Inclusion of ADRD Hierarchical Condition Category in Medicare Advantage Risk Adjustment Model and Health Care Experiences

Wei Fu,[1] Seyed Karimi,[1] Hamid Zarei,[1] Xi Chen[2, 3*]

[1] Department of Health Management and Systems Sciences, University of Louisville, KY, U.S.

[2] Department of Health Policy and Management, Yale University, CT, U.S.

3 Department of Economics, Yale University, CT, U.S.

[*] Corresponding author, email: xi.chen@yale.edu

Abstract

Accounting for the full complexity and costs of high-need populations in the risk-adjusted payment model for Medicare Advantage (MA) plans may address financial disincentives, promote investment in comprehensive care for beneficiaries, and narrow health disparities. This study evaluates the effect of including Alzheimer's Disease and Related Dementias (ADRD) hierarchical condition category (HCC) into MA risk-adjusted capitated payment model in 2020 on care access, affordability, and quality for beneficiaries with ADRD. We use the sample of MA beneficiaries from the Medicare Current Beneficiary Survey (2015–2022), and beneficiaries are stratified into treatment and control groups based on ADRD diagnosis, we show that reintroducing ADRD HCCs is associated with improved health care access and reduced financial strain among MA beneficiaries with ADRD. The association between the revised payment model and satisfaction with access to specialists is marginally significant. No significant association, however, is observed for the satisfaction with the overall quality of care. These findings suggest that refining the risk adjustment model to capture chronic and complex condition costs may better align MA plan incentives with vulnerable populations' needs. These findings offer insights for ADRD as well as for other chronic conditions that could benefit from more nuanced risk adjustment. Estimates from key placebo tests and robustness checks, which assess the reliability of research findings under different conditions, strengthen the argument that the identified effects are most likely causal.

Introduction

Alzheimer's Disease and Related Dementias (ADRD) are among the leading causes of disability and dependence among older adults, affecting approximately 6.9 million individuals in the United States, placing a substantial burden on patients, caregivers, and healthcare system, with annual costs exceeding $300 billion in 2024.[1] Medicare Advantage (MA) plans, which now enroll over half of all Medicare beneficiaries,[2] offers a unique approach to address the needs of this vulnerable population through enhanced care management programs. About one third of Medicare-eligible beneficiaries with ADRD in 2018 enrolled in a MA plan, increasing from 22% in 2013.[2] However, MA plans historically faced challenges in providing equitable and high-quality care for ADRD beneficiaries.[2–7]

Different from traditional Medicare (TM), the risk adjustment model used by the Centers for Medicare & Medicaid Services (CMS) plays a critical role in incentivizing MA plans to deliver care tailored to beneficiaries' health needs. MA plans are privately operated and receive prospective, capitated payments from CMS to finance and deliver healthcare services. The capitated payment is predicted through a risk adjustment model that accounts for a beneficiary's demographics and a selected set of Hierarchical Condition Categories (HCCs). From 2014 to 2020, ADRD diagnoses were excluded from the risk adjustment model due to concerns about coding and auditing claims accuracy.[8] As insurers bear increasing financial risks, for beneficiaries with HCCs not incorporated in the risk-adjusted payment model, the capitated payments may incentivize insurers to manage these beneficiaries' medical costs by providing insufficient coverage, restricting physician networks, or requiring prior authorization for care.[9]

In 2020, CMS reinstated ADRD in the risk-adjusted payment model, marking a significant policy shift. This decision offers a unique opportunity to examine the association between the new risk-adjusted payment model and ADRD beneficiaries' care experiences. Recent studies have found a significant increase in the ADRD diagnosis rate among MA beneficiaries after this payment model change.[2,8,10] However, there remains limited empirical evidence on the broader implications of this payment model change for care access, affordability, and quality among ADRD beneficiaries.

Data and Methods

We use the CMS Medicare Current Beneficiary Survey (MCBS) Public Use Files from 2015 to 2022. The targeted population of MCBS survey consists of both TM and MA beneficiaries aged 65 and over and beneficiaries under 65 with certain disabling conditions living in the continental United States. MCBS provides rich information on beneficiaries' care experiences related to access to services and the obstacles encountered.

Our sample comprises beneficiaries in any MA plan who have ever been diagnosed with ADRD, stroke/brain hemorrhage, complete/partial paralysis or Parkinson's diseases. To account for plan-switching

behavior between MA and TM following the inclusion of ADRD in the risk adjustment model in 2020, we exclude beneficiaries with only partial MA enrollment in the past year at the time of the survey. Additionally, veterans are excluded. This results in a sample of 5,353 MA beneficiaries with non-missing values for covariates (See Figure 1 for data process flow).

Variables

We use information regarding MA plan enrollment to define MA status. To assess the beneficiary's health conditions, we use information regarding whether a doctor or other health professional had ever diagnosed an individual with conditions such as ADRD, stroke or brain hemorrhage, complete or partial paralysis, Parkinson's disease, or other related conditions. Due to data limitations, we are unable to ascertain the diagnosis time and the initial MA enrollment time; we further discuss how these constraints may affect our estimates in the Discussion section.

We use two binary variables to measure beneficiaries' care experiences: whether they reported fewer difficulties in accessing needed care and whether they experienced fewer challenges in paying medical bills (only available since 2017). Additionally, we use two binary variables to assess beneficiaries' satisfaction with care: satisfaction with access to specialists and one measure specific to the previous year: satisfaction with the quality of care.

The covariates, listed in Table 1, include demographic information – such as age, marital status, race/ethnicity, sex, education, and household size – as well as health measures such as BMI, functional limitations, and number of chronic conditions.

Statistical Analysis

We employ a Difference-in-Differences (DID) model to compare care experiences between a treatment and a control group before and after the inclusion of ADRD HCCs within the MA risk adjustment model in 2020 (see Appendix B.1 for details). The treatment group consists of MA enrollees with ADRD, while the control group comprises MA enrollees without ADRD but with stroke/brain hemorrhage, complete/partial paralysis, or Parkinson's diseases. This selection is based on the observation that individuals with these conditions, like those with ADRD, frequently consult neurologists, ensuring greater comparability in healthcare utilization patterns. We adjust the model by interacting the covariates listed in Table 1 with year and self-reported indicator, respectively, to mitigate biases arising from contemporaneous events, such as the onset of COVID-19, as well as measurement error in self-reported care experiences among ADRD beneficiaries. All analyses use heteroskedasticity-robust standard errors, and we conduct robustness checks using balanced repeated replications for standard errors estimation.

We further conduct an event study analysis in the same framework as the DID model, with details provided in Appendix B.3. We use 2019 as the reference year—the last year before implementing the new

risk adjustment model. This analysis serves two key purposes: first, to provide suggestive evidence for the parallel-trends assumption of the DID model; second, to examine the temporal dynamics of the association following the new payment model.

We conduct a series of placebo tests within the DID framework (see Appendix B.2 for details). One illustrative placebo test designates a placebo treatment group, consisting of MA enrollees diagnosed with diabetes but not ADRD, and a control group comprising MA enrollees without either condition. We anticipate that the 2020 revised risk-adjusted payment model is not statistically associated with improvements in their care experiences. These tests also help ensure that our findings are not confounded by concurrent shocks or self-reporting bias. We extend this approach to additional placebo tests, each using a distinct placebo treatment group based on a different health condition, including hypertension, myocardial infarction (MI)/heart attack, and stroke, among others.

Another placebo test replicates the baseline DID design in a sample of TM beneficiaries. The placebo treatment group includes TM beneficiaries with ADRD, and the placebo control group comprises TM beneficiaries without ADRD but with stroke/brain hemorrhage, complete/partial paralysis, or Parkinson's diseases.

Study Results

Sample Characteristics

In Table 1, among the 5,353 MA beneficiaries in our sample, 1,629 (30.4%) have been diagnosed with ADRD, while the remaining 3,724 have a stroke, paralysis, or Parkinson's disease. Approximately 18.4% of the sample is under 65, and a significant proportion (58.4%) is 75 or older. The racial composition is predominantly non-Hispanic white (61.7%), followed by Hispanic beneficiaries (16.6%) and black beneficiaries (15.7%). About one third are male or married with a spouse present. Over half have attained no more than high school education. Approximately 73% live with functional limitations (at least one IADL or ADL) and about 88% have more than two chronic conditions.

The sample size varies across care experience outcomes due to missing values in the corresponding measures. About 90% of the sample report having less trouble accessing needed care, while about 76% reported fewer difficulties paying medical bills. A significant majority (over 90%) express satisfaction with access to specialists or the quality of care.

Figure 2 exhibits trends in each care experience outcomes in our treatment and control groups, from 2015 to 2022. Since 2020, a notable increase is observed in the proportion of ADRD beneficiaries reporting fewer barriers to accessing needed healthcare (top left) and fewer financial problems related to medical bills

(top right) compared to the control group. However, the differences in satisfaction with access to specialists (bottom left) or the quality of care (bottom right) between the two groups remain relatively small until 2022.

Association Between MA Risk Adjustment Model Change and Health Care Experiences

Figure 3 shows improved care experiences following the inclusion of ADRD in the risk-adjusted payment model. The revised risk-adjusted payment model is associated with a 6.6 percentage-point increase in reporting less trouble accessing needed care (95% CI, 0.02 to 0.11; P = 0.005), and a 9.2 percentage-point increase in reporting fewer financial problems paying medical bills (95% CI, 0.02 to 0.16; P = 0.009) among MA beneficiaries with ADRD. The association between the revised payment model and the satisfaction with improved access to specialists is marginally significant, with a coefficient of 4.0 percentage points (95% CI, -0.005 to 0.084; P = 0.083). However, no significant association is observed for satisfaction with the overall quality of care (coefficient, -0.014; 95% CI, -0.056 to 0.029; P = 0.526).

