Virtual Access to Subspecialty Care

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KEYWORDS

• Telehealth • Telemedicine • Virtual • Access • Subspecialty care

KEY POINTS

- Before the public health emergency, many subspecialties have a long history of telehealth innovation.
- Telehealth has been demonstrated to improve access and patient satisfaction while, in many cases, maintaining high-quality outcomes of in-person appointments.
- There is much motivation to increase access to telehealth but this effort must be done while monitoring equal access of these services for all and maintenance or improvement in the value of care.
- National regulations have the potential to drive innovations, which would benefit all.
- Primary care physicians could partner with subspecialists to develop processes to link patients to the right subspecialist at the right time and in the right visit type.

INTRODUCTION

Recent expansion in both payment and need for telehealth across all areas of health care has the potential to bring both health-care innovation and patient access to improve health outcomes. With this expansion have come changes in access to subspecialty providers. This article reviews the history and current state of telehealth access in many areas of subspecialty care.

TELEHEALTH MODALITIES

There are several separate but complementary approaches to leveraging telehealth services for outpatient care: (1) the direct provision of care to patients via telehealth (reviewed at more length by specialty below), (2) provider-to-provider-to-patient

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communication via telehealth in real-time during a clinical encounter (not well-studied in an outpatient context, in contrast to, eg, inpatient tele-intensive care), and (3) asynchronous provider-to-provider communication separate from a direct patient encounter.

Asynchronous Provider-To-Provider Consultation

Project extension for community healthcare outcomes

Project Extension for Community Healthcare Outcomes (ECHO) is a model where a clinical specialist or team of specialists provides longitudinal support to primary care clinicians through group reviews of the latest evidence and focused patient case discussions.[1–3] Project ECHO was originally deployed to provide remote education on Hepatitis C virus (HCV) management. In that context, community practitioners (meeting via teleconference) presented cases on HCV-positive patients; discussed relevant details including history, comorbid illness or issues, and physical examination and laboratory test findings; and described ongoing treatment complications. These cases were then discussed with expert support in hepatology, infectious disease, psychiatry, and substance abuse to both provide specific guidance to the providers as well as highlight general principles in management to support ongoing independent practice.[3] A systematic review in 2017 found that these models tended to enroll wide numbers of providers (ranging from as low as 9 to as high as 710, with a median of 38), produce a high level of provider participant satisfaction, and increase provider knowledge and confidence on prepost assessment.[1] One retrospective analysis of 377 VA patients with uncomplicated HCV showed no difference between primary and specialty care services.[4] Other contexts had more limited data, with one study suggesting Project ECHO training resulted in subsequent improved A1c values in diabetes.[5] The systematic review of the original HCV model found it cost-effective, rating an average savings of $1352 per patient compared with conventional approaches.[1]

E-consults

E-consults have been studied in settings where it has been shown to be minimally disruptive to provider workflows and reduced “inappropriate clinic visits” while increasing necessary follow-up visits for specialties, compared with traditional referral processes.[6–8] This is tempered by findings of variable levels of specialist satisfaction and in reports of overall impressions of increased care quality, underscoring the need for effective implementation, monitoring, and feedback to make optimal use of such systems.[6] Overall impact to access in terms of avoided “unnecessary referrals” is reported in a 2019 systematic review ranging from 7.4% to 78% reduction on the extremes and a 22% to 68% range representing most of the studies identified. Such changes in access were generally shown to be cost-effective; across 6 studies in the review, cost savings ranged from $5-$50 per e-consult compared with face-to-face.[7] Typical e-consult turnaround time was 1 to 6 days across 5 studies. Typical specialist time spent to respond was 20, 30, and 78 minutes in 3 separate studies. Referring provider-reported conclusiveness in 2 studies rated 74% to 89%. One study of a system with a mature e-consult implementation reported 3-fold variation in the rate of requests being resolved without a visit after e-consult, from 11.4% to 32.3% across bottom to top decile of provider. Lowest rates of resolution without visit were seen in podiatry, ophthalmology, otolaryngology, and gynecology, with highest rates among hematology/oncology, neurology, cardiology, and rheumatology. In this study, lower rates of e-consultation “first touch resolution" corresponded to lower provider-reported engagement with performing e-consults.[9,15]

