

RESEARCH ARTICLE

Older adults living with dementia enrolled in similar Medicare Advantage plans compared to those without dementia

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Abstract

INTRODUCTION: Medicare Advantage (MA) plan selection may differ between older adults with or without dementia in unexplored ways. This study aims to characterize MA plan choice among those with dementia.**METHODS:** We used the 2010 to 2018 waves of the Health and Retirement Study with linked Medicare enrollment data to identify MA respondents ≥ 65 years, with and without dementia. Conditional logit models examined how characteristics of MA plans affected choice.**RESULTS:** Among respondents overall, there were no differences between those with versus without dementia regarding how plan out-of-pocket cost, star rating, and type affected choice. Among the dual eligible group, those with versus without dementia were more likely to choose Special Needs Plans (difference in log odds: 0.804, $p = 0.007$).**DISCUSSION:** There were few differences in how MA plan characteristics affected choice among older adults with and without dementia. Older adults with dementia may make similar MA plan choices as those without.

KEYWORDS

dementia, dual eligibility, health insurance choice, Medicare Advantage

1 | INTRODUCTION

Care of older adults living with dementia is a significant and growing public health concern in light of the growing number of individuals

with dementia¹ and the associated health-care costs.^{2,3} The popularity of Medicare Advantage (MA) plans continues to grow, covering 54% of Medicare beneficiaries as of 2024.⁴ MA is managed care provided by Medicare-approved private insurance companies that

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receive a monthly capitated payment from Medicare. Older adults living with dementia had rates of MA enrollment similar to those without dementia in 2018.⁵

MA plans may be attractive to older adults with dementia and their caregivers. For example, unlike traditional fee-for-service (FFS) Medicare, the capitated payments MA plans receive create incentives to invest in care coordination,⁶ which may be especially valuable for older adults with dementia.⁷⁻⁹ The inclusion of dementia in risk adjustment for MA payments since 2018 potentially increases the economic benefits of enrolling and investing in the care of this population.¹⁰ While MA plans may offer significant benefits to those with dementia, they might control cost through coverage denials, narrow provider networks, and prior authorization requirements, potentially limiting beneficiaries' access to care.¹¹ MA plans can also vary greatly in quality of care. For example, plans with lower star ratings were associated with lower enrollment rates, higher disenrollment rates, and worse patient outcomes.¹²⁻¹⁴ Quality of care may be especially important for older adults with dementia, given their high health-care needs.

For Medicare beneficiaries, the number of available plans can be overwhelming: the average county offered 43 plans in 2024.¹⁵ Economic theory suggests that Medicare beneficiaries would carefully pick the optimal plan based on expected health-care needs. However, the complexity of MA plans—including varying benefits, cost sharing, provider networks, quality of care, and plans tailored to high-risk populations—complicates plan selection, particularly for beneficiaries living with dementia. Nearly 7 in 10 Medicare beneficiaries do not compare their coverage options annually.¹⁶ Instead, beneficiaries often focus on topline numbers such as premiums, even though premiums do not represent patients' full cost sharing.^{17,18} Individuals with low cognitive function compared to those with high cognition are less responsive to the generosity of coverage when enrolling in an MA plan, raising concern that the complexity of coverage choices may compound the difficulties facing individuals living with dementia.¹⁹

It is unclear whether older adults with dementia (and their caregivers) make coverage decisions similarly to those without dementia. If they do not, this could suggest that they (and their caregivers) have different priorities in selecting a plan; or it may be that those with dementia are simply making mistakes. The task of selecting an MA plan is likely particularly overwhelming for those with impaired decision-making capabilities.^{19,20} Older adults with dementia might also avoid or leave certain MA plans due to enrollment or coverage denials, or active case management restricting services like post-acute care.^{21,22} MA plan choice for those with versus without dementia may be driven by a number of competing factors such as generosity, quality, and plan types; it is important to investigate whether older adults with dementia are making similar MA plan choices to those without dementia.

To our best knowledge, no study has examined the determinants of MA plan choice among older adults with dementia, despite MA's increasing share of the market. In this study, we estimate how the choice of MA plans by older adults with dementia responds to plan characteristics, relative to those without dementia, taking into account characteristics of all plans available to them in the local market. We leveraged the nationally representative Health and Retirement Study

Highlights

- This study provides the first nationally representative analysis of Medicare Advantage (MA) plan choice among older adults living with dementia.
- Overall, there were few differences in how MA plan characteristics affected plan choice among older adults with dementia relative to those without dementia.
- Conditional on being enrolled in MA, between 2010 and 2018, older adults with dementia may make similar MA plan choices as those without dementia.

RESEARCH IN CONTEXT

1. **Systematic review:** Prior work has found that the enormous number of available Medicare Advantage (MA) plans might overwhelm older adults, particularly those living with dementia. No study has examined the determinants of MA plan choice among older adults with dementia.
2. **Interpretation:** Our findings indicate conditional on being enrolled in MA, between 2010 and 2018, older adults with dementia may make similar MA plan choices as those without dementia. Our results were robust to several sensitivity specifications.
3. **Future directions:** Given the continued popularity and growth of MA plans in the United States, it is vitally important to further understand the MA insurance plan decision-making process among older adults with dementia and their caregivers and how these decisions impact their quality of care and health-care outcomes.

