# Hospital Readmission Rates in Medicare Advantage Plans

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**Objectives:** To compute a benchmark for tracking readmission rates among patients enrolled in Medicare's private comprehensive Medicare Advantage (MA) plans and to develop preliminary comparisons with the fee-for-service (FFS) readmission rates.

**Study Design:** Descriptive data presentation with analytic discussion.

**Methods:** We computed a benchmark for rehospitalization rates among MA patients using data from a commercial registry. To compare readmission rates between FFS and MA patients, we analyzed differences in demographics, geography, time period, entitlement status, and risk of readmission based on major diagnosis associated with the admission and the presence of complicating conditions.

**Results:** We found an unadjusted 30-day hospital readmission rate in the MA sample of 14.5% in 2006-2008. Results from contemporaneous comparisons between FFS and MA in the 2006-2008 period showed MA 30-day readmission rates were 22% lower than FFS readmission rates, before risk or other adjustments. After adjusting for risk of readmission (using distributions of major diagnosis codes and their respective likelihoods of readmission) and excluding patients under age 65 years (ie, those entitled to Medicare because of disability) from the comparison, we estimated that 30-day readmission rates for MA patients were approximately 13% to 20% lower than those for FFS patients in the 2006-2008 period.

**Conclusions:** We measured substantial differences in the risk-adjusted rates of hospital readmission among Medicare FFS and MA patients in our samples.

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**For author information and disclosures, see end of text.**

In April 2009, Dr Stephen Jencks and his colleagues published a detailed study of hospital readmissions within Medicare's traditional fee-for-service (FFS) program.[1] The Jencks et al study was notable both for the high rates of readmissions found—a 19.6% 30-day readmission rate in 2004—and for the finding that in approximately half of those readmissions, there was no physician visit in the interim. The Jencks et al study also implied that there has been no substantial improvement in FFS readmission rates in the 23 years since the 1984 benchmark readmissions study by Anderson and Steinberg, who studied FFS data from 1981.[2] The lack of physician visits following hospital discharge suggests opportunities to improve coordination of follow-up care. Jencks et al estimated that the cost of unplanned rehospitalizations exceeded $17 billion in FFS Medicare in 2004. (We use the terms "readmissions" and "rehospitalizations" synonymously throughout this report; likewise the terms "hospital discharges" and "admissions" may be used interchangeably where, for counting purposes, both terms refer to the same number of hospitalizations).



In general, Medicare's FFS program pays hospitals a fixed amount for each admission based on the diagnosis-related group (DRG) code and does not routinely pay for transitional care programs, provider-to-provider communications and care coordination, 24-hour nurse help lines, pharmacy reconciliation efforts, and other initiatives that can help prevent readmissions.[3,4] (For a survey of the recent literature on methods of reducing readmissions, see the study by Boutwell and Hwu.[3] The health insurance industry also has published a set of examples used by Medicare Advantage [MA] plans to reduce readmissions.[4]) The Patient Protection and Affordable Care Act of 2010 requires the Centers for Medicare & Medicaid Services (CMS) to establish a hospital readmissions reduction program in Medicare FFS beginning in 2013. When implemented, the program would reduce payments to hospitals based on their readmission rates. In April 2011, CMS announced a new "partnership for patients," with the goals of reducing FFS readmission rates by 20% and hospital-acquired conditions or adverse events among FFS patients by 40%.[5]

Alternatively, capitated reimbursement (a fixed, risk-adjusted amount per enrollee) gives MA plans strong financial incentives to attempt to reduce avoidable hospitalizations and readmissions via case management or network con-

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tracting arrangements. Several industry studies using hospital discharge data have been published in recent months that estimate readmission rates for both FFS and MA in particular states. (An example is the 2010 study by America's Health Insurance Plans Center for Policy and Research.[6]) The discharge data are collected by states directly or in cooperation with the Agency for Healthcare Research and Quality (the agency is the source of most of the data used in the industry readmission studies[7]). However, these studies are currently limited to a handful of states where the discharge data contain reliable (de-identified) patient indicators that can be used to track readmissions. (For a discussion of analytic and data issues surrounding the use of hospital discharge data sets for readmissions analysis, see the working paper by America's Health Insurance Plans Center for Policy and Research.[8]) Moreover, state discharge data sets do not capture readmissions that occur out of state, and the distinctions between MA and FFS as the patients' source of coverage are imprecise in some states.