Specialty-Specific Reviews

Cardiology

Cardiology consultations via telehealth have included chief complaints such as palpitations, chest pain, dizziness/syncope, dyslipidemia, hypertension, patients with an abnormal electrogram, and patients with a family history of genetic disorders. A 2013 systematic review and meta-analysis of trials on home blood pressure telemonitoring showed significant improvement in blood pressure control relative to usual care.[10] There is less evidence supporting the benefits of telehealth in hypertension management in terms of cost, drug safety, deaths, or hospitalizations.[11] Cardiac rehabilitation programs that used telehealth have shown improved outcomes,[12,13] and a retrospective study of cardiology telehealth visits at an academic pediatric center between 2016 and 2019 showed reduction in cost and travel time for patients and families.[14]

Telehealth in cardiology may use the use of tele echocardiography, remote electrophysiological monitoring and teleausculation.[15] During the COVID-19 pandemic, cardiologists used digital wearables and other at-home monitoring devices to obtain vital signs and electrocardiogram tracings.[11,16] Studies have shown encouraging results of implantable hemodynamic monitoring.[17,18]

There is concern that disparities exist in access to telehealth and medical devices to facilitate virtual visits. Multiple observational studies have shown that patients that are non-White, older, in lower socioeconomic groups, non-English speaking, or with lower education had lower utilization of telehealth and access to cardiac devices to facilitate virtual visits.[19–21]

Dermatology

Because of the expansive work in teledermatology, it is the specialty used the most by remote primary care physicians (PCPs) for telehealth consults as early as 1997.[22] Diagnostic accuracy and treatment effectiveness with teledermatology are equal to in-clinic visits.[23] Teledermatology has also demonstrated reduced in-person referrals to dermatologists and improved access to care,[24] particularly in underserved communities.[25,26] Many studies have been published demonstrating effective processes to implement teledermatology consults in inpatient and outpatient settings.[27–32] This article will highlight the most impactful research in this area.[9]

Reports of accurate diagnosis using telehealth and crossmatching to biopsy range from 60% to 100%.[33] The American Academy of Dermatology (AAD) states that telehealth is equally effective compared with in-person care in the management of inflammatory skin diseases such as atopic dermatitis and psoriasis.[34] In a Spanish study, a cost analysis of teledermatology versus in-person care demonstrated an average savings of 11.4 € per patient visit.[35] In a study of 700 outpatients seen in primary care clinics in Philadelphia and referred for teledermatology consults, researchers demonstrated a 27% decrease in in-person visits and a 3.29% decrease in emergency department visits. The mean expected savings from these changes were estimated as $10.00 to $52.65 per patient.[36] In a retrospective study of more than 2300 referrals from PCPs to dermatologists, e-consults were found to improve access to care for medically underserved populations. In this study, 11% of referrals resulted in a confirmed appointment (median wait time 77 days) before implementation of e-consults. After implementation, 44% of consults were sent via e-consults, and 16% of those required in-person consultation with a median wait time of 28 days.[25] In another study of Medicaid claims data, of patients who received dermatologic care, 48.5% did so via teledermatology. About 75.7% of newly enrolled Medicaid patients who accessed dermatologic care did so via telehealth. Teledermatologists were more likely to care for viral skin lesions and acne (46.7% of visits), whereas in-person dermatologists were more likely to care for psoriasis and skin neoplasms (36.8% of visits) despite the AAD position statement of equal efficacy of treatment of psoriasis in both settings.[26] Data on teledermatology are compelling and show at least equivalency for effectiveness of diagnosis and treatment, decreased cost of care, and increased access to care.

Endocrinology

Telehealth has been used in endocrinology for underserved patient populations that lack access to specialty care due to location.[37–39] It has been found to be safe and associated with time savings, cost savings, and high patient and provider satisfaction.[37,39,40]

Telehealth has been successfully used for new-onset diabetes training and education[41] as well as for patients with an established diabetes diagnosis.[37,40] There seems to be a significant opportunity to achieve better efficiency in diabetes care and self-management with telehealth.[42–44] A meta-analysis supports the use of telehealth in monitoring hemoglobin A1c in type 2 diabetes.[45] There have been reported cases of avoiding diabetic ketoacidosis hospital admissions with the use of telehealth.[46]

Low-risk patients with thyroid disease can receive medication adjustments, medical consultations, or ongoing follow-ups through telehealth.[47]

Gastroenterology

Before the COVID-19 pandemic, the use of telehealth in gastroenterology was ranked second lowest among internal medicine specialties because less than 8% of gastroenterologists used telehealth in their practice, according to a 2016 survey. Telehealth before the pandemic was focused on access to remote or underserved populations. For instance, Project ECHO was initiated in 2003 to provide telementoring for clinicians treating chronic HCV remotely.[48]

