The Relationship Between Medicare Advantage Star Ratings and Enrollee Experience

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BACKGROUND: Medicare Advantage plans, private managed care plans that enrolled 34% of Medicare beneficiaries in 2019, received $6 billion in annual bonus payments on the basis of their performance on a 5-star rating system. Little is known, however, as to the extent these ratings adequately capture enrollee experience.

OBJECTIVES: To measure the effect of exposure to higher rated Medicare Advantage contracts on enrollee experience.

DESIGN: An instrumental variables analysis using MA contract consolidation as an exogenous shock to the quality of plan enrollees are exposed to.

PARTICIPANTS: A total of 345,897 MA enrollees enrolled in non-consolidated contracts and 21,405 enrollees who were consolidated.

MAIN MEASURES: The primary exposure was enrollee star rating, instrumented using contract consolidation. The primary outcomes were enrollee self-reported experience measures.

KEY RESULTS: There were no significant effects on increased star ratings on 23 of 27 outcomes. A one-star increase in contract star rating leads to a 5.4 percentage point increase in reporting that pain does not interfere with daily activities (95%CI 2.4, 8.4), and a 4.4 percentage reduction in the likelihood that a physician would talk to the enrollee about physical activity (95%CI: −7.8, −1.1, all $p<0.05$). A one-star increase in contract star rating led to an 8.4 percentage point reduction in achieving the top score on the received needed information index (95%CI: −16.4, −0.4), and a 1.8 percentage point reduction in responding with the lowest score for the overall rating of care (95%CI: −3.5, −0.1).

CONCLUSIONS: Exposure to a higher rated MA contract did not appreciably increase enrollee experience. Policymakers should consider reassessing how these ratings and associated bonus payments are currently calculated.

KEY WORDS: Medicare; Medicare advantage; star ratings; patient experience.

INTRODUCTION

In the rapidly growing Medicare Advantage (MA) program, private insurers receive capitated payments to cover their enrollees' annual health needs.[1] Over one-third of all Medicare beneficiaries are now enrolled in a MA plan[2], and this number is expected to increase over the next 10 years. In capitated payment models, plans face dueling incentives. On one hand, if a plan manages to improve its enrollees' outcomes, they may be able to prevent costly utilization. On the other hand, if plans restrict access to care, they may also benefit financially. To ensure that any restrictions to care do not adversely affect enrollees, CMS uses a star rating system to assess the quality of plans. There is little evidence, however, as to whether higher rated plans actually deliver improved enrollee experiences.

Across many facets of the healthcare system, star ratings are now used to help consumers make informed decisions about which plans to enroll in.[3] Star ratings as a form of public reporting may encourage plans to improve performance. In the MA program, contracts are rated from 2 to 5 stars on the basis of approximately 35 different measures of quality and patient experience. Since 2012, CMS has additionally paid contracts rated four stars or greater a 5% bonus to their capitated payments.

Prior work has found that enrollees in higher rated plans tend to be admitted to higher quality nursing homes and hospitals,[4,5] and disenroll at lower rates.[6,7] When plans receive higher star ratings, they also tend to have increased enrollment in following years.[8–10] There is some evidence, however, that the ratings are strongly associated with enrollees' sociodemographic characteristics,[11–13] so it is unclear how much the ratings are driven by potential enrollee characteristics as opposed to actual plan performance.

In 2018, the *Wall Street Journal* first reported that Medicare Advantage companies have since the passage of the Affordable Care Act engaged in a practice called "contract consolidation".[14] At the end of each year, insurers who own multiple MA contracts with similar benefit structures could choose to automatically move all enrollees from one contract into another. In the following year, the original contract would no longer exist. If the destination contract was rated 4+ stars, then the company would be eligible to receive bonus payments for all

enrollees, regardless of whether the consolidated contract did not previously receive bonus payments. In 2020, CMS changed its regulations to prevent this practice from occurring; however, between 2012 and 2016, 3.3 million enrollees or 11% of all beneficiaries in the MA program were involved in a consolidation.[15] In this study, we use consolidation as a natural experiment to assess the relationship between exposure to higher star ratings and enrollees' reported health outcomes and health care experiences.