Figure 4 displays the dynamic association from 2015 to 2022 from the event study analysis, with the year of 2019 serving as the reference year. The positive association coefficients and the steady upturn pattern in the period after 2019 reassure that the new risk adjustment model in 2020 is associated with a discernible reduction in troubles in getting needed care (top left: coefficient, 0.048; 95% CI, -0.033 to 0.129 in 2020; coefficient, 0.099; 95% CI, 0.016 to 0.181 in 2021, coefficient, 0.091; 95% CI, -0.001 to 0.183 in 2022 in Table A1) and alleviated financial stress in paying medical bills (top right: coefficient, 0.097; 95% CI, -0.017 to 0.212 in 2020; coefficient, 0.103; 95% CI, -0.007 to 0.214 in 2021, coefficient, 0.117; 95% CI, -0.002 to 0.237 in 2022 in Table A1) among MA beneficiaries with ADRD. Moreover, the stability and insignificance of the coefficients preceding the revised payment model in the top panels, being negative or hovering near zero, lends credibility to the underlying parallel-trends assumption for our DID model. The positive association between the 2020 revised payment model and beneficiaries' satisfaction with access to specialists is relatively weak in 2020 and the subsequent years, although the magnitude of the association shows an increasing trend over time (bottom left). Conversely, the revised payment model demonstrates no significant correlation with beneficiaries' satisfaction regarding the overall quality of care in any single year from 2015 to 2022, further reassuring the null association depicted in Figure 3.

We perform several robustness tests to ensure the reliability of our results. First, our findings remain consistent when standard errors are calculated using balance repeated replications (BRR) methods based on the survey weights (Figure A1). Second, recognizing the potential cognitive challenges faced by MA beneficiaries with ADRD during self-reported interviews, we exclude self-respondents with ADRD, and our results remain robust (Figure A2). To mitigate the potential bias due to plan-switching behavior, we restrict our analysis in beneficiaries with at least 3 years in current MA plan. The results are unchanged (Figure A3). Excluding beneficiaries under 65 does not change our estimates notably (Figure A4). Our

results also remain consistent when using an alternative control group comprising MA beneficiaries without ADRD but with various chronic conditions, including but not limited to stroke, brain hemorrhage, complete or partial paralysis, or Parkinson's disease (Figure A5).

In Figure A6, each association coefficient is estimated from a specific placebo test, with the placebo treatment group specified along the horizontal axis. Notably, most coefficients from placebo treatment groups, including non-ADRD beneficiaries with stroke/brain hemorrhage, hypertension, myocardial infarction, cancer, and osteoarthritis, show no significant associations between the revised payment model and any of the care experience measures. These findings further strengthen the validity of our baseline results, suggesting that the observed associations are unlikely to be driven by unobserved confounders.

In Figure A7, we perform another placebo test by comparing TM beneficiaries with ADRD to TM beneficiaries without ADRD but with stroke, paralysis, or Parkinson's disease. The associations between the inclusion of ADRD in the MA risk adjustment model and each care experience measure are not statistically significant.

Stratification analyses by beneficiaries' characteristics are presented in Figure A8. Among beneficiaries with incomes above 200% of the federal poverty level (FPL), inclusion of ADRD is significantly associated with reduced trouble getting needed care (coefficient, 0.096; 95% CI, 0.001-0.19), while those below 200% FPL show improvements in both reduced trouble getting needed care (coefficient, 0.084; 95% CI, 0.021-0.148) and fewer problems paying medical bills (coefficient, 0.131; 95% CI, 0.044-0.219). Non-White beneficiaries experience stronger associations for reduced problems paying medical bills (coefficient, 0.142; 95% CI, 0.024-0.259), whereas White beneficiaries see modest improvements in reduced trouble getting needed care (coefficient, 0.056; 95% CI, -0.002 to 0.114).

By educational attainment, significant improvements in access to care (coefficient, 0.103; 95% CI, 0.011-0.195) and fewer problems paying medical bills (coefficient, 0.138; 95% CI, -0.003 to 0.279) are observed among those with at least a high school degree, but no significant associations are detected among those with lower educational attainment. Lastly, beneficiaries residing in metropolitan areas experience notable improvements in reduced trouble getting needed care (coefficient, 0.065; 95% CI, 0.016-0.114) and satisfaction with access to specialists (coefficient, 0.06; 95% CI, 0.012-0.109), while no significant associations are observed for non-metropolitan residents, though signs suggest potential benefits.

Discussion

Since its introduction in 2004, the HCC-based risk adjustment model has undergone periodic revisions by CMS to enhance payment fairness and sustainability. Although previous studies have mainly demonstrated that the risk-adjusted payments can manage overall medical costs,[11–13] there is still a gap in understanding

how a condition-specific change, especially the care-intensive conditions, in an HCC-based risk adjustment model incentivizes appropriate care delivery.

Failing to account for the full complexity and costs of high-need populations in the risk-adjusted payment model may under-reimburse the high costs associated with managing these conditions[3,5,9,11], therefore creating financial disincentives for plans to invest in comprehensive care for affected beneficiaries, for instance, dropping high-cost beneficiaries,[3,11] providing narrow provider network,[14,15] and requiring prior-authorization[16,17]. Consequently, existing studies using data prior to 2020 have found large health gaps in ADRD beneficiaries in MA plans before the reintroduction of ADRD into the risk-adjustment model.[6,7,18] Compared to TM, the diagnosed dementia rates in MA are notably lower than TM,[19] suggesting a potential under-diagnosis of ADRD in MA. This underdiagnosis further delays access to appropriate interventions, exacerbating gaps in care quality and outcomes. Moreover, ADRD beneficiaries enrolled in MA have a substantial high rate of leaving MA and joining TM, especially for those experiencing a great demand for post-acute hospitalization, home care, and long-term nursing home care in the previous year.[2–5,7] High-cost MA beneficiaries, including ADRD patients, also have a larger likelihood of entering into low-quality nursing homes compared to their TM counterpart.[18]

Our study uses the 2020 reintroduction of ADRD HCC into the payment model as a pertinent case study to provide insights into the underlying recalibration of the risk-adjustment formula. We find that the 2020 reintroduction of ADRD HCCs is associated with improved care access and reduced financial strain among MA beneficiaries with ADRD. These improvements suggest that updating the risk adjustment model to better reflect the costs of chronic and complex conditions can help realign MA plan incentives with the needs of vulnerable populations. These findings provide a timely assessment on this condition-specific risk adjustment change, inform CMS's ongoing refinement of risk-adjusted payment models, and offer insights not only for ADRD but also for other chronic and complex conditions that could benefit from more nuanced risk adjustment.

Despite these promising results, our study also identifies several areas of concern. For instance, the improvements in access to specialists and overall care quality are limited after the reintroduction of ADRD into risk adjustment, and benefits are more pronounced among urban and highly educated populations than among rural or less-educated groups. These gaps indicate that while the policy change represents progress, it does not fully overcome systemic barriers to high-quality and comprehensive care for all ADRD beneficiaries. Policymakers should consider complementary strategies—such as enhanced care coordination, expanded provider networks, and ADRD-specific quality metrics (e.g., caregiver support and dementia care training)—to further incentivize high-quality and comprehensive care, specifically for beneficiaries in under-served contexts.

We also acknowledge the need to monitor the unintended consequences of risk adjustment reforms. While the inclusion of ADRD HCCs addresses under-compensation for this population, it is essential to ensure that this adjustment does not inadvertently lead to cost-shifting or restricted benefits in other areas. Policymakers should consider periodic reviews of risk adjustment models to avoid up-coding and over-diagnosis,[8,10,13] ensuring a balance of financial sustainability and equity in care delivery.

Several tests help ensure the robustness of our conclusions. Notably, recent studies have identified plan-switching behavior potentially driven by changes in risk adjustment,[2,8,10] which could bias our estimates. To mitigate this concern, we limit our analysis to individuals who have enrolled in their current MA plan for at least three years, and our findings remain consistent. Additionally, to assess potential confounding, we replicate our analyses among TM beneficiaries as a placebo test and find no notable associations. In another series of placebo tests, we use beneficiaries with non-ADRD conditions as the placebo treatment group and do not observe results similar to those in our baseline analysis, suggesting our associations are not primarily driven by systematic changes in the MA payment model but rather by the inclusion of ADRD HCCs in the risk-adjustment model.

Limitations

Our analysis has some limitations. First, we cannot directly observe enrollment and diagnosis timing, which limits our ability to address the potential compositional changes in treatment group – specifically, an increasing rate of dementia diagnoses in MA beneficiaries who are Hispanic or Black, dual-eligible, or received low-income subsidies following the 2020 payment model change.[8,10] Because these groups are more likely to face access and payment challenges, their increased representation in the post-2020 treatment group may lead to an underestimation in our estimates. Second, our estimates represent average associations across beneficiaries with varying levels of disease severity. Future research using individual longitudinal data to track within-person changes over time would provide more robust evidence, overcoming the lack of unique individual identifiers in MCBS public use files.

Moreover, caution should be warranted when interpretating care experience measures. The satisfaction metrics, such as access to specialists and quality of care, are self-reported and may be subject to response bias. Furthermore, our satisfaction metrics are general, rather than specifically tailored to ADRD care, they may introduce noises that mask the true associations.

Lastly, we do not account for the cost of overdiagnosis, a potential consequence of the risk-adjusted payment model change.[8] Thus, our study may not fully capture the broader impact of risk adjustment on both access to care and quality of care.

Conclusions

Amid the growing aging population and the rising burden of ADRD, the findings of this study provide insights into the importance of refining risk adjustment models to better capture both clinical and social complexities. Expanding the scope of risk adjustment to include social determinants of health, such as caregiver burden, socioeconomic status, or access to community resources, may provide a more holistic approach to mitigating gaps and ensuring equitable care for ADRD patients and their families.

