

Research Letter

Primary Care Practice Factors Associated With Telehealth Adoption in the United States: Cross-Sectional Survey Analysis

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Abstract

In this national study of primary care practice-level factors associated with telehealth adoption in 2022, we found that training and assisting patients with the use of telehealth, broadband expansion efforts, and a higher proportion of low-income patients were associated with higher practice-level telehealth use, suggesting both opportunities for telehealth expansion and potential populations with higher need for its use.

(*J Med Internet Res* 2025;27:e70404) doi: [10.2196/70404](https://doi.org/10.2196/70404)

KEYWORDS

telehealth; telemedicine; remote consultation; primary health care; general practice; internet access; health policy; health care economics and organizations; access to primary care; digital divide; vulnerable populations; medically underserved area

Introduction

In 2021, the National Academy of Medicine called for further study of telehealth to help strengthen primary care as part of their “Implementing High-Quality Primary Care in the United States” report [1]. Past studies highlight a range of patterns in telehealth use by patient-level factors [2], but primary care practice-level capabilities, such as resources to enable telehealth, have not been systematically assessed. Organizational and contextual factors, such as a federally qualified health center (FQHC) designation and a practice’s neighborhood characteristics, may also be associated with telehealth use. We analyzed a national survey of US adult primary care practices

to examine relationships between practice-level factors and telehealth adoption.

Methods

Overview

We analyzed cross-sectional data from the 2022-2023 National Survey of Healthcare Organizations and Systems, which surveyed practice leaders about telehealth use in 2021, practice payment models, and care delivery structures and processes (1245/3499 people responded to the survey, for a 36% response rate). Survey administration information and data sources are described in [Multimedia Appendix 1](#).

The primary outcomes are the proportion of all outpatient visits done via telehealth (real-time audiovisual or audio-only, eg, telephone) and the proportion of telehealth visits done audio-only. We categorized practices by quartile of telehealth use to compare practice-level differences by characteristic. We estimated multivariable linear regression models for all cases ($N=1071$) and used average marginal effects to generate estimates and 95% CIs for the primary outcome measures. Model covariates included practice ownership, clinician staffing, FQHC status, and telehealth-enabling resources. All analyses were completed in Stata (version 17; StataCorp), and all models used robust estimates of variance and 2-tailed P values, with $P<.05$ set as the threshold for significance. Weights were used in all analyses to account for nonresponse probabilities, detailed in [Multimedia Appendix 1](#).

Ethical Considerations

This study was deemed exempt by the Dartmouth College Committee for the Protection of Human Subjects (00032337). As practices were the unit of analysis, participants received an

information sheet in lieu of informed consent. Practices were deidentified prior to analysis.

Results

The median use of telehealth for practice encounters was 20% (IQR 10%-35%), and the median proportion of audio-only telehealth visits was 29% (IQR 17%-50%). High-telehealth-use practices were more likely to care for a high proportion of uninsured patients, to have expanded broadband access for patients, and to have trained patients to use telehealth ([Table 1](#)).

In multivariable regression analyses ([Figure 1](#)), a high payer mix of uninsured patients and high broadband expansion corresponded to higher telehealth use ($P=.02$ and $P=.008$, respectively), while rurality corresponded to lower telehealth use ($P=.008$). Audio-only telehealth use was higher among FQHCs compared to other practices ($P=.02$), and assisting patients with using telehealth was associated with both higher telehealth use and a smaller proportion of audio-only telehealth use ($P=.002$ and $P=.001$, respectively).

