Improving TeleDiagnosis: A Call to Action

SOCIETY to IMPROVE DIAGNOSIS in MEDICINE

Final Project Findings

AN OVERVIEW

- Conversations with Hospitals, Health Systems & Clinical Practices
- Conversations with Clinicians
- Conversations about Functionality, Policy, Payment and the Future
- Conversations with Patients

Problem

Although telemedicine has been available for decades, the COVID-19 pandemic transformed its usage overnight. From being a niche resource or a convenient alternative for a small group of patients, remote visits using telemedicine resources became the mainstay for healthcare delivery across the nation. Most available research on telemedicine is focused on the use of virtual care for maintenance of health, but use of telemedicine for diagnosis- telediagnosis – at this scale is unprecedented, creating more unknowns than knowns about its impact on diagnostic quality and safety.(1, 2)

Through a generous award from the Patient-Centered Outcomes Research Institute (PCORI), the Society to Improve Diagnosis in Medicine (SIDM) launched this project to survey the available literature and talk with a wide array of stakeholders including hospitals and health systems, clinical practices, clinicians, telemedicine vendors and companies, and patients. Our aim was to combine the learnings emanating from the most recent publications and research with the on-the-ground experience of patients, clinicians, and others as they navigated these early days of the telediagnosis revolution.

This brief, the fifth and final of the series will summarize the key findings from across each set of stakeholder conversations, contextualized against the relevant literature, with the goal of identifying the most pressing research questions on how to maximize the potential—and avoid the pitfalls—of telediagnosis. Our findings are organized using the "RE-AIM" framework, which focuses on five key aspects of novel implementations: **R**each, **E**ffectiveness, **A**doption, **I**mplementation, and **M**aintenance (including trends and future directions).(3) The environmental scan that grounded this work centered on the use of telehealth for diagnosis and included a 10 year look-back for relevant systematic reviews (35 full texts reviewed out of 203 abstracts) and a 3 year look-back through MedLine and grey literature (310 full texts reviewed from 2597 abstracts), supplemented by information from hundreds of blogs and twitter chats.

Guiding Questions for Literature Review, from Agency for Healthcare Research and Quality 2019 Systematic Review, Telehealth for Acute and Chronic Care Consultations

Are telehealth consultations effective in improving clinical and economic outcomes?

Are telehealth consultations effective in improving intermediate outcomes?

Do telehealth consultations result in harms, adverse events, or negative unintended consequences?

What are the characteristics of telehealth consultations that have been the subject of comparative studies?

Do clinical, economic, intermediate, or negative outcomes vary across telehealth consultation characteristics?

Reach

Key findings from the literature: The literature amply documented the unprecedented, rapid uptake of telehealth for diagnosis across the United States over a period of weeks to months. The ability to quickly engineer processes to quickly and effectively pivot to virtual care, ample resources to build or enhance the technological infrastructure, and support for training and guidance for clinicians to use virtual tools all contributed to success.

What we heard: Across the series of listening sessions from December of 2020 to May of 2021, the rapid and immense spread of telemedicine was evident to each and every stakeholder group. Whereas the hospitals, health systems, clinical practices, and clinicians we spoke with felt the burden and stress of the rapid expansion of telemedicine during early months of pandemic, patients' shift to this model of care was a bit more seamless. Some described a short learning curve with the technology, but most were able to successfully and quickly adapt to this modality.

The experiences of large and well-funded institutions, versus solo practitioners or very small practices, emerged as a key differentiator in speed of uptake and build-out, with some providers sharing how they themselves crafted and launched their own platform for virtual care. On the patient side, the literature has outlined which communities and patient populations are largely being left out of the telehealth divide. Because we did not talk to any patients who are *not* telehealth users, it was difficult to corroborate or further contextualize those findings. Interestingly, in our patient listening sessions, no clear patient "prototype" materialized as the most or least likely to use and benefit from telemedicine; stereotypical assumptions about age and concordant technical savvy did not fully pan out, with some clinicians sharing that many older patients were particularly engaged users.

Access to broadband was identified as a significant barrier to accessing telemedicine, particularly within the context of a raging pandemic—which was still very much underway during our initial listening sessions. Typical alternatives like tapping into the internet at a library or coffee shop were not available; and given the intimate nature of healthcare may not yield the requisite privacy for a video telemedicine visit even when they are accessible. Audio-only interactions were deemed more-than-adequate for some types of encounters, but clearly a second-choice option for those who could communicate with video.