References

1. 2024 Alzheimer's disease facts and figures. *Alzheimers Dement*. 2024;20(5):3708-3821. doi:10.1002/alz.13809

2. James HO, Trivedi AN, Meyers DJ. Medicare Advantage Enrollment and Disenrollment Among Persons With Alzheimer Disease and Related Dementias. *JAMA Health Forum*. 2023;4(9):e233080. doi:10.1001/jamahealthforum.2023.3080

3. 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

4. Jutkowitz E, Bynum JPW, Mitchell SL, et al. Diagnosed prevalence of Alzheimer's disease and related dementias in Medicare Advantage plans. *Alzheimers Dement Diagn Assess Dis Monit*. 2020;12(1). doi:10.1002/dad2.12048

5. Meyers DJ, Rahman M, Rivera-Hernandez M, Trivedi AN, Mor V. Plan switching among Medicare Advantage beneficiaries with Alzheimer's disease and other dementias. *Alzheimers Dement Transl Res Clin Interv*. 2021;7(1):e12150. doi:10.1002/trc2.12150

6. Meyers DJ, Rivera-Hernandez M, Kim D, Keohane LM, Mor V, Trivedi AN. Comparing the care experiences of Medicare Advantage beneficiaries with and without Alzheimer's disease and related dementias. *J Am Geriatr Soc*. 2022;70(8):2344-2353. doi:10.1111/jgs.17817

7. Kim D, Meyers DJ, Keohane LM, Varma H, Achola EM, Trivedi AN. Medicare Advantage enrollment and outcomes of post-acute nursing home care among patients with dementia. *Health Aff Sch*. 2024;2(6):qxae084. doi:10.1093/haschl/qxae084

8. Festa N, Price M, Weiss M, et al. Evaluating The Accuracy Of Medicare Risk Adjustment For Alzheimer's Disease And Related Dementias: Study examines the accuracy of Medicare Advantage and ACO payments of Alzheimer's Disease and related dementias claims. *Health Aff (Millwood)*. 2022;41(9):1324-1332. doi:10.1377/hlthaff.2022.00185

9. 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. doi:10.1001/jamainternmed.2018.7639

10. Haye S, Jacobson M, Joyce G, Zissimopoulos JM. After Risk-Adjustment Change, Dementia Diagnoses Increased In Medicare Advantage Relative To Traditional Medicare: Article examines dementia diagnosis in Medicare Advantage after risk-adjustment change. *Health Aff (Millwood)*. 2025;44(1):81-89. doi:10.1377/hlthaff.2024.00723

11. Brown J, Duggan M, Kuziemko I, Woolston W. How Does Risk Selection Respond to Risk Adjustment? New Evidence from the Medicare Advantage Program. *Am Econ Rev*. 2014;104(10):3335-3364. doi:10.1257/aer.104.10.3335

12. 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

13. Geruso M, Layton T. Upcoding: Evidence from Medicare on Squishy Risk Adjustment. *J Polit Econ*. 128(3):984-1026.

14. Meyers DJ, Rahman M, Trivedi AN. Narrow Primary Care Networks in Medicare Advantage. *J Gen Intern Med*. 2022;37(2):488-491. doi:10.1007/s11606-020-06534-2

15. Zhu JM, Meiselbach MK, Drake C, Polsky D. Psychiatrist Networks In Medicare Advantage Plans Are Substantially Narrower Than In Medicaid And ACA Markets: Study examines psychiatrist networks in Medicare Advantage compared with Medicaid and ACA markets. *Health Aff (Millwood)*. 2023;42(7):909-918. doi:10.1377/hlthaff.2022.01547

16. Gupta R, Fein J, Newhouse JP, Schwartz AL. Comparison of prior authorization across insurers: cross sectional evidence from Medicare Advantage. *BMJ*. Published online March 7, 2024:e077797. doi:10.1136/bmj-2023-077797

17. Neprash TH, Mulcahy J, Golberstein E. The Extent and Growth of Prior Authorization in Medicare Advantage. *Am J Manag Care*. 2024;30(3):e85-e92. doi:10.37765/ajmc.2024.89519

18. Meyers DJ, Mor V, Rahman M. Medicare Advantage Enrollees More Likely To Enter Lower-Quality Nursing Homes Compared To Fee-For-Service Enrollees. *Health Aff (Millwood)*. 2018;37(1):78-85. doi:10.1377/hlthaff.2017.0714

19. Haye S, Thunell J, Joyce G, et al. Estimates of diagnosed dementia prevalence and incidence among diverse beneficiaries in traditional Medicare and Medicare Advantage. *Alzheimers Dement Diagn Assess Dis Monit*. 2023;15(3):e12472. doi:10.1002/dad2.12472

Table 1. Summary Statistics for MA beneficiaries with ADRD and with Stroke/Paralysis/Parkinson's Disease

	(1) All			(2) ADRD			(3) Stroke/Paralysis/ Parkinson's Disease		
	Mean	SD	N	Mean	SD	N	Mean	SD	N
ADRD	0.304	(0.460)	5353	1.000	(0.000)	1629	0.000	(0.000)	3724
Dependent Vars:									
Less Trouble Getting Needed Care	0.900	(0.301)	5339	0.913	(0.283)	1624	0.894	(0.308)	3715
Less Problem Paying Medical Bills	0.766	(0.423)	4172	0.807	(0.395)	1220	0.749	(0.433)	2952
Satisfaction about Access to Specialist	0.921	(0.269)	5049	0.908	(0.289)	1524	0.927	(0.260)	3525
Satisfaction about Quality of Care	0.930	(0.256)	5280	0.928	(0.259)	1611	0.930	(0.254)	3669
Demographics:									
Age Group <65	0.184	(0.388)	5353	0.069	(0.254)	1629	0.235	(0.424)	3724
Age Group 65 to 75	0.231	(0.422)	5353	0.138	(0.344)	1629	0.273	(0.445)	3724
Age Group 75+	0.584	(0.493)	5353	0.793	(0.405)	1629	0.493	(0.500)	3724
Non-Hispanic white	0.617	(0.486)	5353	0.565	(0.496)	1629	0.640	(0.480)	3724
Black	0.157	(0.364)	5353	0.133	(0.340)	1629	0.167	(0.373)	3724
Hispanic	0.166	(0.372)	5353	0.242	(0.428)	1629	0.132	(0.339)	3724
Other races/ethnicities	0.060	(0.238)	5353	0.060	(0.238)	1629	0.060	(0.238)	3724
Male	0.333	(0.471)	5353	0.272	(0.445)	1629	0.360	(0.480)	3724
Married, spouse present	0.332	(0.471)	5353	0.320	(0.467)	1629	0.337	(0.473)	3724
Married: missing	0.146	(0.354)	5353	0.133	(0.339)	1629	0.153	(0.360)	3724
High school or less	0.541	(0.498)	5353	0.608	(0.488)	1629	0.512	(0.500)	3724
Education missing	0.154	(0.361)	5353	0.145	(0.353)	1629	0.158	(0.365)	3724
Self-respondent	0.733	(0.443)	5353	0.390	(0.488)	1629	0.883	(0.322)	3724
Household size: 1	0.312	(0.463)	5353	0.229	(0.420)	1629	0.348	(0.476)	3724
Household size: 2	0.433	(0.496)	5353	0.460	(0.499)	1629	0.421	(0.494)	3724
Household size: 3+	0.255	(0.436)	5353	0.311	(0.463)	1629	0.231	(0.421)	3724

Notes: The working sample consists of MA beneficiaries from 2015-2022 MCBS. Beneficiaries with only partial enrollment in an MA plan during the past year at the time of the survey and veteran are excluded.

Table 1 (Cont.). Summary Statistics for MA beneficiaries with ADRD and with Stroke/Paralysis/Parkinson's Disease

	(1) All			(2) ADRD			(3) Stroke/Paralysis/ Parkinson's Disease		
	Mean	SD	N	Mean	SD	N	Mean	SD	N
Health Conditions:									
Underweight/healthy (<25)	0.337	(0.473)	5353	0.431	(0.495)	1629	0.296	(0.457)	3724
Overweight (25-30)	0.330	(0.470)	5353	0.292	(0.455)	1629	0.347	(0.476)	3724
Obese/high-risk obese (>=30)	0.302	(0.459)	5353	0.233	(0.423)	1629	0.332	(0.471)	3724
BMI missing	0.031	(0.172)	5353	0.045	(0.207)	1629	0.024	(0.154)	3724
IADLs or ADLs: 0	0.273	(0.446)	5353	0.130	(0.337)	1629	0.336	(0.472)	3724
IADLs: 1	0.173	(0.378)	5353	0.214	(0.410)	1629	0.155	(0.362)	3724
ADLs: 1-2	0.283	(0.451)	5353	0.252	(0.434)	1629	0.297	(0.457)	3724
ADLs: 3-4	0.145	(0.352)	5353	0.182	(0.386)	1629	0.128	(0.335)	3724
ADLs: 5-6	0.126	(0.332)	5353	0.223	(0.416)	1629	0.084	(0.277)	3724
Chronic Conditions (except ADRD): 0	0.007	(0.085)	5353	0.024	(0.153)	1629	0.000	(0.000)	3724
Chronic Conditions (except ADRD): 1	0.039	(0.193)	5353	0.076	(0.265)	1629	0.023	(0.149)	3724
Chronic Conditions (except ADRD): 2	0.078	(0.268)	5353	0.112	(0.315)	1629	0.063	(0.243)	3724
Chronic Conditions (except ADRD): 3-4	0.303	(0.460)	5353	0.319	(0.466)	1629	0.296	(0.456)	3724
Chronic Conditions (except ADRD): 5-6	0.322	(0.467)	5353	0.277	(0.448)	1629	0.341	(0.474)	3724
Chronic Conditions (except ADRD): 7-10	0.229	(0.420)	5353	0.172	(0.378)	1629	0.254	(0.435)	3724
Chronic Conditions (except ADRD): 11+	0.023	(0.149)	5353	0.019	(0.137)	1629	0.024	(0.154)	3724

Notes: The working sample consists of MA beneficiaries from 2015-2022 MCBS. Beneficiaries with only partial enrollment in an MA plan during the past year at the time of the survey and veteran are excluded.