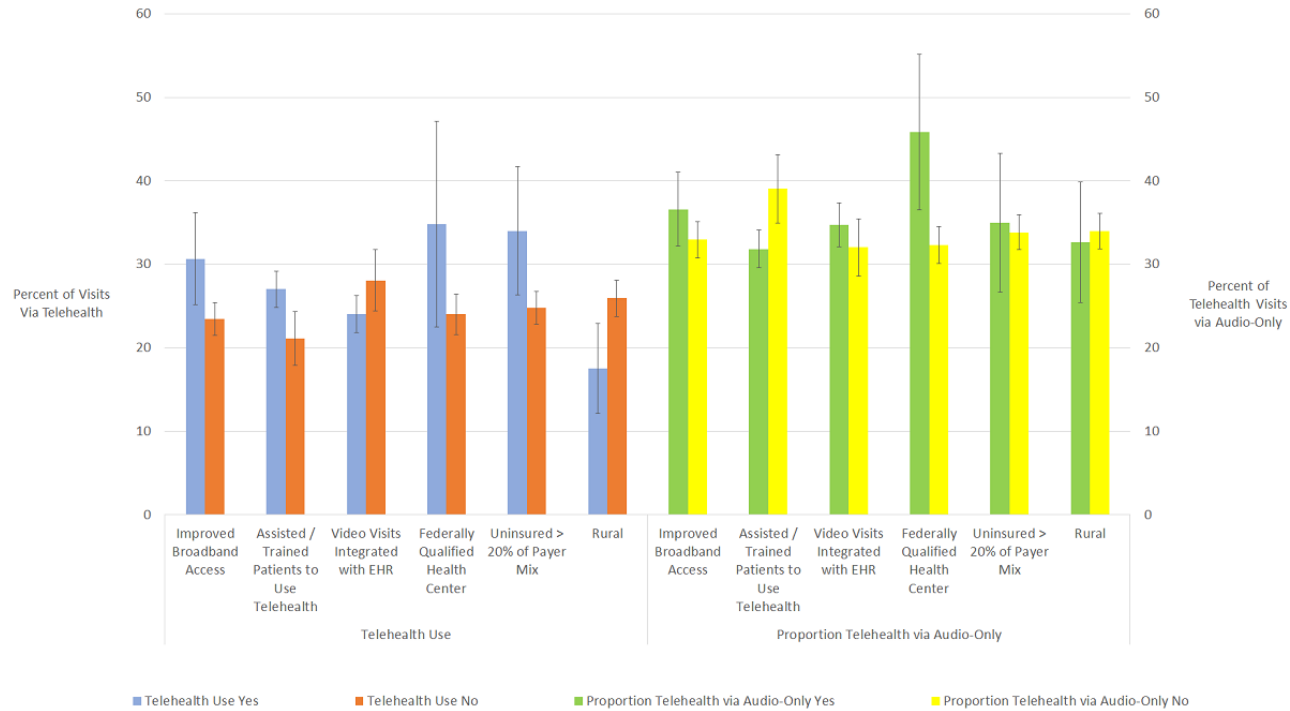
Table 1. Practice demographics (N=1071), overall and stratified by telehealth use quartile.

Characteristics ^a	Overall, %	Practice quartile for telehealth use, %				P value ^b
		Lowest (0%-10%)	Second (>10%-20%)	Third (>20%-35%)	Highest (>35%)	
Practice structure						
Ownership						.53
Independent	25.4	27.9	27.4	24.6	21.2	
Physician group	7.1	5.6	9.5	9.8	4.1	
Hospital	15.7	18.8	15.4	9.4	17.2	
Health system	37.9	38.5	37.4	40.3	39.9	
Federally qualified health center or look-alike	13.6	8.9	10	15.6	17.4	
Physician count, n						.05
0-4	39.5	37.9	46.7	27.4	43.9	
5-9	37	32	37.4	52	30.3	
10-19	12.6	13.8	9.7	9.6	16.7	
>20	10.9	16.3	6.2	11	9.1	
Advanced practice provider (physician assistant, advanced registered practice nurse) count, n						.04
Zero	21.4	28.8	24.7	7.5	20.3	
1 or 2	27.2	19.7	34.1	33.8	23.7	
3 or 4	23.9	20.8	21.1	25	29.8	
5 to 10	18	17	12.7	24.6	19.5	
>10 ()	9.5%	13.7	7.5	9.1	6.6	
Practice financial characteristics						
Self-reported poor financial health	8.7	8.2	6.6	10.5	10.3	.80
Current alternative payment model participation ^c	81.5	78.1	86	83.6	79.5	.51
Impacted by physician workforce shortages	56.4	49.9	55.1	57.9	64.5	.41
Impacted by staff shortages	74	68.4	73.1	77.8	78.5	.33
Payer mix (>20% of revenue from listed sources)						
Commercial	84.1	86.3	84.1	80.9	84.2	.68
Medicare	80.3	88.8	74.4	76.1	79.5	.10
Medicaid	34.1	31.8	33.4	35.1	36.7	.94
Uninsured	6.2	2.9	6	8.5	8.6	.04
Telehealth enablement factors						
Facilitated telehealth for patients by improving broad-band access	27.7	19.7	24.7	25.7	42.6	.02
Facilitated telehealth by assisting or training patients to use telehealth	70.5	52.6	75.7	74.3	84.5	<.001
Platform for video visit integrated with electronic health record	69.4	70.2	69.3	68.1	69.7	.99
Census tract-level indicators						
Practice in a rural location	7.4	11.6	6.1	7.5	3.6	.10
Area Deprivation Index quartile						.40
Most deprived	26.5	18.1	27	24.7	37.9	
2nd quartile	(32.9	38.8	29.5	35.8	26.5	
3rd quartile	22.9	24.6	25.3	22.2	18.9	

