

A Practical Framework for Conducting Video Telemedicine Visits with Trainees

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Short Report

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Abstract

Background:

Due to COVID-19, traditional clinical education for senior medical students has largely halted. In response to social distancing, many outpatient practices have transitioned to Telemedicine (TM). While TM has been integrated into undergraduate medical education curricula at many institutions, a published roadmap for incorporating learners into TM is not readily available.

Aim:

To describe one healthcare system's transition to TM and propose a framework for including learners in video TM visits

Setting:

Primary care clinics at an academic medical center

Participants:

Medical students, faculty

Program Description:

Training protocols were distributed to providers and students. Multi-provider video visits were enabled for distance teaching. Students tested potential workflow models and provided feedback, facilitating creation of a 4-phase construct to guide inclusion of learners in video TM encounters.

Program Evaluation:

We employed a rapid feedback cycle to improve workflow process and to modify trainee and preceptor instructions. We analyzed student comments for narrative themes to plan for future evaluation of video TM encounters.

Discussion:

TM will be increasingly used in the provision of medical care. Clinician-educators will need to innovate in order to meet patient and learner expectations. TM will be an integral teaching tool and may enhance the educational experience.

Introduction

The COVID-19 pandemic has upended medical education. While pre-clinical curricula has transitioned to online learning, in-person clinical education for senior medical students has largely ground to a halt as student access to patient encounters have been broadly restricted.¹ While many institutions are utilizing

teleteaching and online virtual case repositories, these curricula are designed to supplement but not replace actual patient interactions.

Telemedicine (TM), the remote delivery of medical care, is becoming a fundamental component of American health care delivery.² With the mandate for social distancing in the COVID-19 era, primary care practices have been forced to rapidly transition scheduled office visits to TM encounters to continue delivering care to patients. With institutions modifying their technological infrastructure, a unique opportunity exists to incorporate trainees into this virtual practice environment. However, intrinsic challenges exist, including differences in practice between traditional clinical encounters and telemedicine, unfamiliarity and discomfort with TM visits, and lack of a structured TM educational framework to conduct patient encounters.² While many institutions have incorporated TM into undergraduate medical education (UME) curricula,³ a review of the literature did not reveal any published protocols guiding educators on how to incorporate trainees into video TM encounters. Recognizing that others may be facing similar challenges at their own institutions, we describe our local process of transitioning to TM and propose a framework for conducting multi-provider TM video visits.

Setting And Participants

General Internal Medicine (GIM) faculty and third-year medical students at an academic medical center were included.

Program Description

In March 2020, the University of California, San Diego (UCSD) began planning for widespread community transmission of COVID-19. Anticipating a greater need for TM, an institution-wide command center staffed with electronic medical record (EMR) and TM-trained personnel was instituted. TM training protocols were developed and distributed to providers and patients. Clinic schedulers converted templates to accommodate TM visits, conducting patient outreach and education on visit logistics. TM was provided using the EMR patient web-portal, allowing for consent, documentation and billing. Prior to March, less than 1% of all UCSD GIM faculty visits used video. Between March 16th and 20th, all GIM faculty received TM training, and by the week's end, nearly 80% of all patient visits were by video.⁴

The VA San Diego Healthcare System (VASDHC) had existing TM capability within primary care using the VA Video Connect (VVC) application which was not extensively used prior to COVID-19. Scheduling staff converted most appointments to video or telephone, educating patients about VVC technology via phone calls and test-appointments. Between February 2020 to April 2020, the percentage of primary care providers conducting at least one video visit increased from 66.8% to 88.5%, while total number of video TM appointments among all specialties increased from 1,093 to 4,448.⁵

Third-year medical students on the internal medicine clerkship volunteered to test potential workflow models for optimizing TM virtual education. Paired with GIM faculty, these trainees helped develop a framework for TM video encounters, facilitating the creation of both trainee-facing and preceptor-

oriented protocols. A construct consisting of four distinct phases (*pre-implementation, preparatory, active, and debriefing*) emerged from these efforts (Table 1).

In the pre-implementation phase, students gain access to and learn how to use the necessary technological platforms, orient to TM best practices such as appropriate setting, consideration of device positioning, and review of proper “websites manner”.⁶

During the preparatory phase, students are paired with TM-practicing GIM faculty and contact their preceptor to coordinate details of the virtual clinic session. The preceptor selects 1-3 patients for the student to evaluate. Students review patient data in the EMR or via notes provided over secure email in advance of the visit. The student and preceptor discuss pertinent medical and psychosocial information that should be addressed for each patient. The preceptor and student plan the agenda and workflow for the visits.