### Take-Away Points

Hospital readmission rates in Medicare's comprehensive private plans, called Medicare Advantage (MA) plans, are lower than those in Medicare's fee-for-service (FFS) program, after accounting for differences in risk.

- Based on a large sample of administrative claims data, the 30-day readmission rate for hospitalized MA patients was about 14.5% in the 2006-2008 period.
- After adjustments for readmission risk and disability entitlement status, the MA readmission rate was about 13% to 20% lower than that in Medicare's traditional FFS program.
- Benchmark measurements of readmission rates among MA patients can help provide an impetus for additional reductions in both MA and FFS Medicare.

The primary aim of this report is to create a national benchmark for readmission rates among MA patients using the same methods described by Jencks et al.[1] Establishing a benchmark measurement will make it possible to track progress in lowering MA readmission rates over time. A second goal is to develop direct comparisons of MA and FFS readmission rates and discuss some analytic issues surrounding comparisons. We analyzed the possible impact of differences in geographic location, time frame, age, entitlement (disability) status, and the diagnosis and complications present at admission. The comparisons between the FFS and MA systems can be instructive for discerning the impact of the different incentive systems.

## DATA AND METHODS

The MA data for this study are from the commercially available MedAssurant Medical Outcomes Research for Effectiveness and Economics Registry (MORE$^2$ Registry), which is a clinically enriched super set of de-identified, longitudinal, patient-level administrative claims data. The MA data included approximately 5.6 million observations (enrollee-years) and 2.4 million individuals in the 3-year (2006-2008) period from 11 MA plans (de-identified and aggregated by MedAssurant). There were 2.4 million individuals in the MA sample in 2008, approximately one-fourth of the MA population of 9.4 million in that year. We estimated that 45% of the patients in the MA sample were enrolled in for-profit plans; 55% were in nonprofit plans. The FFS data in this study were from the Medicare 5% sample claims and administrative files.

We used the same calculation methods described in the Jencks et al study[1] for the MA data in the MedAssurant data set, based on the "all cause" concept and following the Jencks method of excluding readmissions identified with the DRG for rehabilitation. This method tracks "initial" or "index" admissions from the fourth quarter of the prior year. It excludes patients who died or switched coverage types during the study period. Computationally, we believe our results for 2006-2008 using this method are directly comparable to the Jencks results for 2004.

The MedAssurant MA sample is demographically and geographically diverse. (MedAssurant has entered into an agreement with the National Committee for Quality Assurance to provide data and measures of preventable hospital admissions and readmissions for the Medicare population, under contract with CMS.[9]) We compared the age and sex distribution of the 2006-2008 MedAssurant data with national MA demographic data from Medicare's 5% sample administrative files for 2006-2008. The percentages of enrollees by age and sex in the MedAssurant MA sample were similar to those in the national data in most respects. The MedAssurant MA sample included proportionately more enrollees 80 years and older but slightly fewer in the 55 to 69 year range. The net impact on benchmark readmission rates of these differences in age distribution is likely to be small, in part because the differences were small and in part because patients 80 years and older and patients under age 65 years both tend to have higher-than-average readmission rates. **eAppendix A** (available at **www.ajmc.com**) shows the MedAssurant and national MA enrollment data by age cohort and sex.

### Geographic Representation

While the MedAssurant data set has geographic representation in all 50 states, the distribution by state of MA enrollees is not identical to the national distribution of MA enrollees. In general, the MedAssurant MA sample had a somewhat



higher share of enrollment in the South and a lower share of enrollees in the West. This could be an important difference, since readmission rates tend to be higher in the South than in the West.

To test for this possibility, we computed readmission rates by state from the MedAssurant MA sample and "weighted" them according to the statewide MA enrollment data. The resulting nationally weighted readmission rate was only slightly lower—about 0.1 percentage point—than the rate we computed from the MedAssurant data. Although we have not performed a detailed analysis of substate distributions, our preliminary conclusion is that any differences in the geographic dispersion of the MedAssurant and overall MA enrollment are not large enough to substantially change the estimated benchmark MA readmission rate.

