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Interstate Telemedicine for Urologic Cancer Care

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Abstract

PURPOSE: US states eased licensing restrictions on telemedicine during the COVID-19 pandemic, allowing interstate use. As waivers expire, optimal uses of telemedicine must be assessed to inform policy, legislation, and clinical care. We assessed whether telemedicine visits provided the same patient experience as in-person visits, stratified by in- versus out-of-state residence, and examined the financial burden.

PATIENTS AND METHODS: Patients seen in person and via telemedicine for urologic cancer care at a major regional cancer center received a survey after their first appointment (August 2019–June 2022) on satisfaction with care, perceptions of communication during their visit, travel time, travel costs, and days of work missed.

RESULTS: Surveys were completed for 1,058 patient visits (N=178 in-person, N=880 telemedicine). Satisfaction rates were high for all visit types, both interstate and in-state care (mean score 60.1–60.8 [maximum 63], $p>0.05$). More patients convening interstate telemedicine would repeat that modality (71%) than interstate in-person care (61%) or in-state telemedicine (57%). Patients receiving interstate care had significantly higher travel costs (median estimated visit costs $200, IQR $0-$800 vs median $0, IQR 0-$20 for in-state care, $p<0.001$); 55% of patients receiving interstate in-person care required plane travel and 60% required a hotel stay.

CONCLUSIONS: Telemedicine appointments may increase access for rural-residing patients with cancer. Satisfaction outcomes among patients with urologic cancer receiving interstate care were similar to those of patients cared for in state; costs were markedly lower. Extending interstate exemptions beyond COVID-19 licensing waivers would permit continued delivery of high-quality urologic cancer care to rural-residing patients.

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Introduction

Approximately one-fifth of the US population resides in rural communities.[1] Contemporary rural-residing individuals face multiple health care challenges, including access to quality health care services, poverty, and prevalent tobacco use.[2,3] Specifically, for cancer care, issues of travel burden, financial costs, disproportionate impact of time off work, and reduced access to clinical trials put individuals residing in rural areas at risk for health disparities.[4] As a result, rural counties have higher rates of cancer mortality despite having lower cancer incidence.[5] With respect to genitourinary cancers, counties without a urologist have higher population-level mortality rates.[6,7]

Although telemedicine has the potential to facilitate rural access to health care, telemedicine policy before the COVID-19 public health emergency severely restricted the use of telemedicine across state lines. Due to emergency licensure waivers, telemedicine use expanded significantly after March 2020, including increased use of interstate telemedicine.[8] Given that most of these waivers have expired, understanding the impact of telemedicine on patient-centered outcomes of interstate cancer-care delivery is essential to inform clinical practice and health policy.

The Fred Hutchinson Cancer Center (FHCC) is situated in a unique geographic catchment area that includes several Northwest states: Washington, Wyoming, Alaska, Montana, and Idaho (WWAMI). Given that the WWAMI region constitutes 28% of the US landmass, interstate care often requires onerous travel or overnight stays for clinic visits. Distance imposes burdens on patients from the WWAMI region that are different from those faced by patients seeking interstate care in other less expansive US regions. A lack of reciprocity in licensure poses an additional barrier.

Beginning in August 2019, we initiated a prospective cohort study to understand the impact of telemedicine on rural access to urologic cancer care and assessed patient-reported satisfaction with clinic encounters. We assessed the use of telemedicine for patients residing in state (i.e., Washington State residents) and out of state to understand whether interstate care conferred adverse patient-centered outcomes for individuals seen via telemedicine.

Methods

This study was approved by the Fred Hutchinson Cancer Consortium Institutional Review Board as protocol 8727. FHCC is an independent organization that serves as the cancer program for UW Medicine. From August 2019 through June 2022, a convenience sample was established among patients seen at FHCC, both in-person and via telemedicine, for chief complaints consistent with a urologic cancer (cancer types included prostate, bladder, kidney, upper tract urothelial, testicular, and penile) or risk for a urologic cancer (i.e., elevated PSA, new renal mass). Emergency licensure waivers granted in response to the COVID-19 public health emergency resulted in a marked increase in the practice of interstate telemedicine at FHCC; thus, the study drew on patients from the WWAMI area (with the exception of Wyoming), as well as from Oregon and Hawaii.

