



# Impact of Telehealth Use for Primary Care Among Mississippi Medicare Beneficiaries with Hypertension

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## INTRODUCTION

Hypertension is one of the most prevalent chronic conditions among Medicare beneficiaries and a major, modifiable risk factor for cardiovascular and renal diseases. Effective hypertension management is essential to prevent adverse outcomes, often relying on consistent primary care interventions. The COVID-19 pandemic accelerated the adoption of telehealth, making healthcare services more accessible, particularly for hypertension management. However, as the pandemic subsides, debates about the cost-effectiveness of telehealth in the post-COVID-19 era persist. In Mississippi, where one-third of residents live in primary care shortage areas, telehealth presents an opportunity to bridge gaps in healthcare access.

## AIM

This study evaluates the impact of telehealth utilization within primary care settings on sociodemographic disparities, healthcare resource utilization (HCRU), spending, and antihypertensive medication adherence among Medicare beneficiaries with hypertension in Mississippi.

## METHODS

### Study Design

A retrospective cohort study analyzing Medicare claims data from Mississippi beneficiaries between 2019–2021, adjusting for primary care utilization.

### Inclusion criteria:

- Adult beneficiaries (aged 18 and older) who were continuously enrolled in Medicare Parts A, B, and D and accessed primary care during the study period.
- Diagnosed with hypertension in at least two separate years.

### Exclusion criteria:

- Beneficiaries who had Part C coverage or were entitled to Medicare due to end-stage renal disease were excluded.

### Telehealth for Primary Care Services

- Primary care services were identified based on the 2-step attribution method of the Centers for Medicare & Medicaid Services (CMS) using the Healthcare Common Procedure Coding System (HCPCS) and CMS specialty codes.
- Telehealth services were identified using place of service codes and telehealth modifiers. A practice was classified as telehealth use for primary care if its claim included both primary care service and telehealth service codes.

### Marginal Structural Modeling (MSM)

With the COVID-19 pandemic, time-varying confounders impacted primary care practices, telehealth utilization, and study outcomes. To account for both time-invariant baseline covariates and time-varying confounders, we employed an MSM approach using inverse probability of treatment weights (IPTW) in conjunction with mixed-effects models.

## RESULTS

### Key Findings

- Telehealth was more commonly used by participants who were younger, female, White beneficiaries, those entitled due to disability insurance benefits, dually enrolled in Medicaid, residing in non-rural areas, and with a higher comorbidity index. Telehealth users had higher continuity of care scores and more primary care visits in 2019. Additionally, they accessed a broader range of primary care providers, though with a lower proportion of services from surgeons and other specialists. (Table 1)
- Telehealth utilization was associated with a 0.9% increase in outpatient visits and a 5.9% increase in ED visits, indicating increased triage touchpoints. A 14.1% decrease in inpatient admissions and a 23.7% decrease in 30-day readmissions, PMPY, were also noted. Telehealth utilization also significantly reduced all spending, PMPY: 12.4% in Medicare medical spending, 26.2% in beneficiary OOP medical spending, 13.5% in gross medical spending, 12.6% in Medicare part D spending, 0.7% beneficiary OOP pharmacy spending, and 5.2% gross pharmacy spending.
- It was further associated with a 3.6% increase in antihypertensive medication adherence. (Table 2)

### Conclusion

1. Telehealth use among Medicare beneficiaries with hypertension was associated with improved antihypertensive medication adherence, increased outpatient and ED visits, but reduced inpatient admissions and 30-day readmissions, **suggesting its potential to enhance hypertension management by augmenting primary care services.**
2. The associated decrease in Medicare, beneficiary OOP, and overall medical and pharmacy spending **indicates effective cost management** under current Medicare telehealth reimbursement policies.
3. However, **significant sociodemographic disparities** in telehealth access, particularly among older, minority, and rural populations, highlight concerns regarding the digital divide. Addressing these disparities and addressing health equity is crucial post-pandemic.

