JAMA Health Forum

Research Letter

Association Between Primary Care Payment Model and Telemedicine Use for Medicare Advantage Enrollees During the COVID-19 Pandemic

Brian W. Powers, MD; Dana Drzayich Antol, MS; Yongming Zhao, PhD; Gilbert S. Haugh, MS; Oraida Roman, MHA; William H. Shrank, MD; Niteesh K. Choudhry, MD, PhD

+ Supplemental content

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

Introduction

Patterns of outpatient care shifted dramatically during the early stages of the COVID-19 pandemic,[1] with deferred in-person care leading to substantial revenue losses for primary care organizations.[2] This shift created a strong financial incentive to move visits to telemedicine, especially among organizations reimbursed under fee-for-service payment models. Primary care organizations reimbursed under value-based payment models did not experience the same near-term financial incentives but may have found it easier to expand telemedicine access given underlying technology and infrastructure investments.[3] To better understand these dynamics, we examined the association between the primary care payment model and telemedicine use for Medicare Advantage enrollees during the COVID-19 pandemic.

Methods

For this cohort study, we identified beneficiaries continuously enrolled in Medicare Advantage health maintenance organization (HMO) plans offered by Humana, Inc, from January 1, 2019, to September 30, 2020. Enrollees in HMO plans are required to select a primary care clinician, which we used to attribute patients to a primary care organization. We then used contract data to identify the payment model under which the organization was reimbursed for the patients' care and classified those payment models according to the following taxonomy: fee-for-service; shared savings with upside-only financial risk; shared savings with downside financial risk; or capitation, as described in the eMethods of the Supplement. We considered shared savings with downside financial risk and capitation to represent advanced value-based payment models.

Next, we identified audiovisual and audio-only telemedicine visits with the attributed primary care organization from January 1, 2020, to September 30, 2020, using paid outpatient claims, as described in the eMethods of the Supplement. We then assessed changes in weekly rates of telemedicine utilization, stratified by primary care payment model. Finally, we estimated the association between telemedicine use and primary care payment model using a patient-level negative binomial regression model that adjusted for patient age, sex, race/ethnicity, Medicare eligibility criteria, comorbidity,[4] and practice size, and included hospital referral region fixed effects. Race/ethnicity was assessed according to the Centers for Medicare & Medicaid Services beneficiary race code, which reflects data self-reported to the Social Security Administration.

An Advarra institutional review board deemed the study exempt and waived informed consent because it used only retrospective deidentified data and did not meet the criteria found in the Regulations for the Protection of Human Subjects (45 CFR §46). Data analyses were performed from December 30, 2020, to May 14, 2021, using SAS Enterprise Guide, version 8.2 (SAS Inc). *P* values were 2-tailed and statistical significance was defined as $P < .05$. The study followed the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) reporting guideline.

Results

The study population of 1 125 946 patients (mean [SD] age, 74.7 [6.7] years; 645 489 [57.3%] women) comprised 28 508 (2.5%) Asian, 228 105 (20.3%) Black, 121 016 (10.8%) Hispanic, 1732 (0.2%) Native American, and 733 803 (65.2%) White individuals. Telemedicine use rose faster and reached higher absolute levels among those patients attributed to primary care organizations reimbursed via advanced value-based payment models compared with those reimbursed via fee-for-service (**Figure**). In multivariable analyses of cumulative telemedicine visits from March 1, 2020, to September 30, 2020, primary care payment model was significantly associated with telemedicine utilization (**Table**). Compared with patients attributed to organizations reimbursed under fee-for-service, the marginal effects of primary care payment model on telemedicine visits per 1000 patients were −12.9 (95% CI, −17.4 to −8.4) for shared savings with upside-only financial risk, 71.5 (95% CI, 66.9 to 76.1) for shared savings with downside financial risk, and 105.6 (95% CI, 96.1 to 115.1) for capitation.

Discussion

In this cohort study of Medicare Advantage enrollees during the COVID-19 pandemic, we found that the primary care payment model was significantly associated with telemedicine use. The patients attributed to the primary care organizations reimbursed under advanced value-based payment models used telemedicine services at the highest rates. Rates of telemedicine utilization were lower among patients attributed to organizations reimbursed under fee-for-service, despite those organizations facing the strongest near-term financial incentive to increase telemedicine utilization.[2] This suggests that accountability for cost, quality, and disease management under value-based payment models—and the infrastructure, technology, and management systems of organizations engaging in these models—may have been a stronger catalyst for telemedicine adoption than recouping revenue from deferred in-person visits.

A limitation of this study was the inability to observe practice characteristics beyond payment model and size that may be associated with telemedicine adoption. Further research is needed to better understand the specific drivers of telemedicine adoption within physician organizations, especially as payers and policy makers consider approaches to ensure adequate, equitable, and sustainable access to telemedicine in the postpandemic era.

