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Scientific Article

Physician Perspectives on Telemedicine in Radiation Oncology

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Abstract

Purpose: Telemedicine enthusiasm and uptake in radiation oncology rapidly increased during the COVID-19 pandemic, but it is unclear if and how telemedicine should be used after the COVID-19 public health emergency ends is unclear. Herein, we report on our institution’s provider experience after the mature adoption of telemedicine.

Methods and Materials: We distributed a survey to all radiation oncology attending physicians at our institution in October 2021 to assess satisfaction, facilitators, and barriers to telemedicine implementation. We performed quantitative and qualitative analyses to characterize satisfaction and identify influencing factors whether telemedicine is employed. We calculated the average proportion of visits that providers expected to be appropriately performed with telemedicine for each disease site and visit type.

Results: A total of 60 of the 82 eligible radiation oncologists (73%) responded to the survey, of whom 78% were satisfied with telemedicine in the radiation oncology department and 83% wished to continue offering video visits after the COVID-19 public health emergency ends. Common patient factors influencing whether physicians offer telemedicine include the patient’s travel burden, patient preferences, and whether a physical examination is required. Approximately 20% of new consultations and 50% of weekly management visits were estimated to be appropriate for telemedicine. The central nervous system/pediatrics and thoracic faculty considered telemedicine appropriate for the greatest proportion of new consultations, and 93% of respondents felt comfortable determining whether telemedicine was appropriate.

Conclusions: Surveyed radiation oncologists were satisfied with telemedicine in their practice, and wished to continue offering video visits in the future. Our data suggest that payers should continue to support this patient-centered technology.

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Introduction

Telemedicine offers the potential for a range of benefits, including improvements in clinical outcomes, quality and safety, access to care, financial and operational impact, health equity, and patient, family and clinician experience. Although telemedicine was implemented in limited settings before the COVID-19 pandemic, U.S. radiation oncology (RO) practices dramatically increased their use of telemedicine in early 2020, partly out of concern for viral transmission and partly due to temporary waivers that eased payment and privacy restrictions for Medicare providers.

Given that telehealth policies have the potential to impact how millions receive care, both the implementation and discontinuation of telemedicine must be considered thoughtfully. RO is a unique setting in health care delivery that benefits from specialty-specific examination of virtual care models due to the need for frequent weekly management checks (weekly see or on-treatment visits [WS/OTVs]), daily in-person visits for treatment delivery, close collaboration with multidisciplinary colleagues, and the critical importance of the physical examination to monitor for toxicities or cancer recurrence in any part of the body.

Although surveys addressing RO provider perspectives on telemedicine have been published previously, they suffer from several limitations. Many prior studies had few analyzable responses (n <20), and others had low (<20%) or incalculable response rates. Some researchers invited midlevel providers and residents to complete the survey, which may reflect a different perspective with regard to medical knowledge or risk assessment. Several surveys were multispecialty, which makes deriving RO-specific conclusions challenging. Other surveys were single-institution studies, suggest more data would support the robustness of their findings. Moreover, some researchers surveyed young attending physicians or foreign providers without video-visit technology, limiting their generalizability to practices in the United States. All previous reports surveyed providers within the first 9 months of implementation, with most distributed within the first 3 months. Although these early reports document important phenomena at a time of sweeping health care transformation, perspectives may have shifted as providers have become more accustomed to telemedicine. A few payers serving patients at our institution recently stopped reimbursing for telemedicine weekly management visits, highlighting the shifting regulatory landscape.

Given these limitations, we sought to better understand the perspectives of radiation oncologists at our large academic medical center after we had achieved a more advanced level of telehealth integration than previously reported. To inform how and when telemedicine should be performed in the future, we characterized factors that providers considered when making this determination in their clinical practices. Furthermore, we evaluated the impact of visit type and disease site on whether a patient could be considered clinically appropriate for a telemedicine encounter.

Methods and Materials

This protocol was approved by the institutional review board at MD Anderson Cancer Center. Study data were collected and managed using Research Electronic Data Capture electronic data capture tools. Research Electronic Data Capture is a secure, web-based software platform designed to support data capture for research studies.

The survey was emailed to all RO attending physicians at our institution (including both the main campus and nearby regional satellite facilities). Providers without routine clinical workloads (<1 half day/week) and who did not complete the survey were excluded from the analysis. The survey was open from mid-October to mid-November 2021, and at least 1 reminder was sent to providers a week later. The instruments were developed by the authors specifically for this survey. Some instruments were inspired by previously reported surveys of satisfaction with telemedicine. The full survey instrument is provided in Supplemental Document A.