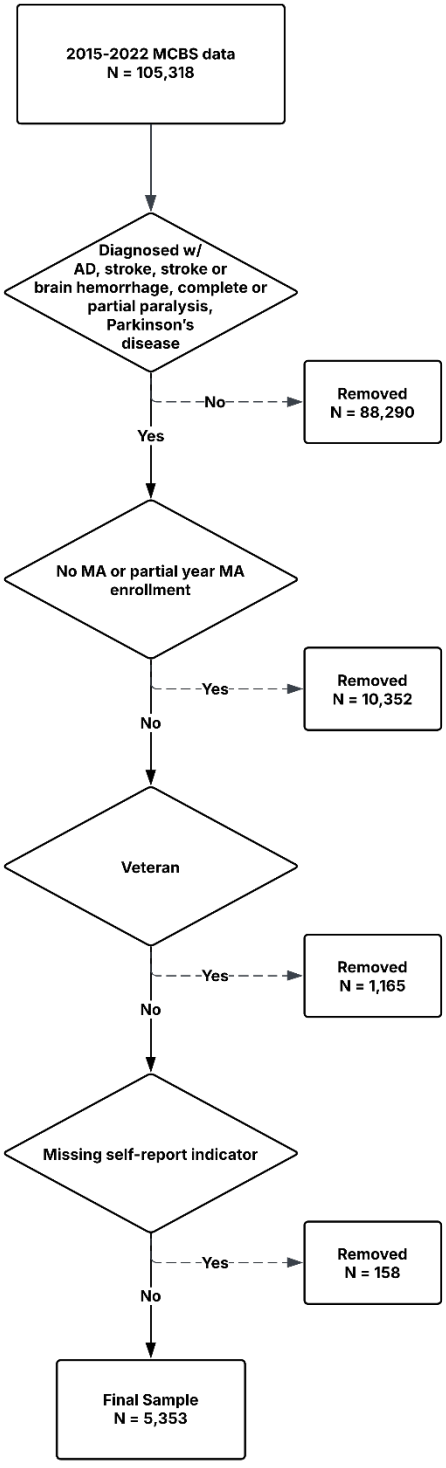


Figure 1. Data Process Flow



4

Figure 2. Pattern of Care Experiences Over Time

Notes: The working sample consists of MA beneficiaries from 2015-2022 MCBS. Beneficiaries with only partial enrollment in an MA plan during the past year at the time of the survey and veteran are excluded.

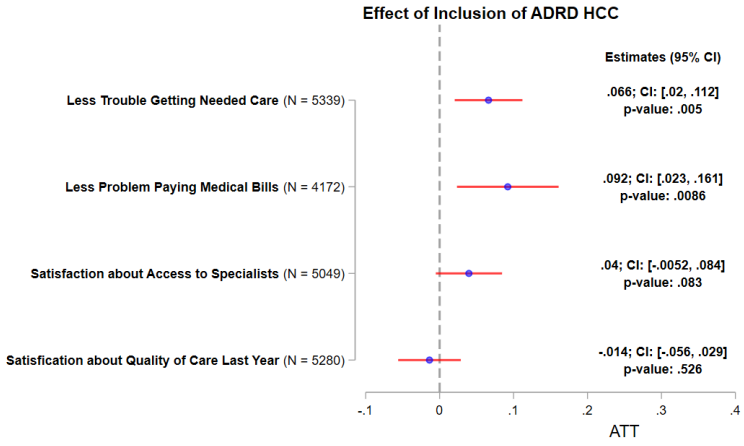


Figure 3. Association between the Inclusion of ADRD HCCs in Payment Model and Care Experiences

Notes: The working sample consists of MA beneficiaries from 2015-2022 MCBS. Beneficiaries with only partial enrollment in an MA plan during the past year at the time of the survey and veteran are excluded. The plotted estimates represent the coefficients for the interaction term between the treatment indicator and the post indicator from a DID estimation, with the dependent variable indicated on the y-axis. In each DID estimation, the treatment group consists of MA beneficiaries with ADRD, and the control group consists of MA beneficiaries without ADRD but with stroke/brain hemorrhage, complete/partial paralysis, or Parkinson's diseases. The post indicator takes the value of one if 2020 or afterwards, and zero otherwise. The associated 95% CIs are plotted. Robust standard errors are applied.

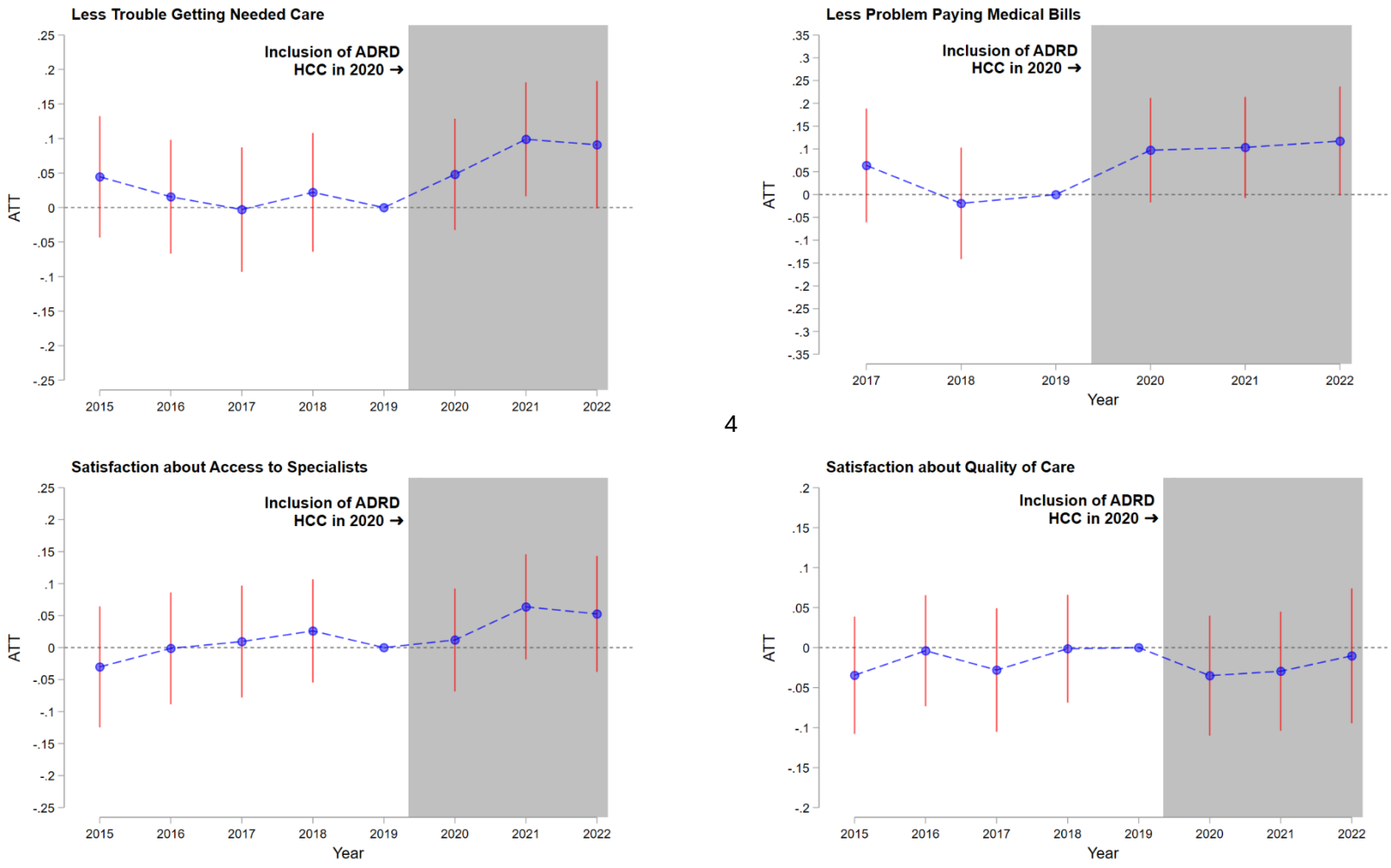


Figure 4. Dynamic Association between the Inclusion of ADRD HCCs in Payment Model and Care Experiences

Notes: The working sample consists of MA beneficiaries from 2015-2022 MCBS. Beneficiaries with only partial enrollment in an MA plan during the past year at the time of the survey and veteran are excluded. Each figure presents results from an event study model, with the dependent variable specified above. The plotted estimates represent the coefficients for the interaction term between treated indicator and year indicators. In each estimation, the treatment group consists of MA beneficiaries with ADRD, and the control group consists of MA beneficiaries without ADRD but with stroke/brain hemorrhage, complete/partial paralysis, or Parkinson's diseases. The associated 95% CIs are also plotted. Robust standard errors are applied.

