

Trends and Disparities in the Use of Telehealth Among Injured Workers During the COVID-19 Pandemic

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Objective: To describe telehealth trends within a population-based workers' compensation system during the COVID-19 pandemic, and to assess telehealth utilization by sociodemographic characteristics. **Methods:** This cross-sectional study used Washington State workers' compensation claims and medical billing data from January 2019 to October 2020. **Results:** Telehealth use averaged 1.2% of medical bills pre-pandemic, peaked in April 2020 at 8.8%, and leveled off to around 3.6% from July to October 2020. Telehealth utilization differed significantly by age, sex, number of dependents, injury, industry, and receipt of interpreter services. Workers residing in counties with higher population, lower poverty rates, and greater Internet access had higher telehealth usage. **Conclusions:** There were dramatic shifts in telehealth; usage differed by sociodemographic characteristics. Further studies evaluating disparities in telehealth access among injured workers are needed.

Keywords: access to care, COVID-19, occupational injuries, telehealth, workers' compensation

Telehealth became an important modality for health care delivery during the COVID-19 pandemic, spurred in part by physical distancing measures and regulatory policies that expanded coverage for a wider range of telehealth services.^{1,2} In the early months of the pandemic, nearly 1.7 million Medicare beneficiaries received telehealth services in a week, compared to approximately 13,000 beneficiaries before the public health emergency.² Similarly, data from a large health insurance database show that telehealth use increased from 0.3% of outpatient encounters in 2019 to 24% in

2020, with around 14% of enrollees experiencing at least one telehealth encounter from March to June 2020.³ Several other reports and publications have also documented the rapid increase in telehealth utilization during the COVID-19 pandemic among specific health conditions,⁴⁻⁶ provider specialties,^{7,8} and patient groups (eg, Veterans Affairs).⁹ However, few studies have examined telehealth utilization within the context of workers' compensation, where physical examination, in-office testing, and participation in work-related functional activities are common.¹⁰ Additionally, it remains unclear how telehealth usage among injured workers has changed as the pandemic continues to evolve.

Prior to COVID-19, few workers' compensation agencies provided coverage for medical services conducted through telehealth. Due to COVID-19, many state agencies expanded telehealth access for injured workers, with telehealth visits now payable under workers' compensation in most states.¹¹ The rapid transition from in-person to telehealth can pose both a significant opportunity and a challenge in providing care for injured workers. Benefits of telehealth for injured workers can include the convenience and ease of telehealth appointments, reduced travel difficulties, and less missed time from work, which can be especially important for those whose workplaces do not provide sick leave. While these benefits may facilitate claim progression through improved access and continuity of care for injured workers, the unprecedented and accelerated expansion of telehealth may exacerbate existing health disparities. Prior to COVID-19, limited digital literacy or digital access presented an immense obstacle to telehealth use for some populations, such as older adults,^{12,13} rural residents,^{12,14,15} racial/ethnic minorities,¹⁵ and those with lower socioeconomic status (SES),¹²⁻¹⁴ or limited English proficiency.^{13,14} In the general population, sociodemographic disparities have persisted, with many studies conducted in the early months of the pandemic highlighting similar disparities in telehealth utilization.^{3,16-18} However, little is known about telehealth utilization in workers' compensation systems, and whether there are sociodemographic disparities in the use of telehealth among injured workers.

To address these knowledge gaps, our aims are: (1) to describe changes in the use of telehealth services within workers' compensation before and during the COVID-19 pandemic, and (2) to describe associations between the usage of telehealth among injured workers and various sociodemographic factors. Given the increased reliance on telehealth for health care delivery, it is possible that telehealth will have a greater influence on the workers' compensation landscape in the future.^{3,19,20} As such, findings from our study will be relevant for policymakers and health care leaders interested in how the transition to telehealth has changed access to care among injured workers. Results may lead to future studies modeling the impact of various access-related factors on the type and quality of care received in workers' compensation.

METHODS

Study Setting and Data Sources

Since early March 2020, the Washington State (WA) Department of Labor and Industries (L&I) changed their existing telehealth policy to temporarily allow the delivery of telehealth with the patient's

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home as the origination site in order to help contain the COVID-19 pandemic while supporting providers and workers in the delivery and maintenance of care. L&I is the sole regulator of workers' compensation coverage in WA. It is the direct insurer for approximately 70% of the non-Federal workforce, covering approximately 2.3 million eligible workers through the State Fund, with self-insured employers accounting for the remaining 30%.²¹ Since WA does not have private workers' compensation insurers, it is an ideal setting for population-based research. The current study was deemed exempt from review by the University of Washington institutional review board because it was a policy evaluation for L&I.

