Issue Brief

Telediagnosis for Acute Care: Implications for the Quality and Safety of Diagnosis

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PATIENT SAFETY

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Introduction

Telehealth has been in its adolescence for decades, but the COVID-19 crisis accelerated its maturation within a matter of weeks. The terms "telehealth," "telemedicine," and "e-health" are often used interchangeably in the literature, but basically, they represent telecommunication used for healthcare, although the technology has clearly evolved. What started as simple telephone calls now includes video-enabled visits and consults.[1,2]

Telehealth, defined here as the remote consultation between the clinician and the patient regardless of technology,[1] is no longer an attractive niche option but now a necessity for delivering timely and safe healthcare. The ability to conduct a remote evaluation protects both patients and providers at a time when physical distancing is a priority, and both parties appreciate its availability, safety, and convenience.

As this unplanned experiment unfolds, it is useful to call out the specific use of telehealth for diagnosis. Building on the definition of diagnostic error from the National Academies of Science, Engineering, and Medicine's report on improving diagnosis,[3] the authors propose the following definition of telediagnosis:

> *...the co-production of an accurate and timely explanation of the patient's health problem through remote interactions and transmitted data, including the clear communication of that explanation to the patient through these interactions.*

This definition is agnostic to the specific technologies (e.g., telephone or video) that connect patients with clinicians to enable diagnosis at a distance, and it encompasses both synchronous (real-time), as well as asynchronous elements (uploading of data collected remotely).

As patients and clinicians participate in telediagnosis at scale, it is vital to consider quality and safety issues that arise when it is used for the diagnosis of acute conditions. What is known? What is not known? Given the likelihood that telehealth will become a mainstay after the current COVID-19 epidemic, we need to learn about optimizing the use of telediagnosis from the massive expansion now in progress and identify emerging research priorities.

Evidence Base Supporting Telehealth

The evidence-base for telehealth is strong, especially for the remote management of chronic health conditions.[4] Systematic reviews confirm that telehealth improves health outcomes, utilization, and cost of care for a host of chronic diseases, including heart failure, diabetes, depression, obesity, asthma, and mental health conditions.[1-4] For nonurgent complaints in primary care settings, diagnostic accuracy and the likelihood of diagnostic error appear to be roughly comparable in telediagnosis versus face-to-face encounters.[5,6]

For more critical issues, the more pressing matter is not the accuracy of diagnosis, but rather the appropriateness of the triage advice, which can include stay home, schedule a visit, go to the emergency department, or call 911. Reviews suggest telehealth management of stroke and cardiovascular conditions improve care,[7] but the quality of care as evidenced by adherence to evidence-based practice guidelines varies greatly across telehealth providers.[8]

Impact of Telediagnosis on Every Step of the Diagnostic Process

Although the steps of the diagnostic process are comparable in telediagnosis and in-person assessments, telediagnosis create opportunities to improve the process while presenting unique challenges for clinicians and patients to address (Table 1).[1-3,5-13] Beyond the infrastructure to enable it, telediagnosis requires specialized training, a new language for patients to describe their symptoms, exceptional communication skills, and a keen appreciation of its limits. Clinicians will need to calibrate their thresholds for when a patient's evaluation should convert to an in-person visit.

Conducting a remote physical examination remains an issue. However, telediagnosis experts believe that except for visualizing the fundus and tympanic membranes and listening to the heart and lungs, in essence, every other element of the examination can be performed successfully with a trained clinician and a willing patient. Many resources for clinicians exist with tips for a successful telehealth visit, including advice from the Centers for Medicare & Medicaid Services,[9] the American Medical Association,[10] and the American Telemedicine Association,[11] among others.[12] With the rapid transition to telehealth prompted by COVID-19, research should rigorously evaluate the impact of the quality, safety, and value of telediagnosis to inform policy, practice, and preference decisions.