In this study, we take advantage of a contract consolidation as a unique natural experiment in which MA enrollees in lower rated plans were automatically shifted into higher rated contracts, potentially independent of enrollee selection bias. Using this shift, and a unique set of MA enrollee survey data, our objective is to assess the relationship between exposure to a higher star rating and enrollee's self-reported health status and plan experience.

METHODS

Data Sources. To identify our sample of Medicare Advantage enrollees, we used the Master Beneficiary Summary File (MBSF) which includes demographic characteristics for all Medicare beneficiaries including their MA enrollment status and their contract and plan. We linked each enrollee's contract to publicly available star ratings and contract characteristics released by CMS. Our two primary sources of data for our study outcomes were the Medicare Advantage Health Outcomes Survey (HOS) and the Medicare Advantage Consumer Assessment of Healthcare Providers and Systems (MA-CAHPS).

The HOS is an annual survey of 1200 randomly sample enrollees in each MA contract.[16] It is available both cross-sectionally with a different set of enrollees each year, as well as in a cohort format in which enrollees who remain enrolled in the same MA contract are resampled 2 years later. The questions on the HOS primarily relate to an enrollee's health status, and several variables including changes in a mental and physical health index are included in the calculation of MA star ratings.

The MA-CAHPS is an annual cross-sectional survey of 600 enrollees from each MA contract.[17] The CAHPS survey includes the standard CAHPS survey questions used in other settings and primarily focuses on an enrollee's experience with their plan and how easy it is for them to access care. There are fields in the survey that relate to enrollees' experiences with providers as well as their health plan. Indices calculated from the CAHPS survey comprise roughly a third of all measures included in the star rating calculation.

Both the HOS and the MA-CAHPS are available at the individual beneficiary level and can be linked to the MBSF and other identifiable data sources.

Study Population. We included in this study all MA enrollees nationally who were sampled by either the CAHPS, the HOS, or both in either 2015 or 2016. We exclude enrollees who are in national PACE plans, Medicare-Medicaid plans, and employer-sponsored plans as they operate differently from most other plans in the MA market.

Study Design

We classified enrollees into two groups for whether their enrolled contract in 2015 consolidated at the end of the year with another contract, or not. We calculated outcomes for enrollees in each group in both 2015, prior to consolidation, and in 2016, post consolidation. A primary concern in any study of the relationship between star ratings and outcomes is that the enrollees who select higher rated contracts are likely different in significant ways than those who select lower quality contracts, presenting a significant threat of confounding. As consolidation is not an enrollee's choice, and results in exposure to a higher rated contract without selection, it may potentially be used to measure the effect of star ratings independent from enrollee selection effects. We present a graphical depiction of this process in Figure 1.

We use consolidation as an instrumental variable (IV) for star ratings. With an instrumental variable design, we can estimate the local average treatment effect of an increase in star ratings on an enrollee's experience outcomes. This is preferable to other methods in this case such as difference-in-differences which would only be able to estimate the effect of consolidation on outcomes.

In order to be a valid instrument, an IV must meet the strength assumption and the exclusion restriction. It is likely to be strongly associated with star ratings as most consolidations lead to an improvement in star ratings (meeting the first assumption of an IV). It may also meet the exclusion restriction as consolidation is unlikely to affect outcomes themselves except through exposure to higher rated plans. A more complete explanation of the instrumental variables design is available in Appendix 1.

Variables

From the HOS, we included 7 measures of interest including reported days of poor physical health in the last 30, reported days of poor mental health in the last 30, reported days that health interfered with daily activities in the last 30, report that pain interferes with daily activities very much, report that pain interferes with daily activities not at all, if a physician talked with the enrollee about physical activity, and if a physician talked to the enrollee about falls. The rates of the later two are included in the calculation of star ratings.

