

Scientific Article

Virtual On-Treatment Visits: Implementation, Patient Perspectives, Barriers, Limitations, Benefits, and Opportunities



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Abstract

Purpose: This study aimed to report our initial experience with weekly tele-video “virtual” on-treatment visits (vOTVs), describe the logistics of implementation, report the results of patient and physician surveys, and discuss the barriers, limitations, and benefits of vOTVs during the COVID-19 pandemic.

Methods and materials: vOTVs were piloted at 2 centers and within 1 week were expanded to 4 additional centers. Patients participating in vOTVs were surveyed about their satisfaction with vOTVs, the quality of vOTVs, and confidence in their physician’s ability to manage their care through vOTVs, as well as their support of and preferences related to vOTVs. Participating physicians were surveyed about their comfort and satisfaction with vOTVs. Medical directors at nonparticipating centers within our network were surveyed regarding their reasoning for not using vOTVs.

Results: In week 1, 72 of 81 patients between 2 pilot centers were seen using vOTVs. In week 2, 189 of 211 patients were seen using vOTVs at 6 centers. Patient satisfaction with and confidence in their physician’s ability to address their concerns through the vOTV was high at 4.75 on a 5-point scale. Patients were overall very supportive (4.67) and found the quality of the visits to be as good as or better than their prior in-person weekly on-treatment visit (3.75). Physicians participating in the vOTVs felt very comfortable in their ability to manage patients through this platform (5.0) and on average did not report any difference in terms of efficiency of visits (3.0).

Conclusions: vOTVs were easy to implement and well received by patients and participating physicians. Our experience suggests that vOTVs can be implemented rapidly using available technology and with a high degree of patient and physician satisfaction during this pandemic with similar efficiency to in-person on-treatment visits.

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Introduction

COVID-19 can cause serious illness or death, particularly in high-risk groups. Early data suggest that patients

with cancer may be particularly vulnerable, with death rates approaching 28%.¹ Given the highly contagious nature of COVID-19 and the high mortality rate for patients with cancer, significant efforts have been made to decrease infection risks for these patients, including limiting visitors, screening patients, removing nonessential staff, and using personal protective equipment (PPE).

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Additional measures include postponing nonurgent visits and treatments, with increased use of hypofractionation. Lastly, widespread adoption of telehealth consults and follow-up visits has been rapidly implemented. In an effort to further minimize patient and staff risk of COVID-19 exposure, the American Society for Radiation Oncology lobbied for coverage of virtual on-treatment visits (vOTVs). On March 30, 2020, the Centers for Medicare & Medicaid Services (CMS) approved the use of telemedicine technology for weekly on-treatment visits (OTVs) during this crisis.²

For quality assurance purposes related to our launch of vOTVs, we surveyed patients and physicians participating in vOTVs to identify potential problems and assess patient and physician satisfaction with vOTVs. Here we report the logistics of implementing vOTVs and the results of patient and physician surveys. We discuss potential barriers to implementation, as well as benefits and possible future opportunities.

Methods and materials

Institutional review board authorization was provided based on the study being an evidence-based practice project. Permission was granted to proceed with analysis for publication.

On March 30, 2020, CMS authorized the use of telemedicine for the management of radiation oncology patients under treatment.² Immediately thereafter, the executive committee of our group authorized piloting a trial of vOTVs at 2 centers. On March 31, 2020, vOTVs were performed independently at 2 centers. Both centers set up laptops in each examination room, and separate Zoom meetings (Zoom Video Communications, Inc., San Jose, CA) were initiated for each room from the physician's office. The Zoom meeting platform allowed real-time audiovisual interactions between providers in their offices and patients in examination rooms. Patients were brought to the room by nurses during week 1. Nurses performed assessments and evaluations of the patients, including vital signs, and then reported to the physician's office. The physician then joined the patient in the Zoom meeting and completed the visit in the electronic medical record. Similar implementation was subsequently adopted at 4 other clinics during week 2.

