JAMA Network Open

Original Investigation | Health Policy

Health Care Utilization, Care Satisfaction, and Health Status for Medicare Advantage and Traditional Medicare Beneficiaries With and Without Alzheimer Disease and Related Dementias

Sungchul Park, PhD; Lindsay White, PhD; Paul Fishman, PhD; Eric B. Larson, MD, MPH; Norma B. Coe, PhD

Abstract

IMPORTANCE Compared with traditional Medicare (TM) fee-for-service plans, Medicare Advantage (MA) plans may provide more-efficient care for beneficiaries with Alzheimer disease and related dementias (ADRD) without compromising care quality.

OBJECTIVE To determine differences in health care utilization, care satisfaction, and health status for MA and TM beneficiaries with and without ADRD.

DESIGN, SETTING, AND PARTICIPANTS A cohort study was conducted of MA and TM beneficiaries with and without ADRD from all publicly available years of the Medicare Current Beneficiary Survey between 2010 and 2016. To address advantageous selection into MA plans, county-level MA enrollment rate was used as an instrument. Data were analyzed between July 2019 and December 2019.

EXPOSURES Enrollment in MA.

MAIN OUTCOMES AND MEASURES Self-reported health care utilization, care satisfaction, and health status.

RESULTS The sample included 47 100 Medicare beneficiaries (25 900 women [54.9%]; mean [SD] age, 72.2 [11.4] years). Compared with TM beneficiaries with ADRD, MA beneficiaries with ADRD had lower utilization across the board, including a mean of −22.3 medical practitioner visits (95% CI, −24.9 to −19.8 medical practitioner visits), −2.3 outpatient hospital visits (95% CI, −3.6 to −1.1 outpatient hospital visits), −0.2 inpatient hospital admissions (95% CI, −0.3 to −0.1 inpatient hospital admissions), and −0.1 long-term care facility stays (95% CI, −0.2 to −0.1 long-term care facility stays). A similar trend was observed among beneficiaries without ADRD, but the difference was greater between MA and TM beneficiaries with ADRD than between MA and TM beneficiaries without ADRD (mean, −15.0 medical practitioner visits [95% CI, −18.7 to −11.3 medical practitioner visits], −1.7 outpatient hospital visits [95% CI, −3.0 to −0.3 outpatient hospital visits], and −0.1 inpatient hospital admissions [95% CI, −1.0 to 0.0 inpatient hospital admissions]). Overall, no or negligible differences were detected in care satisfaction and health status between MA and TM beneficiaries with and without ADRD.

CONCLUSIONS AND RELEVANCE Compared with TM beneficiaries, MA beneficiaries had lower health care utilization without compromising care satisfaction and health status. This difference was more pronounced among beneficiaries with ADRD. These findings suggest that MA plans may be delivering health care more efficiently than TM, especially for beneficiaries with ADRD.

JAMA Network Open. 2020;3(3):e201809. doi:10.1001/jamanetworkopen.2020.1809

Key Points

Question Are there differences in health care utilization, care satisfaction, and health status among US Medicare beneficiaries with Alzheimer disease and related dementias enrolled in Medicare Advantage vs traditional Medicare?

Findings This cohort study of 47 100 Medicare beneficiaries found that Medicare Advantage beneficiaries with Alzheimer disease and related dementias had lower health care utilization rates than did traditional Medicare beneficiaries with Alzheimer disease and related dementias, especially for medical practitioner visits. Overall, there were no differences in care satisfaction and health status.

Meaning These findings suggest that Medicare Advantage plans may achieve lower health care utilization through high efficiency of care rather than underprovision of care.

+ Invited Commentary

+ Supplemental content

Author affiliations and article information are listed at the end of this article.

Introduction

Caring for people with Alzheimer disease and related dementias (ADRD) will generate substantial costs to the US health care system. Both the number of individuals with ADRD and the associated costs are projected to increase over time. As of 2010, there were 4.5 million US individuals with ADRD, and that number is expected to increase to 13.2 million in 2050.[1] In addition, mean per-person Medicare costs for beneficiaries with ADRD were estimated to be $23 497 in 2011, more than triple the mean $7223 costs for Medicare beneficiaries without ADRD.[2,3] Total costs (including health care, long-term care, and hospice services) for Medicare beneficiaries with ADRD are projected to increase from $172 billion in 2010 to $1.1 trillion in 2050.[3] Such a dramatic increase in the costs associated with ADRD will pose a substantial burden to the US federal government.

Managed care provides opportunities to reduce the growth rate of health care costs. Medicare provides a managed care option, the Medicare Advantage (MA) program, which allows beneficiaries to enroll in private insurance plans rather than in traditional fee-for-service Medicare (TM). There are several differences between MA and TM, but perhaps the most important is that MA practitioners are paid on a capitated basis rather than for each service performed. Capitation creates the incentive for practitioners to be efficient in their approach to care because their revenue is fixed prospectively.[4] The MA plans use various techniques to control health care utilization, such as restricted practitioner networks, prior authorization, and utilization review, as well as investing in preventive services, care coordination, and chronic disease management.[5-9]

There is evidence that MA plans tend to enroll beneficiaries who are healthier than average, and comparisons that use beneficiaries with similar health profiles have found lower health service utilization among MA beneficiaries than among TM beneficiaries.[5-8] These results have been attributed, in part, to improved care coordination, chronic condition management, provision of low-intensity care, and transitions to less-expensive care settings in MA plans. In addition, compared with TM beneficiaries, MA beneficiaries had lower hospital readmission rates,[6,7,10] better clinical quality outcomes,[11,12] better patient experiences,[11,13] and lower mortality rates.[6,14] These findings support the notion that care coordination and management strategies among MA plans have the potential to improve the efficiency of care delivery without compromising care quality.

Within the literature addressing the role of MA plans in providing lower utilization with quality comparable to that of TM, we did not find any reference to the impact of MA plans among individuals with ADRD. However, there is evidence suggesting that care delivery and health care utilization are inefficient for TM beneficiaries with ADRD. A large proportion of health care utilization for beneficiaries with ADRD is associated with transitions to high-cost settings, such as an inpatient setting or skilled nursing facility,[15-17] some of which have been shown to be unnecessary or preventable.[18-21] Moreover, MA plans may make targeted improvements in the care management of beneficiaries with ADRD because of the growing volume of ADRD beneficiaries enrolled. Previous research[22] found that after a new ADRD diagnosis, TM beneficiaries were more likely to switch to MA plans, whereas MA beneficiaries were more likely to stay in MA plans.

To address this gap, we examined health care utilization, care satisfaction, and health status among MA and TM beneficiaries with ADRD. We compared our findings with those of a similar analysis among beneficiaries without ADRD to address the association of MA enrollment with the outcomes.