For the active phase, the student is encouraged to log onto the video platform prior to the first encounter. At the start of the visit, the student and preceptor join the encounter synchronously to perform patient safety and technology pauses and student introduction. The student then executes the agreed-upon workflow of the visit.

In the debriefing phase, the preceptor and student discuss the encounter, documentation, and questions that arose during the visit. Faculty provides feedback to the student about history-taking technique and TM principles. Debriefing occurs between patients or at the end of the session.

Program Evaluation

Early pilots of video visits allowed clinician-educators and learners to evaluate the feasibility of such encounters in an under-developed TM environment, starting with the functionality of technological platforms and support of existing infrastructure (e.g. information technology bandwidth). During the first two weeks of TM implementation in March 2020, four highly engaged third-year students were matched with GIM faculty to test educational workflows, providing detailed feedback (Table 2) that enabled the development of the above framework for TM video encounters. Students found participation in video visits to be an overall positive experience, appreciating the opportunity to engage with patients during COVID-19 and refine their clinical skills. Benefits included increased opportunities for direct observation and feedback, while learning a new skill in TM. Drawbacks included limited ability to practice the physical exam, technological difficulties, and adjusting to the virtual workflow (Table 2). Learner-facing and preceptor-oriented protocols were incrementally rolled-out to additional clinician-educators and trainees (Appendix A,B).

Two distinct workflow models arose from our pilot. In the first, preceptors chose to observe trainees throughout the entire TM video visit. While the learner interviewed the patient, the preceptor provided a supporting role, conducting chart review, documentation, and order entry. Additionally, the preceptor could offer suggestions to the learner or pose questions directly to the patient. In the second, the learner

conducted the history and physical in the virtual care room independently, presenting to the supervisor who would join the TM visit at a later time.

The former appeared to be favored by providers new to TM video encounters, those that had not yet formed a working relationship with their learners, and learners that were earlier in their training. This workflow model allowed the preceptor to directly observe the learner, develop trust, and provide real-time feedback on the history-taking and assessment. The supervisor could also document and enter orders during the encounter. Disadvantages included the total amount of time required by the preceptor, inability to see other patients during the student's encounter, limited focus on learner clinical reasoning and presentations, and the potential for the trainee to perceive they have less autonomy in the care of the patient.

The latter model was preferred for more advanced medical students. Preceptors who have formed longitudinal relationships with learners or who oversee multiple learners simultaneously may also benefit in using this approach. This model can also be extended to practices with residents and fellows, as it permitted a more autonomous level of function. Within this model, the trainee can either present to the preceptor "live" in front of the patient (similar to a bedside presentation), or the preceptor and trainee can leave the virtual room to discuss the plan before returning to review with the patient. While there are several advantages to "live" presentations including opportunities for the patient to clarify the history and increased patient satisfaction related to involvement in the care plan,⁷ inherent challenges include balancing the correction of trainee errors without undermining patient confidence in the learner and difficulty in broaching sensitive topics. Disadvantages include more limited observation of learner interactions with the patient, additional complexity in coordinating learner and attending join and discussion times, decreased opportunities to teach by modeling, and potential delays while awaiting preceptor availability to join the TM visit.

Both workflow models were conducive to the preceptor and trainee leaving the virtual exam room and connecting elsewhere to discuss the care plan. While mechanisms to leave the virtual exam room with the trainee have not been optimized, approaches may include calling the trainee on the phone or using a video telecommunication application (e.g. FaceTime, Skype). Both have limitations including additional time, clicks, and other technical barriers, potential to lose the connection with the patient, and possible patient confidentiality issues. Having an open line of communication between provider and trainee during the encounter (e.g. via virtual chat or alternative communication devices) is critical in order to share information that could facilitate workflow.