We obtained administrative workers' compensation claims data for all workers with an accepted State Fund claim who were at least 18 years of age and had at least one paid workers' compensation medical bill in 2019 or 2020 related to the work injury/illness. Self-insured claims were excluded due to unavailable medical billing data. Claims data used for analysis were obtained in January 2021, and analysis was restricted to workers' compensation services received from January 2019 to October 2020 to account for delays in billing.

Defining Telehealth Encounters

We identified and categorized telehealth bills using place of service codes, service modifiers, and Current Procedural Terminology (CPT) codes from medical billing data. Telehealth was categorized as: (1) audio-video, (2) phone, or (3) e-visits (ie, non-face-to-face patient-initiated communications, such as messaging or email, through an online patient portal).²² Audio-video telehealth bills were identified using the place of service and modifier fields, and CPT codes were used to identify phone and e-visits (Table 1). Since the place of service code for home-designated services (ie, place of service code = 12) can also be used for non-telehealth related services, we removed bills for services conducted by home health agencies, nursing homes, and services pertaining to durable medical equipment from our telehealth counts to obtain a more accurate assessment of telehealth usage. While excluded from being classified as telehealth, home-designated services were included in the total number of paid medical bills. On average, home-designated services comprised 1.5% of monthly paid bills and remained stable across the study time period.

Covariates

L&I's administrative data provided demographic and injury-related characteristics for injured workers. Worker demographic characteristics included: age at injury, sex, marital status, number of dependents, industry, and county of residence. Injury-related characteristics, such as the year of injury and the nature of injury, using the Occupational Injury and Illness Classification System, were also included.

We created several metrics of health care access. County of residence was classified as urban or rural using the 2013 National

Center for Health Statistics 6-category Urban-Rural Classification Scheme for Counties.²³ Worker county of residence was also linked with sociodemographic factors measured from the 2019 American Community Survey,²⁴ to determine the percentage of households without broadband Internet and the percentage living below the federal poverty line, in order to assess the impact of county-level Internet access and poverty on telehealth usage. These metrics were categorized as quantiles, where the highest quantile represented workers who live in counties that have the highest share of households without broadband Internet or have the highest share of the population who are below the federal poverty line. We also used L&I administrative billing data to examine whether workers ever used interpreter services in workers' compensation. Workers with interpreter services were identified using medical billing CPT codes, obtained from L&I's payment fee schedule.²⁵

Data Analysis

We examined trends in medical utilization by calculating the monthly total number of paid medical (including both telehealth and non-telehealth encounters) and monthly paid telehealth bills from January 2019 to October 2020. We examined trends by telehealth modality, categorized as audio-video, phone (voice-only), and e-visits. Trends in the number of telehealth bills from March 2020 to October 2020 were compared to the same months in 2019.

We used negative binomial models with robust standard errors to examine whether there was a significant difference in the average rates of telehealth bills before and after implementation of L&I's Temporary Telehealth Policy. The dependent variable was the monthly count of telehealth bills occurring from January 2019 to October 2020. The primary independent variable was the Temporary Telehealth Policy, where medical bills occurring from January 2019 to February 2020 were classified as pre-implementation (coded as 0) and bills occurring from March 2020 to October 2020 were classified as post-implementation (coded as 1). To model changes in the rates of telehealth, the monthly count of telehealth bills was offset by the corresponding monthly number of total medical bills, which includes both paid telehealth and non-telehealth bills. Analysis included 22 month-year observations.

We examined the utilization of telehealth during the COVID-19 pandemic by sociodemographic and injury-related characteristics of injured workers. For this analysis, we identified workers with medical services occurring between March 2020 and October 2020, corresponding with post-implementation of L&I's Temporary Telehealth Policy due to COVID-19, and classified workers based on whether they received any telehealth services during this time period. We used 2-tailed chi-square tests to assess sociodemographic and geographical differences between workers who received any type of telehealth services and those who did not receive telehealth. A *P*-value less than 0.05 was considered statistically significant. Additional analysis examined telehealth usage by type of modality. Workers were considered to have completed an audio-video encounter if at least one audio-video encounter was completed. Workers who had at least one phone encounter and no audio-video encounter were classified as receiving at least one phone encounter. Lastly, workers were considered to have completed an e-visit if at least one e-visit was completed and no audiovideo or phone encounters were conducted during this time. All analyses were conducted in R, version 3.6.2.