Because of the COVID-19 pandemic, providers were forced to scale down in-person visits. A hybrid gastroenterology consultation program trial during a continuous 5-month period during the pandemic at an academic center noted that more than 71% of virtual consults were resolved without a need for a clinic visit.[49] Additionally, a randomized trial showed that patients with inflammatory bowel disease, who had close follow-up with remote technology, had decreased subsequent hospitalizations.[50]

There has been positive patient and clinician experience with telehealth in gastroenterology.[49,51,52] Although the value of telehealth is recognized, the future is uncertain. Provider-perceived telehealth barriers include technical issues and lack of patient preparedness.[53] A survey of gastroenterologists and hepatologists in 2020 revealed that up to 20% plan to completely transition to in-person visits after the COVID-19 pandemic.[53]

Infectious diseases

Telehealth for outpatient infectious diseases has a few areas of predominant focus including management of human immunodeficiency virus (HIV), HCV, and tuberculosis (TB).[54] Each of these conditions share a common feature of requiring nuance in medication selection and monitoring, where ease of access to care may play a key role in long-term adherence, management, and cure/sustained remission.

Human immunodeficiency virus care. Telehealth has been leveraged for decades in HIV care, using remote communication via telephone to preserve patient anonymity in screening and diagnosis.[55] In contemporary HIV care, the use of telehealth to support the safe and effective use of preexposure and postexposure prophylaxis is an area of ongoing study, including the use of Project ECHO and e-consult modalities to encourage management by primary care.[56] Evidence supports the use of telehealth in HIV care to promote follow-up and retention for remote patients along with preserving privacy; however, a relatively high proportion of HIV-positive patients are homeless compared with the general population and telehealth can be challenging to deliver privately in such a context.[57,58] Telehealth use overall showed slightly superior rates of viral suppression compared with in-person care in a cluster randomized VA study of HIV care in Iowa in 2015 to 2016.[59] One observational study in San Francisco noted higher rates of viral loads among patients managed via telehealth during the COVID-19 pandemic despite lower no-show rates and more frequent visits via telehealth in such patients, especially among patients who were homeless, Black, or young (aged less than 35 years), suggesting possible confounders affecting HIV adherence in the pandemic and the potential benefit for “wrap-around” social services in clinic which are relatively less accessible in a telehealth context.[58] Clinical outcome data was limited otherwise, and there is a need for further study of telehealth and its impact on patient care along the HIV care continuum from prevention and diagnosis to chronic care management.[57,60]

Hepatitis C and other applications. HCV is another area of study for telehealth in infectious diseases, with Project ECHO implementation demonstrated to expand access to care.[61] TB has been less studied but has shown promise in facilitating directly observed therapy, a longstanding mainstay in treatment.[54] Travel medicine is another area where telehealth could have promise, potentially enabling GPS-accurate travel history for identifying exposure risks.[62]

Outside of HIV care and HCV, the evidence for the use of telehealth to enable access to outpatient infectious disease care is limited,[63] and cost-efficacy data are lacking.[54] Although telehealth shows great promise for improving access, the relatively higher comorbidity rate of some infectious diseases such as HIV with complicating social determinants and other medical conditions such as substance use disorder lends itself to careful study among vulnerable populations. Future research can help ensure implementation includes holistic support toward improving health, or otherwise runs the risk of undermining any benefit from telehealth’s increased access. To that end, increasing support for infectious disease management in a specialist-supported, well-integrated primary care practice model would seem promising.

Neurology

Before the pandemic, teleneurology had been well championed and studied in the use of telehealth in contexts including the rapid evaluation of stroke in emergency settings.[64–66] There has emerged a clear consensus for the potential benefit of telehealth across a variety of conditions.[67]

A 2019 review suggested benefits to outpatient neurology access for the care and management multiple sclerosis, neurooncology, and the management of cerebrovascular disorders and their underlying risk factors such as hypertension and diabetes.[68] Specific technological applications proposed ranged from teleconsulting and remote management to the monitoring and remote control of deep brain stimulation or infusion pumps, leveraging of teleradiology and telepathology to aid diagnosis, and expansion of use cases for telerehabilitation and general outpatient telemetry for the monitoring of biological functions.[68] The use of video is seen as beneficial for variety of neurologic conditions ranging from vertigo to neuromuscular diseases, dementia, and movement disorders such as Parkinson disease.[69] Epilepsy care is an opportunity to expand teleneurology virtual clinics with ambulatory electroencephalogram (EEG) to facilitate access.[70] Routine outpatient headache management is another promising area for teleneurology intervention.[71]