(HRS) with linked Medicare Beneficiary Summary File data and publicly available MA plan characteristics. Our findings may help inform policies and supportive services to help older adults with dementia and their caregivers choose the insurance plan that best meets their needs.

2 | METHODS

2.1 | Data and study cohort

We used data from the 2010 to 2018 biennial waves of the HRS, a longitudinal, nationally representative survey of US adults aged ≥ 51 years, with detailed information collected on health, function, and cognition.^{23,24} We linked the survey data to respondents' annual Medicare Beneficiary Summary File data to determine the MA plan (i.e., MA contract and plan numbers) in which respondents enrolled, which

we further linked to publicly available MA plan characteristics such as average Out-of-Pocket Cost (OOPC), star ratings, and plan type.^{25,26} This study was reviewed and approved by the Michigan Medicine Institutional Review Board.

We used the Langa–Weir Classification of Cognitive Function to determine respondents' dementia status at the time of interview, through an evaluation adapted from the modified Telephone Interview for Cognitive Status for self-respondents, and proxy assessment of respondent memory or cognition for individuals with proxy respondents.^{27,28} We followed previous studies to consider dementia present if their cognitive status was classified as dementia and consider those with cognitive status classified as normal or cognitive impairment but no dementia to not have dementia.^{28,29}

We included respondents aged ≥ 65 years and enrolled in MA for at least 1 month in any survey year (i.e., 2010, 2012, 2014, 2016, and 2018),¹³ living with or without dementia ($N = 17,347$ respondent waves). We excluded respondents enrolled in plans with < 10 enrollees in their county ($N = 389$), enrolled in employer group health plans ($N = 3081$) for which the eligibility was based on previous employment status, or living in a county with only one plan ($N = 13$). If a given respondent was included in multiple waves, we randomly selected one wave for analysis. We generated a uniformly distributed random variable and chose the wave corresponding to the smallest generated number for each respondent. Therefore, each respondent was represented in the analytic data set one time. The final sample included 4810 unique respondents, of whom 658 lived with dementia and 4152 lived without dementia.

2.2 | Plan characteristics

We examined a set of plan characteristics that measure the generosity, quality, and types of MA plans.^{12,13,19,30,31} Following McWilliams et al., we first included a measure of plan generosity based on average monthly OOPC.¹⁹ A plan's estimated OOPC were obtained from the Centers for Medicare & Medicaid Services and included premiums and expected medical care spending for a standard population based on general health status (i.e., excellent, very good, good, fair, poor).¹⁹ Based on each respondent's self-reported general health status, we obtained the average monthly OOPC for the plan in which they enrolled and all other plans available to them in the county for a standard population with similar health status in that plan. We included continuous average monthly OOPC and its square term to capture the non-linear relationship between OOPC and plan choices. Approximately 10.6% of MA plans (i.e., the majority of Special Needs Plans [SNPs], all Program of All-Inclusive Care for the Elderly [PACE] plans, and all Medicare–Medicaid Plans) did not have OOPC information, likely due to limited or zero cost sharing. For these plans, we assigned \$0 as the average monthly OOPC and created a binary indicator where cost was missing and imputed.

We then examined plan star rating from the MA Quality Bonus Program.³² Higher star ratings are associated with improved quality of care for enrollees.¹⁴ We used Parts C and D overall star rating for

MA prescription drug plans and Part C star rating for MA only plans calculated at the contract (i.e., a set of plans across regions and with varying benefit packages) level.³³ In 2018, the star rating system incorporates 34 Part C measures and 14 Part D measures across various domains including staying healthy (e.g., screenings, tests, and vaccines), managing chronic conditions (e.g., medication review, pain assessment, transition of care), drug safety and price accuracy, member experience (e.g., getting appointments and care quickly), complaints, and customer services. Star ratings range from 2 to 5 stars in 0.5-star increments; we categorized them as 2 to 2.5, 3 to 3.5, 4 to 4.5, 5, with a separate category for unrated plans because they were too new or too small.^{12,13}

We further examined plan type: Health Maintenance Organization (HMO), local Preferred Provider Organization (PPO), regional PPO, private FFS, and plans classified as other: 1876 cost plans (in which traditional FFS Medicare pays for care outside the network), PACE, Medicare–Medicaid Plans (providing coordinated Medicare and Medicaid benefits for dually eligible individuals), and provider-sponsored organizations (operated by a group of physicians and hospitals). Different types of plans vary in care delivery such as provider networks, premiums, cost-sharing, and specialist referral requirements. We also included an indicator for whether a plan was a SNP, a coordinated care plan designed for individuals with special care needs and offering additional care management, including Dual Eligible Special Needs Plan (D-SNP) for dually eligible individuals; Chronic Condition Special Needs Plan for individuals with disabling chronic conditions such as diabetes, heart disease, and dementia; and Institutional Special Needs Plan for institutionalized individuals. A SNP could be any plan type, for example, HMO or PPO.