RESULTS

Trends in the Use of Medical Services

Total number of paid medical bills declined by 9.4% in 2020, averaging 187,070 medical bills per month between January and October 2020, compared to 206,486 monthly bills for the same months in the previous year (Fig. 1). In the early months of the

TABLE 1. List of Billing Codes Used to Categorize the Type of Telehealth Encounter

Type of Telecommunication	Codes
Audio-video	Place of service: 02 (telehealth) or 12 (home) Service modifiers: GT or 95 (synchronous telecommunication)
Phone	CPT: 99441, 99442, 99443, 98966, 98967, 98968
E-visits*	CPT: G2061, G2062, G2063, 99421, 99422, 99423

CPT, Current Procedural Terminology.
*E-visits are non-face-to-face communications conducted through an online patient portal.

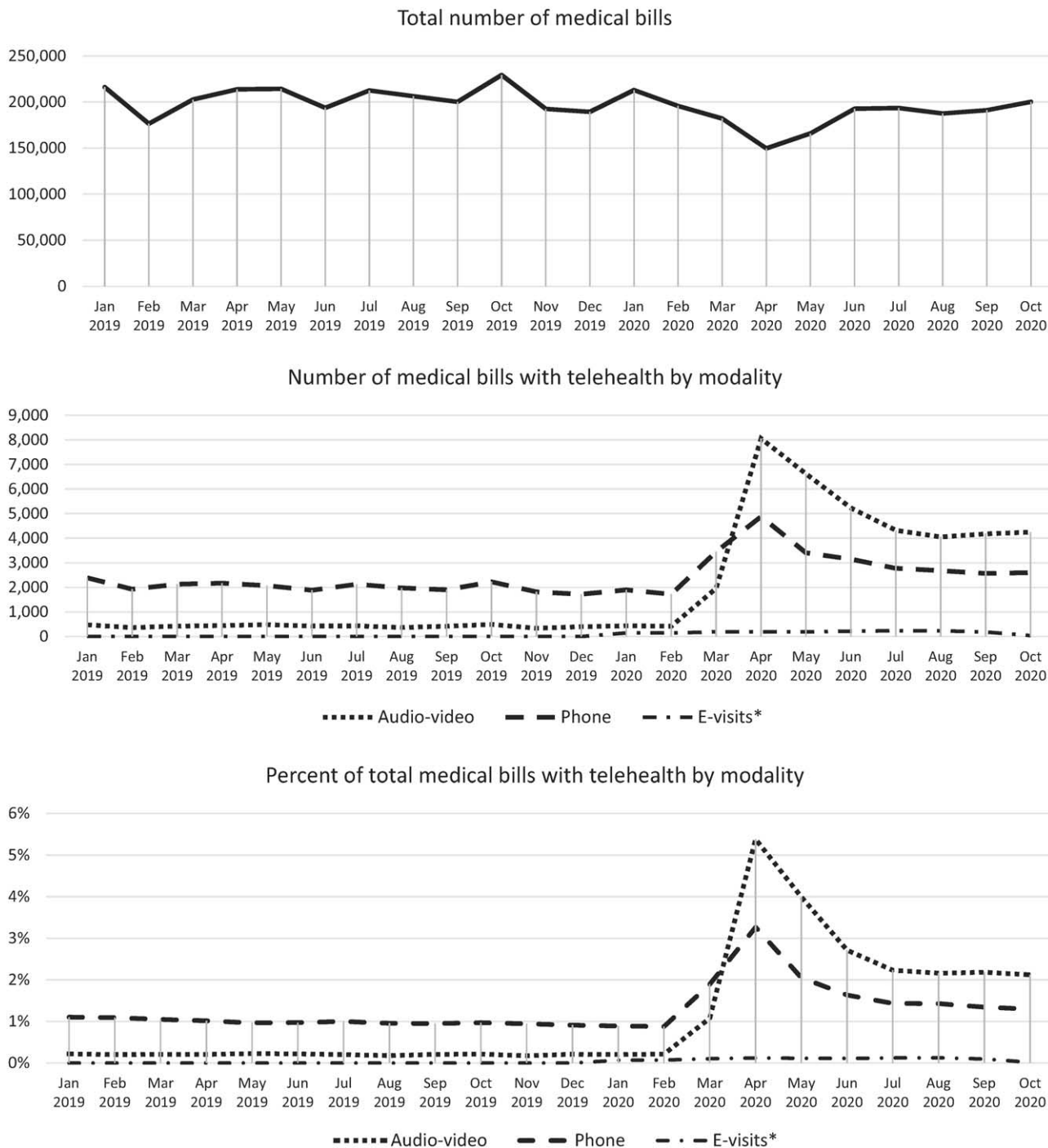


FIGURE 1. Trends in paid medical bills (top), telecommunication services by modality (middle), and percent of medical bills with telecommunication (bottom), January 2019 to October 2020. * E-visits are non-face-to-face communications conducted through an online patient portal.

COVID-19 pandemic, the total number of medical bills decreased by 20.4% in March and April 2020, averaging 165,774 monthly bills, compared to the same months in the previous year (208,160 bills in March and April 2019). While medical bills increased after April 2020, the number of bills had not rebounded to pre-pandemic levels as of October 2020. Specifically, medical bills were 12.7% lower in October 2020 (200,196 medical bills), compared to the previous year (229,238 in October 2019).

In the 14 months prior to L&I's Temporary Telehealth Policy, there were minimal services conducted through telehealth (Fig. 1). From January 2019 to February 2020, the percent of monthly bills with telehealth averaged around 1.2% of medical bills per month. Phone was the most common mode of telehealth before the Temporary Telehealth Policy, accounting for 81.8% of the total number of all telehealth-related bills from January 2019 to February 2020. During the same period, audio-video comprised 17.4% of the total

number of telehealth-related bills, while <1% were due to e-visits. Telehealth increased in March 2020 and peaked in April 2020, accounting for 8.8% of total medical bills occurring in April 2020, with 61.4% of telehealth conducted via audio-video and 37.2% via phone. Services conducted through telehealth declined to 3.4% in October 2020, with audio-video accounting for 61.7% of telehealth bills. The average rate of telehealth bills occurring post-implementation of the Temporary Telehealth Policy was 4.63 per 100 medical bills (95% confidence interval [CI]: 3.54, 6.06), which was significantly higher than the pre-implementation rate of 1.20 per 100 medical bills (95% CI: 1.17, 1.23). The rate ratio was 3.87 (95% CI: 2.95, 5.07; *P*-value < 0.001).