Figure. Trends in Weekly Telemedicine Visits for Medicare Advantage Enrollees, by Primary Care Payment Model, January 1, 2020, to September 30, 2020

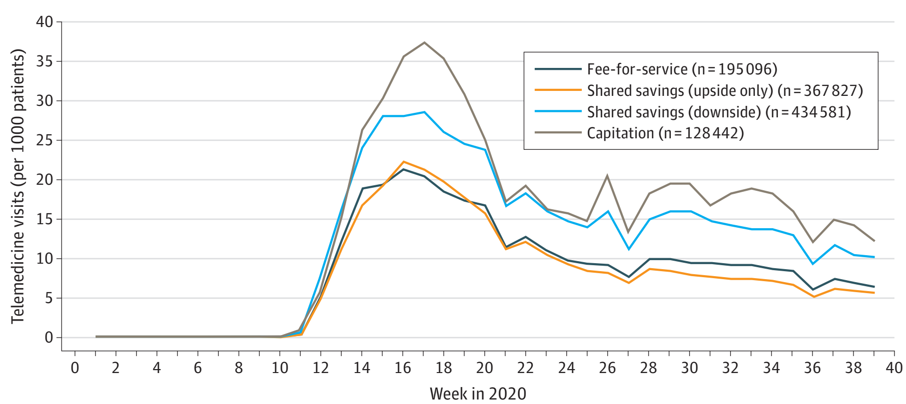

Table. Association Between Patient and Primary Care Organization Characteristics and Telemedicine Visits for Medicare Advantage Enrollees During the COVID-19 Pandemic, March 1, 2020, to September 30, 2020

Variable[a]	Patients, No. (%)	Marginal effect (95% CI)[b]	*P* value
Primary care payment model[c]			
Fee-for-service	195 096 (17.3)	0 [Reference]	NA
Shared savings (upside only)	367 827 (32.7)	−12.9 (−17.4 to −8.4)	<.001
Shared saving (downside)	434 581 (38.6)	71.5 (66.9 to 76.1)	<.001
Capitation	128 442 (11.4)	105.6 (96.1 to 115.1)	<.001
Age, y			
65-74	631 754 (56.1)	0 [Reference]	NA
75-84	384 625 (34.2)	−28.7 (−31.7 to −25.7)	<.001
≥85	109 567 (9.7)	−34.5 (−39.0 to −30.0)	<.001
Sex			
Male	480 457 (42.7)	0 [Reference]	NA
Female	645 489 (57.3)	61.1 (58.3 to 63.9)	<.001
Race/ethnicity[d]			
White	733 803 (65.2)	0 [Reference]	NA
Asian	28 508 (2.5)	−8.1 (−16.2 to 0.0)	.05
Black	228 105 (20.3)	44.8 (41.0 to 48. 6)	<.001
Hispanic	121 016 (10.8)	38.1 (33.4 to 42.8)	<.001
Native American	1732 (0.1)	−25.9 (−58.1 to 6.3)	.13
Other	12 782 (1.1)	43.3 (30.8 to 55.8)	<.001
Dual Medicare and Medicaid eligible	189 581 (16.8)	−5.9 (−11.4 to −0.4)	.06
Medicare low-income subsidy eligible	251 233 (22.3)	25.9 (20.7 to 31.1)	<.001
Social Security Disability eligible	177 741 (15.8)	31.6 (27.7 to 35.5)	<.001
Charlson Comorbidity Index, mean (SD)[e]	2.58 (2.5)	16.06 (13.4 to 18.6)	<.001
Comorbidities[e]			
Hypertension	869 765 (77.3)	81 (77.9 to 84.1)	<.001
Myocardial infarction	76 986 (6.8)	−23.5 (−28.9 to −18.1)	<.001
Congestive heart failure	171 494 (15.2)	52.8 (47.8 to 57.8)	<.001
Peripheral vascular diseases	349 527 (31.0)	68.2 (64.2 to 72.2)	<.001
Cerebrovascular diseases	145 341 (12.9)	2.3 (−2.4 to 7.0)	.36
COPD	225 469 (20.0)	34.5 (30.4 to 38.6)	<.001
Diabetes without complications	90 409 (8.0)	−4.6 (−10.2 to 1.0)	.12
Diabetes with complications	304 839 (27.1)	28.6 (23.1 to 34.1)	<.001
Chronic kidney disease	289 596 (25.7)	−19.1 (−24.0 to −14.2)	<.001
End-stage renal disease	38 140 (3.4)	−25.4 (−33.4 to −17.4)	<.001
Liver disease, mild	67 580 (6.0)	17.6 (11.4 to 23.8)	<.001
Liver disease, moderate/severe	4469 (0.4)	−24.2 (−43.3 to −5.1)	.02
Rheumatoid arthritis	80 878 (7.2)	40.3 (34.8 to 45.8)	<.001
Cancers	119 042 (10.6)	−5.4 (−11.9 to 1.1)	.12
Metastatic carcinoma	13 613 (1.2)	−60.7 (−76.8 to −44.6)	<.001
HIV/AIDS	1911 (0.2)	−55 (−82.0 to −28.0)	<.001
Obesity	330 949 (29.4)	31.6 (28.5 to 34.7)	<.001
Depression	241 580 (21.5)	69.2 (65.5 to 72.9)	<.001
Anxiety	190 318 (16.9)	70.9 (66.8 to 75.0)	<.001
Bipolar disorder	13 403 (1.2)	46.4 (33.6 to 59.2)	<.001
Schizophrenia	8899 (0.8)	−93.8 (−130.9 to −56.7)	<.001
Dementia	60 189 (5.4)	−3 (−9.3 to 3.3)	.35
Psychoses	8964 (0.8)	48.3 (−11.2 to 107.8)	.09
Alcohol abuse	36 673 (3.3)	20.4 (13.0 to 27.8)	<.001
Drug abuse	68 238 (6.1)	74.5 (68.5 to 80.5)	<.001