Online Appendix for "Inclusion of ADRD Hierarchical Condition Category in Medicare Advantage Risk Adjustment Model and Health Care Experiences"

Appendix A: Additional Tables and Figures

Appendix B: Econometric Models

- B.1: Difference-in-Differences Model
- B.2: Placebo Tests
- B.3: Event Study Model

Appendix A: Additional Tables and Figures

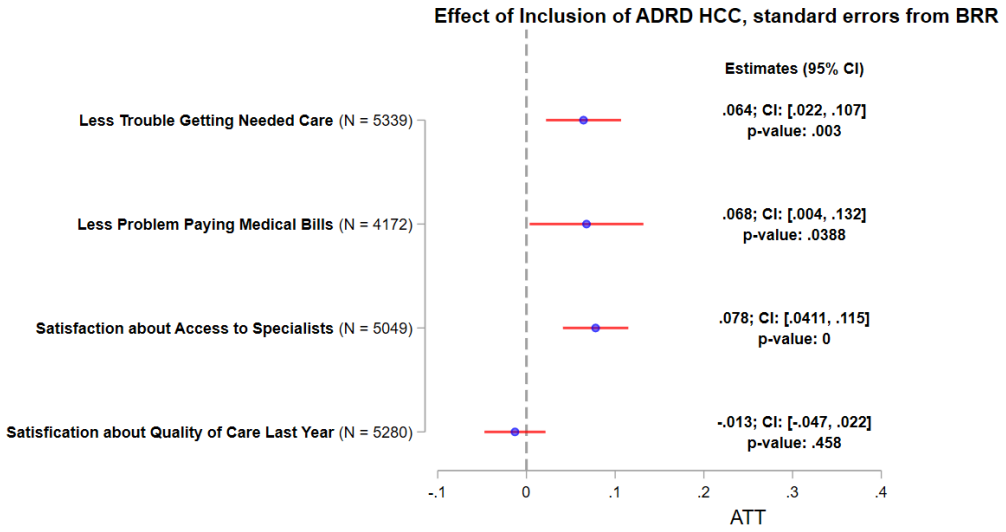


Figure A1. Association between the Inclusion of ADRD HCCs in Payment Model and Care Experiences using Balanced Repeated Replications Method

Notes: The working sample consists of MA beneficiaries from 2015-2022 MCBS. Beneficiaries with only partial enrollment in an MA plan during the past year at the time of the survey and veteran are excluded. The plotted estimates represent the coefficients for the interaction term between the treatment indicator and the post indicator from a DID estimation, with the dependent variable indicated on the y-axis. In each DID estimation, the treatment group consists of MA beneficiaries with ADRD, and the control group consists of MA beneficiaries without ADRD but with stroke/brain hemorrhage, complete/partial paralysis, or Parkinson's diseases. The post indicator takes the value of one if 2020 or afterwards, and zero otherwise. The associated 95% CIs are plotted. Balanced repeated replications (BRR) for standard errors are applied.

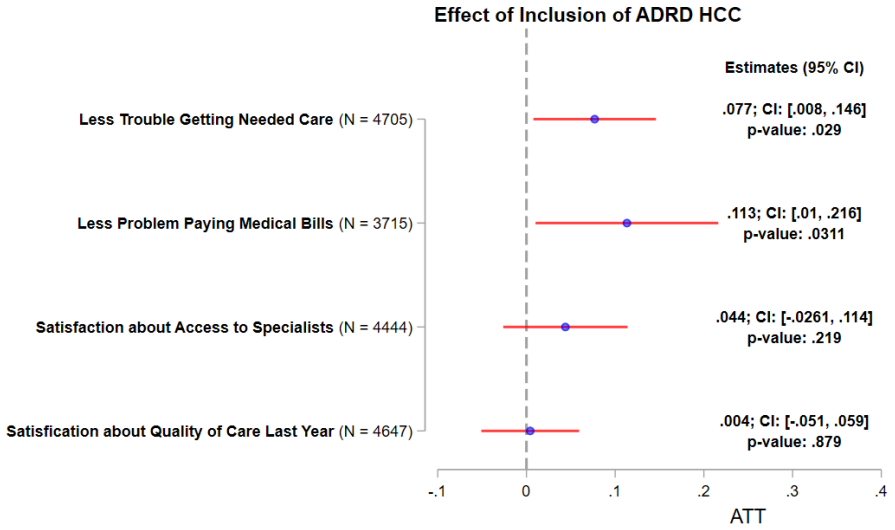


Figure A2. Association between the Inclusion of ADRD HCCs in Payment Model and Care Experiences – Drop MA ADRD Beneficiaries with Self-Response

Notes: The working sample consists of MA beneficiaries from 2015-2022 MCBS. Beneficiaries with only partial enrollment in an MA plan during the past year at the time of the survey and veteran are excluded. MA ADRD beneficiaries with self-response in the survey are also removed. The plotted estimates represent the coefficients for interaction term between the treatment indicator and the post indicator from a DID estimation, with the dependent variable indicated on the y-axis. In each DID estimation, the treatment group consists of MA beneficiaries with ADRD, and the control group consists of MA beneficiaries without ADRD but with stroke/brain hemorrhage, complete/partial paralysis, or Parkinson's diseases. The post indicator takes the value of one if 2020 or afterwards, and zero otherwise. The associated 95% CIs are plotted. Robust standard errors are applied.

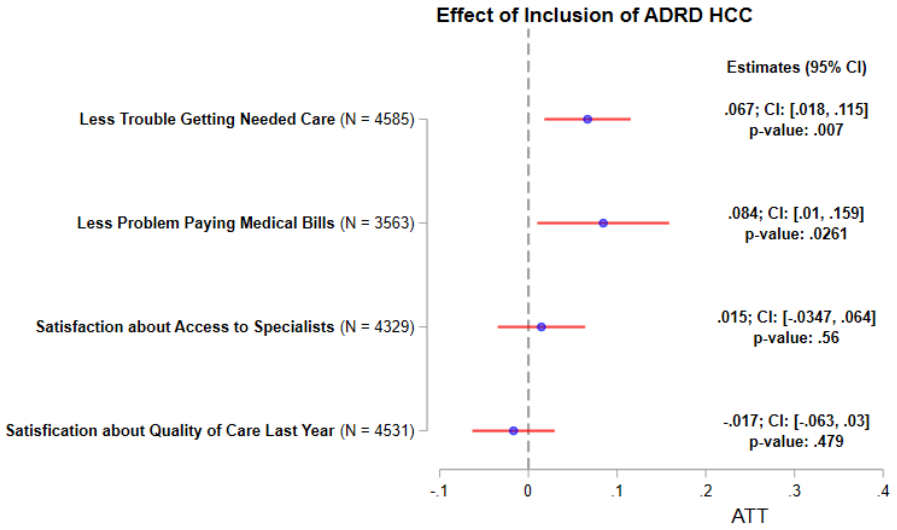


Figure A3. Association between the Inclusion of ADRD HCCs in Payment Model and Care Experiences – Exclude Beneficiaries in Current MA Plan for Less than 3 Years

Notes: The working sample consists of MA beneficiaries from 2015-2022 MCBS. Beneficiaries with only partial enrollment in an MA plan during the past year at the time of the survey and veteran are excluded. MA beneficiaries who have been in current MA plans for less than 3 years at the time of the survey are also removed. The plotted estimates represent the coefficients for the interaction term between the treatment indicator and the post indicator from a DID estimation, with the dependent variable indicated on the y-axis. In each DID estimation, the treatment group consists of MA beneficiaries with ADRD, and the control group consists of MA beneficiaries without ADRD but with stroke/brain hemorrhage, complete/partial paralysis, or Parkinson's diseases. The post indicator takes the value of one if 2020 or afterwards, and zero otherwise. The associated 95% CIs are plotted. Robust standard errors are applied.

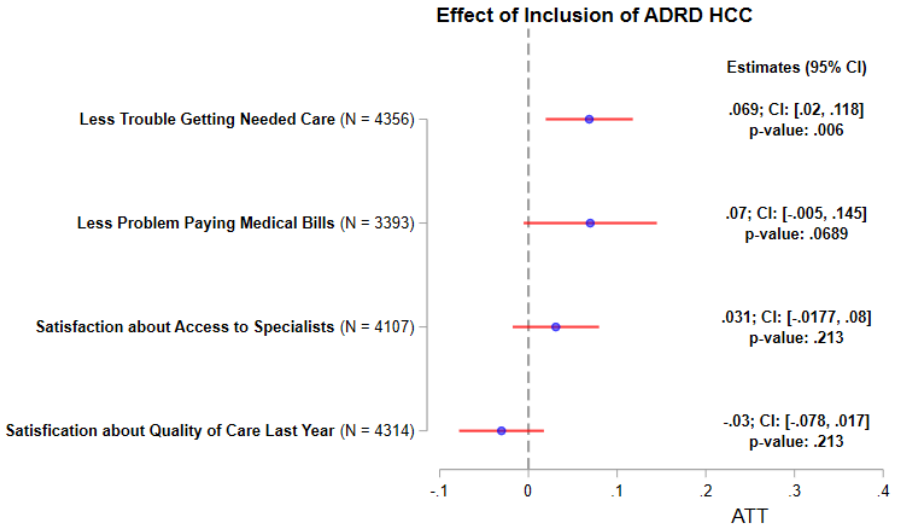


Figure A4. Association between the Inclusion of ADRD HCCs in Payment Model and Care Experiences – Exclude MA Beneficiaries Under 65

Notes: The working sample consists of MA beneficiaries from 2015-2022 MCBS. Beneficiaries with only partial enrollment in an MA plan during the past year at the time of the survey and veteran are excluded. MA beneficiaries less than 65 years old at the time of the survey are also removed. The plotted estimates represent the coefficients for the interaction term between the treatment indicator and the post indicator from a DID estimation, with the dependent variable indicated on the y-axis. In each DID estimation, the treated group consists of MA beneficiaries with ADRD, and the control group consists of MA beneficiaries without ADRD but with stroke/brain hemorrhage, complete/partial paralysis, or Parkinson's diseases. The post indicator takes the value of one if 2020 or afterwards, and zero otherwise. The associated 95% CIs are plotted. Robust standard errors are applied.