During week 2, 2 centers transitioned to a virtual nursing assessment for vOTVs as well. In 1 clinic, patients were directed by radiation therapists to the appropriate examination room. The nurse joined the patient virtually in the Zoom meeting, completed the assessments, and reported to the physician either via a separate Zoom meeting or in person. The physician then entered the virtual examination room and completed the visit. After the virtual visits were completed, the nurse cleaned each room. The second center had the nurse perform

assessments at the nursing station from a distance of 6 feet; then the nurse would direct the patient to the appropriate examination room. As part of a quality assurance effort, patients were given an anonymous 5-question survey (Fig 1), which they were asked to submit on their way out.

After the pilot trial, vOTVs were approved for use on a wider basis in our group. Medical directors at centers where vOTVs were not employed in week 2 were sent a survey about barriers to implementation, plans to employ vOTVs in the future, and specific concerns regarding vOTVs (Fig 2). Participating physicians were surveyed about their experience (Fig 3). Each survey question with a numerical response was recorded. The numerical answers were multiplied by the number of responses with that number, summed, and then divided by the total number of responses to provide a mean response score for the question. Surveys in which a question was not answered were excluded from analysis for that specific question. Averages were initially obtained by center. All surveys were then averaged as a combined average score. The averages by center are presented as a range around the combined average.

Results

Implementation results

In week 1, 2 centers participated in the pilot vOTVs. A total of 72 of 81 OTVs (89%) were seen exclusively via tele-video visit (30 of 34 and 42 of 47, respectively). During the second week, 5 additional centers performed vOTVs. Four of these 5 centers performed vOTVs on the majority of patients, whereas the fifth center used vOTVs on only a few patients. Two of the 4 additional centers that performed vOTVs on the majority of patients during week 2 distributed patient surveys. Among the 6 centers using vOTVs regularly in week 2, a total of 189 of 211 OTVs (90%; range, 77%-100%) were seen exclusively through vOTVs.

In addition, 130 of 140 patients (93%) offered surveys between weeks 1 and 2 completed the survey. Surveys were offered to all patients in 1 center in weeks 1 and 2. Surveys were anonymous, and it was not clear which patients had or had not completed the surveys. It is possible some patients may have completed the survey in both weeks 1 and 2 at that center. Of the 31 patients not seen virtually, the reasons for in-person visits included the need for more detailed examinations ($n = 9$; including skin examination [$n = 5$] and head/neck examination [$n = 4$]) and communication difficulties ($n = 7$; including translator services [$n = 3$], laryngectomy [$n = 2$], hard of hearing [$n = 1$], and need for family member to participate by phone [$n = 1$]). Technical problems accounted for 4 in-person visits, and admitted patients (n

= 3), syncope (n = 1), patient request (n = 1), and other medical problems not specified (n = 6) accounted for the remaining in-person visits. The authors observed that patients who were most likely to need in-person assessments were those with breast or head and neck cancer in later phases of therapy or those with communication barriers. Of note, demographics, tumor type, and treatment specifics were not recorded.

Patient survey results

The patient survey results are shown in [Figure 4](#).

Question 1

Please rate your satisfaction with your telemedicine visit.

| | | | | |
|--------------------|---------------|---------|-----------|----------------|
| 1 | 2 | 3 | 4 | 5 |
| Very Dis-Satisfied | Dis-Satisfied | Neutral | Satisfied | Very Satisfied |

Question 2

How did you feel about the quality of this visit as compared to prior weekly visits with your radiation oncologist?

| | | | | |
|----------------------|---|---------------|---|-----------------------|
| 1 | 2 | 3 | 4 | 5 |
| Experience was Worse | | No Difference | | Experience was Better |

Question 3

How confident did you feel your doctor was able to address your concerns equally effectively using this platform compared to an in person visit?

| | | | | |
|---------------|--------------------|---------|-----------|----------------|
| 1 | 2 | 3 | 4 | 5 |
| Not Confident | Somewhat Confident | Neutral | Confident | Very Confident |

Question 4

How supportive are you of using televisits for your weekly visit during the COVID-19 pandemic?

| | | | | |
|----------------|---------------------|---------|------------|-----------------|
| 1 | 2 | 3 | 4 | 5 |
| Not Supportive | Somewhat Supportive | Neutral | Supportive | Very Supportive |

Question 5

If given the choice, would you rather see another physician provider in the room in person each week or would you rather see your regular radiation oncologist through a tele-visit weekly (there would be a provider available on site if you needed immediate in person attention)?