Telehealth Utilization by Sociodemographic Characteristics

From March 2020 to October 2020, a total of 88,197 workers had at least one paid medical bill. Of these, 23.5% (*n* = 20,716) of workers had at least one telehealth encounter (Table 2). Among those with at least one telehealth encounter, 53.3% (*n* = 11,048) had at least one audio-video telehealth encounter, 45.9% (*n* = 9,504) had at least one phone encounter, and 0.79% (*n* = 164) had at least one evisit encounter. Use of telehealth varied significantly across age groups, with 17.5% of workers aged 18 to 24 years old and 17.3% of workers aged ≥65 years old with at least one telehealth encounter, compared to 22.3% to 26.6% among those in other age groups (Table 2, *P*-value < 0.001). Telehealth utilization significantly differed by sex (26.9% among women, compared to 21.9% among men, *P*-value < 0.001) and number of dependents (35.0% among workers with at least one dependent, compared to 21.7% among those without dependents, *P*-value < 0.001). Among workers who had ever used interpreter services, 30.4% had at least one telehealth encounter, compared to 22.5% among people who did not use interpreter services.

Telehealth utilization varied significantly by industry and injury characteristics (Table 2). Telehealth was more common among workers in transportation or warehousing (29.0%), followed by workers in education, health care, or social services (27.1%), and less common among workers in agriculture (17.8%). High use of telehealth was found among workers with multiple injuries or conditions (31.0%), workers with intracranial injuries (30.7%), workers with sprains, strains, and tears (30.5%), and workers with fractures (29.0%). Few workers with injuries involving deafness, hearing loss or impairment (2.5%), and open wounds (12.0%) received telehealth. Among workers who received medical services post-implementation of the Temporary Telehealth Policy, 27.3% of workers injured before 2020 received telehealth, compared to 20.5% among workers injured in 2020. Specifically, for workers who used any audio-video telehealth, 35.3% (3,903 out of 11,048) were injured in 2020 and 64.7% (7145 out of 11,048) were injured prior to 2020 (Supplement, <http://links.lww.com/JOM/B74>).