Figure 1. Absolute standardized difference before and after IPTW

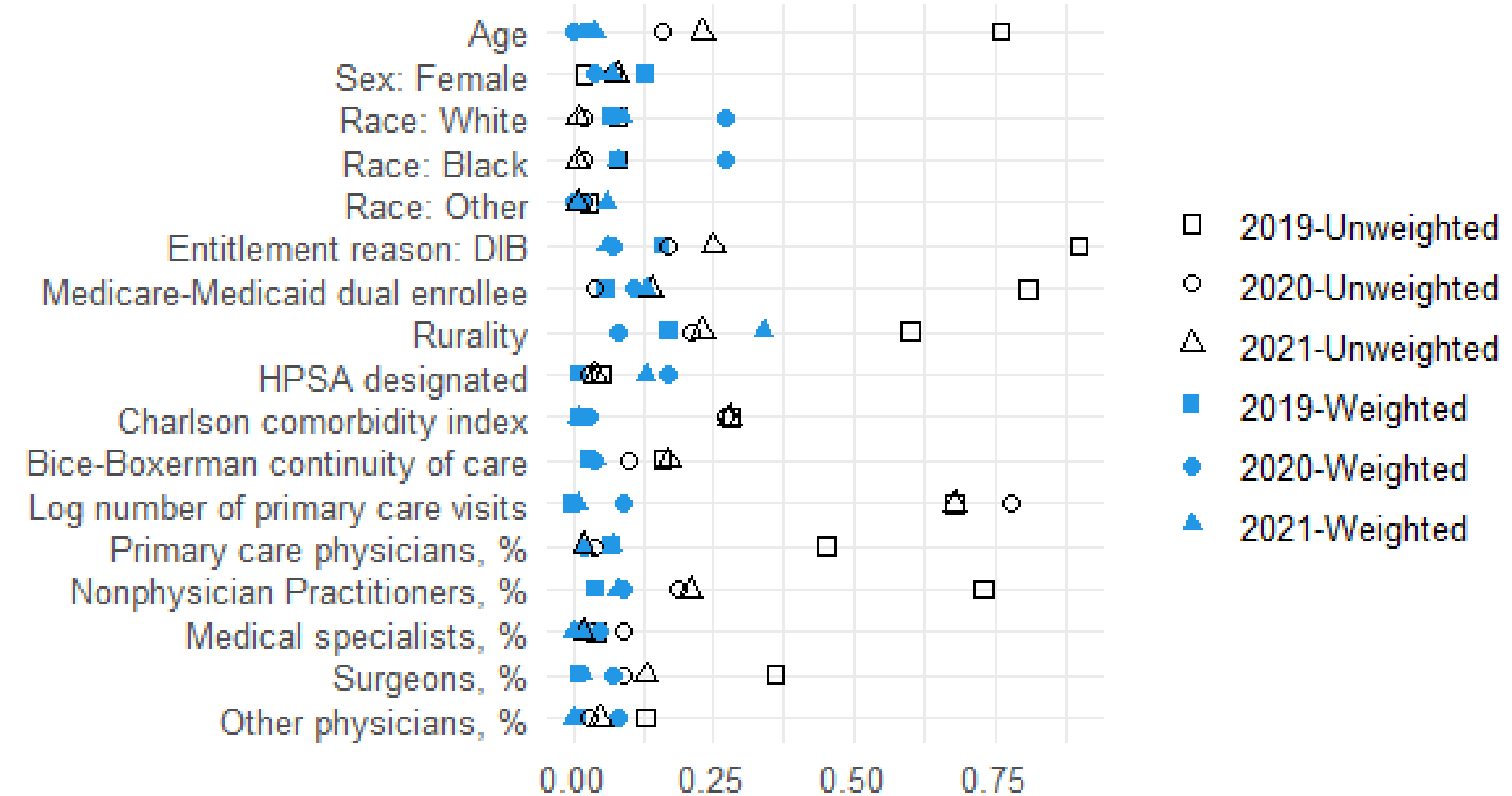


Table 1. Participant baseline characteristics (N = 152,143)