Some examination elements remain barriers to full telehealth adoption, including the effective remote examination of deep tendon reflexes, vestibular function, and the performance of fundoscopy.[67,72] Despite this, in one study of a multisite pediatric neurology department's COVID-19 transition at Children's Hospital of Philadelphia analyzing more than 1200 visits, only 5% of visits were recommended for necessary in-person follow-up and providers considered telehealth satisfactory in 93% of visits.[73] Contrast with a mixed-methods study where more than 700 patients were surveyed and interviewed after being seen by Neurology at Wake Forest, patients frequently perceived telehealth evaluation to be insufficient to fully assess their examination (nearly half of respondents), although more than 75% of patients reported the telehealth visit met their needs without significant differences noted between telephone and video evaluation. Telehealth was viewed as more acceptable for follow-up visits and the care of patients with stable diagnoses by patients in the same study. Patients reported a variety of scenarios where they had an unmet need following a telehealth visit that could have been addressed in person, such as medication injections and delays in paperwork completion. In-person care also remains important for in-person evaluations such as nerve conduction testing.[74] Some of these barriers are potentially able to be addressed with trained telepresenters in some contexts but such approaches remain an area for future study, particularly in a prospective, controlled trial format to gauge the value of video examination for the broad range of neurologic conditions and population settings seen for care.[67]

Ophthalmology

The existing literature base primarily supports the use of models with remote trained examiners obtaining high-quality images for later review (store-and-forward), the most common conditions being diabetic retinopathy and glaucoma screening.[75] Other conditions amenable to teleophthalmology in the literature include macular degeneration, retinopathy of prematurity, and triage of eye conditions (such as in the emergency room). Technologic advances are enabling the use of smartphone-connected autorefraction testing for prescription glasses.[76] These evaluations typically require a significant infrastructure for specialized equipment and training (frequently studied in conjunction with existing primary care or emergency room infrastructure); as such an ideal teleophthalmologic model might best be considered as a "hybrid" where patients still present to a medical site with appropriate setup for examination but are remote from the ophthalmologist until an in-person ophthalmologic examination is deemed necessary.[76,77]

Pain management

Pilot studies and retrospective cohort studies have evaluated the utility of telehealth services for pain management.[78] Integrated care models with primary care using pain management services via telehealth have been described but not studied.[79–81] In one study, military PCPs were given access to video consults with pain management specialists as well as an online pain management curriculum. Patients were asked to assess their pain at various intervals up until 8 weeks after their visit with a PCP. Data are still pending from this study.[79] In a qualitative assessment, 48 e-consults to pain management specialists from PCPs were assessed for the types of patients who were most likely to be referred via this form of consultation. The most common patient diagnoses included chronic pain patients with mental health diagnoses, substance dependence, and social complexity.[80]

In a case series of 54 patients referred for interventional pain procedures who underwent telehealth evaluations, the referral period gradually decreased as the system evolved. No clinical disease progression was noted in between the telehealth evaluation and the procedure for these patients.[82]

An analysis of 16 patients with teleprogramming of spinal cord stimulators demonstrated high levels of success. One hundred percent (4/4) of the physicians thought that patients' needs were addressed appropriately, all patients thought that their pain quickly resolved, and only 1/16 required additional follow-up.[83] At the time of writing of this article, teleprogramming for spinal cord stimulators is not widely available, and this data indicates that in the future patients may be able to access this care more quickly.

A Brazilian retrospective study analyzed the impact of asynchronous telehealth consultations from PCPs to orthopedic surgeons for musculoskeletal complaints (26.1% spine, 16.6% foot, 13.8% knee, and others less than 10%). Of 1174 teleconsultations assessed, only 38.4% of these required evaluation by an orthopedic specialist.[84] Asynchronous consultation by orthopedic surgeons or musculoskeletal specialists may dramatically decrease the necessity for full evaluation from the specialist.

A Veteran's Administration (VA) study on the use of telehealth to treat patients with chronic pain showed the potential for a disparity in care. Veterans in urban settings were less likely to use telehealth services compared with those in rural settings. The researchers expressed concern that patients who live in rural settings may be replacing in-person visits with telehealth visits because of inability to access in-person services, whereas those patients in urban centers continued to use in-person services because of proximity.