Methods

Data

We used the Medicare Current Beneficiary Survey and the Geographic Variation Public Use File. The Medicare Current Beneficiary Survey provides a nationally representative sample of the Medicare population with a 4-year follow-up. The data provide individual-level information on demographic characteristics, socioeconomic characteristics, health care utilization, care satisfaction, and health

status. The Geographic Variation Public Use File provides county-level MA enrollment rates. Our analysis uses all publicly available data from 2010 to 2016. The 2014 Medicare Current Beneficiary Survey data were never released.

This study was approved by the University of Pennsylvania's institutional review board and received a waiver of informed consent and HIPPA authorization because the data were deidentified. This study follows the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) reporting guideline for cohort studies.

Study Sample

We included Medicare beneficiaries aged 65 years or older with 12 months of continuous enrollment in MA or TM. We excluded those whose original eligibility was attributable to disability or end-stage kidney disease and those who died. We then identified the following 4 groups: MA beneficiaries with ADRD, TM beneficiaries with ADRD, MA beneficiaries without ADRD, and TM beneficiaries without ADRD. We identified ADRD cases through the beneficiary or proxy survey responses to the following question: "Has a doctor ever told you that you had Alzheimer disease or dementia?"

Variables

Our outcomes were self-reported health care utilization, care satisfaction, and health status. First, we assessed utilization for each of the following 9 types of service: inpatient hospital admission, outpatient hospital visit, medical practitioner visit, home health visit, hospice stay, short-term facility stay (eg, skilled nursing facility), long-term care facility stay (eg, nursing home), prescription drug purchase measured as a single purchase of a single drug in a single container, and dental visit. Self-reported utilization for TM beneficiaries undergoes extensive validation using Medicare claims data and has generally been found to be accurate.[23,24] Second, we assessed the extent to which beneficiaries were satisfied with their plans in terms of care quality, out-of-pocket costs, access to specialists, follow-up after initial treatments, and physician's concern for overall health. Satisfaction was measured in 4 levels: very dissatisfied, dissatisfied, satisfied, or very satisfied. Finally, we assessed self-reported general health status compared with same-age people and overall health status compared with 1 year ago. General health status compared with same-age people was measured in 5 levels: poor, fair, good, very good, or excellent. Overall health status compared with 1 year ago was measured in 2 levels: worse health vs same or better health. A higher value indicates better care satisfaction or health status.

Our key independent variables were 12-month enrollment in MA, the presence of ADRD, and its interaction term. To control for differences in sample characteristics among MA and TM beneficiaries, we included the following variables: age, sex, race/ethnicity, education level, income, Medicare and Medicaid dual eligibility, marital status, indicator for living with someone, residence in a metropolitan area, US Census region of residence, comorbidity, number of limitations on activities of daily living, and year.

Previous research[25-28] has found that healthy beneficiaries are more likely to enroll in MA than TM, suggesting that advantageous selection would invalidate a direct comparison between MA and TM beneficiaries. To address selection bias, we used an instrumental variable approach, using county-level MA enrollment rate as an instrument for the individual-level decision to enroll in MA plans. We calculated the county-level MA enrollment rate as the share of Medicare beneficiaries (aged ≥65 years) enrolled in MA plans.

Statistical Analysis

We estimated sample characteristics and outcomes and tested unadjusted differences between MA and TM beneficiaries with and without ADRD. We used χ^2 tests for categorical variables and analysis of variance for continuous variables. Next, we performed a 2-stage least-squares regression model. In the first stage, we obtained the estimated likelihood of enrolling in MA plans while accounting for advantageous selection into MA plans according to the county-level MA enrollment rates. In the

second stage, we estimated the association between estimated enrollment in MA plans from the first stage and the outcomes of interest. To assess whether the instrument was strong, we tested the association with MA enrollment and then examined *F* statistics, where a value greater than 10 traditionally indicates a strong instrument.[29] To assess whether the instrument was valid, we examined the association between the instrument and measured confounders because we cannot directly assess the association between the instrument and unmeasured confounders. Both stages adjusted for the aforementioned control variables and adjusted the SEs for clustering within county.

Using the marginal effects estimated from the 2-stage least-squares regression model, we estimated the mean values of the outcomes for MA beneficiaries with ADRD, TM beneficiaries with ADRD, MA beneficiaries without ADRD, and TM beneficiaries without ADRD, respectively. We then performed postestimation tests to estimate the differences in the outcomes between MA and TM beneficiaries with and without ADRD, respectively. We conducted several sensitivity analyses. First, we reexamined our analysis by using state-level MA enrollment rates, because there may be some concern about the validity of the county-level MA enrollment rate as an instrument. Second, we adjusted the SEs for clustering within individual and county. In our primary analysis, we treated the Medicare Current Beneficiary Survey data for each year as an independent annual cross-sectional survey, even though some beneficiaries were included in the data over the course of multiple years. We used survey weights to adjust sample characteristics to be representative of the Medicare population. All analyses were conducted using Stata statistical software version 16.0 (StataCorp). All *P* values were from 2-sided tests, and results were deemed statistically significant at $P < .05$. Data were analyzed between July 2019 and December 2019.

Results

Our sample included 47 100 Medicare beneficiaries (25 900 women [54.9%]; mean [SD] age, 72.2 [11.4] years) (**Table 1**). We identified 1006 MA beneficiaries with ADRD, 1841 TM beneficiaries with ADRD, 14 880 MA beneficiaries without ADRD, and 29 373 TM beneficiaries without ADRD. The MA and TM beneficiaries with ADRD had similar demographic characteristics (mean [SD] age, 77.14 [11.0] vs 77.56 [12.0] years; 610 [60.6%] vs 1089 [59.2%] women; and 454 [45.1%] vs 811 [44.1%] married). However, there were differences in sample characteristics between MA and TM beneficiaries without ADRD in terms of comorbidities, especially hardening of the arteries (1333 [9.0%] vs 2923 [10.0%] beneficiaries), hypertension (10 519 [70.7%] vs 19 919 [67.8%] beneficiaries), cancer (5043 [33.9%] vs 10 797 [36.8%] beneficiaries), rheumatoid arthritis (2445 [16.4%] vs 4424 [15.1%] beneficiaries), osteoporosis (3381 [22.7%] vs 6333 [21.6%] beneficiaries), asthma or chronic obstructive pulmonary disease (2929 [19.7%] vs 6234 [21.2%] beneficiaries), diabetes (4502 [30.3%] vs 7760 [26.4%] beneficiaries), mental illness (1052 [7.1%] vs 2977 [10.1%] beneficiaries), and depression (3813 [25.6%] vs 8168 [27.8%] beneficiaries) (Table 1). Despite these differences in comorbid conditions, MA beneficiaries without ADRD were not necessarily healthier than TM beneficiaries without ADRD.