We also tested whether geographic differences in samples would have an impact on the MA versus FFS comparisons. Our preliminary finding was that no adjustments were needed, at least based on comparisons of the samples on a state-by-state basis. We also performed some preliminary investigations of differences in enrollment by county within states. The distribution of MA enrollment by county appeared to be relatively similar to that of FFS in several states examined. If anything, MA enrollees may be clustered more in urban areas, which tend to have higher-than-average readmission rates within the states analyzed. Thus, any such within-state geographic adjustment would likely favor MA, not FFS. **eAppendix B** (available at **www.ajmc.com**) explains the calculations that led to these conclusions.

## Risk Adjustment in MA Versus FFS Comparisons

There is no perfect way to measure how differences in risk of readmission could affect the comparisons between MA and FFS patients. We developed a measure of risk of readmission using expected readmission rates for each type of hospital discharge (DRGs) and measured differences in MA and FFS discharge distributions against this expectation. However, it is possible that additional unmeasured or unmeasurable factors could have affected the results.

A large recent study of differences in self-reported consumer satisfaction measures (Medicare Consumer Assessment of Health Care Providers and Systems) among MA and FFS enrollees illustrated many differences in the characteristics of the MA and FFS populations, any of which could affect the comparisons of readmission rates.[10] For example, the study showed that MA enrollees tended to have lower education levels than FFS enrollees (a higher share of MA enrollees did not graduate from high school) and were more likely than FFS enrollees to be African American or Hispanic (higher readmission rates among African American beneficiaries have been noted in other recent research).[11] According to the Medicare Current Beneficiary Survey, MA enrollees' incomes tend to be lower than those of FFS enrollees, although the distribution of incomes among FFS enrollees is wider (authors' calculations from the Medicare Current Beneficiary Survey Access to Care Files for 2009). That is, there are relatively more FFS enrollees with very low incomes (often dual Medicare-Medicaid eligible beneficiaries) and with high incomes. However, the Consumer Assessment of Health Care Providers and Systems data also indicated that MA enrollees report better self-perceived health status than FFS enrollees (relatively more MA enrollees report that they are in good or excellent health). On balance, it is unclear whether these characteristics would indicate the expectation of higher or lower readmission rates in MA or FFS. On the one hand, the racial and income characteristics could suggest higher readmission rates in MA. (For examples based on preventable admissions, see Basu[12] and Basu and Mobley.[13]) However, self-reported health status measures imply that MA patients might be expected to have fewer complications or other health conditions that could make readmissions more likely after a hospital stay.

The current risk adjustment system used by CMS for reimbursement of MA plans provides a general measure of patients' health costs, but it does not directly measure the probability of a readmission. Medicare's risk-adjustment system is now based more on diagnosis codes for major illnesses (eg, diabetes, heart disease) than demographic indicators (eg, age, sex). However, before the diagnosis-based risk adjustments were phased in, MA plans had an incentive to attempt to enroll healthier-than-average patients within a demographic cohort, and the impact of this incentive may persist.

However, there is less reason to believe that *hospitalized* patients in MA plans—those who are actually at risk for readmission—are healthier than *hospitalized* FFS patients. In fact, given the incentives created by capitated reimbursements, MA plans have reason to attempt to treat all but their sickest patients out of the expensive inpatient hospital setting. (We observed in this and prior studies that MA enrollees had lower overall hospitalization rates than FFS patients. This is likely due in part to enrollment of healthier-than-average beneficiaries, but it is also due to efforts designed to help at-risk patients avoid preventable hospitalizations in the first place.) Thus, there may not necessarily be a reason to assume that hospitalized MA patients would have lower readmission rates than hospitalized FFS patients. In fact, the opposite assumption—that hospitalized MA patients could be less healthy than hospitalized FFS patients—is not implausible. Nevertheless, our analysis indicates that for the purpose of analyzing readmission rates, there are important differences in the types