A unique study demonstrated no differences in transactional costs between in-person and telehealth visits for chronic pain services.[85]

Palliative and Hospice care

By its nature, most patients cared for by palliative care are at increased risk for COVID-19 exposure, and consultations are often focused on discussion, goals of care, and matters not requiring extensive physical examination or evaluation. Telehealth is efficacious for a variety of applications ranging from education and information sharing to symptom management and decision-making in care.[86,87] Data from the United Kingdom suggest its benefit for providing continuity of care (eg, off-hours telephonic support) in addition to the previously noted applications.[88] Research evaluating outcomes of telehealth as a strategy to expand access or the equitability of access in palliative care is limited and further study is crucial to the field.[86,87]

Hospice care has an evidence base supporting the generally high acceptability of the incorporation of telehealth for patients and caregivers; data on implementation beyond gauging acceptability have not been reported.[89,90]

Physical medicine and rehabilitation

Reports of successful integration of telerehabilitation as a consultation service in the Philippines demonstrated initial success during the COVID-19 pandemic.[91] There have also been reports of success with telerehabilitation in amputee care and patients with acquired brain injury.[92,93] Recommended practice patterns surrounding virtual physical therapy have also been published.[94] Low-quality evidence have demonstrated that physical therapy and occupational therapy can be used successfully for the following needs: modified evaluations, home exercise programs, group visits, assistive device training, self-care training, home environment assessments, and wheelchair assessments.[94] Lack of evidence of safety and efficacy is one of several reasons that there has been significant concern regarding whether access to telehealth services in the rehabilitation setting may further widen the inequity gap to care in patients with disabilities.[95]

The most robust study in this specialty was performed on patients who had sustained a stroke and had motor deficits in the upper extremity. A total of 124 patients were randomized to either telerehabilitation or in-clinic rehabilitation. Both groups had sustained improvement in upper extremity function and noninferiority of telerehabilitation was statistically significant.[96]

Psychiatry

Between 2010 and 2017, the use of telehealth in psychiatry by state agencies increased from 15.2% to 29.2%.[97] A national survey of emergency departments in 2016 showed that psychiatry was the second most common application of telehealth in the emergency room setting after neurology and stroke consults.[98]

Studies suggest that telehealth broadens access and improves the rate of attainment of behavioral goals.[99,100] At the outpatient psychiatry division at Massachusetts General Hospital, 5% of visits were virtual in March 2019 compared with more than 97% visits in March 2020.[101] Further challenges include the need for more careful safety planning for high-risk patients, maintaining professional boundaries in a relatively informal virtual setting, and continuing care team collaboration without physical locations.[102]

Urology

Before COVID-19, one cross-sectional international survey found 15.8% of urologists used telehealth in clinical practice.[103] A study of a single institution's VA data found that the most common reasons for urologic telehealth referrals were sexual dysfunction (26.8%), lower urinary tract symptoms (20.6%), hematuria (15.0%), prostate cancer (13.3%), and elevated PSA (12.1%).[104] Before the pandemic, the most common telehealth modality was video visits; studies reported a high level of satisfaction and found that they were an effective and safe means of conducting follow-up visits.[105] During COVID-19, one study found that urologists demonstrated the highest use of telehealth visits among surgical specialties during the late pandemic period.[106] Small studies during this time period showed high levels of satisfaction from patients, their families, and providers.[107,108]

A cross-sectional survey of 620 urologists from 58 different countries and 6 continents found that the highest proportion of telehealth visits were for oncology practices followed by nononcology, general, and pediatrics.[103] A small study of a rural patient population found that benefits including convenience were found for pediatric urology patients requiring low-acuity care.[109] Thirty-four percent of the study population indicated they would have driven between 50 and 99 miles for in-person visits, 58% would have lost time at work.

Telehealth services have been successfully implemented in several preoperative and postoperative settings. One study compared video visits to "on site" visits of postoperative pediatric patients and found no surgical complications in either group.[110] A European study of adults found postoperative video visits were associated with equivalent efficiency, similar satisfaction, and significantly lower patient costs when compared with office visits in a randomized group of men with a history of prostate cancer.[111] Similar results were found in a survey of patients and providers who took part in a preoperative and postoperative clinic in Nebraska.[112] In a study of postoperative patients, researchers found that, using a commercially available tablet on postoperative day 1 for telerounding, patients expressed a high level of satisfaction.[113]

In a study of the VA Greater Lost Angeles Healthcare System, researchers found that urology telehealth clinics expanded access to visits for lower urinary tract symptoms (35%), elevated PSA (15%), and prostate cancer (14%).[114]

Challenges

The expansion of virtual care services during the COVID-19 pandemic impacted access to patient care. Among 33.6 million Medicare beneficiaries with a usual source of care who reported that their provider currently offers telehealth appointments, 45% said they had a telehealth visit with a doctor or other health professional between the summer and fall of 2020. Most of these beneficiaries (56%) reported accessing care using telephone visits while a smaller proportion reported video (28%) or both video and telephone (16%).[115] In addition, specialty use of telehealth expanded although there were differences in implementation. Use of virtual care services ranged from 9% of ophthalmologists to 68% of endocrinologists.[116]