(continued)

Table. Association Between Patient and Primary Care Organization Characteristics and Telemedicine Visits for Medicare Advantage Enrollees During the COVID-19 Pandemic, March 1, 2020, to September 30, 2020 (continued)

Variable[a]	Patients, No. (%)	Marginal effect (95% CI)[b]	P value
Practice size (No. of primary care clinicians)[f]			
1	402 700 (35.8)	0 [Reference]	NA
2-3	358 283 (31.8)	−1.7 (−5.0 to 1.6)	.30
4-7	238 361 (21.2)	−4.1 (−7.9 to −0.3)	.03
≥8	126 602 (11.2)	15.3 (10.1 to 20.5)	<.001

Abbreviations: COPD, chronic obstructive pulmonary disease; NA, not applicable.

[a] Model also included Dartmouth Hospital Referral Region fixed effects.

[b] Reflect marginal effect on telemedicine visits per 1000 patients as compared with reference group (for categorical variables) or with 1 unit change in variable (for continuous variables).

[c] Detail on payment model taxonomy and definitions can be found in the eMethods in the Supplement.

[d] Race was assessed according to the Centers for Medicare & Medicaid Services beneficiary race code, which reflects data self-reported to the Social Security Administration.

[e] Calculated using 2019 claims data.

[f] Number of primary care clinicians in the attributed primary care organization.

ARTICLE INFORMATION

Accepted for Publication: May 17, 2021.

Published: July 16, 2021. doi:10.1001/jamahealthforum.2021.1597

Corresponding Author: Brian W. Powers, MD, MBA, Humana Inc, 500 W Main St, Louisville, KY 40202 (bpowers5@humana.com).

Author Affiliations: Humana Inc, Louisville, Kentucky (Powers, Drzayich Antol, Zhao, Haugh, Roman, Shrank); Department of Medicine, Brigham and Women's Hospital and Harvard Medical School, Boston, Massachusetts (Choudhry).

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

Concept and design: All authors.

Acquisition, analysis, or interpretation of data: Powers, Drzayich Antol, Zhao, Haugh, Shrank, Choudhry.

Drafting of the manuscript: Powers, Shrank.

Critical revision of the manuscript for important intellectual content: Powers, Drzayich Antol, Zhao, Haugh, Roman, Choudhry.

Statistical analysis: Zhao, Haugh, Shrank.

Administrative, technical, or material support: Powers, Drzayich Antol, Roman, Shrank.

Supervision: Powers, Haugh, Shrank.

Conflict of Interest Disclosures: Dr Powers, Ms Drzayich Antol, and Ms Roman report equity in Humana, outside of the submitted work. Dr Shrank reports equity in Humana and serving as a Director at GetWellNetwork, outside the submitted work. Dr Choudhry reports grants from Humana, outside the submitted work. No other disclosures were reported.

Additional Contributions: We would like to thank Yong Li, PhD, Humana Inc, and Adrianne Casebeer, PhD, Humana Inc, for their contributions to the study design, data analysis, and results interpretation. They were not compensated beyond their regular salaries.

REFERENCES

1. Patel SY, Mehrotra A, Huskamp HA, Uscher-Pines L, Ganguli I, Barnett ML. Trends in outpatient care delivery and telemedicine during the COVID-19 pandemic in the US. *JAMA Intern Med*. 2021;181(3):388-391. doi:10.1001/jamainternmed.2020.5928

2. Basu S, Phillips RS, Phillips R, Peterson LE, Landon BE. Primary care practice finances in the United States amid the COVID-19 pandemic. *Health Aff (Millwood)*. 2020;39(9):1605-1614. doi:10.1377/hlthaff.2020.00794

3. American Academy of Family Physicians. Value-based payment study. Accessed March 1, 2021. https://valuebasedcare.humana.com/wp-content/uploads/2018/02/2017-Value-Based-Payment-Study-External.pdf

4. Quan H, Sundararajan V, Halfon P, et al. Coding algorithms for defining comorbidities in ICD-9-CM and ICD-10 administrative data. *Med Care*. 2005;43(11):1130-1139. doi:10.1097/01.mlr.0000182534.19832.83

SUPPLEMENT.
eMethods