Does Accounting for Socioeconomic Status Affect Whether Hospitals are Penalized for Readmissions?

Abstract

The Affordable Care Act created the Hospital Readmissions Reduction Program (HRRP), which requires the Centers for Medicare & Medicaid Services (CMS) to penalize hospitals with excess readmission rates for certain conditions. The readmission rate measures the share of patients who are readmitted to a hospital following a recent hospital stay, and lower readmission rates are an important measure of the quality of hospital care. Beyond treatment quality, however, many other factors affect hospital readmission rates. To account for this, CMS currently calculates readmission rates by adjusting for certain differences between the patients treated at different hospitals, such as patient age, sex, and clinical characteristics. CMS, however, does not adjust readmission rates for differences in patient socioeconomic status. This study first seeks to determine the relationship between area-level socioeconomic status measures and the likelihood a patient is readmitted. Second, this study examines how including area-level socioeconomic status measures in the risk adjustment process affects whether or not a hospital is predicted to pay a penalty under the HRRP. This study finds no evidence that area-level socioeconomic status influences the likelihood of readmission among Virginians age 65 and older with a principal diagnosis of acute myocardial infarction (AMI), or heart attack. In addition, the findings suggest that the inclusion of area-level socioeconomic status measures in the calculation of risk-adjusted readmission rates does not substantially change whether or not a hospital is predicted to pay a penalty for having excess readmissions under the HRRP.
Policy Relevance

Background

Readmissions are an important indicator of the quality of care that hospitals provide. The Centers for Medicare & Medicaid Services (CMS) suggests that “from the patient perspective, readmission for any cause is an adverse event” and that readmissions due to certain common conditions “impose a substantial burden on the patients and the healthcare system.” As such, the Affordable Care Act (ACA) included a program aimed at reducing readmissions—specifically, those readmissions occurring within 30 days of the original discharge, a time period which CMS asserts “a standard period that can be strongly influenced by hospital care and the early transition to the outpatient setting.”

The ACA’s Hospital Readmissions Reduction Program (HRRP) requires CMS to reduce Medicare payments to hospitals that have readmission rates above the national average for certain conditions. These include acute myocardial infarction (heart attack), heart failure, pneumonia, and more. The HRRP payment penalties began in October 2012, and hospitals can currently incur a penalty of up to three percent of their Medicare reimbursements for exceeding the national average readmission rate. The purpose of these penalties is to provide hospitals with a financial incentive to improve patient care quality.

For purposes of the HRRP, CMS developed a 30-day, all-cause readmission measure for Medicare fee-for-service patients initially hospitalized with a principal diagnosis of acute myocardial infarction (AMI). The current CMS methodology calculates hospital-specific 30-day readmission rates by risk-adjusting for a large number of patient clinical characteristics (such as certain other diagnoses and procedures) as well as patient age and sex. The purpose of risk adjustment is to consider the totality of a hospital’s case mix when evaluating hospital performance. Risk adjustment is especially necessary in the context of the HRRP since a patient’s likelihood of readmission is affected not only by the quality of care provided by the hospital, but also by patient-level clinical and demographic factors that are out of the hospital’s control. Risk adjustment is needed to avoid penalizing hospitals that have high readmission rates simply because they treat older or more clinically complex patients.

Should Socioeconomic Variables Be Included in the Calculation?

CMS does not currently adjust for patients’ socioeconomic status (SES) in calculating risk-adjusted hospital readmission rates because of concerns that hospitals should provide the same quality of healthcare no matter the financial resources of their patients. However, debate exists over whether or not patient socioeconomic factors should be included in the risk adjustment process.
Proponents of including socioeconomic status in the risk adjustment process argue that factors such as poverty and low educational attainment may be directly associated with readmission outcomes. A recent study by Gu and colleagues suggests that, under the current methodology, hospitals with a high percentage of patients dually-enrolled in Medicare and Medicaid are more likely to have excess readmissions, thereby exposing these hospitals to disproportionate penalties. This would effectively worsen disparities by penalizing providers who treat more economically vulnerable patients. In 2014, recognizing the possibility of a relationship between socioeconomic status and readmissions, the National Quality Forum (NQF) recommended a trial period for assessing the impact of risk-adjusting for sociodemographic factors.