Role of the Patient and Family in Telediagnosis

Coproducing an accurate and timely diagnosis requires effective engagement of the patient whether the encounter is in an office or through telehealth. Similar to in-person interactions, the clinician-patient relationship and the level of patient involvement can influence the effectiveness and quality of the telehealth encounter.[13,14] Family members or onsite aides can also contribute to the evaluation by providing context and help with elements of the physical exam. With appropriate attention to their "webside manner,"[i] providers say that a telediagnosis visit feels like a house call.[15]

The ability to communicate effectively during telehealth interactions is a core competency for clinicians. Studies suggest that clinicians should draw on similar communication skills for telehealth visits to those used when they are face to face with their patients.[13] These skills include deep and reflective listening, motivational interviewing, and critical nonverbal communication attributes, such as eye contact.

Many clinicians already struggle with fostering presence and connection with patients during clinic visits.[16] Creating presence during telehealth visits may prove even more challenging. Clinicians will be required to adopt additional skills to effectively develop relationships, engender patients' trust, and avoid depersonalization of the remote encounter. Many healthcare organizations have developed orientation training for their clinicians new to virtual encounters, and publications with tips and advice are widely available to optimize "webside manner."[15] While some of the skills needed for a successful telehealth visit are similar to those needed for an effective in-person visit, additional skills include how to prepare for the encounter, what to wear, how to adjust the lighting and background, how to summarize the visit, and the need to outline and confirm patient's understanding of next steps.[16-18]

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[i] In April 2020, Joseph Kvedar tweeted: "there is a concept called 'webside manner'. it indicates that providers should be as engaged as possible, establish good eye contact, etc. #teledx"

Research suggests that if the patient does not have a previous relationship with the clinician, video visits are preferred and provide a more natural setting to establish clinician presence and effective patient engagement.[15] Clinicians may be more comfortable with telephone visits for their established patients. Despite its importance to diagnostic safety, little attention has been paid to the impact of patient engagement and patient participation in telediagnosis,[17,18] beyond patient satisfaction. Patient engagement strategies to improve telediagnosis, and studies to evaluate them, are now needed.

Telehealth and Health Disparities

Telehealth can help address disparities in access to healthcare services and health outcomes. As its utility becomes increasingly evident, so do its challenges regarding serving the needs of vulnerable populations in the United States. Two main areas that remain particularly challenging are differential access of connectivity to the internet and access to quality healthcare services.[19] Although 80 percent of all U.S. households have access to the internet, data from the Health Information National Trends Survey suggest that significant disparities in internet access exist by age, sex, race, ethnicity, income, and education.[20] Likewise, as noted in AHRQ's 2018 National Healthcare Quality and Disparities Report,[21] while some of the observed disparities have declined over the past two decades, many persist, especially for poor and uninsured populations in all priority areas.[21]

Results from a recent systematic literature review suggest that satisfaction with the use of eHealth and telehealth tools was generally positive across the various studies examined.[22] However, the authors cautioned that the sole reliance on electronic tools to deliver health services may not enhance a patient's ability to obtain, process, and understand relevant health information. As such, telediagnosis services that only focus on access issues and ignore how individuals in vulnerable populations process and understand the information shared may exacerbate existing health disparities.[22]

