Comparing Receipt of Prescribed Post-acute Home Health Care Between Medicare Advantage and Traditional Medicare Beneficiaries: an Observational Study

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BACKGROUND: Medicare Advantage (MA) covers more than 1/3rd of all Medicare beneficiaries. MA plans are required to provide the same benefits as Traditional Medicare (TM), but can impose utilization management tools to control costs.

OBJECTIVE: To assess differences between TM and MA enrollees in the probability of receiving prescribed post-acute home health (HH) care and to describe MA plan characteristics associated with HH receipt.

DESIGN: Retrospective cross-sectional analysis of claims data, HH patient assessment data, and MA plan data from 2011 to 2017.

PARTICIPANTS: Medicare beneficiaries aged 66 and older with an incident hospitalization for joint replacement, pneumonia, chronic obstructive pulmonary disease, stroke, urinary tract infection, septicemia, acute renal failure, or congestive heart failure.

MAIN MEASURES: Receipt of prescribed HH as indicated by a HH discharge code and corresponding HH patient assessment within 14 days of hospital discharge.

KEY RESULTS: There were 2,723,245 beneficiaries prescribed HH at discharge (68% TM, 32% MA). About 75% of TM enrollees and 62% of MA enrollees received prescribed post-acute HH. In adjusted analyses, MA enrollees had an −11.7 percentage point (pp) (95% confidence interval (CI): −16.8, −6.5) lower probability of receiving HH compared with TM enrollees. In adjusted analyses, HMO enrollees in plans with cost sharing (− 8.4 pp; 95% CI: − 14.3, − 2.5), referrals (− 3.7 pp; 95% CI: − 6.1, − 1.2), and pre-authorization (− 5.1 pp; 95% CI: − 8.3, − 2.0) were less likely to receive prescribed HH. In adjusted analyses, PPO enrollees in plans with cost sharing were −7.0 pp (95% CI: − 12.7, − 1.4) less likely to receive HH, but there was no difference for those with referrals (1.1 pp; 95% CI, − 1.5, 3.7) or pre-authorization (1.6 pp; 95% CI: −0.6, − 3.9).

CONCLUSIONS: Among Medicare beneficiaries, MA enrollees were less likely to receive prescribed post-acute HH compared with TM. As enrollment in MA continues to grow, it is important to examine how differences in utilization relate to outcomes.

KEY WORDS: home health; home care; Medicare Advantage; managed care; post-acute care.

INTRODUCTION

Medicare Advantage (MA) covers more than one-third of all Medicare beneficiaries.[1] MA plans are required to provide at least the same benefits as Traditional fee-for-service Medicare (TM), but can impose utilization management tools (e.g., referrals) or use narrow provider networks to control costs which may lead to lower utilization. Indeed, several studies have shown that the utilization of post-acute care, the major source of variation in Medicare expenditures,[2] is lower for MA enrollees.[3–8]

Home health is a unique type of post-acute care, which is available to Medicare beneficiaries as a benefit for those who are homebound and need intermittent care (e.g., skilled nursing, physical therapy). While TM enrollees face no additional cost barriers to access home health care, cost sharing and other utilization controls may reduce access for MA enrollees and could potentially impact post-acute rehabilitation. Previous research has shown lower home health utilization for MA enrollees compared with TM enrollees as well as substantial geographic variation.[3–6, 8] This lower health care utilization by MA enrollees may be due to having better unobserved health status.[9, 10] However, differences in home health utilization between MA and TM enrollees could be driven by financial incentives for MA plans. Specifically, MA plans receive a per member per month rate to cover all health care services and therefore earn revenue by limiting care. Thus, cost sharing, pre-authorization, and referral requirements may explain the lower utilization of home health care by MA enrollees; however, evidence pertaining to the impact of utilization restrictions on home health is mixed.[6, 11]

MA enrollees may also have reduced access to home health care. To ensure that MA enrollees are able to receive comparable health care services to TM enrollees, the Centers for Medicare and Medicaid Services (CMS) requires MA plans to demonstrate network adequacy (i.e., having a sufficient number of providers) for most types of health care providers. While network adequacy must be achieved for some types of post-acute care providers, such as skilled nursing facilities, home health agencies are currently exempt from the network adequacy requirement.[12]

Previous studies[3, 6] have only assessed MA versus TM differences in home health care utilization after home health has already been received. This study builds upon this prior work by examining home health utilization among a group of patients who were prescribed home health at hospital discharge. The specific objectives of this study were to assess differences in the probability of receiving prescribed post-acute home health care between TM and MA enrollees and to describe MA plan characteristics associated with home health receipt among MA enrollees.