**Table 1.** Medicare Advantage Versus Fee-for-Service Readmission Rates: All Discharges (Medical and Surgical)[a,b]

| Interval After Discharge | Patients at Risk at Beginning of Period | % | Cumulative Rehospitalizations by End of Period | % | Cumulative Death or Disenrollment Without Rehospitalization by End of Period | % |
|---|---|---|---|---|---|---|
| **2004 (FFS)** | | | | | | |
| 0-30 days | 2,961,460 | 100.0 | 579,903 | 19.6 | 103,741 | 3.5 |
| 31-60 days | 2,277,816 | 76.9 | 834,369 | 28.2 | 134,697 | 4.5 |
| 61-90 days | 1,992,394 | 67.3 | 1,006,762 | 34.0 | 151,901 | 5.1 |
| 91-180 days | 1,802,797 | 60.9 | 1,325,645 | 44.8 | 177,234 | 6.0 |
| **2006 (MA)** | | | | | | |
| 0-30 days | 62,012 | 100.0 | 9069 | 14.6 | 817 | 1.3 |
| 31-60 days | 52,126 | 84.1 | 13,288 | 21.4 | 1323 | 2.1 |
| 61-90 days | 47,401 | 76.4 | 16,147 | 26.0 | 1696 | 2.7 |
| 91-180 days | 44,169 | 71.2 | 21,661 | 34.9 | 2491 | 4.0 |
| **2007 (MA)** | | | | | | |
| 0-30 days | 75,847 | 100.0 | 11,013 | 14.5 | 1152 | 1.5 |
| 31-60 days | 63,682 | 84.0 | 15,968 | 21.1 | 1840 | 2.4 |
| 61-90 days | 58,039 | 76.5 | 19,496 | 25.7 | 2374 | 3.1 |
| 91-180 days | 53,977 | 71.2 | 26,327 | 34.7 | 3419 | 4.5 |
| **2008 (MA)** | | | | | | |
| 0-30 days | 93,226 | 100.0 | 13,559 | 14.5 | 1424 | 1.5 |
| 31-60 days | 78,243 | 83.9 | 19,675 | 21.1 | 2125 | 2.3 |
| 61-90 days | 71,217 | 76.4 | 23,845 | 25.6 | 2490 | 2.7 |
| 91-180 days | 66,643 | 71.5 | 31,902 | 34.2 | 3041 | 3.3 |

FFS indicates fee-for-service; MA, Medicare Advantage.
[a]*Sources:* Jencks et al[1] for 2004 national FFS and MedAssurant Medical Outcomes Research for Effectiveness and Economics Registry (MORE[2] Registry) for MA plans 2006-2008.
[b]Rates were not risk adjusted.

of admissions that should be taken into account when comparing readmission rates.

Therefore, we developed a risk-adjustment measure directly associated with readmission risk among hospitalized patients. The method is straightforward: first, we computed the probability that each admission DRG would be associated with readmissions in the FFS population. Then we compared the distribution of those DRGs in the MA data against this baseline. If the FFS population had more admission codes with higher-than-average readmission rates, then an adjustment could be computed based on the admission distribution and each DRG's likelihood of readmission. In **eAppendix C** (available at **www.ajmc.com**), we discuss this method in detail.

## RESULTS AND ANALYSIS

**Table 1** shows unadjusted benchmark readmission rates found in the MA plans for the 2006-2008 period alongside the Jencks et al results for 2004 FFS.[1] The MA 30-day readmission rates in 2006, 2007, and 2008 were remarkably consistent across each of the years, with an overall 30-day readmission rate of 14.5%, just over 25% lower than the FFS rate of 19.6%. The 60-day and 90-day readmission rates in the MA plans were similarly consistent over the 3-year period and were also about 25% lower than the FFS rates measured in the Jencks et al study. **Table 2** shows the same breakouts of readmission rates for medical and surgical index admissions of various types as were shown in the Jencks et al study for FFS.

A secondary goal of this report was to address the comparability of the benchmark MA and FFS readmission rates. We discuss the effects on comparability of the different periods measured, the presence of disabled enrollees under age 65 years and enrollees 90 years and older, the geographic location of enrollees in the samples, and the distributions of DRGs associated with MA and FFS enrollees' admissions and whether