From the CAHPS, we included indicators for reporting the top or bottom score on a set of five indices: getting needed care, getting appointments and care quickly, customer service, getting needed prescription drugs, and care coordination. Each of these indices is used in the star rating calculation, and we calculated them based on the component questions following
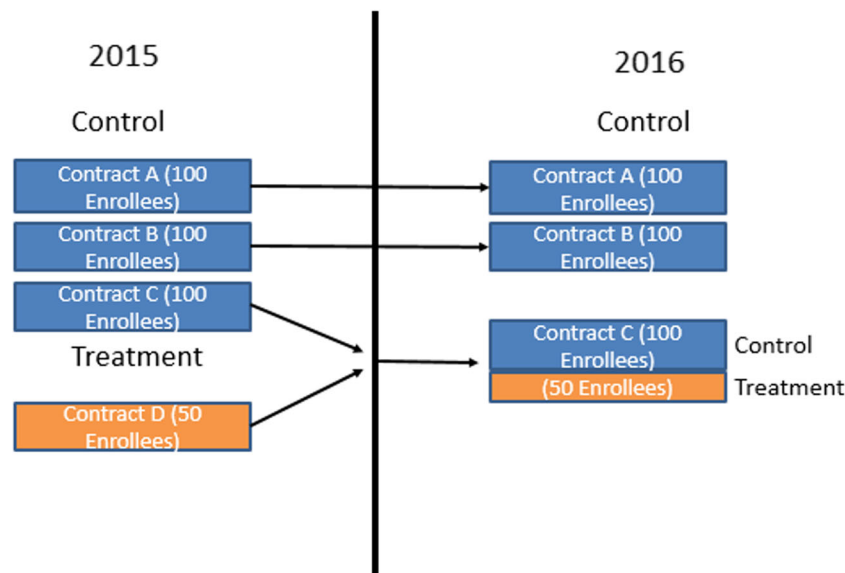
Fig. 1 Diagram of contract consolidation. Notes: This diagram provides a stylized depiction of our study design. In 2015 there are contracts that are not involved in consolidation (A, B). These contracts can be either high or low rated. There is also contract C which serves as a destination contract for a consolidation. Between 2015 and 2016, contract D is consolidated into contract C. The enrollees who were in contract D, and are now in contract C, serve as the primary treatment group. Enrollees who were already in contract C prior to the consolidation still remain in the treatment group. To control for the characteristics of enrollee's initial contracts, we include 2015 contract fixed effects in out models.

CMS protocols.[18] We also included flags for if an enrollee rated their care, plan, or drug plan a 10 out of 10 or a 1 out of ten. Finally, from CAHPS we included the percent of time that an enrollee reported being denied needed care, the percent of time a prescription drug was not covered, and the % of time the enrollee delayed prescriptions due to costs.

To flag enrollees who were in a consolidated contract, we used the MBSF to identify contracts that were terminated between 2015 and 2016 and the subsequent contract for their enrollees. Consistent with a previously published approach,[15] if over 70% of those enrollees moved to the same contract owned by the same parent company as the one that was terminated, we considered it a consolidation. All enrollees in a contract in 2015 that consolidated were given the consolidation flag regardless of their enrolled contract in 2016 in an intent-to-treat approach. As a sensitivity check, we compared this consolidation definition with plan crosswalk files released by CMS. There is some concern that consolidations that occur between contracts that operate in different parts of the country may not accurately reflect quality as the consolidation may be more administrative than substantive. To address this concern, we conducted an additional sensitivity check where we restricted our analysis to contracts that consolidated that had overlapping service areas, to determine if these "in-market" consolidations led to a difference in quality.

In all of our analysis, we included additional control variables including enrollee age, gender, race/ethnicity, if they were entitled for Medicare due to disability, if they were dually enrolled with Medicaid, and fixed effects for their enrolled contract in 2015.

Statistical Analysis

First, we compare the characteristics of enrollees who were in consolidated and non-consolidated contracts in 2015 prior to consolidation. Next, we compare the unadjusted outcomes for consolidated and non-consolidated enrollees between 2015 and 2016. We then fit our primary two-state least squares (2SLS) instrumental variable models adjusting for age, gender, race/ethnicity, dual eligibility with Medicaid, and disability status. In the first stage, we estimate the role of consolidations on star ratings, from which we estimate our second stage on each outcome of interest. We also included 2015 contract fixed effects in our models to account for differences that may be related to each enrollee's initial contract before consolidation occurred. We fitted a separate model for each outcome of interest, and only include enrollees sampled by HOS for the HOS measures and vice-versa for the CAHPS measures. As our analysis included a wide range of outcomes, we performed a Bonferroni correction to our p-values and required a p-value of less than 0.002 to determine statistical significance.