Effectiveness

Key findings from the literature: Published evidence regarding the effectiveness of telemedicine for diagnosis—telediagnosis—is fairly limited and mixed.(4-7) While some evidence shows high rates of satisfaction among patients, other data shows that such convenience may come at a cost.(8, 9) Generally speaking, there is still much to learn about the effectiveness of telemedicine overall, and even more so within the ambit of diagnostic quality and safety.

What we heard: Again, the experiences and sentiments from the discussants mirrored many of those captured in the literature, and demonstrated the same diversity of opinion and perspective. Unequivocally, convenience was an important aspect of telemedicine, as reported by patients and healthcare providers. In some cases, providers were challenged by just how much patients seized upon that convenience, sharing stories of patients attempting to participate in virtual visits from restaurant drive-throughs, or while in transit in the car. Several patients spoke to the significant reduction in time and financial commitment telemedicine provided, eliminating the need to travel—sometimes for hours—to

the clinical site, find and pay for parking, and miss long segments of work. More longitudinal data is needed to understand whether the convenience factor translates into improved appointment attendance or follow-ups. We know that so far, only a fraction of in-person appointments affected by the pandemic were replaced by a virtual visit, and delayed diagnosis of both infections and cancers are already being identified.

Aside from the impact on quality per se, many providers and patients corroborated a better sense of "connection" during virtual visits. The mechanics of conducting a telehealth visit requires the clinician to be looking at the monitor (and its camera); many patients perceived this as much better eye contact compared to in-person visits, where the clinician is constantly shifting gaze from the patient back to the computer, besides the interruptions and distractions that are common in office-based practice. Other patients provided a more nuanced perspective on this, pointing out that the personal connection was still not the same as being there in person.

Looking beyond the technology as a mechanism for care and diagnosis, we sought to understand from multiple stakeholder perspectives how well telemedicine worked to reproduce or even enhance the typical clinical experience. There was some divergence of opinion across stakeholders about whether virtual care affords more or less face-to-face time between clinicians and patients, probably one of the easier research questions that will hopefully be addressed going forward.
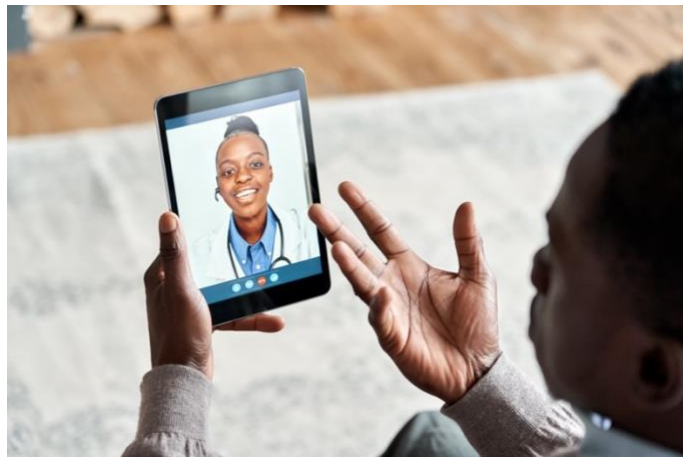
Many providers noted the value in being able to see into someone's home to better understand their familial and social context; though it was more difficult to evaluate body language and other visual clues. In conversations with telemedicine vendors, the concept of remote patient monitoring was highlighted as an important enabler of continuity of care and patient support. These health-focused devices and connections were thought to be facilitators of diagnostic quality that could, in the words of one clinician, help prevent "surprises". Similarly, the ability to use virtual appointments was described as a more flexible and simpler way to do follow-up visits, especially during early days of a provisional diagnosis.

One challenge that emerged within each stakeholder group was the difficulty in measuring or evaluating the true impact of telemedicine on quality and safety, and this remains the key research question that needs to be addressed.(2, 10) Many hospitals and health systems had collected data on patient satisfaction, but those surveys stopped short of assessing diagnostic accuracy. Given the relative novelty of telediagnosis, this should not be a surprise, as we still lack systematic ways to report and capture diagnostic errors in typical in-person settings. However, might this virtual care revolution provide a natural starting point for more robust study of diagnostic quality and safety?