Implications for Research, Policy, and Practice

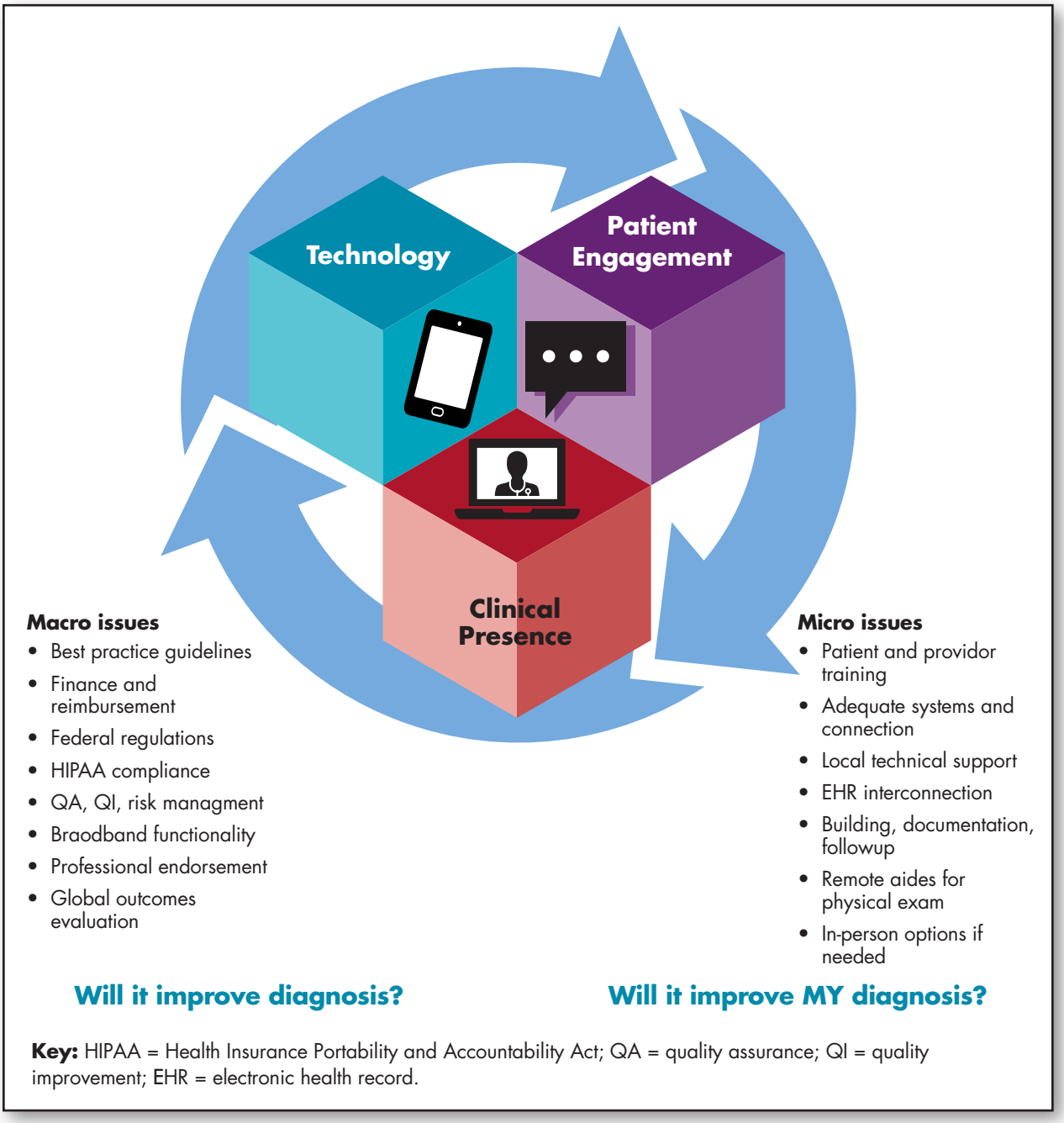
Telehealth has quickly moved from a boutique offering to a mainstay of healthcare provision. Telehealth is well suited to support many of the essential elements of effective primary care, especially when blended with in-person visits. Beyond solving the travel problem for rural, elderly, and disadvantaged populations, telehealth supports health screening, disease prevention, coordinated long-term followup, and personalized, patient-centric care.[23]

In contrast, the efficacy of telediagnosis for acute conditions has yet to be validated. With the tools and functionality of telehealth evolving so rapidly, formal controlled studies will be a challenge. New research will need to be highly focused, iterative, and adaptive to the unique aspects of care provided remotely.[23]

Besides the apparent limitations on the physical examination, telediagnosis substantially alters many other critical elements of the diagnostic process, including access, engagement, and teamwork in particular. Whether these individual differences affect diagnosis favorably or unfavorably will need to be rigorously studied. Beyond the impact of these different elements, the success of telediagnosis will ultimately be judged by whether it improves the quality, safety, and value of diagnosis for individuals and communities. A host of macro and micro issues may affect these outcomes (Figure 1). Evaluation of these issues from a formal sociotechnical perspective will be essential to account for the contextual factors that affect the outcomes of individual diagnostic encounters.[24]

Telediagnosis is likely here to stay. The intense use of telehealth we are now witnessing should be accompanied by an equally intense analysis of how to optimize the quality, safety, and humanity of telediagnosis while preserving the convenience and efficiency it provides.