1. See different physician in person rather than any tele-visits
2. See different MD some weeks as long as could see my MD in person some weeks
3. No preference
4. Prefer to see my own physician via telemedicine most weeks with occasional different MD
5. Prefer to always see my own physician by telemedicine and not see any MD in person

Question 1: Please rate your satisfaction with your telemedicine visit?

A total of 128 of 130 survey respondents (98.5%) answered this question. The combined average score for this question was 4.75 of 5. Ninety-seven percent of patients recorded a score of 4 (satisfied; 18%) or 5 (very satisfied; 79%). One patient (0.8%) indicated dissatisfaction but answered the remainder of the questions very positively, suggesting possible confusion about question 1. This high level of patient satisfaction was consistent across centers, with center averages on this question ranging from 4.7 to 4.9.

Figure 1 Survey distributed to patients as part of initial quality assurance for “virtual” on-treatment visits. Survey was modified at 2 centers such that question 2 was modified to just 3 choices (1 = worse, 2 = no difference, 3 = better) and question 4 was modified to 4 responses (1 = not supportive, 2 = somewhat supportive, 3 = neutral supportive, 4 = very supportive).

- 1) What was the primary reason you did not utilize virtual OTVs the week of April 6?
 - A. Health System did not have approve of use of available software to allow virtual OTVs.
If "A" do they plan to obtain or have they obtained software system to allow use of virtual OTVs? Yes or No
 - B. Health System did not have the hardware (cameras/microphones in rooms) in place to allow virtual OTVs.
If "B" does your healthcare system plan to obtain necessary hardware to allow virtual OTVs? Yes or No
 - C. Lack of knowledge on how to set up virtual OTVs.
If "C", would you be willing and able to perform virtual OTVs if you were educated as to how to perform? Yes or No. If no why not?
 - D. Did not perform due to RN or RTT discomfort with virtual OTVs.
If "D" was it RN, RTT or both that were cause of concern?
 - E. I would have and could have performed virtual OTVs, but I was unaware this was an option.
- 2) Are you planning to utilize virtual OTVs at your center this week? Yes or No
- 3) Do you plan to use virtual OTVs at any point? Yes or No
- 4) Do you have specific concerns about the use of virtual OTVs? Yes or No
If so, please elaborate.

Figure 2 Nonparticipating medical director survey. The circle indicates the average response. The average response for question 3 was 2.7.

Question 2: How did you feel about the quality of this visit as compared to prior weekly visits with your radiation oncologist?

There was the option to check not applicable if this was the patient's first OTV. Of note, centers B and C modified this question to allow only 3 answers: 1 = worse, 2 = no difference, and 3 = better. For grading purposes on this version of the survey, a score of 2 was correlated with a 3 (no difference), and a score of 3 was correlated with a 5. Ten respondents selected not applicable, and 2 respondents failed to answer this question. A total of 118 of 130 respondents (91%) answered the question. The combined average score for this question was 3.75 of 5, with center averages ranging from 3.4 to 4.2. Most notably, no respondents reported the quality of the visit as worse than their prior in-person weekly visit.

Question 3: How confident did you feel your doctor was able to address your concerns equally effectively using this platform compared to an in-person visit?

A total of 129 of 130 respondents (99%) answered this question. The average score was 4.74, with a range of 4.6 to 4.84 among centers. Ninety-four percent of respondents felt confident to very confident that the physician could address concerns as effectively through tele-video visits as in person. Only 1 person responded with a less than neutral response of somewhat confident (score of 2), and 7 respondents reported being neutral (score of 3) about their physician's ability to equally effectively manage their care with a vOTV.