Use of telehealth varied significantly by geographic metrics of access (Table 3). Among workers who resided in Western WA, 24.7% had at least one telehealth encounter, compared to 20.9% among those in Eastern WA. Similarly, utilization varied by degree of urbanicity, with 14.6% of workers who resided in more rural counties (micropolitan or noncore) having at least 1 telehealth encounter, compared to 25.0% among workers who resided in more populated counties. Telehealth was common among workers who lived in counties with lower poverty and with greater access to broadband Internet. Specifically, 16.0% of workers residing in counties with the highest level of residents living below poverty level had at least one telehealth encounter, compared to 25.8% of workers who resided in counties with the lowest level of poverty. Around 16.7% of workers residing in counties with the lowest access to broadband Internet had a telehealth encounter, compared to 26.1% of workers who resided in counties with the greatest access to broadband Internet. When examined by telehealth modality,

audio-video was more common than phone and e-visits among workers residing in less populated areas (eg, small metro, micropolitan, or noncore), as well as among those residing in counties with the highest level of poverty and the lowest access to broadband Internet (Supplement, <http://links.lww.com/JOM/B74>).

DISCUSSION

To our knowledge, this is the first study that has examined trends in the rapid transition from traditional in-person workers' compensation services to home-based telehealth services during the COVID-19 pandemic. We found increases in telehealth utilization during the COVID-19 pandemic among injured workers, with audio-video as the most common type of telehealth modality. Additionally, we found that telehealth usage varied by patient, injury, and geographical characteristics, suggesting the need to evaluate the impact of these barriers in order to ensure equity in telehealth-related services among injured workers.

Many publications have documented declining medical visits in tandem with increasing telehealth services, especially in the early months of the COVID-19 pandemic.^{2,18,26,27} Consistent with these studies, we also found fewer medical bills in March and April 2020 in workers' compensation. Declines in medical billings likely represent measures across many health care institutions and facilities to limit face-to-face visits and elective procedures as preventive COVID-19 exposure measures, while trying to ramp up telehealth. Additionally, WA's "Stay Home, Stay Healthy" order, announced in late March 2020, required residents to stay home unless they need to pursue an essential activity, which may have led to workers delaying or postponing medical services,²⁸ and it is possible that fewer injuries occurred as a result of more people working from home or not working (eg, restaurant workers). The stay-at-home order expired in June 2020,²⁸ which may have contributed to the increase in medical billings and the continued decrease in telehealth services seen during this month. Usage of telehealth services has decreased since the initial peak of the pandemic; however, telehealth utilization remains higher than pre-pandemic levels, suggesting interest in continuing telehealth services for both workers and providers.²⁰

We found lower overall rates of telehealth utilization during the COVID-19 pandemic than other insurers and reporting systems. Trends in the utilization of telehealth services vary and may depend on the how telehealth metrics are constructed. For example, one study using data from a commercial health insurance plan found that telehealth accounted for nearly 24% of all encounters from March to June 2020.³ Another study using billing data collected from primary care physicians participating in a large health database reported that telehealth accounted for 35% of primary care visits from April to June 2020.²⁹ However, these studies were restricted to the list of services payable via telehealth under the Medicare Physician Fee Schedule or primary care visits,²⁹ which may exclude services more common in the injured worker population, such as physical therapy, work hardening, chronic pain management, or brain injury rehabilitation, all of which are payable via telehealth in L&I's Temporary Telehealth Policy.³⁰

We found that telehealth utilization during the COVID-19 pandemic varied significantly across some demographic characteristics, such as age, gender, and number of dependents. Consistent with previous studies, we found lower telehealth utilization among older adults.^{29,31} Differences in utilization may be attributable to lack of familiarity with telehealth among older adults, as well as the presence of physical disabilities that can make hearing and communicating difficult without the cues available in person.^{32,33} Prevailing biases related to technology use and literacy may also contribute to the non-prioritization of older adults in telehealth services, with older adults more likely to report that their physician does not offer telehealth visits, compared to younger adults.³⁴ Telehealth initiatives aimed at increasing accessibility accommodations, such as closed captioning

TABLE 2. Telehealth Utilization by Sociodemographic Characteristics Among Workers who Received Medical Services During the COVID-19 Pandemic, March 2020 to October 2020 (N = 88,197)