Characteristics ^a	Overall, %	Practice quartile for telehealth use, %				P value ^b
		Lowest (0%-10%)	Second (>10%-20%)	Third (>20%-35%)	Highest (>35%)	
Least deprived	17.8	18.6	18.2	17.3	16.7	
Internet speed measures (Mbps), mean (SD)						
Median download speed	76 (1.5)	70 (2.5)	78 (3.3)	73 (3.9)	83 (3.5)	.19
Median upload speed	16 (0.9)	15 (1.0)	17 (1.7)	14 (1.2)	18 (2.9)	.39

^aCharacteristics are reported as weighted percentages unless otherwise noted. Details on weighting are provided in [Multimedia Appendix 1](#).
^bDifferences between quartiles; generated via the χ^2 test with the exception of download and upload speed, which were generated with the adjusted Wald test.
^cIncludes any engagement in accountable care organization and capitated payment contracts, which are alternatives to fee-for-service billing.

Figure 1. Adjusted Telehealth Use Rates and Audio-Only Telehealth Proportions by Select Factors. Covariates included in the multivariable linear regression model were as follows: practice ownership type, US census region, clinician staffing size, Area Deprivation Index quartile, median download speed at the census tract level, reported financial health, whether a practice reported impacts from staff shortages, alternative (to fee-for-service) payment model participation, and a payer mix that was >20% Medicare. Each covariate was significant in univariate regression at the $P<.1$ level; in preliminary runs when 2 factors had a Spearman correlation coefficient >0.5 or <-0.5, the least significant factor was excluded. EHR: electronic health record.



Discussion

In this national study of primary care practices in 2022, we found that respondent practices serving the uninsured reported greater use of telehealth for patient encounters, and FQHCs used more audio-only telehealth. This suggests that low socioeconomic status populations had a higher need for telehealth and that cuts to audio-only reimbursement would disproportionately impact care for such patients. The “digital divide,” systematic barriers for accessing and using technology and telehealth among various populations [3], is a known issue for FQHC and rural populations [4,5], and our study provides national evidence that these practice-level factors are significantly associated with lower adoption of video-based telehealth.

Importantly, we found that the telehealth-enabling practices of training and assisting patients with using telehealth and broadband expansion were associated with higher telehealth adoption. In contrast, electronic health record integration for video visits, participation in alternative payment models that incentivize care quality, and practice ownership were not significant practice-level factors, contrasting with a prior study suggesting health system integration was linked to higher telehealth use at the physician level [6].

Limitations include potential nonresponse bias due to the modest response rate, though we used weights to account for this (sensitivity analyses of missing data are in [Multimedia Appendix 1](#)); that telehealth use is reported in aggregate rather than calculated from visit data, so could not be verified; and an inability to draw causal inference from cross-sectional analysis. Longitudinal analyses or controlled trials would provide stronger

evidence and be able to describe any changes in significance of the identified factors for telehealth use over time.

These findings provide important national data for the design of policy and practice interventions to expand telehealth use.

Practices focused on enabling telehealth appear able to meaningfully increase its uptake [7]. Federally, renewing the lapsed support for broadband accessibility is an important means to address the digital divide [8,9].

Acknowledgments

The team would like to thank Jonathan Skinner, PhD, for his review of a draft of this research letter, and Ching-Wen W Yang, MSPH, for her contributions to the construction of the dataset.

Research reported in this publication was funded by the Robert Wood Johnson Foundation (78479, 80738, and 81412) and supported by the National Institute on Aging of the National Institutes of Health (R01AG084611). The content is solely the responsibility of the authors and does not necessarily represent the official views of the Robert Wood Johnson Foundation or the National Institutes of Health.

Data Availability

The datasets generated or analyzed during this study are not publicly available due to the need for curating deidentified data, but are available on reasonable request from KES (karen.e.schifferdecker@dartmouth.edu).

Disclaimer

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Conflicts of Interest

None declared.

Multimedia Appendix 1

Further information on survey administration, analytic datasets, weights, and missing data.

[\[DOCX File , 26 KB-Multimedia Appendix 1\]](#)

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Abbreviations

APRN: advanced registered practice nurse

FQHC: federally qualified health center

PA: physician assistant

Edited by N Cahill; submitted 20.12.24; peer-reviewed by D Colburn, F Opia, S Ajayi; comments to author 27.01.25; revised version received 05.03.25; accepted 06.03.25; published 28.03.25

Please cite as:

Mackwood M, Fisher E, Schmidt RO, O'Malley AJ, Rodriguez HP, Shortell S, Akre E-R, Berube A, Schifferdecker KE
Primary Care Practice Factors Associated With Telehealth Adoption in the United States: Cross-Sectional Survey Analysis
J Med Internet Res 2025;27:e70404

URL: <https://www.jmir.org/2025/1/e70404>

doi: [10.2196/70404](https://doi.org/10.2196/70404)

PMID:

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