It remains to be seen how telehealth will continue as the public health crisis improves. Patients and providers may prefer the comfort of an in-person consultation, and evidence needs to be more robust to reinforce any policies or approaches that champion direct telehealth access to specialty providers as a default. This is especially true with regard to evaluating the differences in care quality and outcomes between telephone and video care; the use of video is clearly favored by certain populations, and policy decisions for differential reimbursement or emphasis on video risk leaving behind many in the digital divide.[117]

Other factors may affect the ability of patients to access telehealth care. A study of patients at a single academic institution being seen for urologic conditions in 2020 found that, although there were no differences in telehealth utilization after stratifying providers by age, sex, or training type (physician or advanced practice provider), patients who were Hispanic, older, or had Medicaid insurance were significantly less likely to access telehealth during the pandemic.[118]

It remains to be seen if telehealth visits bring true value to health care in every specialty. One study found that care initially beginning via a telehealth appointment more frequently generated related visits within a 30-day period.[119] This could be a signal of either increased health care utilization or could reflect expanded access to care.

Opportunities

COVID-19 has accelerated the growth of telehealth as a consultative service across many specialties. Dermatology was uniquely ahead of other specialties in their usage of telehealth, with other specialties now following suit. Given that teledermatology has demonstrated equal effectiveness for many conditions, the future of this field may lie in moving to exclusive telehealth models, in which PCPs can send “store and forward” images to dermatologists, whose practices may come to resemble that of radiologists.

For other specialties, the use of telehealth has allowed for improved access, which will only improve further with enhanced models of delivery of care. Because the Centers for Medicare and Medicaid Services (CMS) have recently codified a long-term structure for payment for telehealth services, specialists will feel comfortable establishing teleconsultation relationships with PCPs.[120] Although there are regulations surrounding the use of telehealth consultation in the new CMS fee schedules that may delay access, this article has demonstrated that access is typically enhanced by the use of telehealth. There is cost savings associated with the use of telehealth, and this may drive future implementation.

Continued expansion of provider-to-provider telehealth look promising and are worth continued study. Such work should extend beyond the existing literature to focus on patient-oriented outcome evidence on which policy decisions can soundly rest. Telehealth increases the ease with which patients can be reached and engaged for ongoing care management and is generally seen as appropriate for follow-up care of many conditions. Continued study of the benefits of direct patient visits for telehealth for access, particularly among complex and historically underserved populations, will help to provide a clear road map to improving the equitability as well as the quality of medical care.

SUMMARY

Subspecialty telehealth care is an expanding field that has brought multiple benefits to patients, and there is much interest to examine other possibilities. Because technology has caught up to subspecialist and patient needs, the benefits include increased access, maintained quality of care, and improved patient experience. There is also a recognition of the limitations of telehealth. Patient and provider technological or social determinants limitations, lack of physical examination, cost of implementation, and questions about future payments affect widespread dissemination. Therefore, the benefits of telehealth to subspecialty care are often balanced by the multiple risks. Nevertheless, there is broad momentum to move the needle forward in subspecialty telehealth to help patients.

PCPs may be unaware of the telehealth services and options local subspecialists offer. To best serve patients, PCPs could partner with subspecialists to develop processes to link patients to the right subspecialist at the right time and in the right visit type.

DISCLOSURE

The authors declare that they have no relevant or material financial interests that relate to the research described in this article.

REFERENCES

1. Zhou C, Crawford A, Serhal E, et al. The impact of project ECHO on participant and patient outcomes: a systematic review. Acad Med 2016;91(10):1439–61.
2. McBain RK, Sousa JL, Rose AJ, et al. Impact of project ECHO models of medical tele-education: a systematic review. J Gen Intern Med 2019;34(12): 2842–57.
3. Arora S, Geppert CMA, Kalishman S, et al. Academic health center management of chronic diseases through knowledge networks: Project ECHO. Acad Med J Assoc Am Med Coll 2007;82(2):154–60.
4. Syed TA, Bashir MH, Farooqui SM, et al. Treatment outcomes of hepatitis c-infected patients in specialty clinic vs. primary care physician clinic: a comparative analysis. Gastroenterol Res Pract 2019;2019:8434602.
5. Watts SA, Roush L, Julius M, et al. Improved glycemic control in veterans with poorly controlled diabetes mellitus using a specialty care access network-extension for community healthcare outcomes model at primary care clinics. J Telemed Telecare 2016;22(4):221–4.