Descriptive statistics were performed to describe the surveyed population, assess satisfaction, and determine which factors influence their decision to use telemedicine. To estimate the fraction of visits that could be addressed appropriately with telemedicine, providers were asked to estimate the percentage of each visit type that could be performed with telemedicine without a clinically significant decline in quality of care. These data were analyzed for all respondents to provide general estimates, and then limited to providers who treat a single disease site to identify trends by disease site.

A qualitative analysis was performed for all open-ended survey questions. Two authors (SM, BSD) read anonymized responses to open-ended questions, and independently coded responses inductively (no codes were developed a priori). The authors subsequently independently categorized the codes into categories and themes per established content analysis methodology. The coders then compared the results to arrive at a consensus set of categories and themes reflected in the survey responses.

Results

A total of 60 of the 82 eligible respondents completed the survey for a 73.2% response rate. Respondent characteristics are described in Table 1. Figure 1 displays several
measures of satisfaction with telemedicine in RO. With respect to our clinic specifically, 78% of respondents agreed or strongly agreed that they were satisfied with telemedicine visits in the RO department. In addition, 57% of respondents agreed that telemedicine visits are at least as good as in-person visits in the appropriate settings, and 83% wanted to continue offering telemedicine after the public health emergency ends. Four of the 57 respondents (7%) did not want to offer video visits after the public health emergency ended.

Providers ranked the top 3 patient factors influencing whether they would use telemedicine for a specific visit (Fig. 2A). The most commonly reported factors included travel barriers for the patient (95%), patient preference (70%), and whether a physical examination was thought to be necessary (65%). An analysis of the free-text “other” option revealed a theme of deferring to patient preference and comfort with technology. Physicians also ranked the top 3 system factors that would influence whether they would perform telemedicine in the future (Fig. 2B). The most common responses were ease of use (90%), institutional support for telemedicine (70%), and adequate technical support (68%). Reimbursement parity was only listed by 28% of respondents as a top 3 factor. Free-text “other” answers focused on workflows and maintaining clinic efficiency. Finally, physicians reported the most important reasons why they do not perform more telemedicine (Fig. 2C), including patient refusal (33%), providers not believing more telemedicine is clinically indicated (28%), and other (free-text) responses (25%). The other responses described the lack of a physical examination, state regulatory (insurance) barriers, and a lack of accessible equipment.

Table 2 summarizes the major findings from a qualitative analysis of the key open-ended questions in the survey, focusing on facilitators and barriers to physicians incorporating telemedicine into their practices, as well as other comments the respondents shared. Selected answers are provided to illustrate the themes. Table 3 displays the median percent of visits of each visit type that respondents estimated would be appropriate for telemedicine without a clinically significant decline in quality of care. Verification simulations were the visit type most likely to be judged appropriate for telemedicine (90% of visits), and new consultations were the least likely appropriate (20% of visits).

This analysis was repeated with a sample limited to providers treating a single disease site (Fig. 3). Faculty affiliated with the central nervous system/pediatrics (CNS/peds) and thoracic sections were the most amenable to initial consultations with telemedicine, but all other sections estimated that less than half of new patients could be evaluated with telemedicine. Providers treating CNS/peds, thoracic, and melanoma/sarcoma were the most in favor of follow-up visits with telemedicine. For initial consultations, follow-up visits, and WS/OTVs, faculty treating gynecologic tumors estimated the fewest visits would be appropriate for telemedicine. Physicians treating CNS/peds and gynecologic malignancies were the only groups estimating that >50% of initial simulations could be performed with telemedicine supervision. Overall, 93% of respondents (n = 55 of 59) agreed or strongly agreed with feeling comfortable
determining whether a visit was appropriate for telemedicine or would require an in-person visit.

**Discussion**

We found that our institution’s radiation oncologists were largely satisfied with the use of telemedicine in the department (78%), and wanted to continue to offer telemedicine in the future (83%). These figures are consistent with previously reported high satisfaction rates (74%-100%) and interest (82%-89%) in continuing to offer telemedicine after the pandemic ends among other radiation oncologists. Motivators driving telemedicine utilization included patient and provider preference, the ability to improve access to both standard-of-care radiation treatments and clinical trials, and improved clinical safety and efficiency. Patient factors most often considered when determining to use telemedicine included patient convenience, cost-effectiveness (consistent with prior

**Fig. 1** Percentage of respondents who strongly agree, agree, neither agree nor disagree, disagree, or strongly disagree with several measures of satisfaction with telemedicine.