Our unadjusted analysis showed that MA beneficiaries with ADRD had fewer inpatient hospital admissions (mean [SD], 0.3 [0.6] vs 0.5 [1.0] inpatient hospital admissions), outpatient hospital visits (mean [SD], 3.5 [9.6] vs 6.2 [10.2] outpatient hospital visits), medical practitioner visits (mean [SD], 17.3 [19.0] vs 39.7 [39.0] medical practitioner visits), and long-term care facility stays (mean [SD], 0.1 [0.4] vs 0.3 [1.1] long-term facility stays) than TM beneficiaries with ADRD, but they had more prescription drug purchases (mean [SD], 65.5 [54.9] vs 58.5 [52.4] prescription drug purchases) (**Table 2**). A similar result was found among beneficiaries without ADRD (mean [SD], 44.2 [47.8] vs 41.5 [46.5] prescription drug purchases).

There were only modest differences in care satisfaction (mean [SD] care satisfaction scores, 3.8 [0.7] vs 3.8 [0.7] for quality of medical care; 3.6 [0.7] vs 3.6 [0.8] for out-of-pocket costs for medical care; 3.5 [1.0] vs 3.5 [1.1] for available care by specialists; 3.3 [1.2] vs 3.4 [1.2] for follow-up after initial treatment; and 3.8 [0.7] vs 3.8 [0.7] for physician's concern for overall health) and health status (mean [SD] health status score, 3.2 [0.9] vs 3.2 [0.9] for general health status compared with

Table 1. Sample Characteristics of TM and MA Beneficiaries With and Without ADRD

Characteristic	Participants with ADRD, No. (%)			Participants without ADRD, No. (%)		
	TM beneficiaries (n = 1841)	MA beneficiaries (n = 1006)	*P* value	TM beneficiaries (n = 29 373)	MA beneficiaries (n = 14 880)	*P* value
Age, mean (SD), y	77.56 (12.0)	77.14 (11.0)	.27	71.56 (11.9)	72.54 (9.8)	<.001
Female	1089 (59.2)	610 (60.6)	.44	15 966 (54.4)	8235 (55.3)	.05
Race/ethnicity						
Non-Latino						
White	1376 (74.7)	680 (67.6)	<.001	24 002 (81.7)	10 753 (72.3)	<.001
Black	235 (12.8)	119 (11.8)		2790 (9.5)	1649 (11.1)	
Asian	51 (2.8)	12 (1.2)		384 (1.3)	253 (1.7)	
Latino	154 (8.4)	178 (17.7)		1801 (6.1)	2019 (13.6)	
Others	69 (3.7)	40 (4.0)		973 (3.3)	402 (2.7)	
Education						
Less than high school	578 (31.4)	363 (36.1)	.08	6055 (20.6)	3500 (23.5)	<.001
High school completion	636 (34.5)	325 (32.3)		10 786 (36.7)	5574 (37.5)	
Some college or associate's degree	279 (15.2)	154 (15.3)		6166 (21.0)	2912 (19.6)	
Bachelor's degree	167 (9.1)	88 (8.7)		3466 (11.8)	1584 (10.6)	
Advanced degree	156 (8.5)	66 (6.6)		2800 (9.5)	1270 (8.5)	
Annual income, $						
<25 000	974 (52.9)	607 (60.3)	.002	12 639 (43.0)	6937 (46.6)	<.001
25 000-50 000	721 (39.2)	318 (31.6)		13 650 (46.5)	6349 (42.7)	
>50 000	146 (7.9)	81 (8.1)		3084 (10.5)	1594 (10.7)	
Dual eligibility for Medicare and Medicaid	465 (25.3)	232 (23.1)	.58	5876 (20.0)	2349 (15.8)	<.001
Married	811 (44.1)	454 (45.1)	.19	14 121 (48.1)	7691 (51.7)	<.001
Living with others						
Alone	451 (24.5)	221 (22.0)	.41	9421 (32.1)	4570 (30.7)	<.001
With spouse	764 (41.5)	424 (42.1)		13 472 (45.9)	7282 (48.9)	
With nonspouse family	568 (30.9)	323 (32.1)		5368 (18.3)	2521 (16.9)	
With nonrelatives	58 (3.2)	38 (3.8)		1112 (3.8)	507 (3.4)	
Residence in metropolitan area	1259 (68.4)	864 (85.9)	<.001	19 954 (67.9)	12 504 (84.0)	<.001
US Census region of residence						
New England	53 (2.9)	19 (1.9)	<.001	1014 (3.5)	314 (2.1)	<.001
Middle Atlantic	203 (11.0)	158 (15.7)		3593 (12.2)	2343 (15.7)	
East North Atlantic	311 (16.9)	151 (15.0)		5350 (18.2)	2448 (16.5)	
West North Atlantic	110 (6.0)	60 (6.0)		2256 (7.7)	989 (6.6)	
South Atlantic	430 (23.4)	190 (18.9)		6537 (22.3)	2843 (19.1)	
East South Central	213 (11.6)	55 (5.5)		2847 (9.7)	792 (5.3)	
West South Central	228 (12.4)	91 (9.0)		2999 (10.2)	1281 (8.6)	
Mountain	113 (6.1)	87 (8.6)		2152 (7.3)	1331 (8.9)	
Pacific	168 (9.1)	139 (13.8)		2531 (8.6)	1938 (13.0)	
Puerto Rico	12 (0.7)	56 (5.6)		94 (0.3)	601 (4.0)	
Comorbidity						
Hardening of arteries	320 (17.4)	147 (14.6)	.06	2923 (10.0)	1333 (9.0)	.001
Hypertension	1382 (75.1)	775 (77.0)	.24	19 919 (67.8)	10 519 (70.7)	<.001
Heart attack	332 (18.0)	181 (18.0)	.98	3651 (12.4)	1871 (12.6)	.66
Stroke	467 (25.4)	272 (27.0)	.33	3041 (10.4)	1535 (10.3)	.91
Coronary heart disease	312 (16.9)	147 (14.7)	.11	3272 (11.1)	1584 (10.7)	.12
Cancer	705 (38.3)	357 (35.5)	.14	10 797 (36.8)	5043 (33.9)	<.001
Rheumatoid arthritis	447 (24.3)	228 (22.7)	.33	4424 (15.1)	2445 (16.4)	<.001
Osteoporosis	589 (32.0)	316 (31.4)	.75	6333 (21.6)	3381 (22.7)	.005
Asthma or chronic obstructive pulmonary disease	411 (22.3)	257 (25.5)	.05	6234 (21.2)	2929 (19.7)	<.001
Diabetes	542 (29.4)	330 (32.8)	.06	7760 (26.4)	4502 (30.3)	<.001
Mental illness	371 (20.2)	191 (19.0)	.45	2977 (10.1)	1052 (7.1)	<.001
Depression	940 (51.1)	501 (49.8)	.52	8168 (27.8)	3813 (25.6)	<.001

