                                     | 5.2 (0.03) | 4 (0.16) | 6.2 (0.13) | 3.4 (0.06) | 4.4 (0.07) | 5.7 (0.1) |
| Diabetes mellitus (DM) or DM complications                  | 31 (0.08) | 39.4 (0.43) | 31.3 (0.24) | 34.6 (0.16) | 26.6 (0.15) | 22.7 (0.11) |
| Protein-calorie malnutrition                                | 9.2 (0.09) | 9.7 (0.29) | 8 (0.19) | 7.6 (0.1) | 7.2 (0.1) | 4.7 (0.08) |
| Other significant endocrine and metabolic disorders; disorders of fluid/electrolyte/acid-base balance | 40.2 (0.12) | 40.5 (0.44) | 37.8 (0.26) | 39.1 (0.19) | 35.8 (0.19) | 34.4 (0.16) |
| Other gastrointestinal disorders                            | 36 (0.14) | 32.1 (0.46) | 32.9 (0.29) | 37.2 (0.19) | 29.9 (0.19) | 29.6 (0.16) |
| Severe hematological disorders                              | 1.4 (0.02) | 0.9 (0.07) | 1.5 (0.07) | 1.7 (0.04) | 2 (0.06) | 1.5 (0.04) |
| Iron deficiency or other/unspecified anemias and blood disease | 33.2 (0.14) | 36.1 (0.44) | 29.5 (0.27) | 31.6 (0.2) | 28.8 (0.18) | 24.9 (0.16) |
| Dementia or other specified brain disorders                 | 24 (0.09) | 21.9 (0.4) | 14.2 (0.21) | 4.3 (0.06) | 2.5 (0.05) | 0.8 (0.02) |
| Drug/alcohol abuse/dependence/psychosis                     | 8.6 (0.06) | 9.9 (0.31) | 11.2 (0.17) | 28.5 (0.21) | 39.7 (0.25) | 23.7 (0.16) |
| Major psychiatric disorders                                 | 4.1 (0.04) | 7.5 (0.29) | 2.8 (0.08) | 13.9 (0.12) | 11.3 (0.12) | 3.8 (0.06) |
| Other psychiatric disorders                                 | 8.5 (0.06) | 5.6 (0.2) | 7.4 (0.15) | 13.6 (0.13) | 12.3 (0.14) | 10 (0.1) |
| Hemiplegia, paraplegia, paralysis, functional disability    | 4.9 (0.03) | 7.6 (0.22) | 3.7 (0.09) | 12.3 (0.12) | 9.1 (0.12) | 2.9 (0.05) |
| Respirator dependence/tracheostomy status                   | 0.9 (0.02) | 2.3 (0.14) | 0.9 (0.05) | 3.1 (0.06) | 3.6 (0.08) | 1.2 (0.03) |
| Respiratory arrest; cardio-respiratory failure and shock    | 31.5 (0.19) | 26.4 (0.43) | 30.2 (0.43) | 34.9 (0.25) | 28.3 (0.22) | 27.1 (0.2) |
| Congestive heart failure                                    | 33.9 (0.1) | 28.9 (0.42) | 27.8 (0.24) | 22 (0.14) | 15.6 (0.13) | 10.4 (0.09) |
| Acute coronary syndrome                                     | 2.5 (0.03) | 2.3 (0.12) | 2.2 (0.08) | 1.2 (0.03) | 0.9 (0.03) | 0.8 (0.02) |
| Coronary atherosclerosis or angina                          | 32.3 (0.12) | 24.6 (0.4) | 28.9 (0.25) | 18 (0.13) | 11.3 (0.11) | 9.6 (0.09) |
| Valvular and rheumatic heart disease                        | 7.9 (0.06) | 5.1 (0.18) | 6 (0.14) | 3.3 (0.05) | 2.3 (0.05) | 2.5 (0.04) |
| Specified arrhythmias and other heart rhythm disorders       | 33.4 (0.1) | 23.4 (0.39) | 28.5 (0.28) | 12.8 (0.11) | 9.7 (0.1) | 10.5 (0.09) |
| Stroke                                                      | 0.5 (0.01) | 0.6 (0.07) | 0.5 (0.03) | 0.2 (0.01) | 0.2 (0.01) | 0.2 (0.01) |
| Vascular or circulatory disease                             | 16.9 (0.08) | 12.8 (0.3) | 15.4 (0.2) | 13.7 (0.11) | 9.8 (0.1) | 9 (0.09) |
| Chronic obstructive pulmonary disease (COPD)                | 41.2 (0.12) | 35.7 (0.49) | 40.9 (0.29) | 39.8 (0.23) | 34 (0.22) | 21.7 (0.15) |
### Supplementary Table 15: (Continued)

| Patient Characteristics, N (%) | Medicare | Medicaid | Private Insurance | Medicare | Medicaid | Private Insurance |
|-------------------------------|----------|----------|-------------------|----------|----------|-------------------|
| Fibrosis of lung or other chronic lung disorders | 6.1 (0.04) | 6.4 (0.21) | 6 (0.11) | 5.1 (0.07) | 4.1 (0.06) | 4.8 (0.07) |
| Asthma | 3.9 (0.03) | 6.8 (0.22) | 5.1 (0.11) | 8.2 (0.08) | 13 (0.13) | 13.2 (0.1) |
| Pneumonia | 4.3 (0.05) | 3.6 (0.16) | 4.2 (0.11) | 5.4 (0.07) | 5.2 (0.07) | 5.3 (0.07) |
| Pleural effusion/pneumothorax | 7.3 (0.05) | 6.7 (0.22) | 7.4 (0.14) | 5.8 (0.08) | 6.1 (0.08) | 7.5 (0.08) |
| Other respiratory disorders | 14 (0.08) | 12.9 (0.32) | 15.1 (0.21) | 21 (0.15) | 16.3 (0.14) | 18.9 (0.13) |
| Dialysis status | 1.9 (0.02) | 3.8 (0.16) | 1.3 (0.05) | 7 (0.1) | 1.9 (0.04) | 1 (0.03) |
| Renal failure | 30.3 (0.11) | 28.7 (0.42) | 26.4 (0.28) | 25.5 (0.17) | 14.9 (0.14) | 12.2 (0.11) |
| Urinary tract infection | 12.6 (0.05) | 14.1 (0.31) | 8.9 (0.15) | 8 (0.08) | 7 (0.09) | 4.2 (0.05) |
| Other urinary tract disorders | 5 (0.04) | 4.5 (0.18) | 4.8 (0.11) | 3.3 (0.05) | 2.7 (0.05) | 3.1 (0.05) |
| Decubitus ulcer or chronic skin ulcer | 5.9 (0.04) | 6.5 (0.21) | 4.2 (0.11) | 5.3 (0.07) | 3.8 (0.06) | 1.5 (0.03) |
| Vertebral fractures without spinal cord injury | 0.9 (0.01) | 0.7 (0.06) | 0.8 (0.05) | 0.4 (0.02) | 0.3 (0.01) | 0.3 (0.01) |
| Other injuries | 7.6 (0.07) | 6.6 (0.21) | 6.9 (0.15) | 8.2 (0.11) | 7.2 (0.1) | 5.8 (0.09) |
**Supplementary Figure 1.** Patient Selection Flowsheet. AMI= acute myocardial infarction; COPD= chronic obstructive pulmonary disease; HF= heart failure; H/K= hip/knee replacement; NRD= National Readmission Database; PN= pneumonia.
Supplementary Figure 2. Risk-Adjusted Odds Ratios for Yearly Change in Readmission Rates, According to Different Age-Payer Groups. CI= confidence interval; OR= odds ratio.