Critics argue that including socioeconomic status in the risk adjustment process would allow for disparate treatment of low socioeconomic status patients. Moreover, many claim that including these traits would not substantially affect whether or not a hospital receives a penalty. Blum and colleagues, for example, conclude that including a socioeconomic status “score” (a single aggregated measure of unemployment, poverty, income, dwelling value, educational attainment, and room sharing) does not substantially change whether or not New York City hospitals received a penalty. In a similar national study, Bernheim and colleagues suggest that “adjustment for socioeconomic status does not change hospital results in meaningful ways.”

While both of these studies examined whether the inclusion of a single aggregate socioeconomic measure defined from area-level traits affects readmission rates in other geographic areas, this study seeks to evaluate whether including multiple area-level measures of socioeconomic status, such as median household income, educational attainment, and rates of unemployment and poverty, can be used to predict the likelihood a patient has a readmission and if the inclusion of these socioeconomic measures noticeably changes the predicted penalty status of Virginia hospitals. As such, the results of this study will indicate whether or not the current risk adjustment methodology used in the HRRP imposes a larger burden on those hospitals serving Virginia’s more economically vulnerable populations.

**Methodology**

This study utilizes Virginia Health Information’s (VHI) patient level data (PLD) and readmissions and transfers (RATs) data. Each of the observations in the PLD represents a unique patient discharge. These are matched to readmission observations in the RATs data to identify patients who were readmitted within 30 days from the initial hospital stay’s discharge date. The data include clinical codes that are used to measure a large number of clinical characteristics used in the CMS risk adjustment methodology, as well as patient age and sex.

This study focuses on discharges of adults aged 65 years and older where the principal diagnosis is AMI. Discharges from all short-term acute care, nonfederal hospitals in Virginia were included from the third quarter of 2012 through the second quarter of 2015. The sample excludes same-day discharges, discharges against medical advice,
in-hospital deaths, and transfers; this is because CMS does not include these types of discharges in calculating hospital readmission rates. The sample also excludes discharges preceded by another admission for AMI in the prior 30 days so that a single admission is not counted as both an initial or index admission and a readmission. Furthermore, all observations from hospitals with fewer than 25 eligible discharges are excluded to ensure that there is a sufficient amount of data to reliably measure differences in hospital performance, in accordance with CMS methodology.

Because patient-level socioeconomic status measures are not available in the discharge data, this study uses zip code-level information from the U.S. Census Bureau’s American Fact Finder download center and links it to the discharge observations. The specific measures include zip code-level estimates of median household income, the unemployment rate, percent of the population over the age of 25 with no high school diploma, and the percent of the population with incomes below 100% of the poverty line.

The first analysis estimates the effects of these socioeconomic status measures on the likelihood a patient is readmitted within 30 days of the index admission using two different models. The explanatory variables in the first model (Model 1) include the various clinical characteristics as well as patient age and sex and a set of indicators for the specific hospital where the index admission occurred. The second model (Model 2) includes those same variables and adds the four socioeconomic status measures described above.

The second analysis examines the effect of including area-level socioeconomic traits in the calculation of the predicted readmission penalty status of a hospital. Using the Model 1 and Model 2 results separately, risk-adjusted readmission rates are calculated for each hospital by taking the mean of the respective predicted readmission likelihood for each patient at that hospital. Then, Risk-Standardized Readmission Ratios (RSRRs) are calculated for both the standard risk adjustment procedure (Model 1) and the risk adjustment procedure that includes socioeconomic status (Model 2). The RSRRs are calculated for each hospital by dividing that hospital's predicted readmission rates by its expected readmission rates (the rate expected at the "average" hospital in Virginia given that particular hospital's case mix). RSRR values greater than 1.0 indicate excess readmission in a manner similar to the HRRP and are classified as likely to receive a penalty; conversely, RSRR values equal to or below 1.0 are performing better than expected of a hospital with their case mix and are classified as unlikely to receive a penalty. Standard and socioeconomic-adjusted RSRR results are compared to examine the extent to which the inclusion of area-level socioeconomic traits changes hospitals' penalty status.

Results

The analysis yields two key findings. The first finding is that none of the area-level socioeconomic status measures is significantly associated with the likelihood that an AMI
patient is readmitted within 30 days. Nonetheless, there exists a possibility that including these variables may change the hospital’s predicted penalty classification in a meaningful way.