(continued)

Table 1. Sample Characteristics of TM and MA Beneficiaries With and Without ADRD (continued)

Characteristic	Participants with ADRD, No. (%)		*P* value	Participants without ADRD, No. (%)		*P* value
	TM beneficiaries (n = 1841)	MA beneficiaries (n = 1006)		TM beneficiaries (n = 29 373)	MA beneficiaries (n = 14 880)	
Limitations on activities of daily living, No.						
0	245 (13.3)	174 (17.3)	.01	13871 (47.3)	7691 (51.7)	<.001
1-2	254 (13.8)	120 (12.0)		5855 (19.9)	2927 (19.7)	
>3	1339 (72.9)	709 (70.7)		9627 (32.8)	4251 (28.6)	
Year						
2010	333 (18.1)	142 (14.1)	<.001	5471 (18.6)	2106 (14.2)	<.001
2011	365 (19.8)	155 (15.4)		5460 (18.6)	2325 (15.6)	
2012	356 (19.3)	169 (16.8)		5454 (18.6)	2630 (17.7)	
2013	355 (19.3)	190 (18.9)		5210 (17.7)	2603 (17.5)	
2015	229 (12.4)	193 (19.2)		4272 (14.5)	2848 (19.1)	
2016	203 (11.0)	157 (15.6)		3506 (11.9)	2368 (15.9)	

Abbreviations: ADRD, Alzheimer disease and related dementias; MA, Medicare Advantage; TM, traditional Medicare.

Table 2. Health Care Utilization, Care Satisfaction, and Health Status of TM and MA Beneficiaries With and Without ADRD

Outcomes	Participants, No.	With ADRD, mean (SD)		*P* value	Without ADRD, mean (SD)		*P* value
		TM beneficiaries	MA beneficiaries		TM beneficiaries	MA beneficiaries	
Health care utilization							
Inpatient hospital admissions, No.	47 100	0.5 (1.0)	0.3 (0.6)	<.001	0.2 (0.7)	0.2 (0.5)	<.001
Outpatient hospital visits, No.	47 100	6.1 (10.2)	3.5 (9.6)	<.001	5.6 (9.4)	2.6 (6.3)	<.001
Medical practitioner visits, No.[a]	47 100	39.7 (39.0)	17.3 (19.0)	<.001	31.7 (32.8)	14.2 (20.4)	<.001
Home health visits, No.	47 100	67.0 (159.3)	67.4 (176.5)	.95	14.3 (85.0)	10.8 (63.0)	<.001
Hospice stays, No.	47 100	0.0 (0.2)	0.0 (0.2)	.11	0.0 (0.1)	0.0 (0.1)	.33
Facility stays, No.							
Long-term	47 100	0.3 (1.1)	0.1 (0.4)	<.001	0.1 (0.4)	0.0 (0.3)	<.001
Short-term	47 100	0.0 (0.1)	0.0 (0.1)	.65	0.0 (0.0)	0.0 (0.0)	.60
Prescription drug purchases, No.[b]	33 671	58.5 (52.4)	65.5 (54.9)	<.001	41.5 (46.5)	44.2 (47.8)	<.001
Dental visits, No.	47 100	1.0 (2.2)	0.9 (1.6)	.21	1.5 (2.2)	1.3 (2.1)	<.001
Care satisfaction score[c]							
Quality of medical care	25 533	3.8 (0.6)	3.9 (0.5)	.10	3.8 (0.7)	3.8 (0.7)	<.001
Out-of-pocket costs for medical care	34 274	3.7 (0.7)	3.6 (0.8)	.29	3.6 (0.8)	3.6 (0.7)	.02
Available care by specialists	32 777	3.6 (1.0)	3.6 (0.9)	.20	3.5 (1.1)	3.5 (1.0)	.01
Follow-up after initial treatments	33 389	3.5 (1.1)	3.5 (1.1)	.89	3.4 (1.2)	3.3 (1.2)	<.001
Physician's concern for overall health	31 423	3.8 (0.6)	3.9 (0.5)	.09	3.8 (0.7)	3.8 (0.7)	<.001
Health status score[c]							
General health status compared with same-age people	46 859	2.7 (1.0)	2.7 (1.0)	.59	3.2 (0.9)	3.2 (0.9)	<.001
Overall health status compared with 1 year ago	46 970	0.6 (0.5)	0.6 (0.5)	.08	0.8 (0.4)	0.8 (0.4)	.003

Abbreviations: ADRD, Alzheimer disease and related dementias; MA, Medicare Advantage; TM, Traditional Medicare.

[a] The unit of measurement is a separate visit, procedure, service, or a supplied item.

[b] The unit of measurement is a single purchase of a single drug in a single container.

[c] A higher value indicates better care satisfaction or health status.

same-age people; and 0.8 [0.4] vs 0.8 [0.4] for overall health status compared with 1 year ago) between MA and TM beneficiaries without ADRD (Table 2). It should be noted that approximately 55% of responses for individuals with ADRD relied on proxy responses.

We found that the mean county-level MA enrollment rate (0.009% [95% CI, 0.008%-0.010%] for health care utilization except for prescription drug purchase; 0.010% [95% CI, 0.009%-0.011%] for prescription drug purchase; 0.009% [95% CI, 0.008%-0.011%] for quality of medical care; 0.009% [95% CI, 0.008%-0.010%] for out-of-pocket costs for medical care; 0.009% [95% CI, 0.008%-0.010%] for available care by specialists; 0.009% [95% CI, 0.008%-0.010%] for follow-up

after initial treatment; 0.008% [95% CI, 0.009%-0.011%] for physician's concern for overall health; 0.009% [95% CI, 0.008%-0.011%] for general health status compared with same-age people; and 0.009% [95% CI, 0.008%-0.010%] for overall health status compared with 1 year ago) was a strong and valid instrument. Greater MA enrollment was associated with a higher likelihood of enrolling in MA plans, and *F* statistics were greater than 10 (*F* score range, 184.56-341.04) (**Table 3**). Also, most individual-level control variables were balanced across values of the instrument.