METHODS

Data Sources

We conducted secondary analyses of the Medicare Provider Analysis and Review (MedPAR) file, which includes hospitalizations for all TM enrollees and over 90% of MA enrollees;[5, 7, 13] the Medicare Master Beneficiary Summary File (MBSF), which includes enrollment and demographic information for all Medicare beneficiaries; home health Outcome and Assessment Information Set (OASIS), which are mandatory home health patient assessments; and CMS Plan Characteristics file for 2017, which includes detailed MA plan characteristics.

Study Population

Our sample included Medicare beneficiaries aged 66 years and older with an incident hospitalization (i.e., no hospitalization in prior year). We restricted the analysis to incident hospitalizations because patients with prior hospitalizations may have unobserved differences in illness severity and home health selection patterns.[14, 15] We include only hospitalizations that were prescribed home health at discharge with a primary diagnosis that commonly requires post-acute home health care. These were joint replacement, pneumonia, chronic obstructive pulmonary disorder, stroke, urinary tract infection, septicemia, acute renal failure, or congestive heart failure.[16] We defined home health prescription using the discharge destination code in MedPAR. CMS expects the discharge destination code to be recorded accurately, as it could impact both the diagnosis-related group-based payment for the hospital and the payment for the post-acute provider.[17] Previous studies have shown high correspondence (95% agreement)

between the home health discharge destination code with the presence of a home health claim among TM enrollees.[18] Furthermore, the agreement between the skilled nursing facility discharge destination code and the presence of a nursing home resident assessment (Minimum Data Set) was 94% for both TM and MA enrollees (Appendix Table 1). Hospitals code the discharge destination based on the discharge summary. As such, we infer that patients with home health discharge codes will be comparable because a physician has placed an order for home-based care rather than more intensive inpatient post-acute care, or no post-acute care at all. Indeed, patients prescribed post-acute home health were similar between TM and MA on measures of health (e.g., intensive care unit admission) (Appendix Table 2).

Outcome Variable

We used OASIS to assess receipt of home health within 14 days of hospital discharge. OASIS is the patient assessment required for all Medicare beneficiaries who receive home health from a Medicare-certified agency. We used OASIS to assess home health utilization instead of claims because Medicare home health claims are not generated for MA patients.

Independent Variables

We assessed MA enrollment status, the main explanatory variable, at hospital admission using the MBSF. Other patient characteristics obtained from the MBSF were age, sex, and dual enrollment in Medicaid. We included a number of characteristics from the hospitalization including primary diagnosis, length of stay, intensive care unit admission, and admission from the emergency department. To capture illness burden, we used a count of beneficiaries' Elixhauser comorbidities according to the diagnoses listed on the hospital claim.[19]

We also include patients' home ZIP code-level characteristics to account for neighborhood-level differences between MA and TM enrollees that may explain receipt of home health care. These include the percent of Medicare beneficiaries dually enrolled in Medicaid, percent of beneficiaries enrolled in MA, and the percent of beneficiaries who were Black.

Statistical Analysis

Bivariate comparisons between MA and TM patients who received prescribed home health versus those who did not were compared using t tests and χ^2 tests for continuous and categorical variables, respectively. We used linear probability models to examine the associations between MA enrollment and other factors with the receipt of prescribed home health, adjusting for demographic characteristics, hospitalization characteristics (e.g., primary diagnosis, length of stay), patients' home ZIP code characteristics, and year. We used three models: a model with the aforementioned covariates that included state fixed effects, a model with hospital fixed effects, and a model with ZIP code fixed effects (excluding ZIP

Table 1 Characteristics of Medicare Beneficiaries Prescribed Post-acute Home Health Care at Hospital Discharge According to MedPAR Discharge Destination Code, by Insurer and Receipt of Home Health According to OASIS Assessment Within 14 Days (2011–2017)