The second key finding is that including socioeconomic status measures in the risk adjustment methodology does not appreciably alter the number of hospitals that are predicted to pay penalties under the HRRP. The table below summarizes the predicted penalty classifications of hospitals under each model. Recall that Model 1 does not include the socioeconomic status measures in the risk adjustment process, whereas Model 2 does.

As shown in the table, only 4 out of the 60 (6.67%) Virginia short-term acute care hospitals in the sample would receive a different penalty classification once socioeconomic status variables are used in the risk adjustment process. Two of these four hospitals would move out of the category of paying a penalty (as proponents of the inclusion of socioeconomic status might expect to see), and another two hospitals would move into the category of paying a penalty. This symmetry results from the fact that predicted penalties in this case are based on performance relative to the state average. The first row shows that 29 Virginia hospitals are not predicted to receive penalties under standard risk adjustment procedures. Of these 29 hospitals, 27 are also predicted to not receive penalties when the socioeconomic status measures are included, while 2 hospitals are predicted to receive penalties. The second row shows that 31 hospitals are predicted to receive penalties under risk adjustment methods that do not account for socioeconomic status. Of these 31 hospitals, 2 are no longer predicted to receive penalties when socioeconomic status measures are considered, while the other 29 hospitals are predicted to retain the penalty classification.

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<tr>
<th>Change in Number of Hospitals Predicted to Pay a Penalty with the Inclusion of Socioeconomic Status Variables in the Risk Adjustment Methodology</th>
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<tr>
<td>Model 1: Penalty Status Using Standard Risk Adjustment (# hospitals)</td>
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<tr>
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<tr>
<td>No Penalty</td>
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<tr>
<td>Penalty</td>
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* When socioeconomic status measures are included in the risk adjustment calculation as shown in Model 2, two hospitals that were previously in the category of not paying a penalty under Model 1 moved into the category of paying a penalty.

** When socioeconomic status measures are included in the risk adjustment calculation as shown in Model 2, two hospitals who were previously in the penalty category under Model 1 moved into the category of paying no penalty.
Conclusion

Virginia hospitals are significantly affected by readmission penalties under the HRRP. In the fourth year of penalties under the program, for example, 80% of eligible Virginia hospitals were penalized, noticeably higher than the national average of 54%. As a result, Virginia ranks as the fourth highest state in the U.S. in terms of the share of hospitals penalized, behind New Jersey, Connecticut, and Florida. In addition, Virginia’s average penalty of 1.01% of Medicare hospital payments was also well above the national average of 0.61% and ranked behind only Kentucky during this time period. For example, Carilion Clinic, which operates a network of hospitals in southwestern Virginia, reported a loss of $650,000 in Medicare funding as a result of the penalties. These penalties, in tandem with Virginia’s decision not to expand its Medicaid program, may leave Virginia hospitals at a financial disadvantage.

Evidence that disproportionate penalties are related to the treatment of economically vulnerable populations is of interest to hospital administrators and state officials. Instead, this study finds that zip code-level socioeconomic status measures are not associated with the 30-day readmission outcome for patients age 65 and older hospitalized with heart attacks. Further, this study finds that accounting for socioeconomic status in the risk adjustment process has little effect on whether or not a hospital is predicted to receive a penalty.

Nonetheless, the area-level socioeconomic status measures used in this study may be poor proxies for individual-level socioeconomic status. However, patient-level socioeconomic status data were not available for this study, in part because of “the dearth of nationally available socioeconomic variables” and “the lack of a single accepted variable for assessing socioeconomic status.” As a result, several other options rather than adjusting for socioeconomic status might be considered. These include using incentives tied to improvement rather than relative performance, implementing penalties more slowly for providers of low socioeconomic status patients to allow for investment in quality, and drawing peer-group comparisons for the calculation of payment penalties as proposed by the Medicare Payment Advisory Commission (MedPAC).

Using zip code-level data on socioeconomic status is this study’s greatest limitation. These variables likely do not adequately capture the complexity of patient socioeconomic status and more granular data may yield different results. Further research into the current methodology would likely necessitate the collection of patient-level data. Absent such data, continued study should evaluate the validity and effects of the alternative solutions mentioned above.
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