Sociodemographic Characteristics	TH participants (n = 59,739)	Non-TH participants (n = 92,404)	Odds Ratio (95% CI)	P-value
Age group, yr, n (%)				<.001
< 55	4,415 (7.39)	4,043 (4.38)	Ref	
55 – 64	5,875 (9.83)	6,759 (7.31)	0.80 (0.75, 0.84)	
65 – 74	27,950 (46.79)	43,855 (47.46)	0.58 (0.56, 0.61)	
75 – 84	16,773 (28.08)	29,348 (31.76)	0.52 (0.50, 0.55)	
≥ 85	4,726 (7.91)	8,399 (9.09)	0.52 (0.49, 0.55)	
Sex, n (%)				<.001
Male	23,038 (38.56)	38,545 (41.71)	Ref	
Female	36,701 (61.44)	53,859 (58.29)	1.14 (1.12, 1.16)	
Race, n (%)				<.001
White	45,512 (76.73)	69,162 (75.34)	Ref	
Black	13,423 (22.63)	21,948 (23.91)	0.93 (0.91, 0.95)	
Other	379 (0.64)	695 (0.76)	0.83 (0.73, 0.94)	
Original reason for entitlement, n (%)				<.001
OASI	40,220 (67.33)	68,957 (74.63)	Ref	
DIB	19,519 (32.67)	23,447 (25.37)	1.43 (1.40, 1.46)	
Dual enrollment, n (%)	16,221 (27.15)	23,245 (25.16)	1.11 (1.08, 1.14)	<.001
Rurality, n (%)	35,024 (58.63)	63,857 (69.11)	0.63 (0.62, 0.65)	<.001
HPSA designated, n (%)	10,899 (18.24)	16,986 (18.38)	0.99 (0.97, 1.02)	0.497
Charlson Comorbidity Index, mean (SD)	2.80 (2.66)	2.18 (2.36)	1.10 (1.10, 1.11)	<.001
Primary Care Utilization, mean (SD)				
Bice-Boxerman Care of Continuity Index	0.40 (0.28)	0.39 (0.31)	1.07 (1.03, 1.11)	<.001
Number of primary care visits	12.79 (8.51)	8.48 (6.61)	1.08 (1.08, 1.08)	<.001
Access to provider types				
Primary care physician	46,452 (77.76)	62,555 (67.70)	1.67 (1.63, 1.71)	<.001
Nonphysician Practitioner	44,015 (73.68)	53,650 (58.06)	2.02 (1.98, 2.07)	<.001
Medical specialist	44,018 (73.68)	55,519 (60.08)	1.86 (1.82, 1.90)	<.001
Surgeon	35,748 (59.84)	47,032 (50.90)	1.44 (1.41, 1.47)	<.001
Other physicians	16,902 (28.29)	20,048 (21.70)	1.42 (1.39, 1.46)	<.001
Proportion of services provided				
Primary care physician	0.31 (0.27)	0.33 (0.32)	0.79 (0.76, 0.82)	0.647
Nonphysician Practitioner	0.27 (0.26)	0.23 (0.28)	1.70 (1.64, 1.77)	<.001
Medical specialist	0.23 (0.22)	0.21 (0.25)	1.40 (1.34, 1.46)	<.001
Surgeon	0.14 (0.16)	0.15 (0.21)	0.68 (0.65, 0.72)	<.001
Other physicians	0.05 (0.11)	0.05 (0.14)	0.87 (0.80, 0.94)	<.001

Table 2. MSM results (N = 152,143)

Primary Outcome	Estimates (Std Err)	Exponentiated Estimates (95% CI)	P-value
HCRU, PMPY			
Outpatient visits	0.009 (0.000)	1.009 (1.008, 1.010)	<.001
Inpatient visits	-0.152 (0.005)	0.859 (0.852, 0.867)	<.001
30-day readmissions	-0.271 (0.007)	0.763 (0.753, 0.773)	<.001
ED visits	0.057 (0.002)	1.059 (1.054, 1.064)	<.001
Medical spending, PMPY			
Medicare	-0.133 (0.003)	0.876 (0.870, 0.881)	<.001
Beneficiary OOP	-0.304 (0.005)	0.738 (0.730, 0.746)	<.001
Gross	-0.145 (0.003)	0.865 (0.860, 0.871)	<.001
Pharmacy spending, PMPY			
Part D	-0.135 (0.005)	0.874 (0.866, 0.882)	<.001
Beneficiary OOP	-0.007 (0.002)	0.993 (0.989, 0.998)	0.003
Gross	-0.053 (0.003)	0.948 (0.943, 0.953)	<.001
Secondary Outcome	Estimates (Std Err)	(95% CI)	P-value
Medication adherence, PMPY			
Antidiabetic	-0.004 (0.001)	(-0.005, -0.003)	<.001
Antihypertensive	0.036 (0.001)	(0.034, 0.039)	<.001
Antihyperlipidemic	0.028 (0.001)	(0.026, 0.030)	<.001

Abbreviations: OASI (Old Age & Survivors Insurance), DIB (Disability Insurance Benefits), HPSA (Health Professional Shortage Area), OOP (Out-of-Pocket), PMPY (Per Member Per Year).