Sociodemographic characteristics	Total (n = 88,197)	Any Telehealth (n = 20,716) (n, row %)	No Telehealth (n = 67,481) (n, row %)	P*
Age at injury				<0.001
18–24	9,697	1,700 (17.5%)	7,997 (82.5%)	
25–34	18,341	4,240 (23.1%)	14,101 (76.9%)	
35–44	19,085	5,073 (26.6%)	14,012 (73.4%)	
45–54	19,884	5,162 (26.0%)	14,722 (74.0%)	
55–64	17,568	3,915 (22.3%)	13,653 (77.7%)	
>65	3,622	626 (17.3%)	2,996 (82.7%)	
Sex				<0.001
Female	27,367	7,372 (26.9%)	19,995 (73.1%)	
Male	60,823	13,344 (21.9%)	47,479 (78.1%)	
Missing	7	0 (0.0%)	7 (100%)	
Marital status				0.22
Married	43,284	10,069 (23.3%)	33,215 (76.7%)	
Single	43,725	10,327 (23.6%)	33,398 (76.4%)	
Missing	1,188	320 (26.9%)	868 (73.1%)	
Number of dependents				<0.001
0	76,404	16,591 (21.7%)	59,813 (78.3%)	
>1	11,793	4,125 (35.0%)	7,668 (65.0%)	
Ever had interpreter services				<0.001
Yes	11,451	3,481 (30.4%)	7,970 (69.6%)	
No	76,746	17,235 (22.5%)	59,511 (77.5%)	
Industry [†]				<0.001
Agriculture	7,804	1,391 (17.8%)	6,413 (82.2%)	
Arts	5,894	1,336 (22.7%)	4,558 (77.3%)	
Construction	15,107	3,936 (26.1%)	11,171 (73.9%)	
Education	11,471	3,111 (27.1%)	8,360 (72.9%)	
Information	4,847	1,099 (22.7%)	3,748 (77.3%)	
Manufacturing	8,023	1,904 (23.7%)	6,119 (76.3%)	
Retail/wholesale trade	12,437	3,216 (25.9%)	9,221 (74.1%)	
Services	13,065	3,290 (25.2%)	9,775 (74.8%)	
Transportation, warehousing	4,349	1,260 (29.0%)	3,089 (71.0%)	
Missing	5,200	173 (3.3%)	5,027 (96.7%)	
Year of injury				<0.001
Prior to 2016	14,514	2,632 (18.1%)	11,882 (81.9%)	
2016	2,057	689 (33.5%)	1,368 (66.5%)	
2017	2,869	968 (33.7%)	1,901 (66.3%)	
2018	5,177	1,737 (33.6%)	3,440 (66.4%)	
2019	14,498	4,646 (32.0%)	9,852 (68.0%)	
2020	49,082	10,044 (20.5%)	39,038 (79.5%)	
Nature of injuries				<0.001
Sprains, tears, dislocations	39,245	11,987 (30.5%)	27,258 (69.5%)	
Open wounds	11,115	1,331 (12.0%)	9,784 (88.0%)	
Deafness, hearing loss or impairment	9,236	234 (2.5%)	9,002 (97.5%)	
Superficial wounds, bruises, burns	9,093	1,637 (18.0%)	7,456 (82.0%)	
Multiple injuries or conditions	6,450	1,998 (31.0%)	4,452 (69.0%)	
Fractures	5,755	1,668 (29.0%)	4,087 (71.0%)	
Intracranial	1,824	560 (30.7%)	1,264 (69.3%)	
Environmental (heat stroke, frostbite)	47	4 (8.5%)	43 (91.5%)	
Other [§]	5,125	1,230 (24.0%)	3,461 (75.4%)	
Missing	307	67 (21.8%)	67 (80.0%)	

*P-values are from the chi-square test of descriptive variables between workers who received any type of telehealth and those who did not receive any telehealth from March 2020 to October 2020. Missing values were excluded from chi-square tests.

[†]Industry categories: (1) Agriculture, forestry, fishing, hunting; (2) Arts, entertainment, hospitality; (3) Construction, utilities, mining; (4) Education, health care, social services; (5) Information, finance, real estate, professional, technology; (6) Manufacturing; (7) Retail/wholesale trade; (8) Services, administrative, support, waste, other (9) Transportation, warehousing.