Characteristics	Pooled (N = 2,723,245)	Traditional Medicare (N = 1,849,532)*		Medicare Advantage (N = 873,713)*	
		Did not receive home health (n = 469,343)	Received home health (n = 1,380,189)	Did not receive home health (n = 332,966)	Received home health (n = 540,747)
Age, years no. (%)					
66–74	1,176,171 (43.2)	206,205 (43.9)	596,815 (43.2)	141,838 (42.6)	231,313 (42.8)
75–84	972,350 (35.7)	152,938 (32.6)	491,255 (35.6)	122,911 (36.9)	205,246 (38.0)
≥ 85	574,724 (21.1)	110,200 (23.5)	292,119 (21.2)	68,217 (20.5)	104,188 (19.3)
Gender, no. (%)					
Male	1,111,776 (40.8)	196,137 (41.8)	560,574 (40.6)	140,947 (42.3)	214,118 (39.6)
Female	1,611,461 (59.2)	273,205 (58.2)	819,611 (59.4)	192,019 (57.7)	326,626 (60.4)
Race, no. (%)					
White	2,332,437 (85.6)	396,832 (84.6)	1,215,139 (88.0)	266,719 (80.1)	453,747 (83.9)
Black	241,884 (8.9)	44,160 (9.4)	99,358 (7.2)	39,063 (11.7)	59,303 (11.0)
Other	148,916 (5.5)	28,350 (6.0)	65,688 (4.8)	27,184 (8.2)	27,694 (5.1)
Dually enrolled with Medicaid, no. (%)	276,251 (10.1)	62,949 (13.4)	128,730 (9.3)	39,199 (11.8)	45,373 (8.4)
Primary diagnosis, no. (%)					
Joint replacement	1,184,979 (43.5)	162,832 (34.7)	661,854 (48.0)	114,838 (34.5)	245,455 (45.4)
Pneumonia	237,386 (8.7)	48,322 (10.3)	117,264 (8.5)	29,439 (8.8)	42,361 (7.8)
Chronic obstructive pulmonary disease	192,625 (7.1)	38,486 (8.2)	91,274 (6.6)	26,490 (8.0)	36,375 (6.7)
Stroke	190,244 (7.0)	33,806 (7.2)	87,025 (6.3)	29,614 (8.9)	39,799 (7.4)
Urinary tract infection	126,116 (4.6)	30,512 (6.5)	58,795 (4.3)	16,902 (5.1)	19,907 (3.7)
Septicemia	329,535 (12.1)	63,092 (13.4)	149,970 (10.9)	50,611 (15.2)	65,862 (12.2)
Acute renal failure	140,441 (5.2)	31,007 (6.6)	62,649 (4.5)	20,582 (6.2)	26,203 (4.8)
Congestive heart failure	321,919 (11.8)	61,286 (13.1)	151,358 (11.0)	44,490 (13.4)	64,785 (12.0)
Hospital length of stay, mean (SD)	4.9 (3.2)	5.1 (3.3)	4.8 (3.1)	5.1 (3.4)	5.01 (3.4)
Intensive care unit admission, no. (%)	499,909 (18.4)	96,314 (20.5)	242,397 (17.6)	70,619 (21.2)	90,579 (16.8)
Emergency room admission, no. (%)	1,368,830 (50.3)	277,762 (59.2)	657,015 (47.6)	180,932 (54.3)	253,121 (46.8)
Elixhauser comorbidity count, mean (SD)	2.9 (1.8)	2.9 (1.8)	2.7 (1.8)	3.0 (1.8)	3.0 (1.8)
Proportion MA beneficiaries in ZIP, mean (SD)	0.30 (0.15)	0.27 (0.14)	0.26 (0.14)	0.39 (0.14)	0.38 (0.14)
Proportion Black beneficiaries in ZIP, mean (SD)	0.10 (0.17)	0.11 (0.18)	0.09 (0.16)	0.11 (0.19)	0.11 (0.19)
Proportion % Dual beneficiaries in ZIP, mean (SD)	0.13 (0.10)	0.13 (0.10)	0.12 (0.09)	0.15 (0.12)	0.13 (0.10)

MedPAR, Medicare Provider Analysis and Review; OASIS, Outcome and Assessment Information Set
*Differences between patients that received prescribed home health and those that did not were compared using t tests and chi-squared tests, all p values < 0.001
Measured from 0 to 1

code characteristics due to collinearity). Importantly, estimates in these fixed effects analyses are derived from differences in receiving prescribed home health between MA and TM enrollees from the same state, hospital, or ZIP code. The hospital fixed effects specification, in particular, picks up potential linkages between hospitals and post-acute care providers.[20, 21] We used linear instead of logistic regression for computational efficiency and because higher order fixed effects may bias non-linear models.[22] Standard errors were clustered at the state level. Data were analyzed with Stata MP version 16.0 (College Station, TX). Findings were considered significant at $p < 0.05$ (2-sided).

Supplementary Analysis

Among a subgroup of MA enrollees with enrollment in a health maintenance organization (HMO) or local/regional preferred provider organization (PPO) plan, we also assessed the association of plan characteristics in 2017 with the receipt of prescribed post-acute home health. We excluded individuals enrolled in integrated Medicare-Medicaid plans as well as Program of All-Inclusive Care for the Elderly plans as their payment and network design differ from the rest of the MA program and should not be considered MA plans in comparisons between MA and TM. In both our MA and TM samples, we include those who are dually eligible with Medicaid. The specific plan characteristics examined were co-payments, co-insurance, referral, and pre-authorization requirements for home health. We combined copay and coinsurance as one cost sharing category because the proportion of plans with either characteristic was small and because there was no plan with both copay and coinsurance requirements. We used the same covariates as in the main analysis (excluding year) and also included an indicator for whether a plan was a special needs

