Original Investigation | **Health Policy**

Patient Characteristics and Telemedicine Use in the US, 2022

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Abstract

IMPORTANCE Telemedicine use was common during the COVID-19 pandemic, expanding many patients' approaches to accessing health care. Of concern is whether telemedicine access was poorer among higher-needs and disadvantaged populations.

OBJECTIVE To assess patient characteristics associated with telemedicine use and telemedicine mode and describe telemedicine visit experiences by telemedicine mode.

DESIGN, SETTING, AND PARTICIPANTS This cross-sectional study included data from the 2022 Health Information National Trends Survey and included US adults with a health care visit. Data were analyzed from May to September 2023.

EXPOSURE Patient characteristics.

MAIN OUTCOMES AND MEASURES Any telemedicine visits vs in-person visits only; telemedicine mode (video vs audio-only). Multivariable logistic models assessed patient characteristics associated with telemedicine visits and mode. Bivariate analyses compared telemedicine experiences by mode.

RESULTS The study included 5437 adult patients (mean [SE] age, 49.4 [0.23] years; 3136 females [53.4%]; 1928 males [46.6%]). In 2022, 2384 patients (43%) had a telemedicine visit; 1565 (70%) had a video visit while 819 (30%) had an audio-only visit. In multivariable models, older age (≥75 years: adjusted odds ratio [aOR], 0.63; 95% CI, 0.42-0.94), no internet use (aOR, 0.62; 95% CI, 0.48-0.81), and living in the Midwest (aOR, 0.50; 95% CI, 0.35-0.70) were negatively associated with having telemedicine visits. Female sex (aOR, 1.43; 95% CI, 1.12-1.83), having chronic conditions (aOR, 2.13; 95% CI, 1.66-2.73), and multiple health care visits (2-4 visits: aOR, 1.77; 95% CI, 1.23-2.54; ≥5 visits: aOR, 3.29; 95% CI, 2.20-4.92) were positively associated. Among individuals who used telemedicine, older age (65-74 years: aOR, 2.13; 95% CI, 1.09-4.14; ≥75 years: aOR, 3.58; 95% CI, 1.60-8.00), no health insurance (aOR, 2.84; 95% CI, 1.42-5.67), and no internet use (aOR, 2.11; 95% CI, 1.18-3.78) were positively associated with having audio-only visits. We observed no significant differences in telemedicine use or mode by education, race and ethnicity, or income. Patients' experiences using telemedicine were generally similar for video and audio-only except more individuals who used audio-only had privacy concerns (20% vs 12%, _P_ = .02).

CONCLUSIONS AND RELEVANCE In this cross-sectional study of adults with health care visits, many patients, including those with the greatest care needs, chose telemedicine even after in-person visits were available. These findings support continuing this care delivery approach as an option valued by patients. Differences were not observed by most common measures of socioeconomic status. Continued monitoring of telemedicine use is needed to ensure equitable access to health care innovations.

Key Points

Question Which patients used telemedicine after in-person visits became more available post–COVID-19 restrictions?

Findings In this cross-sectional study of 5437 US adults with health care visits in 2022, 43% used telemedicine (70% video visits; 30% audio-only visits). Patients who used telemedicine were more likely to have more health care needs while video telemedicine visits were less likely among older patients and those without internet; no differences were observed by education, race and ethnicity, or income.

Meaning These findings suggest that while many patients chose to use telemedicine when in-person visits are available, telemedicine access, particularly video visits, was less likely among key populations who experience barriers to accessing care.

➕ **Supplemental content**

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

Introduction

During the COVID-19 pandemic, telemedicine emerged as an important approach for delivering health care. Telemedicine use increased rapidly after COVID-19 was declared a public health emergency.[1] Overall outpatient service rates were able to rebound quickly, largely due to the shift from in-person to telemedicine visits; approximately 50% of visits were through telemedicine during the pandemic's peak in April 2020.[1-3] While telemedicine visits have since declined, recent estimates suggest steady use. In 2021 and 2022, 20% to 39% of adults had telemedicine health care encounters.[4,5]

Several studies have shown patient willingness and desire to use video telemedicine; between 36% to 67% of patients would like to seek care using telemedicine in the future.[6-9] Despite patients' continued interest in telemedicine, equitable access remains a concern.[9-16] Telemedicine offers the promise of improving access by removing financial and logistical barriers associated with transportation, work coverage, and childcare.[15] However, limited access to the technology (particularly for video visits) and other internet-based services risks widening gaps in health care access rather than narrowing them. Several studies from early in the COVID-19 pandemic found less use of telemedicine visits and in fewer video telemedicine visits (than audio-only visits) among patients who were low-income, non-English–speaking, and older age.[12,13,16-20] To our knowledge, few studies have examined how telemedicine use, and its modalities, has evolved.[5]

If telemedicine is to remain a common and important approach to health care delivery, it is necessary to understand who is using the technology successfully and why, and, conversely, uncover barriers in access. Using a nationally representative survey, our objective was to assess telemedicine use and modality among adults who had a health care visit in 2022. We compared differences in patient characteristics associated with having any telemedicine visits vs having an in-person visit only. Then, among telemedicine patients, we identified characteristics associated with having video visits compared with only audio visits. Finally, we examined whether the reasons for and experiences of using telemedicine differed by telemedicine mode.