Our instrumental variable analysis showed that MA beneficiaries with ADRD had lower levels of health care utilization than TM beneficiaries with ADRD, including a mean of −22.3 medical practitioner visits (95% CI, −24.9 to −19.8 medical practitioner visits), −2.3 outpatient hospital visits (95% CI, −3.6 to −1.1 outpatient hospital visits), −0.2 inpatient hospital admissions (95% CI, −0.3 to −0.1 inpatient hospital admissions), and −0.1 long-term care facility stays (95% CI, −0.2 to −0.1 long-term care facility stays) (**Table 4**). There were no statistically significant differences in home health visits, short-term facility stays, prescription drug purchases, and dental visits. Similar trends were observed among beneficiaries without ADRD, in that MA beneficiaries had fewer medical practitioner

Table 3. Results From First-Stage Regression of County-Level MA Enrollment on MA Enrollment

	Variable								
MA Enrollment	Health care utilization except for prescription drug purchase	Prescription drug purchase	Quality of medical care	OOP costs for medical care	Available care by specialists	Follow-up after initial treatments	Physician's concern for overall health	General health status compared with same-age people	Overall health status compared with 1 y ago
County-level MA enrollment, estimate (95% CI), %[a]	0.009 (0.008-0.010)	0.010 (0.009-0.011)	0.009 (0.008-0.011)	0.009 (0.008-0.010)	0.009 (0.008-0.010)	0.009 (0.008-0.010)	0.008 (0.009-0.011)	0.009 (0.008-0.011)	0.009 (0.008-0.010)
Observations, No.	47 100	33 671	25 533	34 274	32 777	33 389	31 423	46 859	46 970
R^2	0.159	0.187	0.161	0.156	0.161	0.159	0.161	0.159	0.159
F score	289.35	184.56	289.20	341.04	287.27	335.76	287.15	288.64	278.22

Abbreviations: MA, Medicare Advantage; OOP, out-of-pocket.

[a] The unit of measurement is the share of Medicare beneficiaries (aged ≥65 years) enrolled in MA plans at the county level.

Table 4. Differences in Health Care Utilization Between TM and MA Beneficiaries With and Without ADRD

		Adjusted estimates, mean (95% CI), No.[a]					
		With ADRD			Without ADRD		
Health care utilizations	Participants, No.	TM beneficiaries	MA beneficiaries	Difference between MA and TM beneficiaries	TM beneficiaries	MA beneficiaries	Difference between MA and TM beneficiaries
Inpatient hospital admission	47 100	0.47 (0.4 to 0.5)	0.3 (0.2 to 0.3)	−0.2 (−0.3 to −0.1)	0.2 (0.2 to 0.3)	0.2 (0.1 to 0.2)	−0.1 (−0.1 to 0.0)
Outpatient hospital visit	47 100	6.0 (5.3 to 6.7)	3.7 (2.7 to 4.7)	−2.3 (−3.6 to −1.1)	5.2 (4.6 to 5.7)	3.5 (2.6 to 4.3)	−1.7 (−3.0 to −0.3)
Medical practitioner visit[b]	47 100	39.7 (37.5 to 41.9)	17.4 (16.0 to 18.8)	−22.3 (−24.9 to −19.8)	30.8 (29.4 to 32.2)	15.8 (13.3 to 18.2)	−15.0 (−18.7 to −11.3)
Home health visit	47 100	66.4 (57.3 to 75.6)	69.3 (55.5 to 83.0)	2.8 (−12.7 to 18.4)	11.9 (9.1 to 14.8)	15.2 (9.6 to 20.8)	3.3 (−4.9 to 11.4)
Hospice stay	47 108	0.0 (0.0 to 0.1)	0.0	0.0	0.0	0.0	0.0
Facility stay							
Long-term	47 100	0.3 (0.2 to 0.3)	0.1 (0.1 to 0.1)	−0.1 (−0.2 to −0.1)	0.1 (0.1 to 0.1)	0.0 (0.0 to 0.1)	0.0 (−0.1 to 0.0)
Short-term	47 100	0.0	0.0	0.0	0.0	0.0	0.0
Prescription drug purchase[c]	33 671	67.5 (63.0 to 72.0)	71.9 (67.8 to 76.0)	4.4 (−1.6 to 10.5)	40.5 (36.3 to 44.6)	59.9 (54.6 to 65.2)	19.4 (10.4 to 28.5)
Dental visit	47 100	1.0 (0.9 to 1.1)	0.9 (0.8 to 1.0)	−0.1 (−0.3 to 0.1)	1.4 (1.3 to 1.5)	1.5 (1.3 to 1.6)	0.1 (−0.2 to 0.3)

Abbreviations: ADRD, Alzheimer disease and related dementias; MA, Medicare Advantage; TM, traditional Medicare.

[a] A 2-stage least square regression model was used, and county-level MA penetration was used as an instrument. Both stages adjusted the SEs for clustering within county.

[b] The unit of measurement is a separate visit, procedure, service, or a supplied item.

[c] The unit of measurement is a single purchase of a single drug in a single container.

visits (mean, −15.0 medical practitioner visits; 95% CI, −18.7 to −11.3 medical practitioner visits), outpatient hospital visits (mean, −1.7 outpatient hospital visits; 95% CI, −3.0 to −0.3 outpatient hospital visits), and inpatient hospital admissions (mean, −0.1 inpatient hospital admissions; 95% CI, −0.1 to 0.0 inpatient hospital admissions) than TM beneficiaries. In addition, MA beneficiaries without ADRD had a mean of 19.4 more prescription drug purchases (95% CI, 10.4 to 28.5 prescription drug purchases) than TM beneficiaries without ADRD.

Our instrumental variable analysis also showed that, overall, there were no statistically significant differences in care satisfaction and health status between MA and TM beneficiaries with ADRD (except for satisfaction on physician's concern for overall health; mean score, 0.1; 95% CI, 0.0 to 0.1) and without ADRD (except for general health status compared with same-age people; mean score, −0.1; 95% CI, −0.2 to −0.1) (**Table 5**). Results are robust to using state-level MA enrollment rates as an instrument (eTable 1 in the Supplement) and clustering within individual and county (eTable 2 and eTable 3 in the Supplement).

Discussion

In an analysis of a nationally representative sample of the Medicare population, we found that compared with TM beneficiaries with ADRD, MA beneficiaries with ADRD had lower health care utilization rates, particularly for medical practitioner visits. A similar trend was observed among beneficiaries without ADRD, but the magnitude of the difference in health care utilization was larger between beneficiaries with ADRD than between beneficiaries without ADRD. On the other hand, no or marginal differences were detected in care satisfaction and health status between MA and TM beneficiaries with and without ADRD.