Adoption

Key findings from the literature: Accommodations to support telehealth varied widely across the states. Many states enacted regulations to ensure financial parity for telehealth care. State regulations governing licensure meant that many telehealth clinicians were restricted to 'seeing' patients just in their own state. A major facilitator of telemedicine uptake was CMS' move to provide full payment for virtual visits in 2020, which most private insurers echoed. (11, 12) Allowing exceptions to HIPAA privacy regulations was another key factor enabling wide adoption. Thanks to these many accommodations, and to the keen interest amongst all parties to minimize physical contact during the peak period of the COVID pandemic, uptake and adoption of telehealth was rapid, widespread, and gladly accepted.

What we heard: Across all the stakeholder groups, there was little if any resistance to the notion of adopting telemedicine as the primary vehicle for healthcare during the pandemic. Now that the pandemic cobwebs are clearing, it seems likely that a hybrid model will prevail, with some visits conducted virtually, and some in person. Yet the ratio that will be preferred by patients and clinicians, or the ratio that optimizes diagnostic quality, is unclear, another research priority. Patients were largely grateful for the option of virtual care given the significant concerns about COVID exposure at clinics and hospitals, and even looking into the future, many patients noted the comfort they sensed not being exposed to other bacteria and viruses. Clinicians and other healthcare stakeholders were grateful for the relaxations in relevant regulations and modifications to public, and then private, insurance payment rules. More than one provider pointed to the Medicare payment change as a pivotal moment in the upswing of telemedicine, and that future decisions on reimbursement policy would likely be pivotal in determining the future of telediagnosis in the future.

As described previously, our conversations with hospitals, health systems, clinical practices, and clinicians did not yield much difference in opinion or sentiment about *whether* to adopt telemedicine; rather, the differences were in resource and capacity to quickly develop necessary infrastructure and pivot workflows and systems. Larger systems and clinics with already-dedicated IT teams were able to move more quickly and expansively; smaller clinics and solo practitioners often fended for themselves.

Using telehealth technology was a new experience for the vast majority of clinicians; tip-sheets, training events, simulated practice sessions, and guidelines from their organizations and professional societies were all helpful in easing their learning curve. Many of the providers we spoke with mentioned resources by name, although a theme among many clinicians was that the same diagnostic skills you need to perform well in an in-person environment apply in a virtual environment. To paraphrase one of the physicians, "if you are good at your job in-person, you'll be good at your job in a virtual setting". For those clinicians who were at first uncomfortable with virtual visits, tips on enhancing their 'webside manner' were welcome resources.

Implementation

Key findings from the literature: Policy issues ranging from reimbursement, scope of practice laws, and patient privacy were the key hurdles to implementing telehealth widely across hospitals and health systems.(13) Apart from these bigger picture aspects were the nuts and bolts of pivoting to virtual care,

including efforts, not always successful, to recreate workflow pathways. The literature clearly reflects clinicians' struggles adapting to virtual care, including the inability to perform a physical exam, and other barriers to most fully and accurately assessing the patient and his or her symptoms. (14, 15)

What we heard: Predictably, for providers one of the biggest hurdles in transitioning to telemedicine was the inability to perform a physical exam—at least in the way they were accustomed to. Many clinicians expressed that there was no adequate substitute for a physical exam, but others developed work-arounds and ways to approximate an exam or guide their patients through a series of questions or exercises to help paint the clinical picture. Some providers described digital tools that supported the diagnostic process, but aside from simple things like thermometers, patient access to and use of blood-pressure devices, oximeters, and connected-digital tools was more the exception than the rule.

Another shift felt by both patients and providers was the elimination—or modification—of the team environment frequently characteristic of in-person clinical visits. In many practice settings, a patient might interact with a host of staff and clinical providers, including physicians nurses, pharmacists, social workers, nutritionists, and others. For some health systems and clinics, this team construct went away entirely; in other cases, the team experience was reimagined for a virtual platform. One clinician described physically "carrying" the patient—who was logged on via iPad—from room to room for each clinical touchpoint; in other cases, multiple clinicians could hop on and off the telehealth visit as needed. While not expressly within the purview for this project, this particular functionality could be the missing link in diagnosis of rare and difficult-to-identify diseases, with patients able to connect with experts across the country or across the world.