Table 2 Percentage Point Differences in the Probability of Receiving Prescribed Post-acute Home Health According to MedPAR Discharge Destination Code and OASIS Assessment Within 14 Days (N = 2,723,233)

Characteristic	Unadjusted* (95% CI)	Adjusted* with state FEs† (95% CI)	Adjusted* with hospital FEs† (95% CI)	Adjusted* with ZIP code FEs† (95% CI)
Insurance type (reference: Traditional Medicare fee-for-service)				
Medicare Advantage	−12.73|| (−12.85, −12.62)	−11.65|| (−16.83, −6.47)	−11.68|| (−17.20, −6.17)	−11.73|| (−17.02, −6.43)
Age, years (reference: 66–74)				
75–84	1.22|| (1.10, 1.34)	5.20|| (4.70, 5.70)	5.18|| (4.69, 5.68)	5.23|| (4.70, 5.75)
≥85	−1.45|| (−1.60, −1.31)	6.53|| (5.40, 7.66)	6.53|| (5.42, 7.63)	6.63|| (5.46, 7.79)
Female (reference: male)	1.45|| (1.34, 1.56)	1.50|| (1.10, 1.89)	1.51|| (1.16, 1.87)	1.51|| (1.14, 1.88)
Race (reference: White)				
Black	−5.96|| (−6.15, −5.77)	−1.24§ (−2.13, −0.34)	−1.01‡ (−1.92, −0.11)	−1.25‡ (−2.19, −0.31)
Other	−8.84|| (−9.08, −8.60)	−1.54 (−3.29, 0.22)	−0.60 (−1.67, 0.47)	−0.56 (−1.89, 0.77)
Dually enrolled with Medicaid coverage (Reference no dual coverage)				
Dually enrolled with Medicaid	−8.36|| (−8.54, −8.18)	−3.05 (−6.56, 0.46)	−2.66 (−6.04, 0.73)	−2.93 (−6.41, 0.56)
Primary diagnosis (reference: joint replacement)				
Pneumonia	−9.32|| (−9.52, −8.13)	−13.74|| (−15.76, −11.72)	−13.05|| (−14.68, −11.43)	−13.37|| (−15.20, −11.55)
Chronic obstructive pulmonary disease	−10.30|| (−10.52, −10.08)	−12.92|| (−15.26, −10.59)	−12.23|| (−14.18, −10.28)	−12.54|| (−14.67, −10.41)
Stroke	−9.90|| (−10.12, −9.68)	−11.33|| (−13.01, −9.65)	−10.82|| (−12.45, −9.19)	−10.98|| (−12.44, −9.51)
Urinary tract infection	−14.16|| (−14.43, −13.90)	−18.07|| (−20.05, −16.09)	−17.00|| (−18.52, −15.48)	−17.35|| (−19.18, −15.52)
Septicemia	−11.07|| (−11.25, −10.90)	−13.75|| (−15.51, −11.98)	−13.32|| (−14.60, −12.05)	−13.44|| (−14.93, −11.95)
Acute renal failure	−13.30|| (−13.55, −13.05)	−16.51|| (−18.43, −14.59)	−15.95|| (−17.54, −14.35)	−16.07|| (−17.81, −14.32)
Congestive heart failure	−9.43|| (−9.60, −9.25)	−13.02|| (−15.29, −10.76)	−12.52|| (−14.61, −10.43)	−12.65|| (−14.75, −10.55)
Hospital length of stay	−0.39|| (−0.41, −0.37)	0.31|| (0.24, 0.38)	0.31|| (0.24, 0.38)	0.31|| (0.24, 0.39)
Intensive care unit admission	−4.82|| (−4.95, −4.68)	0.01 (−0.63, 0.61)	0.49‡ (0.10, 0.89)	0.33 (−0.03, 0.70)
Emergency room admission	−8.14|| (−8.25, −8.03)	0.29 (−1.42, 2.00)	0.04 (−1.32, 1.40)	−0.02 (−1.40, 1.36)
Elixhauser comorbidity count	−1.06|| (−1.09, −1.03)	0.47|| (0.27, 0.66)	0.41|| (0.23, 0.59)	0.46|| (0.24, 0.68)

MedPAR, Medicare Provider Analysis and Review; OASIS, Outcome and Assessment Information Set; CI, confidence interval; FE, fixed effect

*Coefficients were multiplied by 100 to be interpreted as percentage point differences

†Adjusted for ZIP code characteristics: proportion MA beneficiaries, Black beneficiaries, dual Medicaid-Medicare beneficiaries