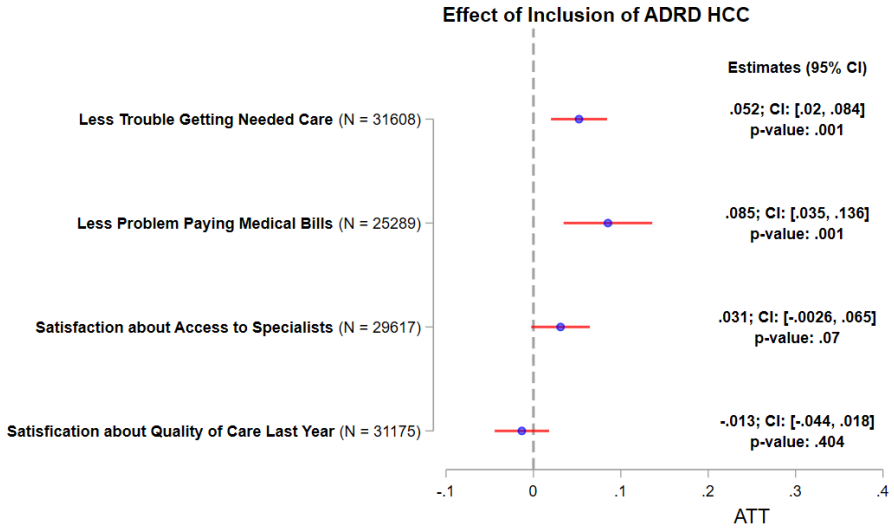


Figure A5. Association between the Inclusion of ADRD HCCs in Payment Model and Care Experiences – Using All Conditions as Control

Notes: The working sample consists of MA beneficiaries from 2015-2022 MCBS. Beneficiaries with only partial enrollment in an MA plan during the past year at the time of the survey and veteran are excluded. MA ADRD beneficiaries with self-response in the survey are also removed. The plotted estimates represent the coefficients for the interaction term between the treatment indicator and the post indicator from a DID estimation, with the dependent variable indicated on the y-axis. In each DID estimation, the treatment group consists of MA beneficiaries with ADRD, and the control group consists of MA beneficiaries without ADRD but with other conditions, including but not limited to stroke/brain hemorrhage, complete/partial paralysis, or Parkinson's diseases. The post indicator takes the value of one if 2020 or afterwards, and zero otherwise. The associated 95% CIs are plotted. Robust standard errors are applied.

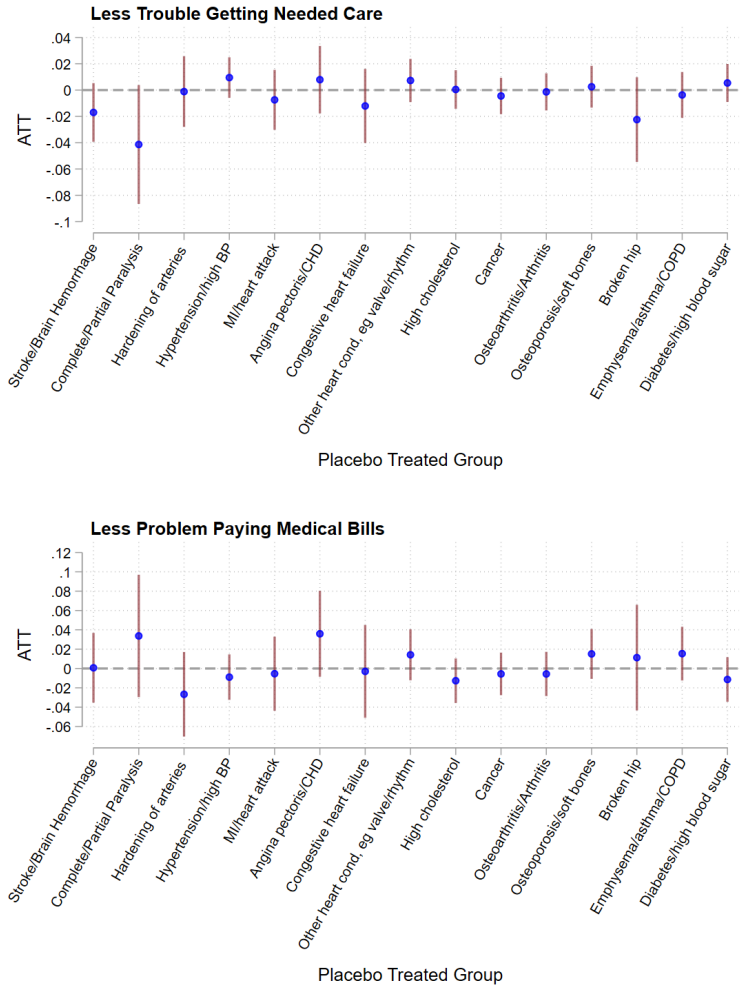


Figure A6. Placebo Tests on the Association between the Inclusion of ADRD HCCs in Payment Model and Care Experiences

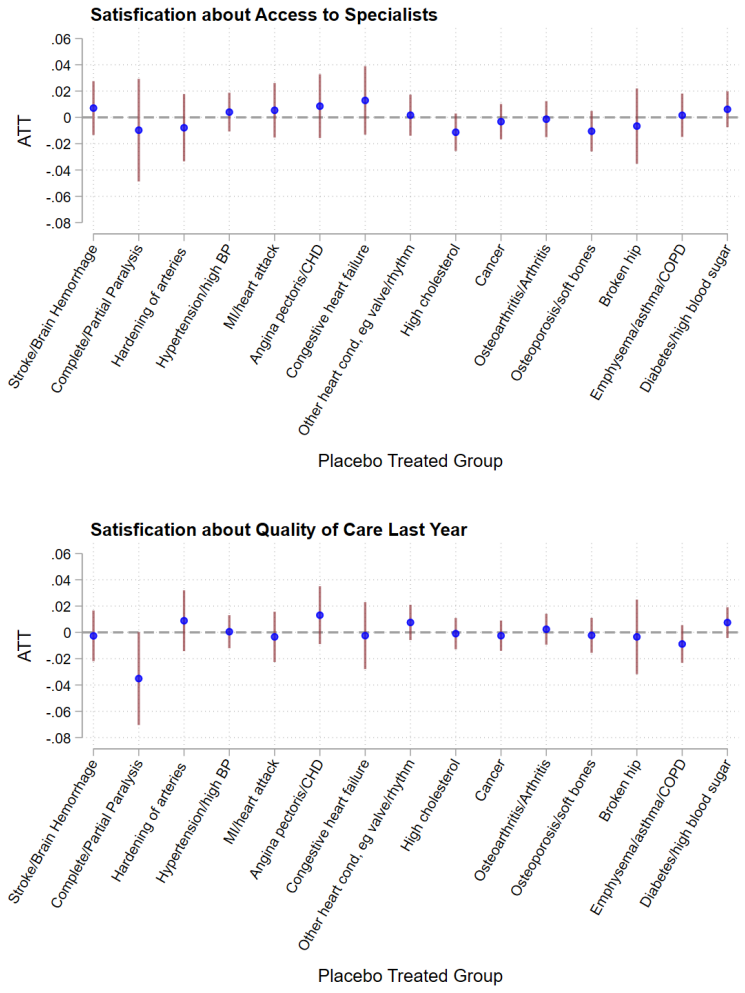


Figure A6 (Cont.). Placebo Tests on the Association between the Inclusion of ADRD HCCs in Payment Model and Care Experiences

Notes: The working sample consists of MA beneficiaries from 2015-2022 MCBS. Beneficiaries with only partial enrollment in an MA plan during the past year at the time of the survey and veteran are excluded. The plotted estimates represent the coefficients for the interaction term between the treatment indicator and the post indicator from a DID estimation, with the dependent variable indicated in each panel. In each DID estimation, the treatment group consists of non-ADRD MA beneficiaries with the disease specified in the x-axis, and the control group consists of non-ADRD MA beneficiaries without the disease specified in the x-axis. The post indicator takes the value of one if 2020 or afterwards, and zero otherwise. The associated 95% CIs are plotted. Robust standard errors are applied.