Perhaps the single most burning question going in to this project—and coming out of it—is when must a patient be seen in-person and when may they be seen virtually. Overall, the providers we spoke with felt there were "easy" scenarios on each end of this decision-making continuum, with cases that clearly warranted in-person care and cases that clearly could be managed virtually. Universally however, there were grey areas in the middle, whether due to the presenting symptoms, the underlying health of the patient, or a variety of other factors. This emerged as a key area for further exploration through research and evaluation, somehow finetuning the ability to determine which care setting was most appropriate.

Many of the patients we spoke with had developed their own triage framework of sorts, that dictated which type of care they would request. For familiar symptoms and simple things—an earache your child has already had a dozen times, or the same heat rash you get each summer, they felt comfortable with a telehealth visit. If it was something new or different—or they anticipated the need for diagnostic testing like labs or x-rays—they may skip right to an in-person visit (when possible). One patient raised concern about an initial telehealth visit being a needless cost, if a follow-up visit for diagnostic testing was inevitable.

Maintenance, Trends & Future Prospects

Key findings from the literature: Nearly every player in the healthcare system—including patients—are eager to continue using virtual care in some capacity, but clinicians, health systems, telemedicine companies, and consumer need answers to the many questions about coverage, and ideally a uniform, national approach to payment.(16) For companies to plan appropriately for the future, the economics of telehealth needs to be more clearly defined, standardized across states and, hopefully, stabilized.

What we heard: If the learnings from this project could be summed up in one phrase it would be "telehealth has a place". There was universal support across all stakeholders for keeping telehealth in some capacity. Even those clinicians or patients who felt strongly about the limitations of using telemedicine for diagnosis acknowledged that virtual care can play an important role, particularly in facilitating easier access to care. As mentioned previously, a potentially significant role for telemedicine could be diagnosis of rare, hard-to-diagnose, and even heavily stigmatized diseases. Much, if not all of the future direction of telemedicine rests on the regulatory, legal, and reimbursement landscape.

The patients we spoke with had varied experiences with insurance coverage and co-pays for telemedicine, a few feeling like no co-pay should be required for virtual visits, and most others equating in-person and virtual care and believing the same rates should apply. From the provider and hospital or health system perspective, reimbursement was a determinative factor. How public and private payors elect to cover telemedicine and integrate virtual care tools into the suite of clinical options will dictate rate of continued use of these modalities by providers. One facet of the telemedicine space that is not "either/or" but rather "in addition to" is the host of remote patient monitoring and other asynchronous care platforms. The providers we spoke to from this sector see great value in these tools and their capacity to facilitate diagnostic quality and safety, and hope that they not only stay in use but continue to expand.

Just as methods for determining the effectiveness of telemedicine—and telediagnosis—are still not fully formed, the clinics and health system representatives we spoke with were still unsure about the ultimate financial impact of telehealth on the healthcare system. Patients identified an array of cost-savings attendant to virtual care from less time away from work, to gas money and parking costs, to child care. The one caveat to this being the actual cost of the virtual care visit if it were to become a necessary step prior to in-person care, similar to requirements for primary care consults prior to specialty referrals.

The other area of uncertainty expressed by clinicians and health system representatives was the budding legal environment, and how malpractice and privacy laws will—or will not—evolve. Concerns about how malpractice laws and insurance provisions will work in a virtual care world were less evidence in the earliest conversations, occurring in December 2020 and January 2021, and began to emerge more toward the spring of 2021 as vaccinations began to roll out and the frenetic response to the pandemic