**Table 2.** Distribution of Medicare Advantage and Fee-for-Service Readmission Rates by Major Condition Category and Index Discharge[a,b]

| Condition at Index Discharge | FFS 30-Day Rehospitalization Rate, % | MA 30-Day Rehospitalization Rate, % | FFS Proportion of All Rehospitalizations, % | MA Proportion of All Rehospitalizations, % |
|---|---|---|---|---|
| **All medical** | **21.1** | **15.8** | **77.6** | **68.3** |
| Heart failure | 26.9 | 21.1 | 7.6 | 4.5 |
| Pneumonia | 20.1 | 14.1 | 6.3 | 3.5 |
| COPD | 22.6 | 17.6 | 4.0 | 3.2 |
| Psychoses | 24.6 | 15.7 | 3.5 | 1.2 |
| GI problem (esophagitis) | 19.2 | 11.9 | 3.1 | 3.2 |
| **All surgical** | **15.6** | **11.7** | **22.4** | **31.7** |
| Cardiac stent | 14.5 | 12.5 | 1.6 | 3.9 |
| Major joint replacement | 9.9 | 7.6 | 1.5 | 4.0 |
| Other vascular surgery | 23.9 | 17.5 | 1.4 | 1.1 |
| Major bowel procedures | 16.6 | 14.7 | 1.0 | 1.3 |
| Other hip and femur | 17.9 | 14.8 | 0.8 | 1.2 |

COPD indicates chronic obstructive pulmonary disease; FFS, fee-for-service; GI, gastrointestinal; MA, Medicare Advantage.
[a]*Sources:* Jencks et al[1] for national 2004 FFS and MedAssurant Medical Outcomes Research for Effectiveness and Economics Registry (MORE[2] Registry) for MA plans 2006-2008.
[b]Rates were not risk adjusted.

those admissions would naturally tend to have higher or lower readmission rates.

## Contemporaneous Comparisons in 2006 to 2008

Our benchmark for MA readmission rates is the 2006-2008 period, a few years after the 2004 Jencks et al calculations for FFS.[1] To address the effect on comparability of possible changes in readmission rates over time, we used an alternative readmission rate calculation method and applied it to both the MA and FFS populations during the 2006-2008 period. The alternative calculations for FFS were made available to us by Dr Gerard Anderson of Johns Hopkins University; we then duplicated Anderson's calculation method for the MA sample. Unlike the Jencks et al method, which tracks readmission from the fourth quarter of the prior year, the Anderson method tracks index admissions occurring in the first 9 months of each year and captures readmissions in the subsequent 30-, 60-, and 90-day periods following each index admission. Like the Jencks et al method, the Anderson method used an all-cause or any-DRG readmission calculation, also excluding admissions for rehabilitation.

Under this alternative method, the FFS 30-day readmission rate for patients 65 years and older in the 2006-2008 period was 18.4%, which compares to the 19.6% rate estimated by Jencks et al for 2004.[1] The MA result was 14.4% in 2006-2008, virtually unchanged from the Jencks-style calculation of 14.5%, presented above, for the same period. The contemporaneous gap between FFS and MA was lowered to 22% by this approach.

These alternative calculations were done only for patients 65 years and older, to address possible objections that differences in the numbers of disabled patients younger than 65 years could affect the comparisons. Because there are 3 moving parts in the alternative calculation—the time period (2006-2008 for FFS), the readmission calculation method (first 3 quarters of the year with 3 months of run-out), and the population (no patients younger than 65 years)—we were not able to precisely compute the degree of change in the FFS results attributable to each. The lowering of the FFS readmission rate by this alternative Anderson-method computation for 2006-2008 was likely due in part to the exclusion of disabled patients younger than 65 years and partly due to a lower readmission rate in FFS over time. Based on 2008 data, we estimated that FFS readmission rates for the under-65 population were approximately 20% higher than those for FFS patients 65 years and older. Moreover, roughly 20% of FFS enrollees were under age 65 years in the 2006-2008 period, and these enrollees, because of their disabilities, were more likely to be hospitalized and thus at risk for readmission. (For Medicare elderly versus disabled readmission rates, see Wier et al.[14]) Therefore, the exclusion of the under-65 population should reduce the computed FFS readmission rate. Finally, we computed readmission rates for FFS for each year during the 2004-2008 period (using yet another method for technical