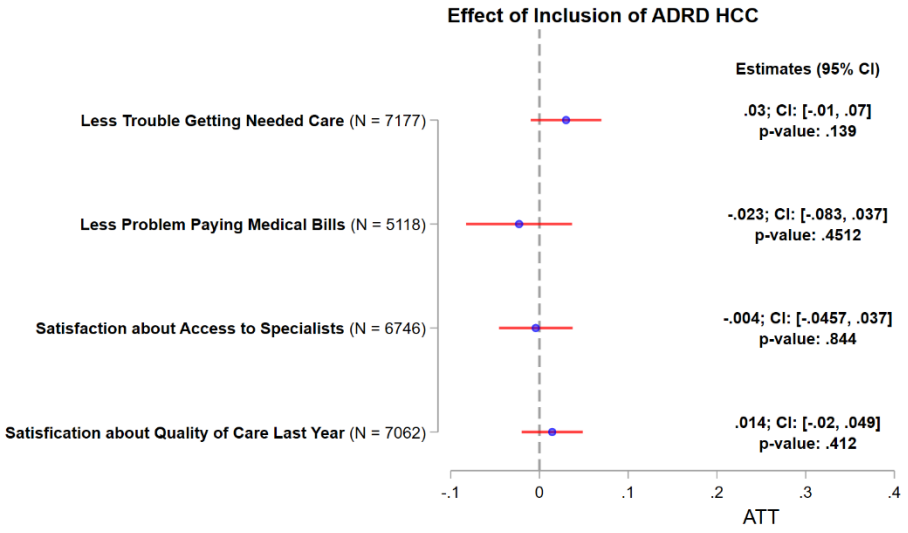
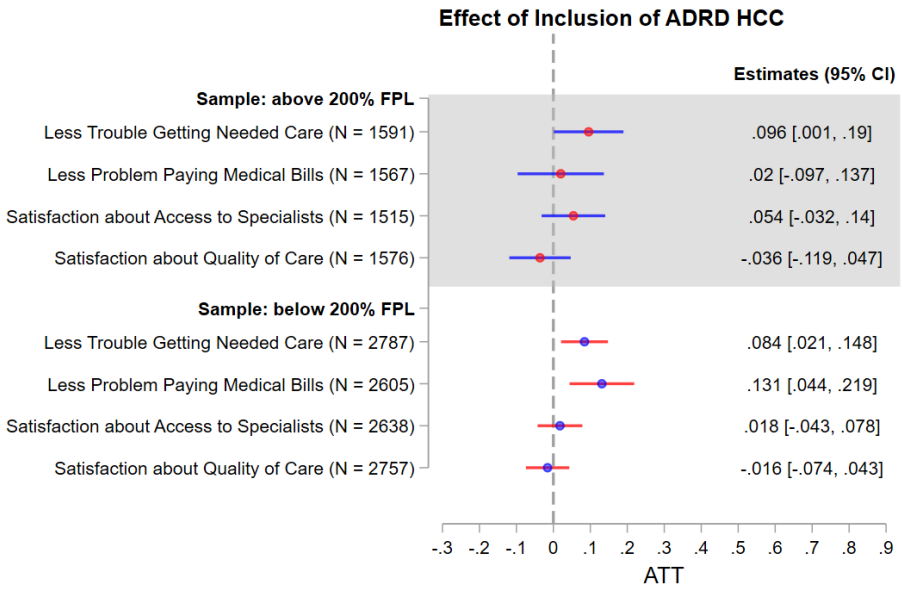
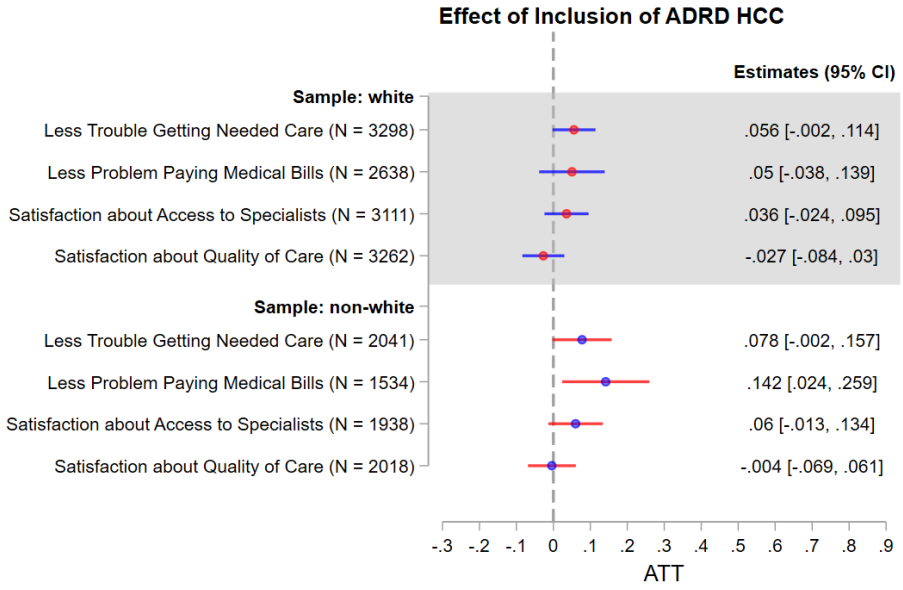


Figure A7. Association between the Inclusion of ADRD HCCs in Payment Model and Care Experiences – Using Traditional Medicare Beneficiaries

Notes: The working sample consists of TM beneficiaries from 2015-2022 MCBS. Veteran beneficiaries are excluded. The plotted estimates represent the coefficients for the interaction term between the treatment indicator and the post indicator from a DID estimation, with the dependent variable indicated on the y-axis. In each DID estimation, the treatment group consists of TM beneficiaries with ADRD, and the control group consists of TM beneficiaries without ADRD but with stroke/brain hemorrhage, complete/partial paralysis, or Parkinson's diseases. The post indicator takes the value of one if 2020 or afterwards, and zero otherwise. The associated 95% CIs are plotted. Robust standard errors are applied.

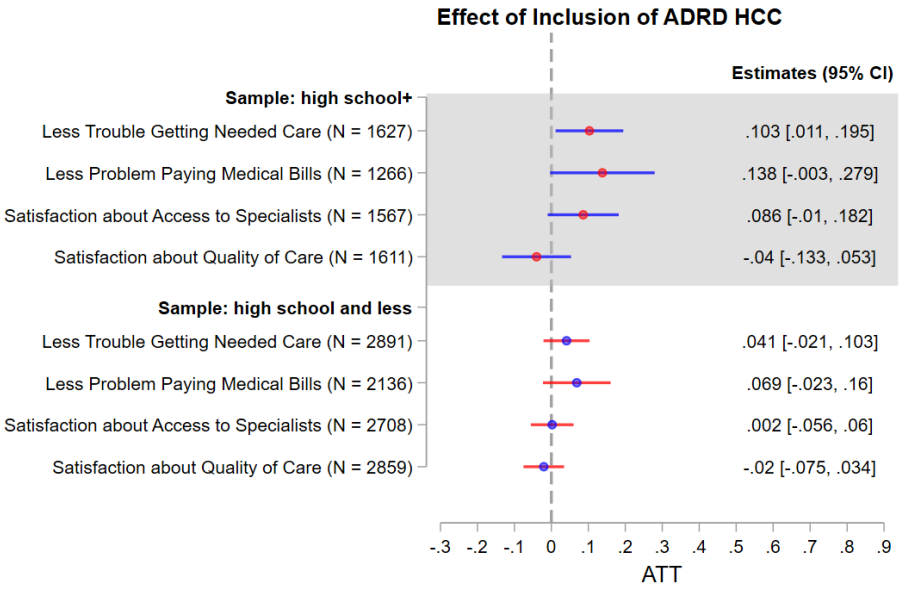


A. By Income Level

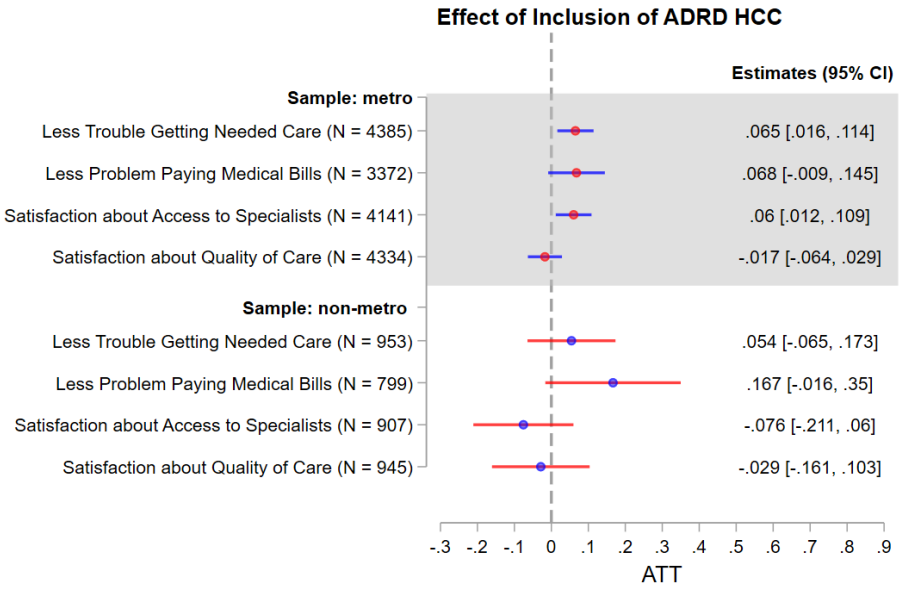


B. By Race/Ethnicity

Figure A8. Association between the Inclusion of ADRD HCCs in Payment Model and Care Experiences – Stratification Analysis



C. By Education Level



D. By Metropolitan Status

Figure A8. (Cont.) Association between the Inclusion of ADRD HCCs in Payment Model and Care Experiences – Stratification Analysis

Notes: The working sample consists of MA beneficiaries from 2015-2022 MCBS. Beneficiaries with only partial enrollment in an MA plan during the past year at the time of the survey and veteran are excluded. The plotted estimates represent the coefficients for the interaction term between the treatment indicator and the post indicator from a DID estimation, with the dependent variable indicated on the y-axis. In each DID estimation, the treatment group consists of MA beneficiaries with ADRD, and the control group consists of MA beneficiaries without ADRD but with stroke/brain hemorrhage, complete/partial paralysis, or Parkinson's diseases. The post indicator takes the value of one if 2020 or afterwards, and zero otherwise. The associated 95% CIs are plotted. Robust standard errors are applied.