Additionally, educators should consider the need for a contingency plan should a patient not show up to a virtual visit or if there are technical challenges in conducting the TM encounter. One solution is to attempt to convert the video visit to a 3-way telephone call between patient, attending, and trainee. Disadvantages with telephone visits include privacy issues in protecting personal phone numbers, depersonalization compared to video encounters, the need for the preceptor to be present for the entire visit in order to satisfy certain billing requirements, and lower rates of reimbursement compared to video visits. Given the

current COVID-19 national emergency, the Office for Civil Rights at the Department of the Health and Human Services has relaxed restrictions on the use of commercially available video communication applications, such as FaceTime,⁸ which may provide alternate options for educators facing technological difficulties.

Discussion

The COVID-19 pandemic has accelerated the rapid adoption of TM in primary care practices, fundamentally altering the way medicine is delivered.⁹ Virtual visits have the potential to increase access to care for some of society's most vulnerable patients including those who are homeless, cannot afford transportation or time off work to attend clinic for a visit, and/or have significant mobility limitations. Recognizing COVID-19's continued impact on societal norms (e.g. social distancing) coupled with the increasing utilization of TM moving forward, educators must swiftly adapt to a "new normal" and consider novel strategies to preserve the educational experience of learners. Despite our institution's relative inexperience with TM prior to COVID-19, we were able to rapidly implement a TM educational experience that was deemed effective by faculty and learners.

Narrative comments from students in our pilot mirror those in other studies in recognizing TM as a valuable educational tool, not only for development of medical knowledge but also for its potential to improve their ability to deliver patient care.^{2,3} Adding TM to already overflowing UME curricula is an ongoing challenge; however amidst the ongoing pandemic, it may be a necessary step towards preserving clinical education as medical schools contemplate when and how to safely re-integrate students back into the clinical realm. Institutions and professional organizations have taken steps to mitigate some of the barriers that had previously limited the widespread adoption of TM, including improvement of technological infrastructure and dissemination of TM resources to providers. We hope that our framework targeting clinician-educators will reduce additional hindrances to incorporating learners in the provision of TM.

There are several limitations with our study, the foremost being that this is a single institution pilot that was implemented with a small number of learners within a single specialty. While our narrative analysis shows that the virtual TM experience was generally accepted by trainees participating in our pilot, additional outcome data is necessary.

Future research is needed to compare and contrast our model of TM encounters to in-person clinical encounters. Student surveys should include average number of patients seen per clinic; amount of time spent preparing for clinic, coordinating with faculty, and completing documentation after the visit; amount of time faculty spent on student teaching during clinic; and quality of teaching and feedback. We plan to survey faculty to assess barriers and facilitators of clinical teaching through TM, amount of time spent in direct observation of students, and the impact of TM on engagement in medical education. Finally, we will solicit feedback from patients regarding their experiences incorporating trainees into multi-provider TM visits.

Conclusion

TM provides an acceptable alternative when in-person visits aren't desirable, feasible or safe. Learners, clinician-educators, and patients need to prepare for TM becoming more common and learn how to use it efficiently and effectively. We offer a practical framework for rapid and effective implementation of TM in ambulatory practices.

Declarations

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Conflicts of Interest

The authors declare that they do not have a conflict of interest.