**Table 3.** Illustration of Risk Adjustment Based on Risk of Readmission by Admission Diagnosis–Related Group[a]

| Selected DRG(s) | Version 24 DRGs | Share of Admissions, % | | FFS Readmittance Likelihood Relative to Average (Average = 1) | Version 26 MS-DRGs | Share of Admissions, % | | FFS Readmittance Likelihood Relative to Average (Average = 1) |
|---|---|---|---|---|---|---|---|---|
| | | FFS | MA | | | FFS | MA | |
| **Heart failure** | 127 | 4.85 | 5.16 | 1.30 | 291<br>292<br>293 | 4.63 | 4.56 | 1.26[b] |
| **COPD** | 88 | 3.12 | 3.11 | 1.14 | 190<br>191<br>192 | 3.80 | 3.57 | 1.00[b] |
| **Psychoses** | 430 | 3.38 | 1.35 | 1.34 | 885 | 3.42 | 1.58 | 1.32 |
| **Major hip or knee surgery** | 544 | 3.53 | 3.34 | 0.64 | 470 | 3.27 | 3.34 | 0.43 |
| **Other vascular surgery** | 553<br>554 | 0.94 | 0.95 | 1.18[b] | 252<br>253<br>254 | 0.98 | 1.15 | 1.07[b] |
| **Major bowel surgery** | 569<br>570 | 1.01 | 1.25 | 0.79[b] | 329<br>330<br>331 | 1.14 | 1.61 | 0.71[b] |
| **Simple pneumonia and pleurisy with CC (age >17 y)** | 89 | 3.88 | 0.89 | 0.92 | 193[c]<br>194[c] | 2.73 | 2.33 | 0.91[b] |
| **Simple pneumonia and pleurisy without CC (age >17 y)** | 90 | 0.29 | 2.34 | 0.57 | 195[c] | 0.91 | 0.79 | 0.56 |

CC indicates complications and comorbidities; COPD, chronic obstructive pulmonary disease; DRG, diagnosis-related group; FFS, fee-for-service; MA, Medicare Advantage; MS-DRG, Medicare Severity diagnosis-related group.
[a] *Sources:* MedAssurant Medical Outcomes Research for Effectiveness and Economics Registry (MORE² Registry) for MA plans 2006-2008 and Medicare FFS 5% and 100% sample claims files.
[b] Simple average for the DRGs is shown, for illustration only. Actual risk-adjustment calculations were based on each DRG separately.
[c] Major complicating conditions included with complicating conditions in this illustration.

reasons). For this calculation, we used the same-quarter readmission rate for each year from 2004 to 2008. This is simply the number of admissions in a calendar quarter minus 1 (for the index admission) divided by the number of admissions in the quarter. According to the industry studies of readmission rates referred to earlier in this report, the same-quarter readmission rate is a reasonable proxy for a 30-day readmission rate, at least for comparative purposes. By this measure, the FFS readmission rate was about 0.6 percentage points lower in 2008 than in 2004 (22.9% in 2004; 22.6% in 2005; 22.4% in 2006; 22.3% in 2007; and 22.3% in 2008). Thus, the change in time periods could account for nearly half of the lower FFS readmission rate found by this alternative calculation. There was no discernible time trend in readmission rates in the MedAssurant data from 2006 to 2008, using either the Jencks et al method or the alternative Anderson-method calculations.

However, the goal was simply to provide a reasonable contemporaneous comparison between FFS and MA results, and the alternative calculations provided a platform for additional adjustments for comparability. A new report by the Dartmouth Atlas Project found only small changes in various readmission rates among Medicare FFS patients during the 2004-2009 period.[15]

## Adjustment for Risk of Readmission

Table 3 provides a simple illustration of a risk-adjustment method based on indexes of readmission risk for version 24 and version 26 DRG distributions. (DRG definitions can change annually, sometimes substantially. The version 26 Medicare Severity DRGs [MS-DRGs] are much more detailed than the version 24 DRGs. Version 25 DRGs were not used due to overlap with their use in the MA data set.) In general, the DRG-based method of risk adjustment lowers the percent reduction in readmission rates in MA from about 22% (unadjusted, contemporaneous 2006-2008 comparisons excluding patients under age 65 years) to a range of about 13% to 20%,