[§]Other types of nature of injury can consist of unspecified or non-classifiable injuries or conditions, systemic diseases and disorders, infectious and parasitic diseases, and neoplasms, cancers, and tumors.

for audio-video visits, and patient education and training may improve telehealth engagement among older adults.^{32,33} Similar to other studies, we found higher telehealth usage among women than men.^{13,16,31,32} Previous studies have suggested that higher telehealth utilization among women may be due to greater familiarity with

telehealth, with women more likely to engage in eHealth activities, such as searching for a health care provider online or communicating with a provider online.³⁵ Telehealth may also represent a more convenient option to access health care, especially in the COVID-19 era where a disproportionate burden of childcare duties are placed

TABLE 3. Telehealth Utilization by Geographical Characteristics Among Workers who Received Medical Services During the COVID-19 Pandemic, March 2020 to October 2020 (N = 88,197)

Characteristics (n, %)	Total (n = 88,197)	Any Telehealth (n = 20,716) (n, row %)	No Telehealth (n = 67,481) (n, row %)	P*
Geography of residence				<0.001
Eastern WA	24,457	5,107 (20.9%)	19,350 (79.1%)	
Western WA	59,515	14,672 (24.7%)	44,843 (75.3%)	
Missing or out of state	4,225	937 (22.2%)	3,288 (77.8%)	
Rural/urban county of residence				<0.001
Large central metro	16,154	4,271 (26.4%)	11,883 (73.6%)	
Large fringe metro	24,279	6,532 (26.9%)	17,747 (73.1%)	
Medium metro	16,987	4,212 (24.8%)	12,775 (75.2%)	
Small metro	14,812	3,048 (20.6%)	11,764 (79.4%)	
Micropolitan	9,612	1,353 (14.1%)	8,259 (85.9%)	
Noncore	2,128	363 (17.1%)	1,765 (82.9%)	
Missing or out of state	4,225	937 (22.2%)	3,288 (77.8%)	
Percent of county residents living below poverty level				<0.001
Quantile 1 (0–8.9%)	29,007	7,475 (25.8%)	21,532 (74.2%)	
Quantile 2 (9.0–10.4%)	18,371	5,069 (27.6%)	13,302 (72.4%)	
Quantile 3 (10.5–13.7%)	16,602	4,046 (24.4%)	12,556 (75.6%)	
Quantile 4 (13.8–26.5%)	19,992	3,189 (16.0%)	16,803 (84.0%)	
Missing or out of state	4,225	937 (22.2%)	3,288 (77.8%)	
Percent of county households without broadband Internet				<0.001
Quantile 1 (0–6.6%)	25,730	6,709 (26.1%)	19,021 (73.9%)	
Quantile 2 (6.7–9.3%)	21,543	5,815 (27.0%)	15,728 (73.0%)	
Quantile 3 (9.5–11.3%)	16,263	3,840 (23.6%)	12,423 (76.4%)	
Quantile 4 (11.4–28.8%)	20,436	3,415 (16.7%)	17,021 (83.3%)	
Missing or out of state	4,225	937 (22.2%)	3,288 (77.8%)	

*P-values are from the chi-square test of descriptive variables between workers who received any type of telehealth and those who did not receive any telehealth from March 2020 to October 2020. Missing or out-of-state values were excluded from chi-square tests.

on women due to the closures of schools and daycare centers.³⁶ This may align with our finding of higher telehealth use among workers with at least one dependent.

Previous studies have reported lower rates of telehealth use among patients with limited English proficiency.^{13,14} Contrary to these studies, we found higher telehealth use among workers who had received interpreter services. Billing for interpreter services may underestimate the number of workers with limited English proficiency. However, health care and vocational providers in WA are responsible for deciding whether an interpreter is needed and are required to arrange and confirm all appointments for workers covered under L&I who are in need of interpreter services.³⁷ Thus, it is possible that workers with interpreters in L&I may be more familiar with navigating their health care system, compared to patients in other health systems where interpreter services are not as accessible.

Telehealth varied by injury characteristics. Telehealth was more common among injuries that may require longer rehabilitation (e.g., intracranial injuries, fractures, conditions involving sprains, strains, tears, or multiple injuries), and its usage (particularly for audio-video telehealth) was more common among workers with more chronic injuries, suggesting that many audio-video telehealth encounters were follow-up visits. Indeed, previous research has found that telehealth usage among new patients is low, with one study reporting that 16% of new patient encounters during the first 4 months of COVID-19 were conducted with telehealth.³ While current research supports the use of telehealth as a service delivery model in a variety of settings applicable to injured workers (e.g., occupational therapy,³⁸ rehabilitation for musculoskeletal conditions,³⁹ and traumatic brain injury⁴⁰), further research is needed to examine the impact of telehealth on medical utilization, worker satisfaction, and return-to-work outcomes.

