



# Evaluation of Patient Perceptions With Orthopedic Oncology Telehealth: A Pilot Project

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Andrea Evenski, MD<sup>1</sup>, Rachel Honig, MD<sup>2</sup>, Deepika Gupta, MS<sup>3</sup>,  
Emmanuelle Wallach, MS, PhD(c)<sup>4</sup>, Lincoln R Sheets, MD, PhD<sup>4,5</sup>,  
and Mirna Becevic, PhD<sup>4,6</sup> 

## Abstract

Telehealth has been used for decades to improve access to care for rural and underserved patients. The adoption of telehealth in orthopedic oncology is novel and expected to positively impact patient access and compliance. However, no previous evaluation has been published of this expected impact. The objective of this pilot project was to evaluate patients' perceptions regarding orthopedic oncology telehealth services. A 13-question satisfaction survey was distributed to patients who used tele-orthopedic oncology. Fifteen respondents (a response rate of 42%) reported satisfaction with services at 9.7 of 10. Median travel distance to the nearest in-person orthopedic oncologist was greater than 150 miles (241 km). These results are consistent with the previous findings of high satisfaction with telehealth in other specialties. Health care organizations are likely to benefit from offering telehealth to orthopedic oncology patients with limited access.

## Keywords

patient satisfaction, outpatient satisfaction data, technology, quality improvement

## Introduction

Bone and soft tissue tumors are rare and aggressive (1). Early diagnosis increases survival and allows for limb-conserving surgery, if needed. However, the geographic concentration of specialists in urban areas and academic hospitals reduces access for patients from rural and underserved regions (2). Currently, there are only 7 orthopedic oncology fellowships and approximately 305 practicing orthopedic oncologists in the United States (3,4).

Telehealth has the potential to enhance access to care for orthopedic oncology patients facing geographic, financial, and other barriers to health care access (5,6). Expert opinion supports the use of telehealth specifically in the oncology and orthopedic settings (7). A review of literature showed that patients with a variety of cancer types who used telehealth reported less disruption in their own and their families' lives and also reduced treatment burden (8). A recent randomized trial analyzing telehealth in the nononcologic general orthopedics setting showed no difference in patient-reported satisfaction and health outcomes between telehealth and face-to-face appointments (9). Furthermore, a significant proportion of patients requested that their next

appointment also be video-assisted (9). Physician-patient encounters via telehealth in nonorthopedic specialties have demonstrated similar outcomes, diagnostic concordance, and satisfaction with services when compared with traditional in-person care, primarily due to avoidance of unnecessary travel and high quality of care (10).

No research studies to date have been done to evaluate the use of telehealth for patient follow-up in orthopedic

<sup>1</sup> Department of Orthopedic Surgery, University of Missouri, MO, USA

<sup>2</sup> Orthopedic Surgery Department, Mayo Clinic, College of Medicine and Medical Sciences, Rochester, MN, USA

<sup>3</sup> University of Missouri, Family and Community Medicine, Columbia, MO, USA

<sup>4</sup> University of Missouri, Missouri Telehealth Network, Columbia, MO, USA

<sup>5</sup> Department of Health Management and Informatics, University of Missouri, Columbia, MO, USA

<sup>6</sup> Department of Dermatology, University of Missouri, Columbia, MO, USA

## Corresponding Author:

Mirna Becevic, Department of Dermatology, University of Missouri, 2800 Maguire Blvd, Columbia, MO 65212 USA.  
Email: becevicm@health.missouri.edu



oncology. The objective of this pilot project was to evaluate patients' perceptions regarding orthopedic oncology telehealth services. For the purposes of this study, we used the Health Resources and Services Administrations Office for the Advancement of Telehealth definition of telehealth as "the use of electronic information and telecommunication technologies to support long-distance clinical health care, patient and professional health-related education, public health, and health administration. Technologies include video conferencing, the internet, store-and-forward imaging, streaming media, and terrestrial and wireless communications" (11).

## Methods

The University of Missouri (MU) institutional review board (IRB) determined that the project qualified as a quality improvement activity and did not require an IRB review. Orthopedic oncology telehealth operations were supported by the Missouri Telehealth Network (MTN) at the MU. The MTN has been providing telehealth services to Missourians since 1994, and over 40 different specialties and subspecialties have provided services with their support. Telehealth coordinators are trained to observe and document in-person visit workflow and facilitate telehealth workflow to mimic the in-person as much as possible. Clinicians also provide additional instructions and training to ensure nurses and other administrative support will register, arrive, and present patients via telehealth with no or minimal disruption.

Patients received a letter inviting them to voluntarily complete the survey, and all of the survey instruments were deidentified prior to data collection. No additional consent was required. The Revised Standards for Quality Improvement Reporting Excellence (SQUIRE 2.0) framework was used to provide structure for designing the telehealth intervention, and patient satisfaction with telehealth services was evaluated via a survey approach (12,13). This pilot initiative was implemented at one patient site, about 170 miles (273 km) from the physician site at the University of Missouri Healthcare System (UMHS).