‡p < 0.05, §p < 0.01, ||p < 0.001

Table 3 Percentage Point Differences in the Probability of Receiving Prescribed Post-acute Home Health According to MedPAR Discharge Destination Code and OASIS Assessment Within 14 Days Among 2017 Medicare Health Maintenance Organization Enrollees ($N = 102,321$)

Characteristic	Unadjusted* (95% CI)	Adjusted* with state FEs (95% CI)†	Adjusted* with hospital FEs (95% CI)†	Adjusted* with ZIP code FEs (95% CI)
Plan requirements for home health (reference: no requirements)†				
Cost sharing†	−11.56‖ (−14.28, −8.85)	−8.38‖ (−14.29, −2.48)	−5.72‖ (−9.50, −1.95)	−7.67‖ (−12.14, −3.20)
Referral	−13.44‖ (−14.05, −12.82)	−3.67‖ (−6.13, −1.21)	−3.21‖ (−5.09, 1.33)	−2.81§ (−5.08, 0.55)
Pre-authorization	−3.82‖ (−4.44, −3.19)	−5.14‖ (−8.31, −1.97)	−2.24§ (−4.03, 0.44)	−7.67‖ (−11.53, −3.81)
SNP (reference: not a SNP)	−8.80‖ (−9.69, −7.91)	−4.07§ (−7.33, −0.81)	−2.49§ (−4.89, −0.10)	−3.93§ (−6.98, −0.88)
Age, years (reference: 66–74)				
75–84	0.27 (−0.41, 0.95)	3.83‖ (3.01, 4.64)	3.55‖ (2.78, 4.32)	3.39‖ (2.51, 4.28)
≥85	−1.46‖ (−2.28, −0.63)	7.34‖ (6.06, 8.61)	7.09‖ (5.90, 8.27)	7.01‖ (5.67, 8.35)
Female (reference: male)	3.78‖ (3.16, 4.40)	2.13‖ (1.53, 2.74)	2.04‖ (1.46, 2.61)	2.02‖ (1.38, 2.67)
Race (reference: White)				
Black	−2.08‖ (−3.00, −1.16)	−0.15 (−1.50, 1.19)	−0.55 (−1.84, 0.75)	−0.12 (−1.71, 1.48)
Other	−10.33‖ (−11.36, −9.29)	−2.42‖ (−4.04, −0.79)	−1.63§ (−3.01, −0.26)	−2.07‖ (−3.70, −0.44)
Dually enrolled with Medicaid coverage (Ref: no dual coverage)				
Dually enrolled with Medicaid	−7.06‖ (−7.97, −6.15)	−0.12 (−2.54, 2.79)	0.16 (−1.91, 2.23)	−0.41 (−2.20, 3.02)
Primary diagnosis (reference: joint replacement)				
Pneumonia	−13.80‖ (−15.14, −12.45)	−18.23‖ (−23.09, −13.37)	−21.36‖ (−26.49, −16.23)	−18.68‖ (−23.51, −13.86)
Chronic obstructive pulmonary disease	−12.00‖ (−13.26, −10.75)	−14.82‖ (−19.70, −9.95)	−18.36‖ (−23.56, −13.16)	−15.34‖ (−20.08, −10.61)
Stroke	−14.73‖ (−15.86, −13.61)	−14.64‖ (−19.42, −9.87)	−18.46‖ (−23.66, −13.26)	−15.60‖ (−20.31, −10.88)
Urinary tract infection	−16.47‖ (−18.24, −14.71)	−19.02‖ (−23.84, −14.19)	−21.80‖ (−26.98, −16.63)	−19.29‖ (−23.96, −14.63)
Septicemia	−15.27‖ (−16.12, −14.41)	−17.48‖ (−22.56, −12.41)	−21.56‖ (−26.93, −16.19)	−18.08‖ (−23.00, −13.16)
Acute renal failure	−14.80‖ (−16.23, −13.36)	−17.85‖ (−22.61, −13.08)	−20.86‖ (−24.92, −15.81)	−17.96‖ (−22.60, −13.12)
Congestive heart failure	−10.56‖ (−11.53, −9.58)	−14.13‖ (−18.83, −9.43)	−18.33‖ (−23.55, −13.12)	−14.67‖ (−19.29, −10.06)
Hospital length of stay	−0.39‖ (−0.48, −0.30)	0.47‖ (0.35, 0.59)	0.46‖ (0.35, 0.57)	0.48‖ (0.36, 0.60)
Intensive care unit admission	−9.67‖ (−10.44, −8.90)	−2.46‖ (−3.69, −1.23)	2.31‖ (1.08, 3.55)	−0.34 (−1.52, 0.85)
Emergency room admission	−9.66‖ (−10.26, −9.05)	0.79 (−4.10, 2.52)	4.69§ (0.28, 9.10)	0.07 (−3.03, 3.17)
Elixhauser comorbidity count	−0.76‖ (−0.92, −0.59)	1.01‖ (0.79, 1.22)	0.57‖ (0.37, 0.77)	0.93‖ (0.70, 1.16)