We also examined whether the plan included Part D prescription drug benefits and the market share of the MA plan in the county (i.e., proportion of all MA enrollees in the county enrolled in that plan).

2.3 | Respondent characteristics

We examined respondent demographic (sex, age, race, and ethnicity), socioeconomic (marital status, education, family income, Medicare and Medicaid dual eligibility, metropolitan statistical area), caregiving (living in a nursing home, household size, number of family and other unpaid caregivers), and health characteristics (functional and sensory impairment, comorbidities) and whether a proxy respondent was used from the selected HRS wave. We measured functional impairment based on self-reported difficulty with: (1) activities of daily living (0–6), including getting in or out of bed, walking across a room, bathing, dressing, eating, and toileting; and (2) instrumental activities of daily living (0–5), including shopping, preparing meals, using a telephone, handling banking, and managing medications in the month prior to the interview. Family and other unpaid caregivers include helpers related to respondents, such as spouse or adult children, as well as unrelated, unpaid helpers such as friends or neighbors who assisted with these functional tasks. Hearing or vision impairment were considered

present if respondents answered “fair” or “poor” (vs. “good,” “very good,” or “excellent”) to questions about their hearing or eyesight. We examined self-reported comorbidities (heart disease, diabetes, lung disease, stroke, cancer, arthritis, psychiatric problems, hypertension, and depression).

2.4 | Statistical analysis

We first described characteristics of MA plans available to older adults with and without dementia (i.e., in their choice set) to test whether characteristics of the plans available to them differ systematically. Specifically, for each respondent, we began by calculating the unweighted average plan characteristics for all plans available in the county (e.g., the average proportion of available plans that are HMOs), and then calculated the weighted average plan characteristics across respondents with and without dementia, by applying the HRS analytic weights. We tested for differences in these average characteristics between the two groups using adjusted Wald tests. Next, we described characteristics of plans in which respondents with and without dementia actually enrolled and compared the differences between the two groups also using adjusted Wald tests.

We assume that individuals choose an MA plan based on characteristics of the plans available to them (i.e., in their choice set) and modeled the relationship using a McFadden conditional logit choice model.^{31,34,35} The conditional logit model estimates how product attributes affect an individual's choice of product, based on a theoretical model in which the attributes are assumed to determine the individual's utility.³⁶ In our model, respondent's choice of MA plan to enroll in is treated as a function of plan generosity, quality, and plan type (HMO, PPO, etc.). The conditional logit model has the advantage of being able to simultaneously account for the various competing characteristics (and their correlations) of all available plans in a beneficiary's choice set. Each respondent contributed as many observations as the number of plans available in their county; therefore, the number of records in the conditional logit model reflects the product of respondents and available county MA plans per respondent. The outcome was an indicator for whether the plan was selected by the respondent. Because the unit of analysis is the respondent, all respondent demographic, socioeconomic, caregiving, and health characteristics do not vary within the respondent and cannot be evaluated for their association with the plan choice.

The estimated conditional logit coefficients measure the association between each plan characteristic and the probability of plan selection: in effect, the importance of each characteristic as a determinant of plan choice. We stratified the model by dementia status to examine whether the importance of each plan characteristic as a determinant of plan choice differed between older adults with and without dementia. To test for the potential differential relationships in the associations between plan characteristics and plan enrollment for those with and without dementia, we pooled the data and assessed the interactions of dementia status with each plan characteristic in the conditional logit model.³⁴

We repeated the analyses stratified by dual eligibility status because D-SNPs are only available to dually eligible beneficiaries and some states have transitioned to default enrollment for D-SNPs for dually eligible beneficiaries.³⁷ We performed sensitivity analyses examining out-of-pocket premiums (Parts B, C, and D, if any) and medical care spending separately as premiums might be more salient in plan choices,^{17,18} and excluding SNPs, PACE, and Medicare–Medicaid Plans as these plans are only available to specific populations (e.g., dually eligible older adults) and might have \$0 or minimal cost sharing. Additional sensitivity analyses included: (1) stratifying by whether the respondent lived in the community or nursing home as care needs differ across residential settings;^{38,39} (2) limiting the sample to respondents continuously enrolled in MA during the survey year as those transitioning between FFS and MA might differ (e.g., individuals with dementia or functional impairment were more likely to switch from MA to FFS);^{5,30,40–42} (3) limiting the sample to unpartnered respondents as those partnered (i.e., married or long-term partnered) might follow their partner's enrollment choices;⁴³ (4) stratifying by whether having any family and other unpaid caregivers who might help with insurance decisions, particularly for those living with dementia; (5) using detailed cognitive categories (i.e., normal, cognitive impairment but no dementia, and dementia); and (6) using dementia diagnoses (self- or proxy-reported from HRS).

For all analyses, we used HRS analytic weights to account for differential probabilities of selection and non-response; we used STATA svy commands to incorporate strata and clustering elements of the sample design when calculating standard errors of the estimates. Statistical significance was set at two-tailed $p < 0.05$; analyses were performed using Stata v. 18.5.