Methods

The Advocate Aurora Health institutional review board determined that study was not human participant research, and thus informed consent was not required. This cross-sectional study followed the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) reporting guideline.[21]

Data and Study Population

This cross-sectional study used data from the 2022 Health Information National Trends Survey (HINTS), a nationally representative self-report survey of noninstitutionalized, civilian adults administered by the National Cancer Institute. The survey is administered multimodally, using both paper and web-based surveys. Households that were potentially Spanish speaking received materials in English and Spanish while other households were able to request a Spanish survey. HINTS uses survey weights to obtain a nationally representative sample of US adults and to account for nonresponse bias. Data were collected between March 7 and November 8, 2022. The overall response rate was 28.1%.[22] This study was restricted to adults who had a health care visit in the past 12 months (5437 of 6252 individuals, weighted 86% of adults) to focus on experiences using the health care system.

Dependent Variables

We measured any telemedicine use (vs only in-person visits) using the question "In the past 12 months, did you receive care from a doctor or health professional using telehealth?" The survey defined telehealth as a "a telephone or video appointment with a doctor or health professional"; it is

often referred to as telemedicine. We categorized respondents who answered yes by video, phone call, or both as having had any telemedicine visits, while others were categorized as having in-person visits only. Among individuals who used telemedicine, we categorized those who responded yes by video (or by both video and phone) as having video visits and those who responded yes by phone as having audio-only visits. Those who had telemedicine visits may have also had in-person visits; this was not captured by the survey.

Individuals who used telemedicine were asked 3 questions capturing reasons for using telemedicine and experiences. First, they were asked why they chose a telemedicine visit (yes or no to each): clinician recommendation or requirement, advice on needing in-person care, to avoid infection, convenience, and/or to include others in the appointment. Second, they were asked the primary reason for their most recent telemedicine visit: annual visit; minor illness or acute care; chronic disease management; medical emergency; mental health, behavioral, or substance abuse issues; or other. Finally, they were asked whether they experienced technical problems, whether telemedicine care received was as good as an in-person visit, and if they had privacy concerns regarding their visit. These questions used a 4-point Likert response scale, which we dichotomized based on agreement and disagreement with the statement. Full questions and response options are available in eTable 1 in Supplement 1.

Independent Variables

Patient characteristics included age, sex, race and ethnicity (Hispanic, non-Hispanic Asian, non-Hispanic Black, non-Hispanic White, or non-Hispanic other [including American Indian or Alaska Native, Other Pacific Islander, or multiple races]), education, marital status, household income, insurance, health status, number of chronic conditions, number of health care visits, and internet use. Living in a linguistically isolated area, urbanicity, and census region were also included.

Statistical Analysis

We used descriptive statistics and χ^2 tests to understand differences in characteristics by telemedicine use and telemedicine mode. We also used χ^2 tests to test differences in reasons for using telemedicine and experiences by telemedicine mode. We used the Bonferroni correction to adjust for multiple comparisons and calculated standardized Pearson residuals where needed.

We conducted 2 analyses using multivariable logistic regression models. First, we assessed differences in characteristics of telemedicine and patients who used only in-person visits. Second, we focused on telemedicine patients and compared characteristics of those who only had an audio-only visit with those who had a video or both types of telemedicine visits. Model goodness-of-fit was confirmed with the area under the receiver operating characteristic curve (which determines the model's ability to discriminate success and failure), the link test (which determines that the model is properly specified if the prediction squared has no explanatory power),[23] and the Archer-Lemeshow test (the Hosmer-Lemeshow test adapted for complex survey samples; whether the fitted model describes the observed data).[24] Weighted missing percentage for sex (5.6%), race or ethnicity (8.2%), education (5.5%), marital status (5.7%), and household income (9.6%) were greater than 5% so we ran models with and without missing as a category. Findings were similar so models without missing categories are presented.

Analyses were conducted using Stata version 17.0 (Stata Corporation). Survey weighting procedures with jackknife replicate weights accounted for the complex survey design; all reported estimates were weighted to represent the US population. Two-sided $P < .05$ was considered statistically significant. Data were analyzed from May to September 2023.