MedPAR, Medicare Provider Analysis and Review; OASIS, Outcome and Assessment Information Set; CI, confidence interval; FE, fixed effect; SNP, special needs plan

Coefficients were multiplied by 100 to be interpreted as percentage point difference

†Adjusted for ZIP code characteristics: proportion MA beneficiaries, Black beneficiaries, dual Medicaid-Medicare beneficiaries

‡Cost sharing includes copays ($5–30) and coinsurance

§$p < 0.05$, ‖$p < 0.01$, ¶$p < 0.001$

Table 4 Percentage Point Differences in the Probability of Receiving Prescribed Post-acute Home Health According to MedPAR Discharge Destination Code and OASIS Assessment Within 14 Days Among 2017 Medicare Preferred Provider Organization Enrollees (N = 42,701)

Characteristic	Unadjusted* (95% CI)	Adjusted* with state FEs† (95% CI)	Adjusted* with Hospital FEs† (95% CI)	Adjusted* with ZIP Code FEs (95% CI)
Plan requirements for home health (reference: no requirements)				
Cost sharing‡	−12.23‖ (−18.39, −6.06)	−7.01§ (−12.68, −1.35)	0.90 (−6.17, 7.97)	4.32 (−2.72, 11.37)
Referral	5.16‖ (3.36, 6.96)	1.09 (−1.50, 3.67)	0.19 (−2.35, 2.72)	1.53 (−2.24, 5.29)
Pre-authorization	4.58‖ (3.61, 5.54)	1.65 (−0.63, 3.94)	0.47 (−1.25, 2.19)	0.44 (−1.87, −2.75)
SNP (reference: not a SNP)	−0.72 (−2.52, 1.09)	4.28§ (1.57, 6.99)	0.80 (−1.26, 2.87)	1.50 (−1.36, −4.37)
Age, years (reference: 66–74)				
75–84	0.86 (−0.15, 1.87)	3.20‖ (1.95, 4.45)	3.25‖ (2.05, 4.46)	3.16‖ (1.84, 4.48)
≥85	−2.41‖ (−3.75, −1.07)	5.20‖ (3.52, 6.88)	5.46‖ (3.61, 7.31)	5.27‖ (3.32, 7.23)
Female (reference: male)	2.38‖ (1.44, 3.32)	1.40‖ (0.53, 2.26)	1.47‖ (0.63, 2.31)	1.56‖ (0.49, 2.64)
Race (reference: White)				
Black	−0.14 (−1.59, 1.32)	−0.09 (−2.03, 1.85)	−0.39 (−2.40, 1.62)	−0.21 (−2.43, 2.86)
Other	−9.64‖ (−12.14, −7.14)	−2.77‖ (−5.12, −0.42)	−1.47§ (−3, 86, −0.74)	−1.45‖ (−4.76, −1.86)
Dually enrolled with Medicaid coverage (Ref: no dual coverage)				
Dually enrolled with Medicaid	−4.36‖ (−6.50, −2.22)	−2.51 (−4.77, 0.25)	0.23 (−2.56, 2.10)	−0.76 (−3.90, 2.37)
Primary diagnosis (reference: joint replacement)				
Pneumonia	−9.69‖ (−11.79, −7.62)	−14.77‖ (−17.47, −12.08)	−15.84‖ (−18.58, −13.09)	−14.39‖ (−17.90, −10.89)
Chronic obstructive pulmonary disease	−9.65‖ (−11.55, −7.74)	−13.10‖ (−15.87, −10.34)	−14.37‖ (−17.20, −11.54)	−13.90‖ (−17.72, −10.08)
Stroke	−9.58‖ (−11.36, −7.80)	−11.64‖ (−14.01, −9.27)	−12.32‖ (−14.86, −9.78)	−10.30‖ (−13.15, −7.44)
Urinary tract infection	−11.90‖ (−14.66, −9.13)	−16.12‖ (−19.33, −12.91)	−17.18‖ (−20.55, −13.81)	−14.41‖ (−18.92, −9.89)
Septicemia	−9.48‖ (−10.88, −8.09)	−13.88‖ (−16.36, −11.40)	−15.23‖ (−17.75, −12.71)	−13.38‖ (−16.61, −10.16)
Acute renal failure	−13.18‖ (−15.39, −10.97)	−17.69‖ (−21.06, −14.33)	−18.91‖ (−22.57, −15.25)	−16.55‖ (−20.46, −12.65)
Congestive heart failure	−9.34‖ (−10.91, −7.78)	−14.07‖ (−16.79, −11.34)	−14.82‖ (−17.77, −11.86)	−13.77‖ (−17.42, −10.11)
Hospital length of stay	−0.15§ (−0.29, −0.02)	0.70‖ (0.53, 0.87)	0.64‖ (0.46, 0.81)	0.70‖ (0.47, 0.93)
Intensive care unit admission	−6.69‖ (−7.85, −5.54)	−2.15‖ (−3.62, −0.69)	0.20 (−1.70, 1.29)	−2.17§ (−3.97, −0.37)
Emergency room admission	−9.26‖ (−10.18, −8.34)	0.99 (−2.92, 0.93)	−0.50 (2.53, 1.54)	1.04 (−3.70, 1.62)
Elixhauser comorbidity count	−0.42‖ (−0.67, −0.16)	0.63‖ (0.37, 0.88)	0.68‖ (0.41, 0.95)	0.79‖ (0.44, 1.15)