3 | RESULTS

MA enrollees with dementia were older than those without dementia (81.1 vs. 73.7 years; Table 1), more likely to be non-Hispanic Black (23.0% vs. 10.4%), less likely to be married (34.6% vs. 56.1%), less educated (< 12 years of education: 52.4% vs. 23.0%), and more likely to be dually eligible (44.3% vs. 17.5%; $p < 0.001$ for all). They had more difficulty in activities of daily living (2.0 vs. 0.5) and instrumental activities of daily living (2.3 vs. 0.3), and greater comorbidity overall (3.4 vs. 2.8; $p < 0.001$ for all).

The average number of plans available to respondents with and without dementia (i.e., in their choice sets) was similar (33.1 vs. 33.9, $p = 0.42$; Table 2). Among plans available to respondents with and without dementia, there were relatively few differences in plan characteristics; there were more differences in the plans in which they enrolled, such as a greater proportion of SNPs among those with dementia compared to those without dementia (26.5% vs. 10.8%, $p < 0.001$) and a smaller proportion of 5-star rated plans (3.1% vs. 6.2%, $p < 0.001$).

Interaction terms from the conditional logit model showed that there were no differences in the effect of average monthly OOPC, star rating, and plan type (e.g., HMO, local PPO) on plan choice of respondents with dementia compared to those without dementia (Table 3).

TABLE 1 Characteristics of older adults with and without dementia.

Characteristics, No. (%)	Overall	Older adults with dementia	Older adults without dementia	<i>p</i>
Sample population ^a	4810 (100.0)	658 (11.0)	4152 (89.0)	
Demographics				
Female	2884 (57.1)	408 (61.0)	2476 (56.7)	0.11
Age, years (SD)	74.5 (8.4)	81.1 (10.4)	73.7 (7.7)	<0.001
65–74	2332 (57.0)	134 (25.0)	2198 (60.9)	<0.001
75–84	1780 (30.2)	277 (37.7)	1503 (29.2)	
85+	698 (12.9)	247 (37.3)	451 (9.9)	
Race and ethnicity				
Non-Hispanic White	2932 (71.8)	318 (55.4)	2614 (73.8)	<0.001
Non-Hispanic Black	931 (11.8)	195 (23.0)	736 (10.4)	
Hispanic	811 (12.9)	— ^b	675 (12.1)	
Other	136 (3.6)	— ^b	127 (3.8)	
Socioeconomic status				
Married	2542 (53.8)	246 (34.6)	2296 (56.1)	<0.001
Years of education, <i>n</i> (SD)	12.2 (3.6)	9.8 (4.6)	12.5 (3.3)	<0.001
< 12	1535 (26.2)	366 (52.4)	1169 (23.0)	<0.001
12	1592 (32.8)	181 (30.3)	1411 (33.1)	
13–15	961 (21.6)	75 (12.1)	886 (22.8)	
16+	722 (19.3)	36 (5.2)	686 (21.0)	
Total family income (\$), mean (SD)	\$52,864 (\$106,246)	\$25,626 (\$29,683)	\$56,227 (\$110,001)	<0.001
Quartile 1: \$0–17,447	1353 (25.0)	311 (48.3)	1042 (22.1)	<0.001
Quartile 2: \$17,448–30,835	1320 (25.0)	194 (27.7)	1126 (24.7)	
Quartile 3: \$30,836–56,201	1164 (25.0)	93 (15.3)	1071 (26.2)	
Quartile 4: \$56,202+	973 (25.0)	60 (8.8)	913 (27.0)	
Medicare and Medicaid dual eligibility	1169 (20.5)	294 (44.3)	875 (17.5)	<0.001
Metropolitan statistical area	4130 (85.4)	552 (83.1)	3578 (85.7)	0.18
Caregiving characteristics				
Living in the nursing home	200 (3.3)	143 (20.4)	57 (1.2)	<0.001
Household size, <i>n</i> (SD)	2.0 (1.2)	2.2 (1.7)	2.0 (1.2)	0.04
Number of family and other unpaid caregivers, <i>n</i> (SD)	0.3 (0.8)	1.0 (1.3)	0.2 (0.6)	<0.001
Health characteristics				
General health status				
Very good or excellent	1481 (33.9)	110 (16.8)	1371 (36.1)	<0.001
Good	1539 (32.3)	150 (23.3)	1389 (33.4)	
Poor or fair	1790 (33.7)	398 (60.0)	1392 (30.5)	
Functional and sensory limitations				
Activities of daily living (0–6), <i>n</i> (SD)	0.6 (1.4)	2.0 (2.6)	0.5 (1.1)	<0.001
Instrumental activities of daily living (0–5), <i>n</i> (SD)	0.5 (1.3)	2.3 (2.4)	0.3 (0.8)	<0.001
Hearing impairment	1375 (27.5)	253 (38.8)	1122 (26.1)	<0.001
Vision impairment	1504 (27.4)	308 (44.1)	1196 (25.3)	<0.001
Comorbidities				
Number of conditions (0–9), <i>n</i> (SD)	2.8 (1.7)	3.4 (1.9)	2.8 (1.7)	<0.001
Heart disease	1567 (31.5)	260 (36.3)	1307 (31.0)	0.049
Diabetes	1504 (29.9)	235 (33.5)	1269 (29.4)	0.06