began to simmer. Conversely, issues around privacy came up as early as our first conversations because so many of the communication platforms that worked so well, and were already familiar to many for work or social activities, were not HIPAA compliant. It was largely unclear to the providers we spoke with where HIPAA and other regulations would ultimately land and if COVID-era easing would become the norm. Most of the patients we spoke with were largely unconcerned about privacy implications of using telemedicine, feeling that they were already largely "connected" to the digital world. One unique consideration of privacy that speaks more to diagnostic accuracy than to concern about data leakage is patients who live in multi-person dwellings and are unable to find private spaces for sensitive or intimate conversations with providers; even more concerning are those in abusive or other dangerous situations who previously may have found refuge at in-person visits, free to speak openly out of earshot of an abuser.
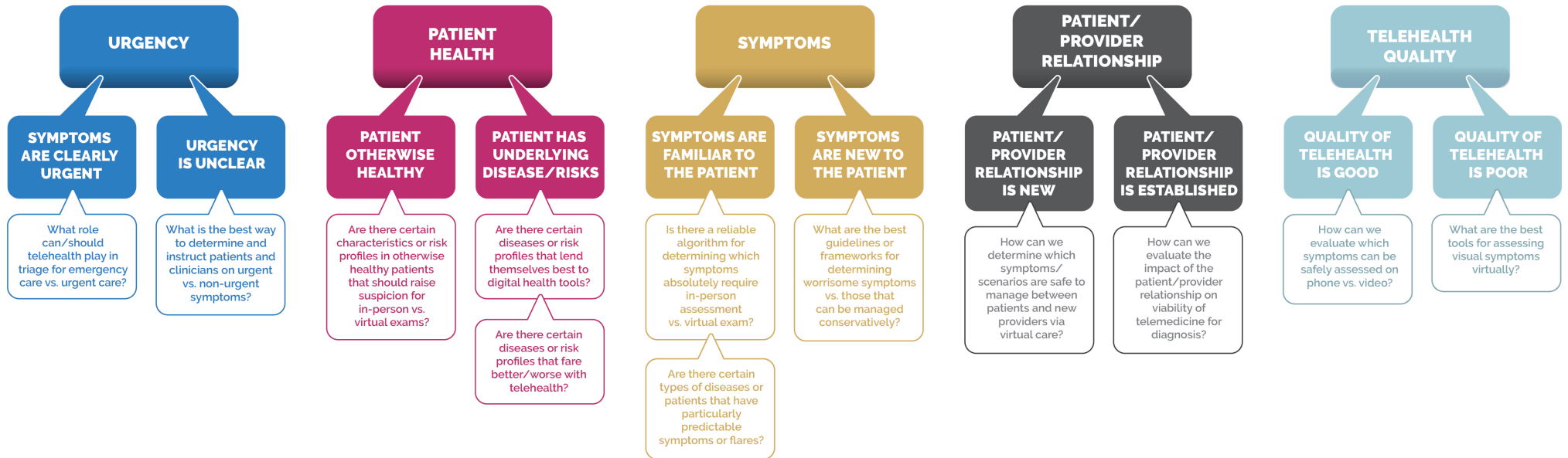
Research Needs

Over the span of the project, both stemming from the literature and the five sets of stakeholder conversations, a set of key decision points began to emerge, typically rooted in the greatest areas of uncertainty and all oriented around the process of triaging patients between in-person exam and virtual assessment. The graphic below captures these key decision points, with two important caveats. The first is that this decision flow presumes the patient has access to both in-person and virtual care. The second, as described previously, speaks to the necessity of in-person diagnostic testing such as x-rays or labs. Patients who surfaced this issue would use the likelihood of this need to determine what type of care (in-person or virtual) they would seek, estimating that a virtual visit would not be "worth it" if in-person testing would be the next step. Clinicians may evaluate that aspect differently, wanting to discuss with the patient virtually first before proceeding to in-person testing.

As we narrowed in on the key research needs stemming from this project, several of them flowed logically from the decision points reflected here, as shown on the next page.

Research Needs as They Relate to Key Decision Points

URGENCY

SYMPTOMS ARE CLEARLY URGENT
What role can/should telehealth play in triage for emergency care vs. urgent care?

URGENCY IS UNCLEAR
What is the best way to determine and instruct patients and clinicians on urgent vs. non-urgent symptoms?

PATIENT HEALTH

PATIENT OTHERWISE HEALTHY
Are there certain characteristics or risk profiles in otherwise healthy patients that should raise suspicion for in-person vs. virtual exams?

PATIENT HAS UNDERLYING DISEASE/RISKS
Are there certain diseases or risk profiles that lend themselves best to digital health tools?

Are there certain diseases or risk profiles that fare better/worse with telehealth?

SYMPTOMS

SYMPTOMS ARE FAMILIAR TO THE PATIENT
Is there a reliable algorithm for determining which symptoms absolutely require in-person assessment vs. virtual exam?