## Study Participants

All adult patients (18 years of age or older) who completed telehealth visits with an orthopedic oncologist from March 2014 to August 2017 were selected. A total of 36 patients received survey invitations. Eligibility criteria included geolocation of the selected telehealth site, returning patients who were scheduled for a follow-up or postoperative visits for musculoskeletal tumor issue, and patients' geolocation. Exclusion criteria included pediatric patients (younger than 18 years of age), new patients, patients scheduled for follow-up or postoperative visits for concerns not related to musculoskeletal tumors. Follow up care, both radiographic and clinic, is essential at routine intervals to ensure no recurrence

which would have detrimental prognostic implications for patients diagnosed with musculoskeletal tumors.

## Study Instrument

We designed a 13-question survey, which included multiple-choice questions with single answers on patient demographics—age, sex, and employment status (questions 1: What is your age?, 2: What is your sex?, and 3: What is your employment status?); travel distance to orthopedic oncology at UMHS and travel distance to their local telehealth site (questions 5: How far did you travel to MU?, and 6: How far did you travel to telehealth appointment?); missed or rescheduled in-person appointment (question 11: How many MU appointments have you missed/rescheduled?) and missed/rescheduled telehealth appointments (question 12: How many telehealth appointments have you missed/rescheduled?); a matrix rating scale question using a 10-point Likert scale on satisfaction with telehealth visit (question 4: On a scale 1-10, with 1 being not satisfied at all to 10 being extremely satisfied, how satisfied are you with your telehealth experience?); and free-text questions (questions 7: If employed, how much work is missed for telehealth appointment?, 8: If employed, how much work is missed for MU appointment?, 9: What are the positive aspects to your telehealth appointment?, 10: What are the negative aspects to your telehealth appointment?, and 13: Have you felt any aspect of your care was compromised during your telehealth visit?). The survey was designed by an orthopedic oncologist and a health informatician, and tested for cognitive validity by 5 orthopedic specialists, a medical student, and 2 administrative professionals. The survey was mailed to patients in November and December 2017. Survey responses were tabulated in Excel and analyzed using descriptive statistics.

## Results

### Patient Demographics

Of 36 patients who had telehealth visits with an orthopedic oncologist during the study period, 15 (42%) returned the survey. The patients who did not return their surveys were not subsequently contacted. The median age of the survey respondents was 55 to 64 years, with approximately half self-identifying as female and half as male (Table 1). Five respondents (33% of those who returned surveys) self-identified as employed for wages, 2 (13%) as self-employed, 6 (40%) as retired, and 1 (6%) as unable to work. One (6%) respondent did not report an employment status.

### Overall Satisfaction

The average overall satisfaction was 9.4 of a possible maximum satisfaction of 10, with a standard deviation of 0.828, and a range of 8 to 10 (Table 2). The standard error of the mean was 0.2138, and the margin of error was 0.419. All of the respondents reported a score of 8 or above, 80% of

respondents reported a score of 9 or above, and 60% of respondents reported a score of 10. The coefficient of variance was 8.81%. Other breakdowns for satisfaction are outlined in Table 2.

### Travel Distance

The respondents' median travel distance to UMHS would have been greater than 150 miles (241 km), and the median travel distance to the respondents' telehealth visits was 26 to 50 miles (41-80 km). We noted that the median difference in travel distance was 100 miles (160 km).

### Time Missed From Work

Five (33%) respondents had to take time off of work for a telehealth visit with an average time missed of 7.1 hours. Seven (47%) respondents had to take time off of work for a UMHS appointment with an average time missed of 12.7 hours.

**Table 1.** Respondent demographics.

Respondent subgroup		Number of respondents <i>n</i>
Age	18-24 years old	1
	25-34 years old	2
	35-44 years old	0
	45-54 years old	2
	55-64 years old	6
Sex	65 years old & over	4
	Male	7
Employment status	Female	8
	Employed for wages	5
	Self-employed	2
	Retired	6
	Unable to work	1
Total	Not reported	1
		15

**Table 2.** Satisfaction scores.

Respondent subgroup		Average satisfaction score	Standard deviation	Number of respondents <i>n</i>
Age	18-24 years old	10	NA	1
	25-34 years old	9.0	1.4	2
	35-44 years old	NA	NA	0
	45-54 years old	9.5	0.7	2
	55-64 years old	9.3	1.0	6
Sex	65 years old & over	9.5	0.6	4
	Male	9.3	1.0	7
Employment status	Female	9.5	0.8	8
	Employed for wages	9.0	1.0	5
	Self-employed	10.0	0	2
	Retired	9.7	0.5	6
	Unable to work	8	NA	1
Total	Not reported	10	NA	1
		9.4	0.8	15

Abbreviation: NA, not applicable.