**Fig. 2** Percent of respondents (n = 60) who reported the listed, A, patient factors in their top 3 as most important when deciding whether to use telemedicine for a visit; B, system factors in their top 3 as most important to influence whether they use telemedicine in the future; and C, factors as most important reason for not performing telemedicine more often.
reports, and patient attitudes toward telemedicine. These features highlight key patient-centered benefits that telemedicine facilitates.

Concerns about telemedicine uptake centered on an inability to perform an adequate evaluation or develop a strong patient–doctor relationship, technical issues, or clinical workflow considerations. These results closely mirror those from the Damico et al’s survey of the American Society for Radiation Oncology member directory, which found that the most common concerns for
| Question | Categories | Themes | Example answers |
|----------|------------|--------|-----------------|
| The most important reason why I want to incorporate telemedicine into my practice is... | • Patient preference | • Some patients would benefit from telemedicine more than others | “It is nice to have the option to offer telemedicine to patients due to exceptional circumstances related to finances, travel, or infection. I am more inclined to use it after having initially met the patient and conducted the new consult in person.” |
| | • Physician preference | • Telemedicine decreases travel burdens to improve access to care | “Very convenient for me and my patients. Patients don’t have to deal with traveling, parking, hotel, etc. to hear what they would hear during an in person visit. More convenient for low risk patients, as well as patients with very poor prognosis that shouldn’t waste time traveling at [the] end of life.” |
| | • Hesitancy | • Telemedicine allows for improved clinical efficiency and continuity of care | |
| | • Increased access to care and clinical trials | • Telemedicine helps engage patients and caregivers in care | |
| The most important reason why I am hesitant to incorporate telemedicine into my practice is... | • Lack of or insufficient quality history and physical examination | • Inability to form effective therapeutic relationship | “It is difficult to have hybrid clinics. It is not conducive of relationship building with patients. There is value in seeing a patient in person.” |
| | • Technical limitations | • Inability to complete a thorough assessment | “… some increasingly frustrating state-to-state agreements or lack thereof to do telehealth across state lines.” |
| | • Patient has difficulty connecting or is intimidated by technology | • Physicians are not adequately supported to perform telemedicine | |
| | • Patient preference | • Patient discomfort with telemedicine | |
| | • Relationship building | | |
| | • Reimbursement concerns | | |
| | • Workflow is less efficient for physicians | | |
| Do you have any other comment you wish to share about the use of telemedicine in radiation oncology? | • Telemedicine is generally working well | • Although helpful for many patient encounters, telemedicine may provide an inadequate physical examination and degrade the doctor—patient relationship over time | “So far, it has been working well for me and my patients. I do ... worry that with long-term video visits, I may lose some connection with patients. So [it] would be nice to ... mix telemedicine with in-person visits when it is convenient for patients.” |
| | • Some visit types (weekly see, follow-up) require more thorough physical examination and may not be appropriate for telemedicine | • Institutional support could be improved, including provision of technology for providers, and patient education and training | “There needs to be more technical support and education for the patient to log on. Anytime I have an unsuccessful telemedicine visit, it is typically due to the patient having difficulty navigating [the telemedicine interface].” |
| | • Institutional support is lacking | | |
| | • Patients often have difficulty connecting | | |
providers were an inability to perform a physical examination (82.4%), poor patient access to technology (63.0%), and difficulty developing a patient–doctor relationship (60.6%). Moreover, one study reported that nearly 40% of respondents agreed that an incomplete physical examination limited them from generating the most appropriate treatment plan. We acknowledge that our survey and others allow for respondents to interpret the type of physical examination needed; therefore, not requiring a physical examination is likely better interpreted as not requiring an in-person physical examination. There is an increasing body of literature that describes a physical examination as an examination performed remotely with the aid of patient or caretaker assistance or adjunctive devices, such as wearables and monitors. It is possible that with increased familiarity with remote physical examination skills or greater proliferation of technology supporting remote examinations, the need for an in-person examination will become less important.