Patients were screened and consent was requested. Those who agreed to participate in the study were sent an online survey for completion after their clinic visit, which was administered through REDCap, a secure, web-based software platform designed to support data capture for research studies. The survey, the Urology Health Care Experience Questionnaire,[9] consists of 24 questions that assess satisfaction with care and the direct and indirect costs of a health care encounter (see Supplemental Appendix). Questions asked about travel costs, time spent traveling, workdays missed, and patient satisfaction with their clinical encounter. Eleven items had seven-point Likert scale responses (ranging from strongly disagree to strongly agree). Study participants were provided with a $10 electronic gift card upon completion of the online survey.

Data concerning patient demographics, home ZIP code, appointment type, and type of cancer or suspected cancer were abstracted from the patient's electronic health record.

The analysis of survey results was restricted to each patient's first appointment via telemedicine or in-person visit during the study period; this minimized the potential bias of patients submitting multiple surveys for successive visits. No additional exclusion criteria were applied.

Patient satisfaction scores were calculated from nine of the items on the Urology Health Experience Questionnaire.[9] Selecting "strongly disagree" contributed one point to their patient satisfaction score. The tabulated score increased one point as their selection increased up the Likert scale, for a maximum contribution of seven points per item for selecting the "strongly agree" response. Patients who selected "strongly agree" for all nine items had a maximum patient satisfaction score of 63. Travel costs for appointments, including gas, airline tickets, and hotels, were self-estimated by patients as part of the Urology Health Care Experience Questionnaire.

We characterized patient demographics with descriptive statistics. To address our objective to compare satisfaction scores and costs between patients seen via telemedicine vs. in-person, we constructed a multiple linear regression model with the dependent outcome of satisfaction score and an interaction test with visit type (telemedicine vs. in-person) and patient location (in-state vs. interstate). Patients with missing responses that precluded calculation of a complete satisfaction score were excluded. To compare proportions selecting "strongly agree" in the patient satisfaction Likert items, we constructed a logistic regression model for each item with an interaction test with visit type and patient location as independent variables. We only present results for which a test for heterogeneity suggested that satisfaction score and the proportion that strongly agree with an individual item varied by visit type and state of residence. We tested for the effect of heterogeneity by type of visit on travel burden by patient location and observed a significant difference for all parameters. We then stratified our analysis by visit type and patient location and compared patients convening telemedicine visits by state of residence, and we compared patients convening in-person visits by state of residence, using multiple linear regression to identify associations between visit type and state of residence and estimated visit costs and travel time and we assessed the association between visit type and state of residence and the proportion of patients that required plane travel, a hotel stay, or at least 1 missed work day with logistic

regression. A two-tailed *P* value <0.05 was considered statistically significant. Analysis was performed using R Version 4.1.3.

Results

Of the 4,843 screened appointments for which patients received surveys, patients submitted surveys for 1,595 appointments (33% response rate). Of the 1,595 post-appointment surveys, 1,136 (71%) were first-time surveys and were included in the analysis.

Participants were mostly male and most commonly self-identified their race as White. The most common malignancy underlying their clinic visit was prostate cancer, followed by bladder and kidney cancers. Medicare was the most common payer, followed by private insurance and Medicaid (Table 1). Among patients seen via telemedicine, new patients were more likely to receive interstate care compared with in-state care (51% vs. 40%, respectively).

Table 2 displays patient-reported satisfaction with the encounter by visit modality stratified by whether patients resided in state or interstate. Although patients receiving interstate telemedicine care had a higher overall satisfaction score compared with those whose telemedicine care was in-state and a higher proportion endorsed a trusting relationship with their health care provider, tests for heterogeneity in these outcomes was not significant suggesting that satisfaction with care as measured by overall satisfaction score or the proportion of patients strongly agreeing with individual satisfaction items did not vary by visit type and state of residence.

The travel burden for patients was much greater among participants residing out of state (Table 3). Tests for heterogeneity in travel burden were significant for travel costs ($p=0.04$), travel time ($p<0.001$), plane travel ($p<0.001$), hotel stay ($p<0.001$), and missed work days ($p<0.001$). Among patients receiving their care via telemedicine, those from out of state had some travel burden (likely because of travel to receive technological help) with respect to overall travel costs, travel time, the need for plane travel or a hotel, and a requirement to miss days of work; this was significantly higher than the limited travel obligations of patients receiving in-state telemedicine care. Among patients seen in-person, the differences between patients residing out of state and in state was magnified. The former had substantially and statistically significantly higher travel costs and travel time; more than half required airplane travel or a hotel stay. No patients seen in state reported travel costs exceeding $800 for their visit compared with 4 interstate telemedicine patients (5.3%) and 29 patients receiving in-person interstate care (33%). Conversely, most patients convening telemedicine visits (75% of in-state patients and 80% of interstate patients) expended no money for their visit compared with 2.1% and 3.4% of in-state and interstate patients seen in person, respectively.