**Table 4.** Demographic Comparison: Medicare Advantage and Medicare Fee-for-Service Patients With a Hospitalization, 65 Years and Older[a,b]

| Characteristic | FFS 2006-2008 | | MA 2006-2008 | |
|---|---|---|---|---|
| | Patients With a Hospitalization | % | Patients With a Hospitalization | % |
| **Age, y** | | | | |
| 65-69 | 171,442 | 21.1 | 192,714 | 21.2 |
| 70-74 | 167,831 | 20.6 | 198,939 | 21.9 |
| 75-79 | 170,702 | 21.1 | 200,382 | 22.1 |
| 80-84 | 153,671 | 18.9 | 166,985 | 18.4 |
| 85-89 | 98,414 | 12.1 | 100,337 | 11.1 |
| ≥90 | 50,809 | 6.3 | 48,347 | 5.3 |
| **Sex** | | | | |
| Female | 479,911 | 59.0 | 502,625 | 55.4 |
| Male | 332,958 | 41.0 | 405,079 | 44.6 |
| **Region** | | | | |
| West | 114,650 | 14.1 | 63,146 | 7.0 |
| Midwest | 211,898 | 26.1 | 242,984 | 26.8 |
| South | 323,097 | 39.7 | 393,045 | 43.3 |
| Northeast | 157,236 | 19.3 | 207,992 | 22.9 |
| Other | 5988 | 0.7 | 537 | 0.1 |
| **Total** | 812,869 | 100.0 | 907,704 | 100.0 |

FFS indicates fee-for-service; MA, Medicare Advantage.
[a]Sources: MedAssurant Medical Outcomes Research for Effectiveness and Economics Registry (MORE² Registry) for MA plans 2006-2008 and Medicare FFS 5% sample claims and administrative files.
[b]Numbers may not sum to totals due to rounding.

depending on the DRG version used. (In theory, comparisons based on the expanded version 26 MS-DRGs should produce a richer measure of readmission risk, because they incorporate the severity of a hospitalization to a greater degree than the version 24 DRGs. Moreover, the version 24 distributions had some unusual results. In the version 24 DRGs, MA plans in the MedAssurant sample coded complicating conditions much less frequently than FFS for many disease categories. For example, the coding for simple pneumonia DRGs showed complication rates in most of the FFS cases but very few of the MA cases. We believe these coding differences are too extreme to be explained by actual patient complication rates, and such differences did not appear in the version 26 data. Therefore the risk adjustment based on the version 24 DRGs should be used with caution, and may represent an overly large adjustment.) Of course, it is possible that some inherent risks of readmission are not captured in this method, even using the more detailed version 26 DRGs, which include expanded information about the presence of complicating conditions. However, it is doubtful that alternative methods of risk adjustment would completely erase a 22% difference in unadjusted readmission rates.

## Impact of Age Distribution

Table 4 shows the demographic distribution of patients with a hospitalization—those enrollees at risk for readmission—in the 2006-2008 MedAssurant MA sample and in FFS (from the Medicare 5% sample). The MA sample had a slightly higher share of patients in the 70- to 79-year age range than the FFS sample, and a slightly lower share of patients over age 85 years. However, based on a simple test—excluding patients 90 years or older, who are more common in FFS than MA—we believe that explicitly adjusting for age within the population 65 years and older is not likely to affect the comparisons. Excluding patients 90 years and older dropped the FFS readmission rate from 18.4% to 18.2% and dropped the MA readmission rate from 14.4% to 14.3%. Thus, the MA readmission rate remained virtually unchanged at 22% lower than FFS. Moreover, when we excluded patients over age 89 years, the risk adjustment indicated by the DRG distributions was slightly reduced. The net result for risk-adjusted FFS- to MA-comparisons was minimal. Table 5 summarizes the results of these comparisons and shows the corresponding industry data computed from state-based hospital discharge data sets. In general, the industry studies from these particular