MedPAR, Medicare Provider Analysis and Review; OASIS, Outcome and Assessment Information Set; CI, confidence interval; FE, fixed effect; SNP, special needs plan

Coefficients were multiplied by 100 to be interpreted as percentage point difference

*Adjusted for ZIP code characteristics

†Adjusted for ZIP code characteristics

‡Cost sharing includes copays ($5–30) and coinsurance

§p < 0.05, ‖p < 0.01, ¶p < 0.001

plan (SNP). We conducted separate analysis for individuals with HMOs and PPOs due to important differences in these types of plans.[1] Specifically, HMOs on average have lower premiums and out-of-pocket limits compared with PPOs, and HMOs do not cover care outside their network whereas PPOs partially cover out of network care. In our sample of prescribed post-acute home health, there are several differences between HMO and PPO enrollees (e.g., 78% of HMO enrollees are White vs. 85% of PPO enrollees) and plan characteristics related to home health (e.g., 57% of HMO enrollees are in a plan that require referral for home health vs. 7.5% of PPO enrollees) (Appendix Table 3). In all MA-only analyses, standard errors were clustered at the plan level.

The institutional review board at Brown University approved this study and determined it to be exempt.

RESULTS

From 2011 to 2017, 2,723,245 Medicare beneficiaries newly hospitalized were prescribed home health at discharge; 873,713 (32%) beneficiaries had MA coverage and 1,849,532 (68%) had TM (Table 1). A higher proportion of TM enrollees (75%; $n = 1,380,189$) received home health based on presence of an OASIS assessment within 14 days of hospital discharge as prescribed compared with 63% ($n = 540,747$) of MA enrollees. There were significant differences within insurer type across all characteristics between patients that received prescribed home health and those that did not (p value < 0.001).

In the unadjusted analysis, MA enrollees were -12.7 percentage points (95% confidence interval (CI): -12.9 to -12.6) less likely to receive prescribed home health compared with TM enrollees (Table 2). In adjusted analyses including state fixed effects, MA enrollees were -11.7 percentage points (95% CI: -16.8 to -6.5) less likely to receive prescribed home health. Findings were consistent in specifications with either patient ZIP code or hospital fixed effects.

In 2017, there were 145,023 HMO enrollees prescribed post-acute home health (Table 3). In unadjusted analyses, HMO enrollees in plans with cost sharing were -11.6 percentage points (95% CI, -14.3 to -8.9) less likely to receive prescribed home health compared with HMO enrollees in plans without any restrictions. Similarly, HMO enrollees in plans with referrals were -13.4 percentage points (95% CI, -14.1 to -12.8) less likely to receive prescribed home health compared with HMO enrollees in plans without restrictions. HMO enrollees in plans with pre-authorization requirements were -3.8 percentage points (95% CI, -4.4 to -3.2) less likely to be prescribed home health compared with HMO enrollees in plans without restrictions. In analyses adjusted for state fixed effects, HMO enrollees in plans with cost sharing, referrals, and pre-authorization were -8.4 percentage points (95% CI, -14.3 to -2.5), -3.7 percentage points (95% CI, -6.1 to -1.2), and -5.1 percentage points (95% CI, -8.3

to -2.0) less likely to receive prescribed home health compared with HMO enrollees in plans without restrictions, respectively. Results were generally consistent in the specifications including ZIP code and hospital fixed effects. Across all model specifications, HMO enrollees in a SNP were less likely to receive prescribed home health (-2 to -9 percentage points).