6. Vimalananda VG, Gupte G, Seraj SM, et al. Electronic consultations (e-consults) to improve access to specialty care: a systematic review and narrative synthesis. J Telemed Telecare 2015;21(6):323–30.
7. Liddy C, Moroz I, Mihan A, et al. A systematic review of asynchronous, provider-to-provider, electronic consultation services to improve access to specialty care available worldwide. Telemed J E-Health 2019;25(3):184–98.
8. Liddy C, Drosinis P, Keely E. Electronic consultation systems: worldwide prevalence and their impact on patient care-a systematic review. Fam Pract 2016;33(3):274–85.
9. Barnett ML, Yee HF, Mehrotra A, et al. Los Angeles safety-net program econsult system was rapidly adopted and decreased wait times to see specialists. Health Aff Proj Hope 2017;36(3):492–9.
10. Omboni S, Gazzola T, Carabelli G, et al. Clinical usefulness and cost effectiveness of home blood pressure telemonitoring: meta-analysis of randomized controlled studies. J Hypertens 2013;31(3):455–67, discussion 467-468.
11. Omboni S, McManus RJ, Bosworth HB, et al. Evidence and recommendations on the use of telemedicine for the management of arterial hypertension: an international expert position paper. Hypertens Dallas Tex 1979 2020;76(5):1368–83.
12. Bostrom J, Sweeney G, Whiteson J, et al. Mobile health and cardiac rehabilitation in older adults. Clin Cardiol 2020;43(2):118–26.
13. Thamman R, Janardhanan R. Cardiac rehabilitation using telemedicine: the need for tele cardiac rehabilitation. Rev Cardiovasc Med 2020;21(4):497–500.
14. Phillips AA, Sable CA, Atabaki SM, et al. Ambulatory cardiology telemedicine: a large academic pediatric center experience. J Investig Med 2021;69(7):1372–6.
15. Satou GM, Rheuban K, Alverson D, et al. American heart association congenital cardiac disease committee of the council on cardiovascular disease in the young and council on quality care and outcomes research. telemedicine in pediatric cardiology: a scientific statement from the American heart association. Circulation 2017;135(11):e648–78.
16. Lakkireddy DR, Chung MK, Gopinathannair R, et al. Guidance for cardiac electrophysiology during the COVID-19 pandemic from the heart rhythm society COVID-19 Task force; electrophysiology section of the American college of cardiology; and the electrocardiography and arrhythmias committee of the council on clinical cardiology, American heart association. Heart Rhythm 2020;17(9):e233–41.
17. Almufleh A, Ahluwalia M, Givertz MM, et al. Short-term outcomes in ambulatory heart failure during the COVID-19 pandemic: insights from pulmonary artery pressure monitoring. J Card Fail 2020;26(7):633–4.
18. Oliveros E, Mahmood K, Mitter S, et al. Pulmonary artery pressure monitoring during the COVID-19 pandemic in New York city. J Card Fail 2020;26(10):900–1.
19. Krishnaswami A, Beavers C, Dorsch MP, et al. Innovations, cardiovascular team and the geriatric cardiology councils, American College of cardiology. gerotechnology for older adults with cardiovascular diseases: JACC state-of-the-art review. J Am Coll Cardiol 2020;76(22):2650–70.
20. Wang X, Hidrue MK, Del Carmen MG, et al. Sociodemographic disparities in outpatient cardiology telemedicine during the COVID-19 pandemic. Circ Cardiovasc Qual Outcomes 2021;14(8):e007813.
21. Haynes N, Ezekwesili A, Nunes K, et al. Can you see my screen?" addressing racial and ethnic disparities in telehealth. Curr Cardiovasc Risk Rep 2021;15(12):23.