Question 4: How supportive are you of using tele-video visits for your weekly visit during the COVID-19 pandemic?

A total of 129 of 130 respondents (99%) answered this question. The average response was 4.67 out of 5. The

range of averages for centers was 4.58 to 4.87, and 121 of 129 respondents (94%) reported being supportive (score of 4) or very supportive (score of 5). Five percent reported being neutral (score of 3), and 1% reported being somewhat supportive (score of 2).

Questions 5: If given the choice, would you rather see another physician provider in the room in person each week or would you rather see your regular radiation oncologist through a tele-visit weekly (there would be a provider on site if you needed medical attention immediately)?

This question was based on the implementation of an alternating physician staffing schedule during the COVID-19 pandemic. Physician partners alternated between clinic and remote coverage during this phase of the pandemic. A total of 128 of 130 respondents (98%) answered this question: 46% had no preference, 25% preferred to always see their own physician by telemedicine rather than see any physician in person, and 21% preferred to see their own physician via telemedicine most weeks even if it meant a different physician by telemedicine some weeks. Less than 10% of patients responded with a score suggesting they would prefer to see a physician in person rather than do tele-video visits.

Nonparticipating medical director survey results

Surveys were sent to medical directors at 13 centers where it was not clear that vOTVs were performed. Two centers reported they had performed vOTVs on the majority of patients but had not distributed the surveys. A third center reported that they had performed vOTVs on some patients but had not used vOTVs for the majority of patients and had not distributed surveys. The medical director of the latter center cited concerns over the logistical difficulties in a busy multimachine center with multiple patient examination rooms, lack of overall physician enthusiasm, and concern over potential adverse response to physician conversion to vOTVs by patient-facing staff (nurses and therapists). This center planned to continue to use vOTVs on a case-by-case basis moving forward.

Six of the 10 medical directors responded that they did not use vOTVs due to a lack of required hardware (primarily cameras or computers in examination rooms). Two of 10 medical directors cited not having hospital-authorized software in place to perform vOTVs, and 2 medical directors did not see a distinct advantage to doing vOTVs as opposed to an in-person visit with PPE from a distance. In the "other comments" section, 3 medical directors expressed concerns over the optics of having nurses and radiation therapists interfacing with patients while physicians saw patients virtually, and one expressed concern over the efficiency of vOTVs.

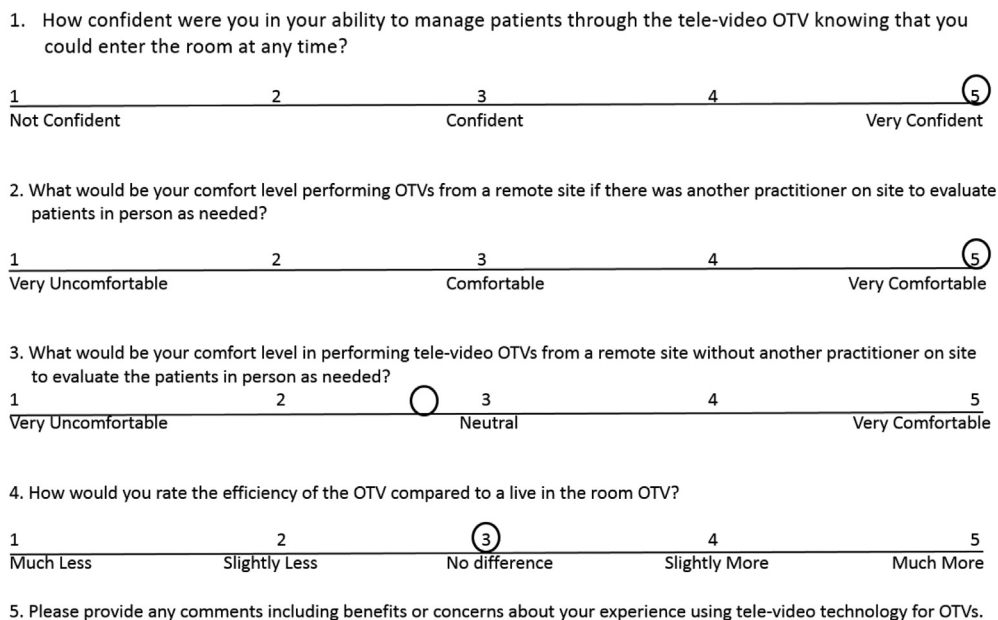


Figure 3 Participating physicians' survey with averaged response results.