(Continues)

TABLE 1 (Continued)

Characteristics, No. (%)	Overall	Older adults with dementia	Older adults without dementia	<i>p</i>
Lung disease	683 (14.1)	117 (17.6)	566 (13.7)	0.03
Stroke	686 (12.6)	201 (28.7)	485 (10.6)	<0.001
Cancer	926 (18.9)	157 (24.5)	769 (18.2)	0.005
Arthritis	3433 (70.4)	484 (74.2)	2949 (69.9)	0.046
Psychiatric problems	1030 (22.2)	194 (31.1)	836 (21.1)	<0.001
Hypertension	3468 (68.6)	525 (79.1)	2943 (67.3)	<0.001
Depression	753 (15.1)	113 (18.3)	640 (14.7)	0.051
Proxy respondent	352 (5.8)	255 (37.7)	97 (1.9)	<0.001

Notes: The study cohort is respondents aged ≥ 65 years from the 2010–2018 Health and Retirement Study (HRS) and enrolled in Medicare Advantage for at least 1 month during the survey year. Adjusted Wald tests (continuous characteristics) and Rao–Scott chi-square tests (categorical characteristics) were performed to compare Medicare Advantage enrollees with and without dementia. Data were weighted using HRS analytic weights; STATA svy commands were used to incorporate strata and clustering elements of the sample design when calculating standard errors of the estimates.

Abbreviation: SD, standard deviation.

^aMedicare Advantage enrollment rates were similar among older adults with and without dementia (36.6% vs. 36.0%, $p = 0.59$).

^bEstimates representing < 10 cases were suppressed, per the Centers for Medicare & Medicaid Services. For categorical variables with three or more groups, if the estimate for one group was suppressed, estimate for the group with the second lowest number of cases was also suppressed to avoid the derivation of suppressed estimates.

Across groups, the signs of estimates were largely as expected; for example, for both respondents with and without dementia, higher OOPC was negatively associated with choosing an MA plan. To facilitate interpretation, marginal probability changes of plan selection associated with each plan characteristic for respondents with dementia and those without dementia were calculated using estimates from the respective conditional logit models (Table S1 in supporting information). Higher star ratings of 3 to 3.5, 4 to 4.5, and 5 versus 2 to 2.5, in contrast, were each positively associated with choosing the plan in those without dementia, but no association was seen in those with dementia except a positive association of 4 to 4.5 versus 2 to 2.5-rated plans; although differences in the associations of star ratings and plan choice between those with versus without dementia were not statistically significant. While both groups responded positively to plans with larger market share, the effect was weaker among respondents with dementia relative to those without dementia (difference in log odds: -0.012 , $p = 0.04$).

Subgroup analysis stratified by dual eligibility showed results consistent with the main findings that there were no differences in determinants of plan choice between respondents with and without dementia except that among the dual eligible group, those with dementia were more likely to choose SNPs (difference in log odds: 0.804 , $p = 0.007$; Table 4).

Sensitivity analysis showed results consistent with the main findings that there were no differences in determinants of plan selection by respondents with and without dementia, regardless of respondents overall and by dual eligibility status, when examining out-of-pocket premiums and medical care spending separately or excluding SNPs, PACE, and Medicare–Medicaid Plans, among those living in the community, nursing home, continuously enrolled in MA, unpartnered, with or without any family and other unpaid caregivers, and using

detailed cognitive categories or dementia diagnoses (Tables S2–S11 in supporting information).

4 | DISCUSSION

This study provides the first nationally representative analysis of MA plan choice among older adults living with dementia, taking into account multiple plan attributes simultaneously. Overall, taking into account all plans available in the county, between 2010 and 2018, the determinants of MA plan choice are similar for older adults with and without dementia. These findings suggest that older adults with dementia may make similar insurance plan choices as those without dementia, which is important to understand given the growing popularity of managed Medicare in the United States. Whereas a prior study found that older adults with dementia were less responsive to the generosity of MA plans in the decision of whether to enroll in MA versus FFS,¹⁹ our findings showed that conditional on being enrolled in MA, older adults with versus without dementia were making similar insurance plan choices regarding out-of-pocket cost.

Despite the complexity of insurance plan choices and impaired decision-making capacity of older adults with dementia, we found that those who choose to enroll in MA are not making different plan choices relative to those without dementia. This may be because they receive help with plan choices from caregivers (e.g., spouse or adult children) or just follow their spouse's plan choices.⁴³ These findings suggest that it might be inappropriate to assume that older adults with dementia are incapable of making insurance enrollment decisions. It is important for providers (e.g., clinicians or billing department of a clinic or hospital) to discuss insurance plans with patients with dementia and caregivers assisting with insurance decisions.

TABLE 2 Plan characteristics of older adults with and without dementia: descriptive analysis.