Discussion

Our study had several important findings that inform clinical and legislative approaches to interstate telemedicine for cancer care. First, telemedicine is being frequently used for interstate cancer-care delivery. Although patients in our study were not consecutively

enrolled, a substantial number of the patients seen at FHCC from out of state were seen via telemedicine. Prior work among Medicare beneficiaries demonstrated little use of interstate telemedicine before the COVID-19 public health emergency; levels of use increased from March 2020 on.[8] Individual states exhibited substantial variation in the proportion of Medicare beneficiaries seeking interstate care, with several WWAMI states being among the highest utilizers of out-of-state care (Alaska, Idaho, Wyoming). This highlights the need for local telemedicine policies that recognize the unique burdens of cancer care delivery that individual states may confront.

Second, patients receiving interstate care for genitourinary cancer are highly satisfied with their medical care, with satisfaction scores similar to those of in-state (Washington State) residents. Their satisfaction scores were high whether they were seen via telemedicine or in-person. Importantly, patients rated the quality of health care they received and the ability to develop trust in their doctor highly. This suggests that telemedicine can engender patient-doctor relationships similar to those developed during in-person visits. The proportion of respondents who would convene their next encounter through the same visit modality was highest among patients receiving care via interstate telemedicine, further indicative of their satisfaction.

Third, the direct and indirect costs of care were markedly lower for patients engaged in interstate telemedicine compared with patients receiving interstate in-person and in-state in-person care. We measured travel burden in terms of estimated travel costs as well as flights and hotel stays needed for clinic visits. Every measure of travel burden was highest among patients receiving interstate in-person care, more than half of whom flew and/or stayed in a hotel for their cancer center visit and one-third of whom spent more than $800 in support of their clinic visit. Given the significant costs of travel and that most Medicare beneficiaries who utilize interstate visits are rural-residing individuals,[8] the availability of telemedicine may provide a cost incentive that can ameliorate rural disparities in access to complex cancer care.

Lastly, interstate telemedicine was used frequently for new patient visits. Preceding the pandemic, Medicare policy restricted telemedicine to established patients who had already had a new patient visit with the same provider. As individual states navigate post-emergency health policy decision-making, there is a need to understand whether visit type impacts system-level, quality, and patient-centered outcomes for cancer care. Within the WWAMI region, Alaska recently enacted telemedicine legislation that allows health care providers in other states to convene patient visits without an Alaska license, but only for established patients.[10] For genitourinary cancer care, this may omit a valuable opportunity to engage patients at the time of their diagnosis when they most benefit from a visit with a comprehensive cancer center, especially for cancers such as kidney cancer and bladder cancer that exhibit natural regionalization to higher volume centers.

Our study has several limitations. First, we were unable to prospectively screen all patients being seen across FHCC sites; thus, our prospective cohort is a convenience sample of patients who were approached for participation, and it does not permit calculation of rates of telemedicine use relative to the denominator of patients seen at FHCC. We also did not

collect information on patients that were not included in the cohort study or that did not respond to our survey invitation. This may also impose a response bias that could lead to a more positive orientation to telemedicine. Second, we used the patient ZIP code listed in the electronic health record, which could result in overcounting patients seen via interstate telemedicine if their listed address was different from their residence at the time of the clinic encounter. Third, we did not assess audio-only visits or visits that were scheduled as telemedicine but had to be converted to audio-only. Patient satisfaction and cost may differ for patients who convene audio-only visits compared with visits that utilized audio and video. We found that a small number of patients traveled for their interstate telemedicine encounters, likely for the purpose of technology support for the encounter. Patients who engage via audio-only telemedicine may have a lower travel burden, but they also may experience less satisfaction with their visit, given the more impersonal nature of an audio-only encounter. More work is needed to understand the barriers experienced by patients who are unable to convene combined audio and video visits. Lastly, our results may be specific to our geographic region and may not generalize to other health care contexts.

Current telemedicine policy derives from limited evidence, and our results demonstrate high satisfaction rates and lower costs for patients receiving interstate care at our comprehensive cancer center for genitourinary cancer. Patients convening interstate in-person visits in other parts of the United States likely navigate similar complex travel burdens, albeit of lower magnitude than our patients, given the geographic breadth of the WWAMI region. Importantly, our cohort included patients being seen for care across the cancer continuum and for multiple cancer types, indicating that the benefits identified may have broad applicability to cancer care more generally. Our results contribute to the growing body of evidence that supports the safety and patient-centeredness of telemedicine for cancer care.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1.