Figure 1. System-level and contextual factors impacting telediagnosis (tele-dx)



Key: HIPAA = Health Insurance Portability and Accountability Act; QA = quality assurance; QI = quality improvement; EHR = electronic health record.

Table 1. Implications of Telediagnosis for Diagnostic Quality and Safety

Diagnostic Process	Prospects	Pitfalls and Challenges
Supportive Infrastructure	• The tools (phones, video chats, others) are familiar to many and generally available. • The general approach is similar enough to in-person care. • Widely used videoconferencing tools may provide opportunities to engage disadvantaged patients.	• Disadvantaged patients may lack internet access or video-chat tools. • Infrastructure is immature compared with in-person care. • Standardized language and protocols have yet to emerge. • Providers may need specific training to perform telediagnosis well. • Some platforms are not HIPAA compliant (Note: During the COVID-19 pandemic, the Office for Civil Rights has waived civil monetary penalties for noncompliance, however, it remains a legal requirement to use HIPAA-compliant software [U.S. Department of Health and Human Services; Office for Civil Rights, 2020 #7516]).[25]
Access to the Health System	• E-visits can provide enhanced access to healthcare professionals. • Multiple platforms are potentially usable. • Video visits may offer enhanced "presence" vs. telephone (e.g., more eye contact, deeper listening). • Tips on how to strengthen "presence" are emerging.	• Creating relationships and presence via phone and video may be challenging. Telehealth experts suggest that it can be difficult to replace the value of "touch" when establishing trust in the therapeutic relationship. • Some platforms are not HIPAA compliant.
Patient History	• History should be comparable to the office-based history. • It may be better than an office-based history to the extent that other family members can be involved and the clinician can get a sense of the home environment.	• Getting the patient history may be problematic with non-English speakers although this issue may be mitigated through improved access to translation services and family members. • Telehealth programs may not be set up to allow patients to pre-enter health information before the visit.
Physical Examination	• With full knowledge of the limitations, virtually all aspects of the in-person visit can be conducted effectively. • At-home devices can augment the ability to collect physical findings (ECG, others).	• Clinicians cannot visualize the tympanic membrane or the retina or listen to heart or lung sounds. • Incidental findings that might have been detected in an office-based visit may be missed.
Clinical Reasoning	• For challenging diagnostic scenarios, telediagnosis could enable timely convening of multiple clinicians (peers, consultants from other specialties, or other health professionals) to be involved in the clinical reasoning process.	• The impact of telediagnosis on the clinical reasoning process is hard to predict and will require focused study.

Diagnostic Process	Prospects	Pitfalls and Challenges
Diagnostic Testing	• At-home testing tools could enhance testing for some conditions (diabetes, asthma, chronic obstructive pulmonary disease, others).	• Most laboratory tests and imaging require a separate visit. • If lab testing or imaging requires a separate in-person visit, it may discourage their completion and followup.
Referral, Consultation, Interfaces	• Virtual conferences with patient, family, and different members of clinical team may be facilitated by technology. • Consults are easily ordered. • In-person evaluation can be arranged for those who need it.	• Virtual visits may not allow a patient's full engagement or the engagement of the full diagnostic team. For example, the patient may be less likely to stop by and chat with the dietitian or social worker and fewer opportunities arise for exposure to patient education materials or health screening.
Communication of Diagnoses	• Communication may be enhanced if family members participate and facilitate communication and understanding.	• Communication is probably reduced if the diagnostic team (for example, the nurse, pharmacist, therapist) is not engaging to the same extent as they would in person.
Monitoring of Health Outcomes	• Monitoring simplifies followup possibilities for patients and providers. • Followup reminders can be set.	• Most telehealth programs as yet do not have systems in place to monitor quality and safety.
Diagnostic Safety	• Safety may be enhanced by improved access, a better sense of the patient's home environment, and participation of family members.	• Safety may be reduced by missed physical findings, lack of presence, and decreased participation of onsite team members (nurses, pharmacists, others).
Family Involvement	• Video visits provide an opportunity to engage patients and families. • Video visits provide a glimpse into the patient's living environment.	• It can be difficult to discuss issues of violence or abuse if the patient cannot complete the visit in a private location.

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