	All plans available across all respondents' choice sets (each respondent counted once for each plan in their county)			Plans in which respondents enrolled (each respondent counted only once for their enrolled plan)		
	Older adults with dementia	Older adults without dementia	p^a	Older adults with dementia	Older adults without dementia	p^b
Observations (no. respondents x no. plans available per respondent)	22,345	144,927		—	—	
Unique respondents	658	4152		658	4152	
Number of plans in the county, mean (SD)	—	—	—	33.1 (29.2)	33.9 (24.3)	.42
Average monthly out-of-pocket cost (\$), mean (SD) ^c	\$412 (\$143)	\$366 (\$117)	<0.001	\$346 (\$284)	\$364 (\$172)	.12
Square term of average monthly out-of-pocket cost (\$), mean (SD)	\$230,101 (\$147,626)	\$178,939 (\$110,790)	<0.001	\$176,359 (\$242,527)	\$159,220 (\$138,495)	.07
Average monthly out-of-pocket cost is missing, % ^d	17.3	16.6	0.32	23.9	8.9	<0.001
Star rating, %						
Unrated	14.1	12.2	0.01	10.4	6.2	0.008
2–2.5	9.3	6.7	<0.001	7.0	4.4	0.047
3–3.5	43.4	41.5	0.08	41.9	38.4	0.16
4–4.5	30.5	35.5	<0.001	37.6	44.8	0.006
5	2.7	4.1	0.02	3.1	6.2	0.004
Plan type, %						
HMO	55.4	56.3	0.48	68.2	66.7	0.61
Local PPO	16.1	17.6	0.07	11.3	15.6	0.06
Regional PPO	13.8	11.9	0.055	9.5	8.5	0.50
Private fee-for-service	9.3	8.0	0.12	5.7	4.4	0.19
Other	5.4	6.2	0.17	5.3	4.8	0.71
Special Needs Plan, %	22.8	22.0	0.42	26.5	10.8	<0.001
Offering Part D prescription drug coverage, %	85.6	85.6	0.85	94.1	93.0	0.31
Market share of the plan in the county (%), mean (SD)	5.4 (6.4)	4.9 (4.8)	.08	14.1 (19.2)	16.4 (0.7)	0.007

Note: The study cohort is respondents aged ≥ 65 years from the 2010–2018 Health and Retirement Study (HRS) and enrolled in Medicare Advantage for at least 1 month during the survey year. For respondents who enrolled in multiple Medicare Advantage plans in a year, we assigned the plan for the respondent based on the most months of enrollment in that year. Data were weighted using HRS analytic weights; STATA svy commands were used to incorporate strata and clustering elements of the sample design when calculating standard errors of the estimates.

Abbreviations: HMO, Health Maintenance Organization; PPO, Preferred Provider Organization; SD, standard deviation.

^aWe examined the plan characteristics across respondents' choice sets (i.e., all plans available in their county) by first calculating the unweighted average plan characteristics for all plans available in the county for each Medicare Advantage enrollee (e.g., the proportion of plans available in each enrollee's county that is an HMO), and then calculating the weighted average plan characteristics for those with and without dementia by applying the respondent-level HRS analytic weights (e.g., the average proportion of plans available in their county that is an HMO among older adults with and without dementia was 55.4% and 56.3%, respectively [$p = 0.48$]). We tested for differences in these average plan characteristics between older adults with and without dementia using adjusted Wald tests.

^bWe used adjusted Wald tests to compare the distribution of each plan characteristic (categorical or continuous) for plans in which older adults with and without dementia enrolled.

^cBased on each respondent's self-reported general health status (i.e., excellent, very good, good, fair, poor), we obtained the average monthly out-of-pocket cost for the plan in which they enrolled and all other plans available to them in the county for a standard population with similar health status in that plan. For example, if a respondent's general health status is "very good," we obtained the average monthly out-of-pocket cost for the plans (in which they enrolled or available to them) for a standard population with general health status of "very good" in that plan. Because older adults with dementia compared to those without dementia generally had worse health status, the plans available in their county demonstrated higher average monthly out-of-pocket cost (\$412 vs. \$366, $p < 0.001$).

^dAverage monthly out-of-pocket is missing and assigned as \$0 for the majority of Special Needs Plans, all Program of All-Inclusive Care for the Elderly plans, and all Medicare–Medicaid Plans.

TABLE 3 Determinants of plan choice of older adults with and without dementia: conditional logit model, log-odds coefficient (SE).

	Dementia status		Difference
	With dementia	Without dementia	
Observations (no. respondents x no. plans available per respondent)	22,345	144,927	167,272
Unique respondents	658	4,152	4,810
Average monthly out-of-pocket cost (in \$100)	−0.714*** (0.188)	−0.629*** (0.094)	−0.086 (0.220)
Square term of average monthly out-of-pocket cost (in \$100)	0.047** (0.015)	0.030** (0.009)	0.017 (0.019)
Average monthly out-of-pocket cost is missing ^a	−1.390* (0.526)	−1.808*** (0.249)	0.418 (0.579)
Star rating (reference: 2–2.5):	0.078	−0.034	0.112
Unrated	(0.215)	(0.147)	(0.222)
3–3.5	0.180 (0.191)	0.297** (0.103)	−0.117 (0.217)
4–4.5	0.478* (0.233)	0.510*** (0.121)	−0.032 (0.244)
5	0.272 (0.416)	0.714*** (0.168)	−0.441 (0.480)
Plan type (reference: HMO):	−0.268	0.011	−0.280
Local PPO	(0.265)	(0.070)	(0.283)
Regional PPO	−0.086 (0.228)	0.134 (0.102)	−0.220 (0.201)
Private fee-for-service	0.003 (0.269)	−0.005 (0.144)	0.008 (0.271)
Other	−0.041 (0.315)	−0.125 (0.187)	0.085 (0.322)
Special Needs Plan	−0.122 (0.206)	−0.739*** (0.106)	0.617** (0.219)
Offering Part D prescription drug coverage	0.442 (0.226)	−0.037 (0.102)	0.480 (0.244)
Market share of the plan in the county	0.070*** (0.005)	0.082*** (0.003)	−0.012* (0.006)