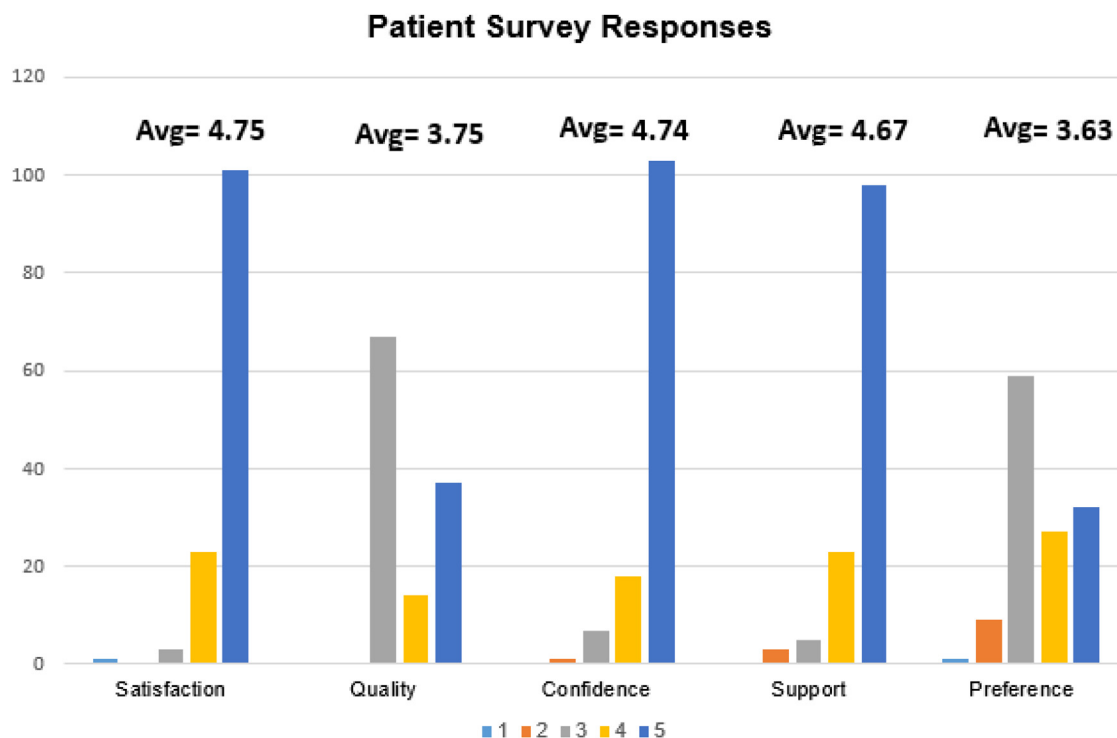


Figure 4 Survey responses. For surveys in which questions 2 and 4 were modified, on question 2 scores of 2 were given a score of 3 and scores of 3 were given score of 5. For question 4, scores of 3 were given a score of 3, and scores of 4 were given a score of 5.

Nine of the 10 medical directors in centers that did not use vOTVs responded that they did not plan to use vOTVs in the immediate future, and 5 of 10 suggested they intended to use vOTVs at some point, if needed. Specific concerns raised by the medical directors about the use of vOTVs included concerns over their ability to adequately examine patients, beliefs about patient dissatisfaction with vOTVs, questions about the benefits, and concerns over optics.