We observed that MA and TM beneficiaries with ADRD had similar demographic and health characteristics. We also found that there were differences in sample characteristics between MA and TM beneficiaries without ADRD, but this does not necessarily indicate that healthier beneficiaries were more likely to enroll in MA than TM. These results are consistent with the more recent literature,[6] which finds little evidence to suggest that MA plans still enroll healthier beneficiaries than TM. The similar sample characteristics of beneficiaries with ADRD are of particular interest because

Table 5. Differences in Care Satisfaction and Health Status Between TM and MA Beneficiaries With and Without ADRD

Outcomes	Participants, No.	Adjusted estimates, mean (95% CI), score[a]					
		With ADRD			Without ADRD		
		TM beneficiaries	MA beneficiaries	Difference between MA and TM beneficiaries	TM beneficiaries	MA beneficiaries	Difference between MA and TM beneficiaries
Care satisfaction[b]							
Quality of medical care	25 533	3.8 (3.8 to 3.7)	3.9 (3.8 to 3.9)	0.1 (0.0 to 0.1)	3.8 (3.7 to 3.8)	3.8 (3.7 to 3.8)	0.0 (−0.1 to 0.1)
Out-of-pocket costs for medical care	34 274	3.7 (3.6 to 3.7)	3.6 (3.6 to 3.7)	0.0 (−0.1 to 0.1)	3.7 (3.6 to 3.7)	3.5 (3.4 to 3.7)	−0.1 (−0.4 to 0.1)
Available care by specialists	32 777	3.5 (3.5 to 3.6)	3.6 (3.6 to 3.7)	0.1 (0.0 to 0.2)	3.5 (3.4 to 3.6)	3.6 (3.5 to 3.7)	0.1 (−0.1 to 0.3)
Follow-up after initial treatments	33 389	3.5 (3.4 to 3.5)	3.5 (3.4 to 3.6)	0.0 (−0.1 to 0.1)	3.4 (3.3 to 3.5)	3.2 (3.1 to 3.4)	−0.2 (−0.4 to 0.0)
Physician's concern for overall health	31 423	3.8 (3.8 to 3.8)	3.9 (3.8 to 3.9)	0.1 (0.0 to 0.1)	3.8 (3.7 to 3.8)	3.8 (3.7 to 3.8)	0.0 (−0.1 to 0.1)
Health status[b]							
General health status compared with same-age people	46 859	2.7 (2.6 to 2.7)	2.7 (2.6 to 2.8)	0.0 (−0.1 to 0.1)	3.2 (3.2 to 3.3)	3.1 (3.0 to 3.2)	−0.1 (−0.2 to −0.1)
Overall health status compared with 1 year ago	46 970	0.6 (0.6 to 0.6)	0.6 (0.6 to 0.7)	0.0 (0.0 to 0.1)	0.8 (0.8 to 0.8)	0.8 (0.8 to 0.8)	0.0 (−0.1 to 0.0)

Abbreviations: ADRD, Alzheimer disease and related dementias; MA, Medicare Advantage; TM, traditional Medicare.

[a] A 2-stage least-squares regression model was used, and county-level MA penetration was used as an instrument. Both stages adjusted the SEs for clustering within county.

[b] A higher value indicates better care satisfaction or health status.

previous research[22] has found that beneficiaries have increasingly enrolled in MA plans after receiving a diagnosis of ADRD. This may reflect the preference of beneficiaries with ADRD for MA plans because MA plans have the flexibility to provide enhanced services for complex and high-need patients through coordinated care that addresses the medical, behavioral, and social aspects of the disease.

We also found that MA beneficiaries had fewer medical practitioner visits, outpatient hospital visits, and inpatient hospital admissions than TM beneficiaries, and these differences were more pronounced among beneficiaries with ADRD than beneficiaries without ADRD. The largest decrease was in medical practitioner visits. Medical practitioner visits are of particular interest because they measure individual events for a variety of medical services, equipment, and supplies, possibly reflecting a high intensity of care. Hence, a higher number of medical practitioner visits among TM beneficiaries compared with MA beneficiaries may indicate inefficient care delivery in TM associated with a lack of incentive to control utilization and coordinate care. Furthermore, the fee-for-service payment system under TM may incentivize more face-to-face visits, but MA plans have greater flexibility in the methods for delivering the care. For example, MA plans have provided additional telehealth services as a supplemental benefit, enabling MA enrollees to have access to care without going to their practitioners. Further decreases in medical practitioner visits among MA enrollees are expected starting in 2020, when MA plans will be able to include telehealth as a basic government-funded benefit.[30,31] This is particularly relevant to beneficiaries with ADRD, who tend to have more-frequent transitions and require care coordination.[32,33] Another notable finding is that MA beneficiaries with ADRD had fewer inpatient hospital admissions than TM beneficiaries with ADRD. Although the magnitude of the difference in inpatient hospital admissions between MA and TM beneficiaries with ADRD was modest, lower inpatient hospital admissions among MA beneficiaries with ADRD are notable because hospitalizations may adversely affect the health status of beneficiaries with ADRD by increasing the risk of nosocomial infections, falls, and cognitive decline.[34,35]

We detected no differences in care satisfaction between MA and TM beneficiaries with or without ADRD. This finding provides evidence suggesting that MA plans may not tailor benefit packages to selectively attract healthy beneficiaries, leading to decreased advantageous selection over time.[6,36,37] However, there is evidence showing that advantageous selection has been decreased but not eliminated; specifically, 11% and 2% of MA beneficiaries voluntarily switched to another MA plan or TM, respectively.[38] In particular, switching to TM was high among MA beneficiaries with high needs and high costs.[26-28,39,40] High disenrollment rates were partly attributable to poor patient experience.[41]

There were no or negligible differences in health status between MA and TM beneficiaries with or without ADRD. This finding suggests that lower health care utilization among MA beneficiaries may not be attributable to under-provision of care and, thus, not come at the cost of poorer care quality. Rather, MA plans may achieve lower health care utilization through high efficiency of care. This study contributes to the growing literature showing that TM lacks a direct financial incentive to control utilization, which could lead to excess care provision that does not improve patient outcomes.[6,10,42] Previous research[34] found that MA beneficiaries had increased inpatient utilization and total charges by 60% and 50%, respectively, when they were forced out of MA plans because of plan exit. However, the increases in utilization and charges were not associated with any measurable reduction in hospital quality or patient mortality.[34]

Limitations

This study has several limitations. First, our variables may be subject to self-reporting errors. Although self-reported utilization for MA beneficiaries was not validated, this is less likely to affect our findings because self-reported utilization for TM beneficiaries has been found to be accurate on the basis of validation using Medicare claims data. Second, our findings for beneficiaries with ADRD may be confounded by proxy response because approximately 55% of them relied on proxy

response, although there is not a differential proxy response rate by MA vs TM. Third, we did not detect differences in patient satisfaction, and this could be associated with sample size. Fourth, we found that MA and TM beneficiaries had similar comorbidities characteristics. However, comorbidities might not be equal across MA and TM because of aggressive diagnostic coding in MA plans.[43,44] Fifth, previous research[27] has found that MA beneficiaries disenrolled from their plans after health shocks. Requiring 12-month continuous enrollment in MA or TM to ensure accurate health plan attribution may lead to some selection on care satisfaction. Sixth, because of the coarse measurements available, we could not account for the severity of ADRD.