Results

The sample of 5437 respondents with a health care visit represented more than 216 million adults nationally. In the final weighted sample, 3136 (53%) identified as female and 1928 (47%) identified as male, with a mean (SE) age of 49.4 (0.23) years.

Telemedicine Visits in the US

We found that 2384 patients (43%) reported that 1 or more of their visits in the past 12 months was through telemedicine. A greater percentage of those with any telemedicine visits were female, had poorer health, had more chronic conditions, used the internet, and had more than 5 health care visits (**Table 1**). Telemedicine use was reported by 50% of patients with multiple chronic conditions (33% with no chronic conditions) and 45% of patients with internet access (31% without internet) (eTable 2 in Supplement 1). Telemedicine use was reported more often by patients with multiple visits (2-4 visits: 42%; ≥5 visits: 58%) than those with only 1 visit (28%).

In multivariable analysis (**Table 2**), having chronic conditions (adjusted odds ratio [aOR], 2.13; 95% CI, 1.66-2.73; $P < .001$), multiple health care visits (2-4: aOR, 1.77; 95% CI, 1.23-2.54; $P = .003$; ≥5: aOR, 3.29; 95% CI, 2.20-4.92; $P < .001$), and female sex (aOR, 1.43; 95% CI, 1.12-1.83; $P = .006$) significantly increased the odds of having any telemedicine visits. Conversely, being in the oldest age group (75 years and older: aOR, 0.63; 95% CI, 0.42-0.94; $P = .03$), having no internet use (aOR, 0.62; 95% CI, 0.48-0.81; $P < .001$), and living in the Midwest (aOR, 0.50; 95% CI, 0.35-0.70; $P < .001$) significantly lowered the odds. We did not find significant differences based on education, race and ethnicity, income, urbanicity, and living in a linguistically isolated area.

Telemedicine Visit Modality (Video vs Audio-Only)

Among the 2384 individuals who used telemedicine, 1565 (70%) had a video visit while 819 (30%) had an audio-only visit. A greater percentage of patients with audio-only visits were older, were uninsured, and did not use the internet (Table 1). While approximately 40% of both the youngest (351 [41%]) and oldest patients (292 [38%]) reported telemedicine use, only 138 patients (49%) of individuals who used telemedicine aged 75 years and older had a video visit compared with 256 (75%) of individuals who used telemedicine aged 18 to 34 years (eTable 2 in Supplement 1).

Multivariable analysis of audio-only vs any video use among individuals who used telemedicine found being in the oldest age groups (aged 65 to 74 years: aOR, 2.13; 95% CI, 1.09-4.14; $P = .03$; ≥75 years: aOR, 3.58; 95% CI, 1.60-8.00; $P = .002$), being uninsured (aOR, 2.84; 95% CI, 1.42-5.67; $P = .004$), and no internet use (aOR, 2.11; 95% CI, 1.18-3.78; $P = .01$) were significantly associated with greater odds of just audio-only telemedicine use (Table 2). Similar to the telemedicine use model results, in the modality model, we observed no significant differences by race and ethnicity, education, marital status, income, health status, living in a linguistically isolated area, and urbanicity. Telemedicine mode also did not significantly differ by number of chronic conditions, number of health care visits, or census region.

Reasons for and Experiences Using Telemedicine

Individuals who used video and audio-only telemedicine offered similar reasons for choosing a telemedicine visit (**Figure 1** and eTable 3 in Supplement 1). The majority of both modes chose telemedicine based on clinician recommendation or requirement (video, 1122 [76%]; audio-only, 497 [67%]) or for convenience (video, 1003 [68%]; audio-only, 424 [60%]). Approximately half wanted to avoid possible infections (1007 [49%]) and almost a third wanted to ask their clinician whether an in-person visit was needed (630 [29%]). More than one-fifth chose telemedicine to include others (446 [22%]).

The goal of the most recent visit was often similar across modes (**Figure 2** and eTable 3 in Supplement 1). Most often, patients using telemedicine sought acute care (568 [30%]) or chronic condition management (557 [22%]). Patients who only used audio were more likely than patients

Table 1. Sociodemographic, Clinical, and Technology Characteristics of Adults With a Health Care Visit in the Past 12 Months, 2022[a]