Note: The study cohort is respondents aged ≥ 65 years from the 2010–2018 Health and Retirement Study (HRS) and enrolled in Medicare Advantage for at least 1 month during the survey year. For respondents who enrolled in multiple Medicare Advantage plans in a year, we assigned the plan for the respondent based on the most months of enrollment in that year. We used conditional logit regression to examine how characteristics of Medicare Advantage plans affect the choice of plan by older adults, taking into account characteristics of all plans available in the county. We stratified the models by dementia status to examine whether the association of each plan characteristic and plan selection differed between older adults with and without dementia. We tested for the differences by pooling the data and including an interaction term between dementia status and each plan characteristic. Data were weighted using HRS analytic weights; STATA svy commands were used to incorporate strata and clustering elements of the sample design when calculating standard errors of the estimates. Log-odds coefficients and standard errors in parentheses were reported.

Abbreviations: HMO, Health Maintenance Organization; PPO, Preferred Provider Organization; SE, standard error.

^a Average monthly out-of-pocket is missing and assigned as \$0 for the majority of Special Needs Plans, all Program of All-Inclusive Care for the Elderly plans, and all Medicare–Medicaid Plans.

*** $p < 0.001$.

** $p < 0.01$.

* $p < 0.05$.

TABLE 4 Determinants of plan choice of older adults with and without dementia: by Medicare and Medicaid dual eligibility status, conditional logit model, log-odds coefficient (SE).

	Non-dually eligible older adults			Dually eligible older adults		
	Dementia status		Difference	Dementia status		Difference
	With dementia	Without dementia		With dementia	Without dementia	
Observations (No. respondents X No. plans available per respondent)	11,792	111,757	123,549	10,553	33,170	43,723
Unique respondents	364	3277	3641	294	875	1169
Average monthly out-of-pocket cost (in \$100)	−0.642** (0.212)	−0.656*** (0.110)	0.013 (0.245)	−0.492 (0.284)	−0.346 (0.242)	−0.147 (0.349)
Square term of average monthly out-of-pocket cost (in \$100)	0.042** (0.015)	0.037*** (0.010)	0.005 (0.020)	0.027 (0.026)	0.010 (0.024)	0.017 (0.035)
Average monthly out-of-pocket cost is missing ^a	−4.369*** (0.792)	−4.557*** (0.380)	0.188 (0.885)	−0.464 (0.688)	0.325 (0.623)	−0.789 (0.850)
Star rating (reference: 2–2.5): Unrated	−0.506 (0.288)	−0.013 (0.171)	−0.493 (0.305)	0.400 (0.309)	0.348 (0.263)	0.053 (0.368)
3–3.5	0.263 (0.238)	0.316* (0.134)	−0.053 (0.268)	0.143 (0.273)	0.195 (0.194)	−0.051 (0.320)
4–4.5	0.434 (0.287)	0.529** (0.154)	−0.095 (0.298)	0.581 (0.347)	0.461 (0.248)	0.120 (0.469)
5	0.265 (0.421)	0.759*** (0.210)	−0.494 (0.463)	0.270 (0.821)	−0.242 (0.361)	0.512 (0.968)
Plan type (reference: HMO): Local PPO	−0.401 (0.268)	0.054 (0.080)	−0.455 (0.290)	−0.225 (0.457)	−0.427 (0.258)	0.202 (0.578)
Regional PPO	−0.435 (0.306)	0.123 (0.109)	−0.558 (0.305)	0.080 (0.338)	0.082 (0.169)	−0.002 (0.349)
Private fee-for-service	0.099 (0.341)	−0.059 (0.154)	0.158 (0.377)	−0.016 (0.553)	0.111 (0.357)	−0.127 (0.522)
Other	−1.565* (0.710)	0.294 (0.195)	−1.858** (0.669)	0.937** (0.316)	−0.346 (0.419)	1.284* (0.516)
Special Needs Plan	−0.815* (0.336)	−1.265*** (0.161)	0.450 (0.347)	1.034*** (0.224)	0.230 (0.204)	0.804** (0.288)
Offering Part D prescription drug coverage	0.145 (0.264)	−0.026 (0.113)	0.170 (0.287)	1.487* (0.562)	1.343*** (0.342)	0.143 (0.587)
Market share of the plan in the county	0.069*** (0.006)	0.082*** (0.003)	−0.013 (0.007)	0.076*** (0.010)	0.090*** (0.007)	−0.013 (0.010)