RESULTS

In Table 1 we present the descriptive characteristics of the enrollee sample in 2015 stratified by consolidation status. Our final sample includes 345,897 enrollees sampled by either the HOS or the CAHPS who were not consolidated and 21,405 enrollees sampled by either source in consolidated contracts. Generally, the demographic characteristics were similar for age (72.0 non-consolidated, 71.2 consolidated), gender (56.5% female non-consolidated, 57.7% female consolidated), dual eligibility (26.4% non-consolidated 27.5% consolidated),

Table 1 Enrollee Characteristics by Consolidation Status

	Not consolidated	Consolidated
N	345,897	21,405
Included in HOS	215,627	12,746
Included in CAHPS	143,736	9285
Included in Both	13,466	626
Age (sd)	72.0 (10.3)	71.2 (10.6)
Female	195,508 (56.5%)	12,359 (57.7%)
Race/ethnicity		
White	246,658 (71.3%)	15,063 (70.4%)
Black	39,344 (11.4%)	4595 (21.5%)
Other	6954 (2.0%)	343 (1.6%)
Asian	10,993 (3.2%)	467 (2.2%)
Hispanic	41,909 (12.1%)	933 (4.4%)
Dual eligible with Medicaid	91,207 (26.4%)	5897 (27.5%)
Disability as reason for entitlement	51,769 (15.0%)	3850 (18.0%)
Overall star rating (mean, sd)	3.8 (.6)	3.6 (.7)
Overall star rating		
2	426 (0.1%)	0 (0.0%)
2.5	13,259 (4.6%)	2096 (11.1%)
3	36,073 (12.6%)	4610 (24.3%)
3.5	75,131 (26.3%)	3662 (19.3%)
4	77,047 (27.0%)	5626 (29.7%)
4.5	70,706 (24.8%)	1951 (10.3%)
5	13,024 (4.6%)	1017 (5.4%)

Notes: All demographic characteristics in this table are from 2015, prior to when consolidation occurs. The total N at the top includes enrollees who were included in either the HOS or the CAHPS

and disability as a reason for entitlement (15% consolidated, 18% non-consolidated). Consolidated enrollees were more often black (21.5% compared to 11.4% non-consolidated) and less often Hispanic (4.4% vs 12.1%). While these differences are notable, they may in part be driven by heterogeneity in enrollment among plans and the specific plans consolidated in 2015. In prior work, we found that over a 10-year period, the demographics of consolidated and non-consolidated contracts tend to balance out.[15] We include unadjusted differences in outcomes between those who were consolidated and non-consolidated in Appendix 2 and 3.

As expected, those who consolidate generally begin in contracts with lower star ratings (45.4% were in 4+ star contracts, mean 3.8 stars, compared to 56.4% non-consolidated). The average star rating in 2016 was 0.04 higher for non-consolidated enrollees and 0.32 higher for consolidated enrollees. Full OLS results can be found in Appendix 4. For all measures, the f-statistic was over 100, indicating a strong instrument (Appendix 5).

Table 2 presents the primary results for the HOS measures from the IV analysis. There was no significant effect of increased star ratings on outcomes for 7 of the 9 measures. After instrumenting for star ratings using consolidations, a one-star increase in contract star rating leads to a 5.4 percentage point increase in reporting that pain does not interfere with daily activities (95%CI 2.4, 8.4), and a 4.4 percentage reduction in the likelihood that a physician would talk to the enrollee about physical activity (95%CI: −7.8, −1.1, all $p<0.05$).

Table 3 presents the primary results for the CAHPS measures. There was no significant association for 17 of the 19

included measures. A one-star increase in contract star rating led to an 8.4 percentage point reduction in achieving the top score on the customer service index (95%CI: −16.4, −0.4), and a 1.8 percentage point reduction in responding with the lowest score for the overall rating of care (95%CI: −3.5, −0.1). Full model coefficients from all analyses can be found in Appendix 6.