Are there certain types of diseases or patients that have particularly predictable symptoms or flares?

SYMPTOMS ARE NEW TO THE PATIENT
What are the best guidelines or frameworks for determining worrisome symptoms vs. those that can be managed conservatively?

PATIENT/ PROVIDER RELATIONSHIP

PATIENT/ PROVIDER RELATIONSHIP IS NEW
How can we determine which symptoms/ scenarios are safe to manage between patients and new providers via virtual care?

PATIENT/ PROVIDER RELATIONSHIP IS ESTABLISHED
How can we evaluate the impact of the patient/provider relationship on viability of telemedicine for diagnosis?

TELEHEALTH QUALITY

QUALITY OF TELEHEALTH IS GOOD
How can we evaluate which symptoms can be safely assessed on phone vs. video?

QUALITY OF TELEHEALTH IS POOR
What are the best tools for assessing visual symptoms virtually?

A great number of research and implementation questions also arose from considering the broader context of telemedicine and policies surrounding its expansion and maintenance, and our concerns largely parallel those raised by others.(17, 18) These grouped loosely into four categories, with understandable overlap.

Technology

- Who is being left behind with the expansion of virtual care?

- What can be done to expand broadband access to rural and underserved areas?

- How can small institutions and clinics and solo practitioners leverage what has been learned and developed by larger healthcare systems?

- How can telemedicine be more systematically integrated to afford greater access to clinicians for patients who live in health professions shortage areas—including access to primary care clinicians and specialists?

Clinical Experience

- How can we best replicate the human connection through the screen, phone, or asynchronous platform?

- How can telehealth simplify and make more efficient routine testing and evaluation?

- How can we foster a care team environment virtually?

- What is the right balance of in-person and virtual care, especially as the pandemic continues to slow?

Measuring Effectivenes

- How can we leverage telemedicine as a vehicle for better evaluation of diagnostic safety and quality?

- Could we employ patient surveys that ask specific questions about diagnostic accuracy and appropriate follow-up?

- Might virtual care provide a mechanism for better tracking/reporting missed diagnoses?

- Is this an opportunity to reset how we evaluate diagnostic safety and quality in general?

Forecasting

- How do we assess the effectiveness of telediagnosis for coverage and reimbursement purposes?

- How will the use of telediagnosis impact medical malpractice law?

- Would continued use of telemedicine reduce healthcare costs? Increase costs? What about telediagnosis specifically?

- How can we evaluate the appropriate balance between privacy protections and access to virtual care?

Conclusion

The sudden and dramatic shift to virtual care in the early days of the pandemic and continuing over the following weeks and months was nothing short of dramatic, and even with the noted pitfalls, impressive. Clinicians and patients alike adapted quickly to this new method of accessing care and made the best out of an incredibly difficult situation. Now that the pandemic has begun to slow, essential questions remain about the viability of telemedicine for diagnosis, and the best methods for continuing to integrate this mechanism for clinical encounters. Through the project literature search and in-depth conversations with an array of insightful healthcare stakeholders, we have been able to identify both virtues and weaknesses of telediagnosis, and key issues and inflection points most in need of further evaluation. We are grateful to the hospital and health system, clinical practice, clinician, telemedicine vendor and company, and patient listening session participants and to our esteemed Advisory Team who was deeply involved in this effort. We are also grateful to PCORI for the opportunity to do this important work.
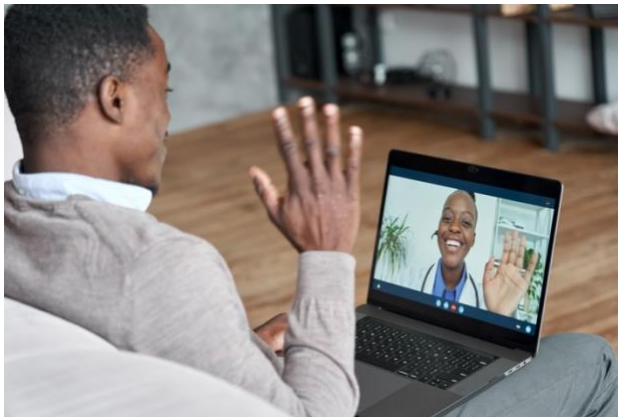
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