### Positive Aspects of Care

All 15 respondents (*n* = 15) noted specific positive aspects of care. These are detailed in Table 3, organized into these themes: Convenience, Atmosphere, and Miscellaneous. The respondents did not note any negative aspects or areas for improvement.

### Discussion

This pilot project, the first of our knowledge to evaluate perceptions regarding orthopedic oncology telehealth services, found patients' perceptions to be uniformly positive. Centers for Medicare and Medicaid Services billing and reimbursement guidelines (pre-COVID-19) limited telehealth visits to specific clinical settings and did not allow for direct-to-consumer appointments from patients' homes (14). This meant patients still needed to travel to their local hospital or ambulatory clinic to be seen by an orthopedic oncologist via telehealth. These are typically located in the same or neighboring county, while the specialist in our study is located in a county about 150 miles (241 km) away from the telehealth site. Telehealth has been shown to increase access to care for highly specialized expertise with limited access for rural and underserved patients (14). New mobile applications, inexpensive and user-friendly, broke early telemedicine barriers of high equipment cost, expensive training, and limited broadband connectivity. The use of telehealth in orthopedic oncology is novel; however, our findings support the current body of literature that shows high patient satisfaction with this care delivery platform (10). Telehealth is predicted to grow rapidly, especially with the introduction of direct-to-consumer telemedicine from payers and entrepreneurial companies, which emphasizes the urgency of making telehealth programs, such as orthopedic oncology, available for patients in order to increase access to care, patient compliance, and satisfaction with health care services (15).

**Table 3.** Patients' comments regarding telehealth visits.

Distance/convenience/travel	Atmosphere	Misc
<ul style="list-style-type: none"> <li>• “Close, fast”</li> <li>• “Decreased travel and wait times”</li> <li>• “Distance, money, time”</li> <li>• “Less travel time”</li> <li>• “Less travel, do not have to get a motel and spend the night. Less money.”</li> <li>• “Not have to drive as far for the same treatment”</li> <li>• “Convenient”</li> <li>• “No travel to MU”</li> <li>• “Cut mileage by about 47%”</li> <li>• “Not driving an additional 2 hours each direction. This is my first and only telehealth appointment. I thought it was a great innovation and was very grateful to have the opportunity to partake!”</li> </ul>	<ul style="list-style-type: none"> <li>• “Very polite staff”</li> <li>• “Pleasant”</li> <li>• “Comfortable/friendly. Easy and informative.”</li> </ul>	<ul style="list-style-type: none"> <li>• “To find out I didn't have cancer”</li> <li>• “They did what they said they would do. Dr. X was the best doctor I have ever been too. Her staff was the best. I wish she was my doctor for everything. God bless Dr. X and her staff always.”</li> </ul>

## Conclusions

Our study's main contribution is in its real-life patient survey, which allowed for a rapid review of the results and any necessary clinic adjustments to be made. The overall positive response is an indication that orthopedic oncology telehealth services for follow-up and postoperative patients will now be expanded beyond the pilot. Since highly specialized services, such as orthopedic oncology, are typically limited to metropolitan areas, access for patients from rural and underserved areas can be improved and increased by telehealth.

This was a one site pilot study, and we recommend future research to study patient perceptions and satisfaction with orthopedic oncology telehealth to be completed with a larger and more diverse patient population.

## Limitations

The key objective of this project was to acquire new knowledge regarding patient satisfaction with orthopedic oncology telehealth services in a single institution. The main limitation of this approach, however, was that this was a single-site study, and the results may not be generalizable beyond this institution or the state lines. We also acknowledge the perception that survey research may produce response bias, which we addressed by completing cognitive validation and testing.


## Declaration of Conflicting Interests

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## ORCID iD

Mirna Becevic, PhD  <https://orcid.org/0000-0001-6520-1581>

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### Author Biographies

**Andrea Evenski** is an associate professor of Orthopedic Surgery with the University of Missouri. Dr Evenski is one of 200 such practitioners in the nation, and has expertise in bone and soft

tissue tumors in adults and children, as well as in surgical joint replacement.

**Rachel Honig** is a resident physician with Orthopedic Surgery Department, Mayo Clinic.

**Deepika Gupta** is a business technology analyst specialist with the University of Missouri, Family and Community Medicine. Ms Gupta helps collect and analyze various datasets, including telemedicine and telehealth.

**Emmanuelle Wallach** is a program coordinator with the Missouri Telehealth Network, University of Missouri. She manages various databases and coordinates survey instrument design and analysis.

**Lincoln R Sheets** is an assistant research professor with the Health Management and Informatics Department, University of Missouri. He is also an associate director for ECHO data and evaluation with the Missouri Telehealth Network.

**Mirna Becevic** is an assistant professor in the Department of Dermatology, University of Missouri. She is a lead evaluator of the Missouri Telehealth Network and the Show-Me ECHO Project.