In our sensitivity analysis, we found similar results when restricting our sample to those who experienced a within-market consolidation. Even when consolidations occurred within market, effects were largely not significant (Appendix 7). In additional sensitivity tests we tested the inclusion of insurer fixed effects also led to largely non-significant results We also tested using 2014 into 2015 consolidations as an instrument to allow for an additional year of follow-up post consolidation. In each of these specifications, there continued to be few significant indications of a relationship between exposure to higher star ratings and outcomes.

DISCUSSION

We find that exposure to a higher rated Medicare Advantage contract does not appear to convey any improved enrollee reported outcomes. For both the health status measures from the HOS, and the patient contract experience measures from CAHPS, increased star ratings did not consistently lead to any improvements.

There are several factors that may have contributed to our findings. First, it could be that in order to achieve higher star ratings, plans do not need to maximize on these enrollees reported outcomes. Contract star ratings are calculated from a variety of measures, including disenrollment rates, readmission rates, quality of care process measures, and secret shopper results. While the CAHPS and the HOS do contribute around half of the measures in the ratings system, many of them receive less weight in the calculation of stars than other included measures. Plans may not put significant effort into maximizing the enrollee experience if it does not substantively factor into the potential bonus payments they may receive. Another possible explanation is that it may take longer than 1 year for changes in these measures to occur. An enrollee's responses may still be influenced by their experience in their plan prior to consolidation and it may take longer for changes due to exposure to a higher rated plan to propagate. Third, it may be that when two contracts consolidate, there may be minimal changes to customer service or benefit design.

Our findings have several implications for public policy. As increased star ratings drive higher enrollment[8–10] and allow plans to increase premiums,[19,20] the success of the star rating program is pivotal to the MA program. Around $6 billion is paid out annually in bonus payments to high performing plans. Our finding that higher star ratings may not contribute to improved enrollee experience suggests that perhaps these financial incentives are not currently targeted to maximize

Table 2 Primary Measures from HOS

HOS	Baseline rate in 2015	Change in outcome associated with a 1-star increase in star rating	95%CI	Observations
Days of poor physical health (days)	7.7	−0.6	(−1.3, 0.1)	338,380
Days of poor mental health (days)	5.2	−0.5	(−1.1, 0.1)	331,672
Days health interfered with activities (days)	6.2	−0.3	(−0.9, 0.4)	303,762
Pain interferes with daily activities–very much (%)	8.7%	−1.4	(−3.1, 0.4)	329,664
Pain interferes with daily activities–not at all (%)	21.6%	5.4**	(2.4, 8.4)	338,380
Count of comorbidities (count)	3.4	−0.1	(−0.2, 0.1)	334,039
Physician talked about physical activity (%)	55.7%	−4.4**	(−7.8, 1.1)	307,660
Physician talked about falls (%)	35.3%	−0.1	(−5.0, 4.8)	146,259

Notes: * indicates statistical significance at the 0.05 level. ** denotes significance at the <0.01 level. Both the OLS and IV models adjust for age, gender, reason for eligibility, dual eligibility with Medicaid, and 2015 MA contract fixed effects. All OLS and IV coefficients represent a change in outcome associated with a 1-star increase. The IV model instruments for star rating using consolidation as an instrument

enrollee outcomes. If the current star rating system does not successfully incentivize plans to improve performance yet results in higher payment, reforms may be necessary. In a recent report, the Medicare Payment and Advisory Commission (MEDPAC) has released a proposal for simplifying the star ratings to several measures of overall population health. While it is not known what effect such changes to the star ratings would have, substantial modifications to the current calculation may be necessary.

Our results also have important implications for enrollee health and experience with their care. If the star rating system as currently constructed does not actually capture meaningful improvements in patient outcomes, then Medicare beneficiaries may have limited information on how to best select plans.

Given the flexibility that MA have to offer supplemental benefits, and to innovate on the delivery of care, MA plans may have the potential to influence patient outcomes more than TM, but this potential may not yet be met.