Survey results of physicians participating in tele-video on-treatment visits

Seven physicians who used vOTVs for the majority of their patients under treatment were surveyed about their experience. Physicians reported their comfort level in their ability to manage patients through vOTVs to be very confident (score of 5) in all cases. Similarly, all 7 reported feeling comfortable or very comfortable performing vOTVs remotely as long as another practitioner in the office was available to perform assessments as needed. Physicians were mixed in their comfort with the idea of using vOTVs to manage patients if there was no clinician on site to perform live assessments as needed. The average score was 2.7, but 2 physicians reported a score of 5 and 2 reported a score of 1. In terms of efficiency, there was a mix of opinions: 3 physicians reported the process to be slightly less efficient, 3 reported the process to be slightly more efficient, and 1 reported no difference (Fig 3).

Discussion

The COVID-19 pandemic led CMS to temporarily deregulate the use of telemedicine to encourage social distancing and help minimize the risk of disease transmission. In addition to allowing for consultation and follow-up visits, CMS also authorized the use of telemedicine for radiation oncology weekly visits for patients under treatment.² Telemedicine use in radiation oncology in the United States before the COVID-19 pandemic was extremely limited, based on all available information. There are reports of its use for multidisciplinary tumor boards, conferences, radiation treatment planning, and follow-up visits.^{3,4} However, we believe this is the first report on the use of telemedicine for radiation oncology visits for patients under treatment.

Based on our nonparticipating medical director surveys as well as public comments on the American Society for Radiation Oncology's open forum, perceived barriers to widespread adoption of vOTVs include lack of hardware/software and concerns about quality of vOTVs. Specifically, concerns exist about physicians' ability to perform an appropriate assessment of the patient or provide emotional support. Additional barriers include concerns

about efficiency and the optics of physicians performing vOTVs while other frontline workers face daily exposure.⁵ Finally, some respondents failed to appreciate the advantages of vOTVs compared with in-person OTVs. Herein, we address each of these concerns in hopes of encouraging others to consider using vOTVs to increase social distancing and help suppress COVID-19 transmission between patients, physicians, and staff.

CMS' relaxation of the Health Insurance Portability and Accountability Act of 1996 compliance requirements for telemedicine platforms during the COVID-19 pandemic has resulted in the hardware and software needed to perform vOTVs being low cost and readily available.⁶ Hardware requirements include Internet connectivity and a minimum of 2 computers with camera and microphone capabilities. Software requirements are also minimal and software is freely available. Although we used Zoom, CMS' requirements allow use of many systems, including Microsoft Teams, Blue Jeans, FaceTime, Messenger, and other tele-video systems. Software and hardware requirements to perform vOTVs are relatively inexpensive and readily available. Technology should not present a barrier to implementation of vOTVs.

Next, the results of our patient and physician surveys demonstrated high patient satisfaction with vOTVs. The perception of the quality of the vOTV was as good as, if not better than, in-person OTVs. Of the 130 surveys completed, none reported vOTV quality as being inferior to the preceding weeks' in-person OTVs. There were no complaints about the visit feeling detached or patients feeling unsupported.

Our participating physician survey results suggest that physicians felt comfortable with and confident in their ability to perform appropriate weekly assessments for the majority of patients through this platform. The 4 basic components of CPT 77427 as defined by CMS include review of the port film or other imaging; review of dosimetry, dose delivery, and treatment parameters; examination of the patient setup; and examination of the patient for medical evaluation and case management.⁷

The key issue here is whether the examination of patients for a medical evaluation can be appropriately performed through a virtual visit. CMS does not specify which components of the physical examination are required for medical evaluation of these patients. Clearly, the examination requirements should vary based on the patient, disease site treated, timepoint in the course of therapy, and symptoms. In our study, approximately 90% of patients were evaluated by the physician exclusively through the virtual visit. It is important to note, however, that the vast majority of our patients were outpatients with a good performance status. They also had a general assessment before entering the department. All admitted patients or unstable patients were evaluated in person. We believe most stable outpatients can be adequately assessed through vOTVs.