Conclusions

Compared with TM beneficiaries, MA beneficiaries had lower rates of health care utilization without compromising care satisfaction and health status, particularly among beneficiaries with ADRD. These findings suggest that MA plans may be more efficient than TM at delivering health care for beneficiaries with ADRD.

ARTICLE INFORMATION

Accepted for Publication: February 6, 2020.

Published: March 30, 2020. doi:10.1001/jamanetworkopen.2020.1809

Corresponding Author: Sungchul Park, PhD, Department of Health Management and Policy, Dornsife School of Public Health, Drexel University, 3215 Market St, Nesbitt Hall, Philadelphia, PA, 19104 (smp462@drexel.edu).

Author Affiliations: Department of Health Management and Policy, Dornsife School of Public Health, Drexel University, Philadelphia, Pennsylvania (Park); RTI International, Research Triangle Park, North Carolina (White); Department of Health Services, School of Public Health, University of Washington, Seattle (Fishman); Kaiser Permanent Washington Health Research Institute, Seattle, Washington (Larson); Department of Medical Ethics and Health Policy, Perelman School of Medicine, University of Pennsylvania, Philadelphia (Coe).

Author Contributions: Dr Park had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

Concept and design: Park, Fishman, Larson, Coe.

Acquisition, analysis, or interpretation of data: Park, White, Fishman, Coe.

Drafting of the manuscript: Park, Fishman.

Critical revision of the manuscript for important intellectual content: All authors.

Statistical analysis: Park, White, Coe.

Obtained funding: Fishman, Larson, Coe.

Administrative, technical, or material support: Larson, Coe.

Supervision: Fishman, Coe.

Conflict of Interest Disclosures: Dr Larson reported receiving royalties from UpToDate outside the submitted work. No other disclosures were reported.

Funding/Support: This work was supported by grant R01 AG049815 from the National Institutes of Health and grant AG U01 0006781 from the National Institute of Aging, National Institutes of Health.

Role of the Funder/Sponsor: The funders had no role in the design and conduct of the study; collection, management, analysis, and interpretation of the data; preparation, review, or approval of the manuscript; and decision to submit the manuscript for publication.

REFERENCES

1. Hebert LE, Scherr PA, Bienias JL, Bennett DA, Evans DA. Alzheimer disease in the US population: prevalence estimates using the 2000 Census. *Arch Neurol*. 2003;60(8):1119-1122. doi:10.1001/archneur.60.8.1119

2. Hurd MD, Martorell P, Delavande A, Mullen KJ, Langa KM. Monetary costs of dementia in the United States. *N Engl J Med*. 2013;368(14):1326-1334. doi:10.1056/NEJMsa1204629

3. Alzheimer's Association. 2017 Alzheimer's disease facts and figures. *Alzheimers Dement*. 2017;3(4):325-373. doi:10.1016/j.jalz.2017.02.001

4. Newhouse JP, McGuire TG. How successful is Medicare Advantage? *Milbank Q*. 2014;92(2):351-394. doi:10.1111/1468-0009.12061

5. Landon BE, Zaslavsky AM, Saunders RC, Pawlson LG, Newhouse JP, Ayanian JZ. Analysis of Medicare Advantage HMOs compared with traditional Medicare shows lower use of many services during 2003-09. *Health Aff (Millwood)*. 2012;31(12):2609-2617. doi:10.1377/hlthaff.2012.0179

6. Huckfeldt PJ, Escarce JJ, Rabideau B, Karaca-Mandic P, Sood N. Less intense postacute care, better outcomes for enrollees in Medicare Advantage than those in fee-for-service. *Health Aff (Millwood)*. 2017;36(1):91-100. doi:10.1377/hlthaff.2016.1027

7. Henke RM, Karaca Z, Gibson TB, et al. Medicare Advantage and traditional Medicare hospitalization intensity and readmissions. *Med Care Res Rev*. 2018;75(4):434-453. doi:10.1177/1077558717692103

8. Curto V, Einav L, Finkelstein A, Levin J, Bhattacharya J. Health care spending and utilization in public and private Medicare. *Am Econ J Appl Econ*. 2019;11(2):302-332. doi:10.1257/app.20170295

9. Medicare Payment Advisory Commission. Report to the Congress: Medicare payment policy. Published March 2015. Accessed February 24, 2020. http://www.medpac.gov/docs/default-source/reports/mar2015_entirereport_revised.pdf

10. Kumar A, Rahman M, Trivedi AN, Resnik L, Gozalo P, Mor V. Comparing post-acute rehabilitation use, length of stay, and outcomes experienced by Medicare fee-for-service and Medicare Advantage beneficiaries with hip fracture in the United States: a secondary analysis of administrative data. *PLoS Med*. 2018;15(6):e1002592. doi:10.1371/journal.pmed.1002592

11. Timbie JW, Bogart A, Damberg CL, et al. Medicare Advantage and fee-for-service performance on clinical quality and patient experience measures: comparisons from three large states. *Health Serv Res*. 2017;52(6):2038-2060. doi:10.1111/1475-6773.12787

12. Figueroa JF, Blumenthal DM, Feyman Y, et al. Differences in management of coronary artery disease in patients with Medicare Advantage vs traditional fee-for-service Medicare among cardiology practices. *JAMA Cardiol*. 2019;4(3):265-271. doi:10.1001/jamacardio.2019.0007

13. Elliott MN, Landon BE, Zaslavsky AM, et al. Medicare prescription drug plan enrollees report less positive experiences than their Medicare Advantage counterparts. *Health Aff (Millwood)*. 2016;35(3):456-463. doi:10.1377/hlthaff.2015.0816

14. Newhouse JP, Price M, McWilliams JM, Hsu J, Souza J, Landon BE. Adjusted mortality rates are lower for Medicare Advantage than traditional Medicare, but the rates converge over time. *Health Aff (Millwood)*. 2019;38(4):554-560. doi:10.1377/hlthaff.2018.05390

15. Khandker RK, Black CM, Xie L, et al. Analysis of episodes of care in Medicare beneficiaries newly diagnosed with Alzheimer's disease. *J Am Geriatr Soc*. 2018;66(5):864-870. doi:10.1111/jgs.15281

16. Teno JM, Gozalo PL, Bynum JP, et al. Change in end-of-life care for Medicare beneficiaries: site of death, place of care, and health care transitions in 2000, 2005, and 2009. *JAMA*. 2013;309(5):470-477. doi:10.1001/jama.2012.207624