Consistent with previous studies, we found that telehealth utilization varied by some geographic metrics of health care access, such as rurality, poverty, and broadband Internet access.^{12–15} Prior to COVID-19, telehealth had been viewed as a promising tool to improve health care access and reduce health inequalities, especially for medically underserved populations. However, telehealth requires adequate broadband access, which is often limited in rural communities where around 33% of residents may lack access to broadband Internet services that are required for audio-video telehealth visits.⁴¹ Additionally, 24% of adults with annual household incomes below \$30,000 do not own a smartphone, 43% do not have home broadband Internet services, and 41% do not have a computer, which may affect access to telehealth.⁴² While the overall use of telehealth was less common among workers in our study who lived in rural counties or counties with the highest poverty and lowest access to broadband Internet, we found that audio-video telehealth was more commonly used among workers residing in disadvantaged counties, compared to phone or e-visits. Higher use of audio-video may reflect L&I’s payment policies, which highlight the importance of a video connection in order to render appropriate health care services to injured workers.³⁰ Indeed, although phone visits may improve health care access for residents without adequate broadband access or those who are inexperienced with audio-video technology, phone visits may not be suitable for care that requires physical assessments.³³ Flexibility in where telehealth appointments can take place and increased access to telehealth infrastructure may mitigate disparities in broadband access and poverty. For example, telehealth appointments could occur at the workplace, where workers may have better access to Internet or computers; however, this may be limited among workers who work in remote settings, such as in agriculture where we found lower telehealth usage compared to workers in other industries. Additionally,

concerns about workers' privacy and confidentiality when telehealth appointments are accepted in public spaces (eg, at work or in crowded, shared housing) are important.

Strengths and Limitations

The present study adds to the sparse literature on telehealth utilization in workers' compensation. While many previous studies examined telehealth within the first 3 or 4 months of the pandemic,^{3,9,29,31} we were able to assess telehealth usage in the later months of the pandemic when stay-at-home orders were lifted and in-person visits became more common. It will remain important to continue assessing telehealth use by modality as telehealth coverage and provider reimbursement policies change and as the COVID-19 prevalence decreases with increasing vaccination. For example, e-visits comprised a small number of encounters in our data, which may be related to its lower reimbursement rates compared with other modalities.⁴³

Several limitations exist. We identified telehealth-related services using CPT codes, modifiers, and place of service codes in workers' compensation billing data. As such, we may have underestimated telehealth services where coding was inaccurate or missing. In addition, workers may receive telehealth for health care services not related to their work injury, and these encounters would not be captured in our data, which could further underestimate telehealth utilization. We used county-level measures as proxies for worker-level SES and access to broadband Internet; however, there can be wide variability in these metrics of access within counties, which can contribute to inaccurate assessment of access. Information on race and ethnicity was not available. Given that systemic racism can create inequalities in access to care, with previous studies highlighting differential telehealth utilization rates by race and ethnicity,^{13–15} future research is needed to understand the extent of differential telehealth utilization by race and ethnicity among injured workers and its implications on health outcomes.

While results indicate a higher average rate of telehealth bills after implementation of L&I's Temporary Telehealth Policy, our sample size (ie, the number of post-policy monthly observations) prohibited us from excluding the transitional period, which may be important given the significant organizational and practice change that is required to implement telehealth (eg, establishing technological infrastructure and skills, redefining existing roles and responsibilities, high implementation costs).⁴⁴ Given that the change in telehealth policy took place at the beginning of the COVID-19 pandemic, it is difficult to disentangle the effects of concurrent policies and the events that contributed to higher telehealth uptake (eg, travel restrictions, uncontrolled community transmission, shortage of personal protective equipment). Future studies quantifying the effects of telehealth expansion policies on access to care could use a control group that was not subject to telehealth expansion policies, which would help mitigate issues surrounding co-occurring policies and events. As telehealth usage stabilizes over time, it will be important to examine whether the increased use of telehealth persists. Additionally, assessing whether satisfaction with telehealth services varies by worker populations may provide insight on factors that can affect telehealth utilization.

CONCLUSIONS

Telehealth use increased among injured workers during the COVID-19 pandemic, with utilization remaining higher after the onset of the pandemic, compared to pre-pandemic. Use of telehealth varied across sociodemographic characteristics. Additional research examining whether telehealth services can provide greater access to care, reduce barriers to care, and improve health outcomes for injured workers is needed.

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