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Tables

| Table 1. Framework for Conducting Video Telemedicine Visits with Trainees |
|---|
| Pre-Implementation Phase |
| IT department authorizes medical student access to video visit technology (if needed) |
| Ensure students have access to required devices or provide loaner devices |
| Orient medical students to video visit platform and basics of conducting physical exam via video (via didactic session, written tip-sheet, online training modules): <ul style="list-style-type: none"> Blood pressure and heart rate measurement or review of home readings Glucose measurement/review of glucometer readings General appearance Visual inspection of area of concern Assessment of tenderness by self-palpation Active range of motion Gait/mobility assessment Neurologic exam: limited cranial nerves, atrophy, symmetry, tremor, coordination, asterixis Mental status exam |
| Educate students about best practices for Telemedicine: <ul style="list-style-type: none"> Quiet, private location Camera/device at eye level Adequate lighting and sound Professional attire and background Computer in reach to allow documentation while maximizing eye contact with patient Help from patient caregiver to hold device, flip camera to visualize areas of interest, etc. Pause before speaking to avoid speaking over patient |
| Identify faculty conducting TM visits who are willing to include students/learners |
| Student practices logging in to video platform prior to clinic session |
| Gather and share personal contact information of student and preceptor pairs |
| Visit Preparatory Phase |
| Preceptor identifies 1-3 patients per session appropriate for student (ideally not scheduled back to back) and notifies them of student participation in appointment |
| Student and preceptor brief over phone or video conference to address questions, visit workflow, and agenda setting for each patient prior to the clinic session. |
| Preceptor orients student to methods of communication for questions during the visit (instant messenger programs, chat programs within the EMR, text messages) |
| Preceptor reviews the contingency plan if the technology fails (e.g. convert the visit to a 3-way telephone encounter) |
| If needed and no available clinical staff to do so, student calls patient 15-20 mins prior to appt to ensure no technical problems |
| Visit Active Phase |
| <i>Patient Safety Pause:</i> ensure patient in private location, confirm identity, confirm physical location and contact information for emergencies, obtain verbal consent for video visit, lock virtual room if applicable |
| <i>Technology Pause:</i> ensure all parties can see and hear participants adequately, inform patient that provider and learner will be documenting during visit and that eye contact may be interrupted |
| Visit Workflow: <ul style="list-style-type: none"> Student and preceptor start visit together, preceptor introduces student and patient and discusses flow of the visit Student facilitates setting agenda for the appointment with patient Student conducts history while preceptor listens without interrupting Preceptor asks additional or clarifying history questions Student conducts physical exam Student and preceptor leave visit (or mute/close camera) and discuss plan by phone or another video platform OR student presents assessment and plan in real-time with input from preceptor Student and preceptor rejoin visit and student explains care plan (if not already done) Student and preceptor close visit and log off |
| Visit Debriefing Phase |
| Preceptor moves to next patient while student works on note, writes patient instructions, and enters orders (if appropriate) |
| Student sends preceptor note via secure email OR enters in EMR for review |
| Preceptor and student virtually discuss encounter, note, and any medical questions that arose during the visit (either in between patients or after the last patient of the session) |

| Theme | Description | Sample Representative Phrases |
|--|---|--|
| Learning | Staying connected to clinical environments, skill upkeep | <p>“With the temporary suspension of our clinical rotations, medical students across the country have been trying to find creative ways to stay involved clinically... Joining Dr. X on a virtual visit was a perfect example of leveraging technology to do just that”</p> <p>“Remote visits have provided a source of coaching and feedback that otherwise are inaccessible during UCSD’s clerkship pause”</p> |
| Direct Observation | Increased opportunities for observed trainee-patient interactions | <p>“Huge benefit was that Dr Y was able listen in to me doing the history/assessment/plan, and could provide more feedback than is usually possible at clinic”</p> <p>“I get more 1:1 feedback time with the attending, and the same amount of time with the patient”</p> |
| Skill Development | Opportunity for growth and exposure to TM | <p>“Helped me feel a lot more comfortable doing virtual visits in general, since I haven’t had exposure to virtual medicine previously in medical school”</p> <p>“More of a quality experience, than a quantity sort of situation, at least as folks are learning. I imagine, my classmates might feel similarly as most were hesitant to try the video visit, seems to be a bit anxiety provoking (understandably), so if we start small and attainable, more folks will surely realize it’s not that bad, and perhaps a little fun even”</p> |
| Patient Care Delivery | Advantages within video TM encounters | <p>“Easier to do medication reconciliation compared to in-person visits since patients have the medications with them at home”</p> <p>“With the virtual visit it was easier to type notes about what the patient was saying without worrying about not having enough eye contact (since it’s hard to have complete eye contact using video chat)”</p> |
| | Challenges within video TM encounters | <p>“Limited ability to do physical exam”</p> <p>“Sometimes I had difficulty hearing the patients because of the audio quality”</p> |
| Comparison between in-person and video TM educational experience | Perception of equivalence of TM educational experience | <p>“Overall I think it’s an equivalent if not better experience than in-person clinic”</p> <p>“I was able to experience the same aspects of being a medical student (e.g. reading patient’s chart, interviewing patient, post-visit feedback session with attending)”</p> |
| | Perception of difference of TM educational experience | <p>“Besides not practicing in person physical exams, the biggest drawback to remote visits has been not being able to step out of the patient room to discuss the case/thought process with my attending.”</p> <p>“I found it a bit tough to wait in between patients, you really just stare at your computer or phone, nervous and wondering when you will be called to participate (if your patient is late or cancelled.)”</p> |

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [AppendixATelemedicineGuideforPreceptors.pdf](#)
- [AppendixBTelemedicineGuideforStudents.pdf](#)