Characteristics of study participants receiving interstate or in-state care

	Interstate (N = 146) *N (%)*	In-State (N = 912) *N (%)*
Age, Median (Interquartile range)	67.9 (63, 73)	68.6 (28, 73)
Telemedicine Appointment	75 (51)	805 (88)
New patient visit	97 (60)	385 (42)
Male Sex	128 (88)	801 (88)
Race/Ethnicity		
White	100 (69)	682 (75)
Black	0	11 (1.2)
Asian	2 (1.4)	21 (2.3)
American Indian/ Alaskan Native	2 (1.4)	4 (0.4)
Native Hawaiian/ Pacific Islander	1 (0.7)	2 (0.2)
Hispanic	0	11 (1.2)
Unknown	41 (28)	181 (20)
Employment Status		
Employed	31 (21)	261 (29)
Retired	38 (26)	295 (32)
Disabled	1 (0.7)	11 (1.2)
Unemployed	1 (0.7)	18 (2.0)
Unknown/ Missing	75 (51)	327 (36)
Cancer Type		
Prostate	91 (62)	561 (62)
Bladder	20 (14)	143 (16)
Kidney	21 (14)	144 (16)
Upper Tract Urothelial	4 (2.7)	20 (2.2)
Testicular	8 (5.5)	13 (1.4)
Penile	0	1 (0.1)
Insurance		
Medicare	88 (60)	540 (59)
Medicaid	3 (2.1)	34 (3.7)
Private	51 (35)	332 (36)
Uninsured/ Unknown	4 (2.7)	6 (0.6)
State of Residence		
Washington	0	912 (100)
Alaska	36 (25)	
Oregon	33 (23)	

	Interstate (N = 146)	**In-State (N = 912)**
	N (%)	***N (%)***
Idaho	27 (19)	
Montana	20 (14)	
Hawaii	6 (4.1)	
Other	24 (16)	

Table 2.

Patient-reported outcomes from the Urology Health Experience Questionnaire for individuals seen via telemedicine or in-person.

	Telemedicine		In-Person	
	Interstate	**In-State**	**Interstate**	**In-State**
	N (%)	***N (%)***	***N (%)***	***N (%)***
Satisfaction score, median (IQR), max 63	62 (60–63)	61 (59–63)	62 (60–63)	62 (59–63)
I was pleased with the quality of the medical encounter.	64 (85)	651 (81)	80 (92)	128 (91)
My visit was on-time and efficient.	53 (71)	559 (69)	63 (72)	104 (74)
I believe that the medical encounter was conducted in a confidential manner.	61 (81)	626 (78)	77 (89)	116 (83)
I was able to share sensitive and/or personal information with my provider.	65 (87)	647 (80)	77 (89)	120 (86)
I was pleased with the quality of educational information provided.	59 (79)	578 (72)	64 (74)	107 (76)
I was overall satisfied with my appointment.	64 (85)	633 (79)	79 (91)	123 (88)
I believe the provider is able to do his or her job even if they aren't able to conduct a physical examination at every appointment.	50 (67)	480 (60)	46 (53)	82 (59)
I have a trusting relationship with my provider.	61 (81)	591 (73)	68 (78)	108 (77)
Considering the cost and time commitment of my appointment, I would choose to meet with my provider in this setting in the future.	53 (71)	462 (57)	55 (63)	82 (59)

IQR = interquartile range

Table 3.

Travel burden associated with telemedicine or in-person care (P-values in the table are derived from multiple linear regression for travel costs and travel time and logistic regression for plane travel, hotel stay, and missed work days).

	Telemedicine			In-person		
	Interstate	**In-State**	***P-value***	**Interstate**	**In-State**	***P-value***
Total costs ($), median (IQR)	$0 ($0)	$0 ($0)	<0.001	$500 ($250–$1000)	$73 ($35–$143)	<0.001
Travel time (minutes), median (IQR)	0 (0–248)	0 (0–60)	0.02	335 (240–470)	180 (120–213)	<0.001
Required plane travel, N (%)	6 (8.0)	1 (0.1)	<0.001	48 (55)	3 (2.1)	<0.001
Required hotel, N (%)	8 (11)	18 (2.2)	<0.001	52 (60)	28 (20)	<0.001
Missed work missed, N (%)	14 (19)	89 (11)	0.05	41 (47)	57 (41)	0.3

IQR = interquartile range