Note: The study cohort is respondents aged ≥ 65 years from the 2010–2018 Health and Retirement Study (HRS) and enrolled in Medicare Advantage for at least 1 month during the survey year. For respondents who enrolled in multiple Medicare Advantage plans in a year, we assigned the plan for the respondent based on the most months of enrollment in that year. We used conditional logit regression to examine how characteristics of Medicare Advantage plans affect the choice of plan by older adults, taking into account characteristics of all plans available in the county. We ran the models separately in subgroups of those with Medicare and Medicaid dual eligibility and of those without dual eligibility. Within each dual eligibility group, we stratified the models by dementia status to examine whether the association of each plan characteristic and plan selection differed between those with and without dementia. We tested for the differences by pooling the data and including an interaction term between dementia status and each plan characteristic. Data were weighted using HRS analytic weights; STATA svy commands were used to incorporate strata and clustering elements of the sample design when calculating standard errors of the estimates. Log-odds coefficients and standard errors in parentheses were reported.

Abbreviations: HMO, Health Maintenance Organization; PPO, Preferred Provider Organization; SE, standard error.

^aAverage monthly out-of-pocket is missing and assigned as \$0 for the majority of Special Needs Plans, all Program of All-Inclusive Care for the Elderly plans, and all Medicare–Medicaid Plans.

*** $p < 0.001$.

** $p < 0.01$.

* $p < 0.05$.

Another question is whether older adults with dementia *should* make different plan choices compared to those without dementia, given their complex health-care needs. For example, ideally, they might benefit in the long run by choosing a plan with a broader provider network, higher quality, and lower out-of-pocket cost compared to their counterparts with fewer care needs. However, we did not find significant differences in plan choices among older adults with and without dementia regarding average monthly OOPC, star rating, and plan type, conditional on being enrolled in MA. We did find that dually eligible older adults with dementia were more likely to choose SNPs than those without dementia, possibly because SNPs may offer better care for this vulnerable population (e.g., more home and community-based services).^{44,45} Recent evidence found that older adults with dementia were more likely to disenroll from MA to FFS,^{5,30} which might suggest that these MA plans did not meet their health-care needs.

This study has several limitations. First, our model does not shed light on how other individual characteristics such as sex affect plan choice because the conditional logit model only estimates the effect of *plan* attributes on choice. Second, due to the small sample size, we cannot distinguish older adults who were first-time or existing MA enrollees who might have different insurance decision-making patterns. Third, this study examined how plan characteristics impact plan choices conditional on MA enrollment, without nesting this decision in the choice of MA versus FFS (alone or with Medigap, Part D, or other supplemental coverage). Fourth, because our most recent data were from 2018, we were unable to test the importance of new plan features resulting from recent policy changes such as the 2018 Creating High-Quality Results and Outcomes Necessary to Improve Chronic Care Act that gave MA plans more flexibility to offer supplemental non-medical benefits, such as caregiver and in-home personal aide support. Due to data limitation, we were also unable to test the importance of other plan characteristics, such as provider network breadth. Fifth, HRS lacks clinical information about whether caregivers or proxies of older adults with dementia made the choice of MA plan or engaged in discussions with health-care providers about insurance options and quality markers of the MA plan such as star ratings. Sixth, our assessment of dementia status using the Langa-Weir Classification of Cognitive Function may subject to misclassification bias.

Ultimately, we know very little about how older adults with dementia or their caregivers make health insurance choices, such as what information they have, what tools they use, whether they compare plans, and what characteristics of plans they value, nor do we know how the selection of different MA plans may impact quality of care (e.g., satisfaction with care, access to care), health-care use (e.g., hospitalization, skilled nursing care), and health outcomes (e.g., new functional disabilities) among older adults with dementia. Given the continued popularity and growth of MA plans in the United States and the associated costs involved for both beneficiaries and the federal government,^{4,46-48} it is vitally important to further understand the MA insurance plan decision-making process among older adults with dementia and their caregivers and how these decisions impact their quality of care and health-care outcomes. Older adults with dementia and their caregivers

may benefit from unique decision-making supports to help navigate the complex insurance choices to make the appropriate plan choice based on their health-care needs.

AUTHOR CONTRIBUTIONS

Study concept and design: Lei, Ankuda, Kim, Maust, and Levy. Acquisition, analysis, or interpretation of data: all authors. Drafting of the manuscript: Lei, Maust, and Levy. Critical revision of the manuscript for important intellectual content: all authors. Approval of the submitted version: all authors.

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CONFLICT OF INTEREST STATEMENT

All the authors declare no conflicts of interest. Author disclosures are available in the [supporting information](#).

DATA AVAILABILITY STATEMENT

Data from the Health and Retirement Study are publicly available via its online platform. MA plan characteristics are also publicly available via the Centers for Medicare & Medicaid Services website. Medicare Beneficiary Summary Files are under a restricted Data Use Agreement with the National Institute on Aging that does not permit data sharing.

ETHICS STATEMENT

Michigan Medicine Institutional Review Board approved this study.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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