17. LaMantia MA, Scheunemann LP, Viera AJ, Busby-Whitehead J, Hanson LC. Interventions to improve transitional care between nursing homes and hospitals: a systematic review. *J Am Geriatr Soc*. 2010;58(4):777-782. doi:10.1111/j.1532-5415.2010.02776.x

18. Intrator O, Zinn J, Mor V. Nursing home characteristics and potentially preventable hospitalizations of long-stay residents. *J Am Geriatr Soc*. 2004;52(10):1730-1736. doi:10.1111/j.1532-5415.2004.52469.x

19. Grabowski DC, O'Malley AJ, Barhydt NR. The costs and potential savings associated with nursing home hospitalizations. *Health Aff (Millwood)*. 2007;26(6):1753-1761. doi:10.1377/hlthaff.26.6.1753

20. Ouslander JG, Lamb G, Tappen R, et al. Interventions to reduce hospitalizations from nursing homes: evaluation of the INTERACT II collaborative quality improvement project. *J Am Geriatr Soc*. 2011;59(4):745-753. doi:10.1111/j.1532-5415.2011.03333.x

21. Ouslander JG, Lamb G, Perloe M, et al. Potentially avoidable hospitalizations of nursing home residents: frequency, causes, and costs [see editorial comments by Drs. Jean F. Wyman and William R. Hazzard, pp 760-761]. *J Am Geriatr Soc*. 2010;58(4):627-635. doi:10.1111/j.1532-5415.2010.02768.x

22. Park S, Fishman P, White L, Larson EB, Coe NB. Disease-specific plan switching between traditional Medicare and Medicare Advantage. *Perm J*. 2020;24:19.059. doi:10.7812/TPP/19.059

23. Centers for Medicare and Medicaid Services. *Data User's Guide: Cost Supplement File*. Centers for Medicare and Medicaid Services; 2017.

24. Centers for Medicare and Medicaid Services. *MCBS Methodology Report*. Centers for Medicare and Medicaid Services; 2017.

25. Medicare Payment Advisory Commission. Report to the Congress: Medicare and the health care delivery system. Published June 2012. Accessed February 24, 2020. http://www.medpac.gov/docs/default-source/reports/jun12_entirereport.pdf

26. Meyers DJ, Belanger E, Joyce N, McHugh J, Rahman M, Mor V. Analysis of drivers of disenrollment and plan switching among Medicare Advantage beneficiaries. *JAMA Intern Med*. 2019;179(4):524-532. doi:10.1001/jamainternmed.2018.7639

27. Goldberg EM, Trivedi AN, Mor V, Jung HY, Rahman M. Favorable risk selection in Medicare Advantage: trends in mortality and plan exits among nursing home beneficiaries. *Med Care Res Rev*. 2017;74(6):736-749. doi:10.1177/1077558716662565

28. Park S, Basu A, Coe NB, Khalil F. Service-level selection: strategic risk selection in Medicare Advantage in response to risk adjustment: NBER working paper No. 24038. Published November 2017. Accessed February 24, 2020. https://www.nber.org/papers/w24038

29. Staiger D, Stock JH. Instrumental variables regression with weak instruments. *Econometrica*. 1997;65(3):557-586. doi:10.2307/2171753

30. Basu A, Rathouz PJ. Estimating marginal and incremental effects on health outcomes using flexible link and variance function models. *Biostatistics*. 2005;6(1):93-109. doi:10.1093/biostatistics/kxh020

31. Centers for Medicare and Medicaid Services. CMS finalizes policies to bring innovative telehealth benefit to Medicare Advantage. Published April 5, 2019. Accessed October 6, 2019. https://www.cms.gov/newsroom/press-releases/cms-finalizes-policies-bring-innovative-telehealth-benefit-medicare-advantage

32. Samus QM, Johnston D, Black BS, et al. A multidimensional home-based care coordination intervention for elders with memory disorders: the maximizing independence at home (MIND) pilot randomized trial. *Am J Geriatr Psychiatry*. 2014;22(4):398-414. doi:10.1016/j.jagp.2013.12.175

33. Lines L, Ahaghotu B, Tilly J, Wiener J. Care coordination for people with Alzheimer's disease and related dementias: literature review. Published December 2013. Accessed February 24, 2020. https://aspe.hhs.gov/system/files/pdf/76771/AlzCC.pdf

34. Ehlenbach WJ, Hough CL, Crane PK, et al. Association between acute care and critical illness hospitalization and cognitive function in older adults. *JAMA*. 2010;303(8):763-770. doi:10.1001/jama.2010.167

35. Phelan EA, Borson S, Grothaus L, Balch S, Larson EB. Association of incident dementia with hospitalizations. *JAMA*. 2012;307(2):165-172. doi:10.1001/jama.2011.1964

36. McWilliams JM, Hsu J, Newhouse JP. New risk-adjustment system was associated with reduced favorable selection in Medicare Advantage. *Health Aff (Millwood)*. 2012;31(12):2630-2640. doi:10.1377/hlthaff.2011.1344

37. Newhouse JP, Price M, McWilliams JM, Hsu J, McGuire TG. How much favorable selection is left in Medicare Advantage? *Am J Health Econ*. 2015;1(1):1-26. doi:10.1162/ajhe_a_00001

38. Jacobson GA, Neuman T, Damico A. *Medicare Advantage Plan Switching: Exception or Norm?* Kaiser Family Foundation; 2016.

39. Li Q, Trivedi AN, Galarraga O, Chernew ME, Weiner DE, Mor V. Medicare Advantage ratings and voluntary disenrollment among patients with end-stage renal disease. *Health Aff (Millwood)*. 2018;37(1):70-77. doi:10.1377/hlthaff.2017.0974

40. Rahman M, Keohane L, Trivedi AN, Mor V. High-cost patients had substantial rates of leaving Medicare Advantage and joining traditional Medicare. *Health Aff (Millwood)*. 2015;34(10):1675-1681. doi:10.1377/hlthaff.2015.0272

41. DuGoff E, Chao S. What's driving high disenrollment in Medicare Advantage? *Inquiry*. 2019;56:46958019841506. doi:10.1177/0046958019841506

42. Kronick R, Welch WP. Measuring coding intensity in the Medicare Advantage program. *Medicare Medicaid Res Rev*. 2014;4(2):mmrr2014.004.02.a06. doi:10.5600/mmrr.004.02.sa06

43. Geruso M, Layton T. Upcoding: evidence from Medicare on squishy risk adjustment. *J Polit Econ*. Published online January 29, 2020. doi:10.1086/704756

44. Duggan M, Gruber AJ, Vabson AB. The consequences of health care privatization: evidence from Medicare Advantage exits. *Am Econ J Appl Econ*. 2018;10(1):153-186. doi:10.1257/pol.20160068

SUPPLEMENT.