Characteristic	Patients, No. (weighted %)						
	All (N = 5437)	In-person visit only	Any telemedicine visit	Adjusted P value[b]	Any video visit	Audio-only visit	Adjusted P value[c]
Total, No. (%)	5437	2933 (57)	2384 (43)	NA	1565 (70)	819 (30)	NA
Age, y							
18-34	746 (23.2)	395 (24.1)	351 (22.0)	.14	256 (23.6)	95 (18.2)	<.001
35-49	1024 (25.0)	493 (21.8)	531 (29.1)		383 (30.8)	148 (25.2)	
50-64	1535 (28.5)	852 (28.9)	683 (27.9)		467 (28.8)	216 (25.7)	
65-74	1195 (14.0)	697 (15.0)	498 (12.7)		307 (11.0)	191 (16.8)	
≥75	756 (9.3)	464 (10.2)	292 (8.3)		138 (5.8)	154 (14.0)	
Sex							
Female	3136 (53.4)	1663 (49.6)	1473 (58.3)	.03	974 (58.1)	499 (58.7)	>.99
Male	1928 (46.6)	1144 (50.4)	784 (41.7)		510 (41.9)	274 (41.3)	
Race or ethnicity							
Non-Hispanic Asian	230 (5.1)	133 (5.0)	97 (5.2)	>.99	60 (5.5)	37 (4.6)	>.99
Non-Hispanic Black	774 (10.9)	448 (11.7)	326 (9.7)		211 (9.8)	115 (9.7)	
Hispanic	806 (15.0)	398 (13.6)	408 (16.9)		246 (15.9)	162 (19.4)	
Non-Hispanic White	2884 (64.8)	1625 (66.0)	1259 (63.3)		868 (63.9)	391 (61.9)	
Non-Hispanic other[d]	154 (4.2)	73 (3.7)	81 (4.8)		55 (4.9)	26 (4.5)	
Education							
College graduate or more	2440 (34.4)	1252 (31.7)	1188 (38.0)	.56	833 (40.2)	355 (32.8)	.42
Some college or vocational	1450 (39.0)	822 (39.6)	628 (38.3)		406 (39.1)	222 (36.4)	
High school graduate	888 (20.9)	559 (22.2)	329 (19.1)		192 (16.9)	137 (24.3)	
Less than high school	291 (5.7)	181 (6.5)	110 (4.6)		50 (3.8)	60 (6.5)	
Marital status							
Married	2318 (53.1)	1266 (51.9)	1052 (54.7)	>.99	714 (56.1)	338 (51.6)	>.99
Not married	2737 (46.9)	1537 (48.1)	1200 (45.3)		761 (43.9)	439 (48.4)	
Household income, $							
≥$75 000	1964 (46.6)	1017 (44.1)	947 (49.8)	>.99	687 (53.1)	260 (42.1)	.08
$35 000 to <$75 000	1443 (29.7)	822 (31.2)	621 (27.7)		399 (27.3)	222 (28.7)	
<$35 000	1388 (23.7)	808 (24.7)	580 (22.5)		331 (19.6)	249 (29.2)	
Insurance							
Covered	4956 (92.7)	2711 (91.3)	2245 (94.4)	.28	1484 (95.9)	761 (91.0)	.01
Not covered	336 (7.3)	207 (8.7)	129 (5.6)		74 (4.1)	55 (9.0)	
Health status							
Excellent, very good, or good	4275 (84.1)	2423 (87.0)	1852 (80.3)	<.001	1234 (81.9)	618 (76.5)	>.99
Poor or fair	941 (15.9)	459 (13.0)	482 (19.7)		301 (18.1)	181 (23.5)	
Chronic conditions[e]							
0	1626 (36.7)	1038 (43.6)	588 (27.7)	<.001	377 (28.0)	211 (26.8)	>.99
≥1	3602 (63.3)	1847 (56.4)	1755 (72.3)		1161 (72.0)	594 (73.2)	
Census region							
Northeast	794 (18.1)	423 (16.9)	371 (19.6)	<.001	260 (19.8)	111 (19.3)	>.99
Midwest	915 (21.0)	595 (24.9)	320 (15.9)		212 (16.7)	108 (14.0)	
South	2418 (38.3)	1385 (39.2)	1033 (37.2)		693 (37.7)	340 (36.1)	
West	1190 (22.6)	530 (19.0)	660 (27.3)		400 (25.8)	260 (30.6)	
Metropolitan status							
Metropolitan	4616 (87.4)	2480 (86.5)	2136 (88.7)	>.99	1407 (88.5)	729 (89.2)	>.99
Nonmetropolitan	701 (12.6)	453 (13.5)	248 (11.3)		158 (11.5)	90 (10.8)	
Living in linguistically isolated strata[f]							
No	4854 (94.6)	2693 (95.1)	2161 (94.0)	>.99	1429 (94.7)	732 (92.3)	.42
Yes	463 (5.4)	240 (4.9)	223 (6.0)		136 (5.3)	87 (7.7)	

(continued)