Our study has several limitations. First, we were limited to data from 2015 and 2016 so we are unable to assess trends in consolidations over a longer time. Relatedly, our CAHPS and HOS surveys depending on when they were fielding during the year may be more indicative of prior year experiences; however, this may not affect our results as our sensitivity analysis including a longer time window was not significant. Second, it is possible that while enrollee choice is independent from consolidation, MA insurers consolidate contracts in a strategic way based on the enrollees in each contract. To the

Table 3 Primary Outcome Measures from CAHPS

	Baseline rate in 2015	Change in outcome associated with a 1-star increase in star rating	95%CI	Observations
Getting Needed Care Index				
Top score (100)	65.1%	0.8	(−5.2 , 6.8)	171,103
Bottom score (0)	2.4%	1.2	(−0.7 , 3.0)	171,103
Getting Appointments and Care Quickly Index				
Top score (100)	25.2%	3.5	(−1.5 , 8.5)	225,398
Bottom score (0)	2.9%	−0.3	(−2.2 , 1.6)	225,398
Customer Service Index				
Top score (100)	47.1%	−8.4*	(−16.4 , −0.4)	105,816
Bottom score (0)	2.1%	−2.0	(−4.1 , 0.2)	105,816
Care Coordination Index				
Top score (100)	36.0%	0.3	(−5.2 , 5.8)	215,401
Bottom score (0)	0.7%	0.1	(−0.8 , 1.1)	215,401
Getting Needed Prescription Index				
Top score (100)	74.8%	1.3	(−3.4 , 6.0)	238,664
Bottom score (0)	0.5%	−0.3	(−0.9 , 0.3)	238,664
Overall rating of care				
Highest (10)	41.7%	2.5	(−2.7 , 7.8)	252,894
Lowest (1)	3.3%	−1.8*	(−3.5 , −0.1)	252,894
Overall rating of plan				
Highest (10)	37.1%	1.3	(−3.7 , 6.4)	259,751
Lowest (1)	3.2%	−0.2	(−1.8 , 1.4)	259,751
Overall rating of drug plan				
Highest (10)	39.6%	1.0	(−4.2 , 6.2)	237,408
Lowest (1)	3.6%	−1.4	(−3.1 , 0.4)	237,408
% of time plan denied needed services	9.3%	−1.8	(−4.6 , 1.1)	259,751
% of time prescription drug not covered	17.8%	−2.2	(−6.1 , 1.6)	247,461
% of time delayed prescriptions due to cost	12.5%	−2.6	(−5.9 , 0.7)	259,751

Notes: * indicates statistical significance at the 0.05 level. ** denotes significance at the <0.01 level. Both the OLS and IV models adjust for age, gender, reason for eligibility, dual eligibility with Medicaid, and 2015 MA contract fixed effects. All OLS and IV coefficients represent a change in outcome associated with a 1-star increase. The IV model instruments for star rating using consolidation as an instrument. Al IV estimates represent percentage point differences

extent that this is occurring, it may bias the outcomes. Third, as in any instrumental variable analysis, we are unable to prove the exclusion restriction definitively. While we believe it is likely that our instrument is exogenous of outcomes, plans may be strategic with what contracts they decide to consolidate, but they do not have the ability to handpick specific individuals to consolidate. Even if this was the case however, our outcomes are based on enrollee self-report and cannot be influenced by the plan, and our inclusion of contract fixed effects allows us to directly compare outcomes between enrollees who begin in the same plan. As such, we believe that our instrument is likely to be conditionally exogenous and valid for inference. Fourth, given that neither the HOS nor CAHPS have 100% response rates, we cannot rule out the possibility that those who choose to participate are different than those who do not; however, the response rate was not differential between consolidated and non-consolidated contracts. Fifth, there may be unmeasured differences between high rated contracts that received enrollees following consolidation, and high rated contracts that were unaffected by consolidation. If that is the case, then our findings may not generalize to all high rated MA contracts. Sixth, as consolidations need to happen within the same insurer, we cannot estimate the effect of exposure to a higher rated plan offered by another insurer. Despite this limitation, it is still noteworthy that there were limited impacts of exposure to increased ratings even within the same insurer.

In conclusion, we find in a unique natural experiment that potentially accounts for enrollee selection, that exposure to a higher-rated Medicare Advantage contract does not appear to result in improved enrollee-reported health status or plan experience. Policy makers and CMS should consider potential modifications to the calculation of these star ratings to better incentivize and improve enrollee experience.

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Declarations:

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