To our knowledge, our study is the first to estimate the clinical appropriateness of telemedicine by visit type and disease site treated. Our data highlighted the heterogeneity of the patient population treated by radiation oncologists and the challenge of instituting blanket billing or regulatory restrictions that might limit the use of telemedicine for some RO patients. Although the subgroups are admittedly small, there are several trends that can be observed in our data. As expected, physicians treating disease sites that often require detailed in-person physical examinations with direct palpation and visualization to design definitive treatment plans (gynecologic, head and neck) estimated that the lowest percentage of new patient consultations could be safely performed with telemedicine. Given the potentially detrimental consequences of missing gross disease on examination, providers seeing these disease sites logically are most likely to require an in-person evaluation. However, this should not mean that physical examinations are categorically less important for other disease sites, but simply that a smaller proportion of patient plans are critically reliant on a detailed physical examination. The appropriateness of a telemedicine evaluation for any of these patients is likely impacted by the quality of the multidisciplinary teams available as well, because poor radiographic imaging, poorly documented physical

| Table 3  | Median percent of each visit type appropriate for telemedicine |
|----------|---------------------------------------------------------------|
|          | Median, % | Interquartile range, % |
| New consultations | 20 | 5-50 |
| Follow-up visits   | 45 | 21-68 |
| Weekly see/on-treatment visits | 50 | 20-60 |
| Initial simulations | 23 | 0-68 |
| Verification or adaptive simulations | 90 | 71-100 |

Fig. 3  Median percent of each visit type appropriate for telemedicine as estimated by providers affiliated with only a single disease site. There were no single-service genitourinary faculty who responded to this question, so they are excluded from this analysis.
examinations, or diagnostic evaluations (laryngoscopy) performed may increase the need for a thorough physical examination.

Our finding that weekly see and follow-up visits were assessed to be clinically appropriate for telemedicine at similar rates (median: 50% vs 45%) differs from a very early report based on a survey distributed nationwide in February of 2020. In that study, 74% of respondents reported using telemedicine for follow-up visits, but only 15% performed telemedicine for on-treatment visits. We postulate that the severity and duration of the pandemic was unclear early on, and that providers were more comfortable performing video follow-up visits back then because performing a single follow-up visit with a virtual physical examination is less consequential than transitioning to an entirely virtual follow-up practice for ≥2 years. The higher rate of telemedicine weekly management visits at our institution than previously reported may be a function of our practice setting (patients often received treatment at satellite facilities with virtual supervision until an in-person visit was deemed necessary), increased comfort with virtual management of treatment-related toxicities with several months of practice and workflow accommodations, or increased aptitude among patients and providers with the telemedicine interface developed over time.

Ongoing Medicare coverage of telemedicine is currently dependent on the U.S. Department of Health and Human Services’ 90-day renewals of the COVID-19 public health emergency declaration, which creates uncertainty about how telemedicine will be incorporated into future practice. Our data suggest that radiation oncologists want to continue offering telemedicine after the COVID-19 pandemic is declared over, which is consistent with high satisfaction scores reported by patients and providers in prior reports, as well as positions from stakeholder organizations, such as the American Hospital Association and American Medical Association. Given that COVID-19 continues to pose a risk to patients and providers, particularly in the setting of immunocompromising cancer therapy, and that mutations of immunogenic portions of COVID-19 will seemingly always threaten immune escape, a more permanent framework for telemedicine use is necessary. The U.S. Department of Health and Human Services continues to invest in telehealth initiatives, suggesting a more permanent solution is both supported and expected by the current administration.

As noted, some private payers serving patients at our institution recently elected to stop covering telemedicine weekly see visits, which has restricted the ability of our patients to use telemedicine without significant out-of-pocket expenses and has led to an institutional decision to stop performing telemedicine weekly see visits for RO patients. Sadly, our experience illustrates both the dangers of a fragmented payer system and the risk that policy changes and individual insurer coverage determinations may pose to advanced models of care that have been developed over the past 2 years. Given that telemedicine workflows have been shown to be cost-effective for patients and providers without any increase in adverse events, the rationale for reversing coverage parity specifically for telemedicine weekly see visits is unclear. Especially in the case of organizations with multiple facilities or for physicians who have academic, administrative, or other responsibilities, telemedicine weekly see visits are a patient-centered solution that allow patients to be managed by the radiation oncologist that knows them best (in conjunction with a covering physician overseeing on-site treatment delivery). Although radiation oncologists must weigh multiple clinical and nonclinical factors to determine whether to use telemedicine, our data suggest that more than half of weekly see visits could be clinically appropriate for telemedicine depending on the treated site, and that providers feel comfortable determining which visits can be performed with telemedicine. The costs of acquiring compatible equipment and developing and maintaining the software infrastructure to perform video visits have already been borne by practices, vendors, and patients, so coverage policies that restrict broader clinically appropriate telemedicine utilization are obstacles to efficient health care delivery.

Payer policies and state licensing regulations threaten to eliminate one of the main perceived benefits of telemedicine highlighted in our survey: Access to care. One model that allows specialists to continue to offer medical advice to patients in a broad geographic area is an out-of-pocket second opinion model that bypasses the need for insurer coverage of telemedicine. Our institution is exploring a peer-to-peer approach as well, which allows for patients to maintain a therapeutic relationship with their local physicians but for our providers to offer their clinical expertise. This model could be particularly impactful for patients with rare diseases or challenging clinical presentations.

