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iPad deployment for virtual evaluation in the emergency department during the COVID-19 pandemic



1. Objective

Emergency Medicine clinicians are rapidly adapting to new ways of operating and delivering care in the era of the COVID-19 pandemic and limited personal protective equipment (PPE) availability [[1]]. At our hospital, a quaternary care academic and level one trauma center, we explored digital care delivery methods to reduce unnecessary exposure and conserve PPE. One method involved the deployment of iPads to evaluate and manage patients using a HIPAA-compliant virtual video and voice application.

2. Development

With support from our information technology team, the Emergency Department (ED) equipped 15 iPads with the VirtualVisit app (SBR Health, Inc.), which creates Virtual Healthcare Delivery Networks to integrate existing information technology infrastructures and clinical workflows. ED clinicians then used iPhones, previously deployed for staff communication, to connect to the patient-facing iPad using VirtualVisit.

3. Functioning

The iPad, mounted on a mobile IV pole (Fig. 1), is positioned 6–8 ft from the patient. The iPads on IV poles can be moved as needed or

anchored in a high patient-turnover room. Clinicians initiate the virtual encounter and access the iPad interface from their iPhone through the VirtualVisit app, immediately appearing on the patient-facing iPad. This does not require patient initiative. The clinician can then obtain a virtual HPI and exam. The iPad is decontaminated between encounters using Sani-Cloth wipes.

4. Barriers

There were few barriers to clinician adoption of iPads to evaluate patients with COVID-19 symptoms, attributable to a unified understanding of the need to reduce the risk of transmission and to preserve PPE. iPhone-mediated communication, already in widespread use among ED clinicians, translated to seamless implementation in already-existing work flows while using the VirtualVisit app.

5. Initial results

Overall, iPad use was feasible for most patients and clinician feedback gathered during ED administrative rounds was positive. Most reported a greater sense of safety with added physical isolation from suspected COVID patients, of respite from donning and doffing PPE multiple times per day, and of stewardship to save PPE for higher risk encounters such as those involving intubation or central line placement. iPad use decreased the frequency and duration of time that a clinician needed to be at the bedside, as the majority of ED faculty reported practice patterns shifting to neither the attending, APP (advanced practice provider) or resident examining at-risk COVID patients in person for those triaged to lower acuity units. The magnitude of reduction of exposure and PPE use for these patients was estimated at 50–75%; few encounters required an MD or APP/resident at the bedside. However, some components of the evaluation still required physical contact for

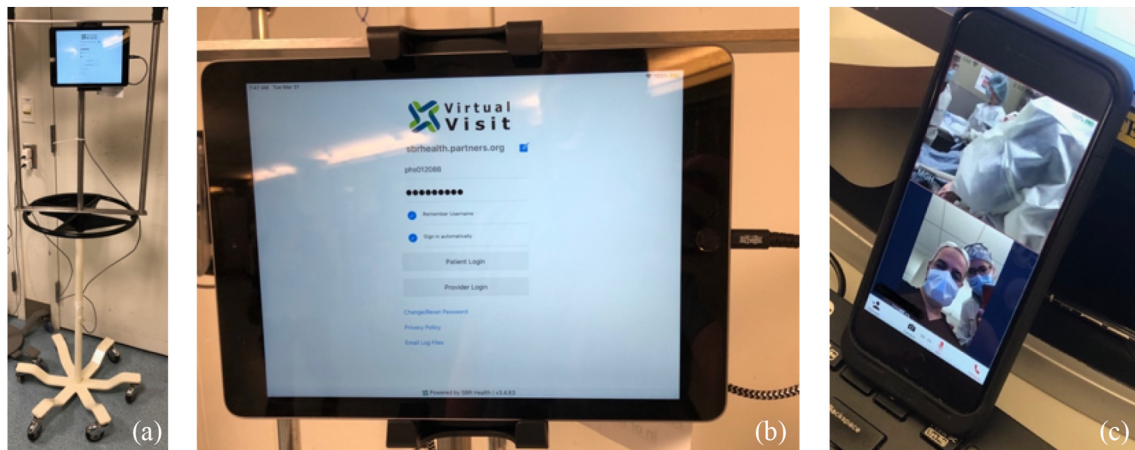


Fig. 1. An iPad mounted on a mobile IV pole (a), a close-up of the VirtualVisit app used for patient communication and virtual examination (b), and view of the clinician (bottom) interfacing with patient (top) in (c).

tasks traditionally done by nursing, such as obtaining vital signs, an EKG, or drawing labs.

This intervention generated robust discussions regarding the utility and value of various aspects of the physical examination (e.g., 'virtual' or 'doorway' exams vs. lung auscultation) in different patient populations, and thoughtful approaches to overcome potential gaps in care (e.g., ambulatory O2 saturations and use of chest x-ray imaging).

Initial challenges included communicating effectively with foreign-language-speaking or deaf patients requiring 3-way interfacing with an interpreter (now resolved issues), difficulty hearing muffled voices if the patient wore a mask or if the iPad was too far away to capture sound, mal-positioning of the iPad (e.g., not facing the patient in the same way each time or if patient's position in the room changed), and clinician inability to control the iPad's camera view. Additional challenges include reliability of the patient self-assessment (e.g., self-palpation of the abdomen) – and that virtual evaluation may not be appropriate for all patients (e.g., certain psychiatric patients or patients requiring interventions such as intubation). In addition, there is variability in patient receptiveness to technology as the care delivery interface.

6. Future considerations

While deploying iPad technology to facilitate safer care during COVID-19 is a major step forward, greater opportunity exists for more agile implementation of digital technology and infrastructure to deliver contact-free care. Potential exists in the design and architecture of healthcare facilities, and the equipment with which they are outfitted for optimal digital interactions, including 360-degree-view two-way video and surround-sound microphone and audio capabilities. Patient rooms could be equipped with automated note-generation from ambient audio/visual technology to increase work-efficiency and decrease administrative burdens. A video laryngoscope's screen could be linked via Bluetooth to a wall-mounted television inside the room or behind glass doors for remote intubation guidance.

Beyond facilities and equipment, the ability to provide care remotely to anywhere beyond our traditional brick and mortar hospital walls is of paramount importance as we face a daunting supply and demand

mismatch in healthcare system capacity and population needs, especially under pandemic circumstances. Our experiences with COVID-19 will undoubtedly catalyze additional digitally-driven care for our patients in the future.

Source of support

This work did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Declaration of competing interest

None.

Acknowledgements

Names redacted for blinded peer review.

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6 April 2020