■ **Table 5.** Risk-Adjusted and Unadjusted 30-Day Readmission Rates per Admission, MA Plans Versus Medicare FFS, 2006-2008[a]

| Basis for Calculation | FFS | MA | Difference (MA vs FFS), Not Risk Adjusted, % | Difference (MA vs FFS) With DRG-Based Risk Adjustment, % |
|---|---|---|---|---|
| **Jencks-style calculations[1] (2004 vs 2006-2008, all ages, not risk adjusted)** | 19.6 | 14.5 | −26 | NA |
| **Anderson-style calculations[2] (2006-2008, age 65+ y, risk adjustment by DRG)** | 18.4 | 14.4 | −22 | −13 to −20 |
| **Anderson-style calculations[2] (2006-2008, age 65-89 y, risk adjustment by DRG)** | 18.2 | 14.3 | −22 | −15 to −20 |
| **Industry comparisons from state hospital discharge data sets (patients age 65+ y)** | | | | |
| California (2006-2008, average) | 19.7 | 15.3 | −22 | −18 |
| Nevada (2006-2007, average) | 17.7 | 13.4 | −25 | −17 |
| Washington (2007) | 14.2 | 11.3 | −20 | −17 |
| Texas (2007) | 19.0 | 15.0 | −21 | −17 |
| North Carolina (2007) | 15.0 | 12.9 | −14 | −12 |

DRG indicates diagnosis-related group; FFS, fee-for-service; MA, Medicare Advantage; NA, not applicable.
[a]*Sources:* MedAssurant Medical Outcomes Research for Effectiveness and Economics Registry (MORE[2] Registry) for MA plans 2006-2008, Jencks et al,[1] and America's Health Insurance Plans Center for Policy and Research.[6]
[b]Risk adjustment was based on MedAssurant data and Medicare FFS 5% and 100% sample claims files.

states were consistent with our results from the MedAssurant data set.

## DISCUSSION

Our objectives in this study were to replicate the Jencks et al results[1] for a large sample of MA patients and to examine the differences in readmission rates between MA and FFS. We estimated that the 30-day readmission rate among MA patients was about 14.5% in the 2006-2008 period and that risk-adjusted readmission rates were approximately 13% to 20% lower in MA patients than in FFS patients. However, the statistics we have compiled thus far do not in themselves explain why readmission rates are lower in MA patients.

There are several possible explanations. First, we cannot exclude the possibility that differences in readmission rates between the MA and FFS plans are the result of unobservable differences in the risk of readmission among those populations. Certainly, there are factors that are not accessible to our claims-based data perspective—like health behaviors and social supports—that could affect patients' likelihood of readmission and were not captured by our DRG-based risk adjuster. That said, it is unclear whether those factors would vary systematically across MA and FFS populations. It is also unclear whether any enhancements in unobservable characteristics of patients (eg, family supports, health behaviors) could be an exogenous tendency or an aftereffect of MA enrollment. For example, suppose we hypothesize that MA enrollees had healthier behaviors and/or stronger support networks that were reducing their readmission rates. Do these behaviors and supports lead them to enroll in MA in the first place, or do MA enrollees have healthier behaviors and/or stronger support networks because MA plans have an incentive to ensure that they do, and provide programmatic interventions to increase the likelihood that they will? Certainly, the latter explanation—which could help to explain the differences we observe—is a tenable one; further research would be important to test this hypothesis.

Likewise, we are not yet able to discern whether network effects—such as steering patients to high-performing hospitals—are more important than other interventions such as transitional care efforts. Preliminary data from Medicare's FFS Care Transitions Project indicate that the sorts of transitional care programs often used by MA plans[4] can work in FFS settings. These efforts, which are sponsored by several Quality Improvement Organizations across the country, indicate that improving communication among healthcare providers and using proven transitional care interventions can play a key role in reducing readmission rates. For example, in one part of western Pennsylvania, FFS readmission rates were reduced from 18% to 14% using staff of the local Area Agencies on Aging trained in the Coleman health coaching model (personal communication with Dr David Wenner, November 30, 2010). Dr Wenner's preliminary results from the Care Transitions Project in Pennsylvania were first presented at the conference Optimizing Home Health in Care Transitions, 2010 Summit, October 26, 2010, Philadelphia, Pennsylvania. Slides from that conference are available from the authors or from Dr Wenner.

Preliminary results from similar interventions provided to FFS Medicare patients in Colorado are also encouraging.[16] Early results and observations from the Care Transitions Project were also cited by CMS at a conference on Medicare readmissions in June 2011[17] and results associated with 14 implementation sites were described in more detail by Dr Jane Brock at a conference on consumer-centric care in October 2011.[18] Measurements such as those presented in this report can help track progress following the introduction of these and other interventions intended to help reduce readmission rates in both MA and FFS.

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