The most common reasons for in-person evaluations included the need for a more detailed skin examination, head and neck examination, language barriers, or emotional or medical instability requiring in-person evaluation and management. Some of these limitations are being addressed with developing technology, such as virtual stethoscopes, otoscopes, and tongue depressors with cameras. None of these advanced technologies were available at our clinic. In addition to the aforementioned advances in virtual technology, high-quality computer cameras in the examination rooms and good examination room lighting should also help address concerns about the quality of the examinations.

In reference to efficiency, these visits were deemed on average to be as efficient as in-person visits. Although there was some inefficiency early in the process, those who had >1 week of experience reported the experience to be more efficient. One respondent who answered that the experience was less efficient cited the need to explain why vOTVs were necessary as being the only reason the visit was less efficient.

Although there are concerns about the optics of physicians and nurses using virtual technology to protect themselves while therapists serve on the front lines without any such protection, it defies logic to argue that we should not protect some because we cannot protect all. As low as reasonably allowable means that if an exposure can be safely minimized, whether to radiation or a virus, it should be. It does not mean if some exposures cannot be limited, efforts should not be taken to minimize other exposures. Every individual interaction eliminated is one less chance of infecting a patient or team member who could then potentially infect the whole team. The idea of using vOTVs only if you are sick is flawed in light of the known risk of asymptomatic carrier transmission. Unnecessarily exposing patients to COVID-19, including exposure via an asymptomatic infected provider, is unjustifiable. In-person OTVs are not medically necessary for proper patient management in the majority of cases. Although the historical norm is to be physically present with our patients, telemedicine allows us to provide equally compassionate care and support to our patients without physical proximity. This protects not only our patients, but also our staff and ourselves.

In addition to the benefit of decreasing the risk of infecting patients with COVID-19 by decreasing exposure to health care workers, vOTVs also afford other benefits. Visitors are currently restricted at our cancer center but can participate in loved one's vOTVs. Moreover, translators, nutritionists, social workers, and other ancillary staff can easily participate in vOTVs remotely. Furthermore, vOTVs allow providers who may be quarantined or working remotely to continue to provide care for their patients.

These virtual visits have only been authorized during the COVID-19 pandemic. Although it is authorized, physicians should feel comfortable using this technology for most but perhaps not all patients under treatment. It is likely there will be a public outcry for continuation of telemedicine benefits after the pandemic. Physicians should continue to assess how we can use this technology to better serve our patients. Further research could help advance this technology so that potentially all patients can be seen virtually with the assistance of wearable devices, virtual stethoscopes, and improvements in camera quality. Such advancements could improve access to radiation oncology site-specific subspecialists and/or improve access to clinical trial participation. Finally, with CMS' recent changes to direct supervision requirements and a potential upcoming shortage of radiation oncologists, this technology could afford more flexibility in staffing solutions to address these shortages as needed.^{8,9}

Potential limitations include that our study was performed very early after the adoption of the technology, potentially resulting in lower efficiency and patient satisfaction scores than might have been obtained after practitioners had become more adept at using the system and patients had become more accustomed to the technology. Alternatively, its implementation occurred just before the anticipated surge in our state, and patients' willingness to accept vOTVs may have been higher at that time than it will be as the crisis continues. Another limitation was the slight variations in the survey between health care systems as this was launched as a quality assurance process rather than a study. These differences in questions complicated interpretation of the results, but we believe the overall message of the results was not affected.

Conclusions

Radiation oncologists learn early in training about the importance of time, distance, and shielding to minimize exposure to radioisotopes. We can apply those same principles to exposure to this virus. vOTVs allow us to dramatically increase our distance from the source and significantly decrease our time exposed to the source when in-person assessments are necessary. PPE provides shielding when we do need to interact with patients. However, PPE is not perfect protection. Time and distance are our best defenses. We should all be doing everything possible to keep our exposure as low as reasonably allowable. Given that experts anticipate a second wave of infections coinciding with influenza in the fall, using vOTVs in addition to virtual consults and follow-ups to minimize our exposure risks to both of these vectors seems prudent and should be strongly considered.¹⁰

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