In 2017, there were 42,701 enrollees in a local or regional PPO prescribed post-acute home health (Table 4). In unadjusted analyses, PPO enrollees in plans with cost sharing were -12.2 percentage points (95% CI, -18.4 to -6.1) less likely to receive prescribed home health compared with HMO enrollees in plans without any restrictions. In contrast, PPO enrollees in plans with referrals or pre-authorization were more likely to receive prescribed home health compared with PPO enrollees in plans without restrictions, 5.2 percentage points (95% CI, 3.4 to 7.0) and 4.6 percentage points (95% CI 3.6 to 5.5), respectively. In adjusted analyses for PPO enrollees, however, referral requirements and pre-authorization were not associated with the receipt of prescribed home health care. Cost sharing and SNP enrollment were associated with a lower probability of receiving prescribed home health in the state fixed effects specification only.

DISCUSSION

Among a national sample of Medicare beneficiaries discharged from the hospital and prescribed post-acute home health care, we found that receipt of post-acute home health care was lower for MA enrollees compared with TM enrollees discharged from the same hospital, from the same state, and/or from the same ZIP code, and after adjusting for demographic and clinical characteristics. We also found that among MA enrollees, those enrolled in an HMO plan with home health utilization restrictions (i.e., cost sharing, pre-authorization, referral requirements) were less likely to receive prescribed home health.

The lower utilization of home health for MA enrollees and its relation to MA plan characteristics is consistent with findings from previous studies.[3–6] We extend this literature in three key ways. First, we compared differences in home health utilization among those who were prescribed post-acute home health at discharge from the hospital, which circumvents a key limitation of previous work: confounding by indication. While prior studies have found lower home health utilization among MA enrollees compared with TM, we observed that even when hospital clinicians prescribed home health to MA enrollees they were less likely to receive it than their TM counterparts. Second, our inclusion of hospital fixed effects is an important methodological approach that allows for us to estimate differences in home health receipt rates between enrollees admitted to the same hospitals. Our results were also consistent when we used fixed effects for the patients' home

ZIP codes. Third, we conducted a supplemental analysis among MA enrollees only and found that home health receipt was associated with HMO plan characteristics, but not for PPO enrollees. This difference could be due to PPOs selectively implementing utilization restrictions to discourage use of out-of-network providers.

Although cost sharing was associated with being less likely to receive prescribed home health, it is a tool infrequently used by MA plans.[6, 23] Therefore, it is unlikely that patient cost sharing for home health is driving the differences we observed in receipt of prescribed post-acute home health care. Indeed, there are several other factors that may contribute to the observed differences in receipt of prescribed home health care between MA and TM enrollees: because a defining characteristic of HMOs are their networks, one possible explanation for our findings could be network adequacy (i.e., not enough available high-quality home health agencies in a plan's network so a patient decided to forgo home health altogether),[6, 24] which is important to investigate as plan network data become more available. Furthermore, as MA commonly pays home health agencies per visit instead of through a prospective episode-based payment like TM, MA patients may be financially less desirable to home health agencies.[6] Another reason for differences in MA and TM utilization of prescribed home health could be a higher rate of health refusals among MA beneficiaries.[25] While previous qualitative research has examined reasons for home health refusals, we are unaware of any existing literature that has examined differences in refusals between MA and TM patients specifically, making this an important future area of research.

Although this paper improves upon other studies examining home health among MA enrollees by restricting analyses to post-acute patients prescribed home health at hospital discharge, there are important limitations to note. Because this is an observational study, we cannot rule out residual confounding. There is known selection into MA based on higher health status;[9, 10] however, the MA patients who were prescribed home health were similar to their TM counterpart in terms of comorbidities, and ICU utilization. In addition, by using the discharge destination code, it may be inferred that the ordering physician has deemed a need for home-based post-acute care rather than inpatient post-acute care (or no post-acute care at all). Furthermore, this study only focuses on receipt of home health, not patient outcomes; therefore, future work is needed to understand how these differences in utilization influence beneficiaries' health outcomes.

CONCLUSION

Among hospitalized Medicare beneficiaries, MA enrollees were less likely to receive post-acute home health that was prescribed at hospital discharge compared with their TM counterparts. This difference in utilization was not explained by differences in admitting hospital, primary diagnoses, or observed illness. Enrollees of MA HMO plans with more utilization restrictions were less likely to received prescribed home health; however, the reasons for this disparity in home health receipt and its ultimate impact on patients' health outcomes must be further examined as MA enrollment grows. Clinicians who care for MA enrollees should be mindful when ordering home health for these patients, as their post-acute care may not be received.

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Compliance with Ethical Standards:

The institutional review board at Brown University approved this study and determined it to be exempt.

Conflict of Interest: Lacey Loomer was previously a paid consultant to the American Health Care Association. Cyrus Kosar, David Meyers, and Kali Thomas report no conflicts of interest. The views expressed in this article are those of the authors and do not necessarily reflect the position or policy of the National Institutes of Health, the Department of Veterans Affairs, or the United States government.

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