Table A1. Dynamic Association between the Inclusion of ADRD HCCs in Payment Model and Care Experiences

variable	Coef.	Standard Error	P value	95% CI: lower	95% CI: upper
Outcome: Less Trouble Getting Needed Care (N = 5,339)					
ADRD × 2015	0.0446	0.0448	0.3199	-0.0433	0.1325
ADRD × 2016	0.0156	0.0421	0.7100	-0.0668	0.0981
ADRD × 2017	-0.0029	0.0460	0.9492	-0.0930	0.0872
ADRD × 2018	0.0221	0.0438	0.6148	-0.0639	0.1080
ADRD × 2020	0.0481	0.0411	0.2422	-0.0325	0.1288
ADRD × 2021	0.0989	0.0421	0.0188	0.0164	0.1814
ADRD × 2022	0.0909	0.0471	0.0536	-0.0014	0.1833
Outcome: Less Problem Paying Medical Bills (N = 4,172)					
ADRD × 2017	0.0639	0.0636	0.3148	-0.0608	0.1886
ADRD × 2018	-0.0193	0.0624	0.7573	-0.1417	0.1031
ADRD × 2020	0.0974	0.0584	0.0953	-0.0171	0.2118
ADRD × 2021	0.1034	0.0565	0.0672	-0.0073	0.2141
ADRD × 2022	0.1174	0.0609	0.0542	-0.0021	0.2368
Outcome: Satisfaction about Access to Specialists (N = 5,049)					
ADRD × 2015	-0.0301	0.0482	0.5319	-0.1246	0.0644
ADRD × 2016	-0.0012	0.0446	0.9784	-0.0886	0.0862
ADRD × 2017	0.0094	0.0446	0.8323	-0.0780	0.0969
ADRD × 2018	0.0261	0.0411	0.5260	-0.0545	0.1067
ADRD × 2020	0.0119	0.0410	0.7711	-0.0684	0.0923
ADRD × 2021	0.0637	0.0419	0.1283	-0.0184	0.1459
ADRD × 2022	0.0526	0.0462	0.2548	-0.0380	0.1432
Outcome: Satisfaction about Quality of Care (N = 5,280)					
ADRD × 2015	-0.0346	0.0374	0.3554	-0.1079	0.0388
ADRD × 2016	-0.0039	0.0354	0.9123	-0.0734	0.0656
ADRD × 2017	-0.0281	0.0394	0.4766	-0.1053	0.0492
ADRD × 2018	-0.0014	0.0344	0.9678	-0.0687	0.0660
ADRD × 2020	-0.0351	0.0382	0.3587	-0.1100	0.0398
ADRD × 2021	-0.0295	0.0380	0.4368	-0.1040	0.0449
ADRD × 2022	-0.0103	0.0430	0.8102	-0.0946	0.0740

Notes: The working sample consists of MA beneficiaries from 2015-2022 MCBS. Beneficiaries with only partial enrollment in an MA plan during the past year at the time of the survey and veteran are excluded. In each estimation, the treatment group consists of MA beneficiaries with ADRD, and the control group consists of MA beneficiaries without ADRD but with stroke/brain hemorrhage, complete/partial paralysis, or Parkinson's diseases. The event study is specified in Appendix B.3. The year of 2019 is selected as the reference year. Robust standard errors are applied.

Appendix B: Econometric Models

B.1 Difference-in-Differences Model

We employ a DID model to exploit the inclusion of ADRD HCCs in the risk adjustment model for MA plans in 2020 as a quasi-natural experiment. This model compares care experiences between a treatment and a control group before and after the 2020 policy change.

The treated group is defined as MA enrollees who reported having ever been told they have symptoms of ADRD. To construct a comparable control group, we select MA enrollees who: (1) had never been diagnosed with ADRD, and (2) had been diagnosed with conditions such as stroke or brain hemorrhage, complete or partial paralysis, or Parkinson's disease. The selection criteria are grounded in the rationale that patients with these conditions are also likely to see neurologists like those with ADRD. This parallel in healthcare pathways allows for a more equitable comparison, ensuring that differences observed can be more confidently attributed to the effects of the ADRD HCCs integration into the risk adjustment model, rather than disparities in the propensity for neurological consultation.

Formally, we build a regression model as outlined in Equation (B.1) below.

$$y_{it} = \beta_0 + \beta_1 treated_{it} \times post_t + \beta_2 treated_{it} + \gamma X'_{it} + \alpha_t + \epsilon_{it}, \quad \text{(B.1)}$$

where y_{it} represents the care experience measure for beneficiary i in year t. The binary variable $treated_{it}$ indicates whether individual i is classified as treated, as defined above. The binary variable $post_t$ takes the value of one for the years following the policy change (2020 and later), and zero otherwise. In a DID framework, the coefficient of the interaction term $treated_{it} \times post_t$, β_1, captures the association between the inclusion of ADRD HCCs in the risk adjusted payment model and the care experience of MA beneficiaries with ADRD. A positive β_1 implies a position association. We apply robust standard errors in the analysis.

To reassure the estimated $\hat{\beta}_1$ unbiasedly measures the association of interest, rather than confounded by other unobserved factors, a critical assumption is that, in the absence of the payment model change, the evolution of the outcomes of interest for the control and treatment groups would have followed a similar trajectory over time. This assumption, commonly known as the parallel-trends assumption, is fundamental to the validity of the DID design. It enables the use of the control group's outcomes as a reliable counterfactual for the treated group.

A notable threat to the parallel-trends assumption is the possibility that the estimated $\hat{\beta}_1$ may pick up confounding effects from some concurrent events, such as the onset of the COVID-19 pandemic in early 2020. To address this concern, we undertake several methodological adjustments. First, we include year fixed effects (α_t) to absorb national-level shocks and contemporary events. Additionally, to account for

potential heterogeneous pandemic impacts across subpopulations, we incorporate several interaction terms in X'_{it}. These include:

(1) interactions between demographic covariates and year indicators, where the demographic covariates encompass age categories, marital status, race/ethnicity, sex, educational attainment, and household size.

(2) the interactions between each health measure and each year indicator, where the health measures include number of functional limitations, number of chronic conditions, and BMI categories.

Our model with these interactions provides greater non-parametric flexibility in accounting for potential heterogeneous exposure to the pandemic, thereby enhancing the robustness of our estimates.

Another potential concern is measurement error arising from proxy reporting, as approximately 27% of the study sample comprises proxy respondents (Table 1). To mitigate the effects of such measurement errors, we include interactions between the self-respondent indicator and all previously described covariates, as well as each time indicator. These interactions allow for a more flexible adjustment, accounting for potential heterogeneity in the patterns and accuracy of proxy reporting.

Moreover, we conduct an event study model, detailed in Appendix B.3 to provide suggestive evidence for the parallel-trends assumption.

B.2: Placebo Tests

We also conduct a series of placebo tests as alternative approaches to support the parallel trends assumption and address the measurement errors described above. The design of these placebo tests involves comparing a group of Medicare Advantage beneficiaries who are not expected to be affected by the inclusion of the ADRD HCC in the risk-adjusted payment model with another group of MA beneficiaries who likewise should not be impacted by the new payment model. Formally, we estimate the following DID model specified in Equation (B.2):

$$y_{it} = \beta'_0 + \beta'_1 placeboTreated_{it} \times post_t + \beta'_2 placeboTreated_{it} + \gamma' X'_{it} + \alpha_t + \epsilon'_{it}. \quad \text{(B.2)}$$

Equation (B.2) mirrors Equation (B.1), with the primary difference being the definition of the placebo-treatment group, denoted as $placeboTreated_{it}$. For instance, one illustrative placebo test designates a placebo treatment group, consisting of MA enrollees diagnosed with diabetes/high blood sugar but not ADRD, and a control group comprising MA enrollees without either diabetes/high blood sugar or ADRD. Since individuals with diabetes and without ADRD are not the primary target of the policy integrating ADRD HCC into the risk adjustment model, we expect to observe a statistically insignificant $\hat{\beta}'_1$ in this placebo test. This would imply that the 2020 revisions to the risk-adjusted payment model are not

statistically associated with improved care experiences for non-ADRD MA beneficiaries with diabetes/high blood sugar. Conversely, if we observe a significant $\hat{\beta}_1'$, it suggests that our benchmark analysis using Equation (B.1) likely picks up confounding bias from concurrent events such as the onset of the COVID-19 pandemic in 2020 or any potential proxy-response bias.

This approach is then extended to a series of placebo tests, with each placebo treated group focusing on a distinct health condition, including hypertension or high blood pressure, myocardial infarction (MI)/heart attack, stroke or brain hemorrhage, osteoarthritis or soft bones, congestive heart failure, emphysema/asthma/COPD, and complete or partial paralysis. The full list of chronic conditions serving as placebo-treatment groups is displayed along the horizontal axis in Figure A6. In this figure, each coefficient of association, along with its corresponding 95% confidence interval, is derived from the results of a specific placebo test.

B.3: Event Study Model

We conduct an event study analysis using Equation (B.3) to provide suggestive evidence for the parallel-trends assumption underlying Equation (B.1). All variables in Equation (B.3) are defined consistently as those in Equation (B.1).

$$y_{it} = \beta_0'' + \sum_{j=2015, j\neq 2019}^{2022} \zeta_j treated_{it} \times \mathbb{I}\{t = j\} + \beta_2'' treated_{it} + \gamma'' X_{it}' + \alpha_t + \epsilon_{it}''. \quad \text{(B.3)}$$

In the equation above, $\mathbb{I}\{t = j\}$ $(2015 \leq j \leq 2022, j \neq 2019)$ is an indicator function. For instance, $\mathbb{I}\{t = 2020\}$ takes the value of one if year is 2020 and otherwise zero. We interact the treatment group indicator, $treated_{it}$, with each year indicator, $\mathbb{I}\{t = j\}$. The year 2019, the last year before the implementation of the new risk-adjusted payment model in 2020, serves as the reference year. The coefficient ζ_j measures the association between the 2020 revised risk adjusted payment model with MA beneficiary's care experience in year j.

This analysis serves two primary purposes. First, if $\hat{\zeta}_j$ ($j \leq 2018$) is statistically insignificant, it provides suggestive evidence supporting the parallel-trends assumption, meaning that in the absence of the 2020 payment model revision, the evolution of care experience among MA beneficiaries with ADRD would follow a parallel trajectory to that of the control group after 2019. Second, if $\hat{\zeta}_j$ ($j \geq 2020$) is statistically significant, it indicates the dynamics of the association between the revised payment model and care experience in the post-revision period. In Figure 4, the $\hat{\zeta}_j$s are plotted with their associated 95% CIs.