There are several strengths to this study. To our knowledge, this is the first report to describe practice patterns and physician perspectives in later stages of adoption of telemedicine at a RO clinic. As reflected in several implementation science frameworks, we acknowledge that the adoption of a new technology is a continuous process, suggesting that patterns of use and perspectives may evolve over time. Given that the survey was disseminated 18 months after telemedicine became widely adopted at our institution, these responses provide insight into physician evaluations of the technology after they have had opportunity to explore telemedicine in several settings (new patient evaluations, multiple follow-up visits) and comment on the medium-term outcomes on their practice (eg, early recurrences, potential for waning patient-provider relationships) previously underrepresented in the literature. Because of the specialized nature of our providers’ clinical practice and the size of our
institution, we also were able to provide information on provider perceptions of the appropriateness of telemedicine based on patient disease site and visit type, although these findings must be interpreted with caution given the small response rates within some sections. We were also able to achieve a high response rate relative to other published studies.

There are several limitations to our study that must be acknowledged. First, we surveyed providers from a single large academic institution, so the results may not be generalizable across different practice settings. For example, most of our providers primarily treat a single disease site, which allowed for us to characterize practice patterns by disease site, but may not necessarily reflect the views of providers who typically treat multiple disease sites per day. Heterogenous patient populations may also make tailoring schedules specifically for telemedicine (e.g., blocking periods of time for telemedicine visits) more challenging for providers. Furthermore, patients who have the resources and motivation to travel to our large academic institution may be more comfortable with telemedicine, biasing the results in favor of increased telemedicine usage. Similarly, our finding that less than a third of providers consider reimbursement parity a top-3 consideration for whether they would perform telemedicine in the future may not translate to other practice settings. Although our institution incorporates productivity metrics into provider compensation models, our provider’s salaries are not derived directly from billing amounts. We anticipate that reimbursement parity would play a more prominent role in shaping national trends in telemedicine use, because providers with billing-based compensation structures are likely to be responsive in the short and long term, and nearly all providers are likely responsive to reimbursement in the long term.

Second, these survey instruments have not all been prospectively validated, but were reviewed and approved by several of the authors before use. Given the unique study population and setting, we considered this sufficient. Furthermore, our instrument and findings are similar to those of other published reports. We also performed a complementary qualitative review of open-ended responses to capture themes not addressed with our instrument. Another consideration is that satisfaction and surveyed provider impressions of telemedicine safety may differ from actual clinical outcomes. However, retrospective evidence suggests that there is no significant difference in toxicity, unplanned hospitalizations, or emergency department visits within 30 days of radiation therapy for patients managed with telemedicine weekly visits relative to those managed with in-person visits. These clinical outcomes support our findings that physicians feel comfortable determining when telemedicine is appropriate, and provide further evidence that telemedicine weekly management visits warrant continued payer coverage.

Finally, these results only reflect the perspectives of responding RO attending physicians. Although we limited data from radiation oncologists who primarily treat genitourinary diseases, evidence from other institutions suggests they tend to favor telemedicine use. Other perspectives are also key to understanding the role telemedicine should play, including those of patients, nurses, midlevel providers, and administrators. Our protocol is collecting data on patient perspectives of telemedicine utilization to further assess the rationale to continue the utilization of telemedicine in RO and beyond. Early reports of patient satisfaction in RO have shown high levels of satisfaction and a preference for telehealth visits over in-person visits.

Conclusions

Our survey of RO attending physicians highlight the strengths and weaknesses of a virtual approach to patient visits in several settings within the complex RO health care pathway. Our findings suggest that approximately one-fifth of new consultations and one-half of follow-up and weekly management visits can be considered clinically appropriate for telemedicine, although this varies widely based on disease site and other practical patient and systemic features. Ultimately, we found that, despite the complexity involved, radiation oncologists feel confident identifying whether to perform a telemedicine visit. The shifting legal and payment landscape will undoubtedly influence how telemedicine is used moving forward, but our data suggest physicians support its continued use in selected clinical settings. As we enter our 3rd year of delivering virtual cancer care, we must find ways to preserve the workflow advances catalyzed by the pandemic so we can safely and effectively care for patients in an endemic COVID-19 era.

Supplementary materials

Supplementary material associated with this article can be found in the online version at doi:10.1016/j.adro.2022.101005.

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