22. Norton SA, Burdick AE, Phillips CM, et al. Teledermatology and underserved populations. Arch Dermatol 1997;133(2):197–200.
23. Lee JJ, English JC. Teledermatology: a review and update. Am J Clin Dermatol 2018;19(2):253–60.
24. Giavina-Bianchi M, Santos AP, Cordioli E. Teledermatology reduces dermatology referrals and improves access to specialists. EClinicalMedicine 2020; 29-30:100641.
25. Naka F, Lu J, Porto A, et al. Impact of dermatology eConsults on access to care and skin cancer screening in underserved populations: A model for teledermatology services in community health centers. J Am Acad Dermatol 2018;78(2): 293–302.
26. Uscher-Pines L, Malsberger R, Burgette L, et al. Effect of teledermatology on access to dermatology care among medicaid enrollees. JAMA Dermatol 2016; 152(8):905–12.
27. Dhaduk K, Miller D, Schliftman A, et al. Implementing and optimizing inpatient access to dermatology consultations via telemedicine: an experiential study. Telemed J E-health Off J Am Telemed Assoc 2021;27(1):68–73.
28. Wang RF, Trinidad J, Lawrence J, et al. Improved patient access and outcomes with the integration of an eConsult program (teledermatology) within a large academic medical center. J Am Acad Dermatol 2020;83(6):1633–8.
29. Costello CM, Cumsky HJL, Maly CJ, et al. Improving access to care through the establishment of a local, teledermatology network. Telemed J E-health Off J Am Telemed Assoc 2020;26(7):935–40.
30. Coustasse A, Sarkar R, Abodunde B, et al. Use of teledermatology to improve dermatological access in rural areas. Telemed J E-health Off J Am Telemed Assoc 2019;25(11):1022–32.
31. Sharma P, Kovarik CL, Lipoff JB. Teledermatology as a means to improve access to inpatient dermatology care. J Telemed Telecare 2016;22(5):304–10.
32. Raugi GJ, Nelson W, Miethke M, et al. Teledermatology implementation in a VHA secondary treatment facility improves access to face-to-face care. Telemed J E-health Off J Am Telemed Assoc 2016;22(1):12–7.
33. Wang RH, Barbieri JS, Nguyen HP, et al. Group for Research of policy dynamics in dermatology. clinical effectiveness and cost-effectiveness of teledermatology: where are we now, and what are the barriers to adoption? J Am Acad Dermatol 2020;83(1):299–307.
34. American Academy of Dermatology Association. Position statement on teledermatology. 2021. Available at: https://server.aad.org/Forms/Policies/Uploads/PS/PS-Teledermatology.pdf?. Accessed January 15, 2022.
35. Vidal-Alaball J, Garcia Domingo JL, Garcia Cuyàs F, et al. A cost savings analysis of asynchronous teledermatology compared to face-to-face dermatology in Catalonia. BMC Health Serv Res 2018;18(1):650.
36. Yang X, Barbieri JS, Kovarik CL. Cost analysis of a store-and-forward teledermatology consult system in Philadelphia. J Am Acad Dermatol 2019;81(3):758–64.
37. Xu T, Pujara S, Sutton S, et al. Telemedicine in the management of type 1 diabetes. Prev Chronic Dis 2018;15:E13.
38. Balamurugan A, Hall-Barrow J, Blevins MA, et al. A pilot study of diabetes education via telemedicine in a rural underserved community–opportunities and challenges: a continuous quality improvement process. Diabetes Educ 2009; 35(1):147–54.
39. Chablani SV, Sabra MM. Thyroid cancer and telemedicine during the COVID-19 pandemic. J Endocr Soc 2021;5(6):bvab059.

40. Zhai YK, Zhu WJ, Cai YL, et al. Clinical- and cost-effectiveness of telemedicine in type 2 diabetes mellitus: a systematic review and meta-analysis. Medicine (Baltimore) 2014;93(28):e312.
41. Garg SK, Rodbard D, Hirsch IB, et al. Managing new-onset type 1 diabetes during the COVID-19 pandemic: challenges and opportunities. Diabetes Technol Ther 2020;22(6):431–9.
42. Wang Y, Xue H, Huang Y, et al. A systematic review of application and effectiveness of mhealth interventions for obesity and diabetes treatment and self-management. Adv Nutr 2017;8(3):449–62.
43. Ashrafzadeh S, Hamdy O. Patient-driven diabetes care of the future in the technology era. Cell Metab 2019;29(3):564–75.
44. Miyamoto S, Henderson S, Fazio S, et al. Empowering diabetes self-management through technology and nurse health coaching. Diabetes Educ 2019;45(6):586–95.
45. Lee PA, Greenfield G, Pappas Y. The impact of telehealth remote patient monitoring on glycemic control in type 2 diabetes: a systematic review and meta-analysis of systematic reviews of randomised controlled trials. BMC Health Serv Res 2018;18(1):495.
46. Peters AL, Garg SK. The silver lining to COVID-19: avoiding diabetic ketoacidosis admissions with telehealth. Diabetes Technol Ther 2020;22(6):449–53.
47. Lisco G, De Tullio A, Jirillo E, et al. Thyroid and COVID-19: a review on pathophysiological, clinical and organizational aspects. J Endocrinol Invest 2021;44(9):1801–14.
48. Siegel CA. Transforming gastroenterology care with telemedicine. Gastroenterology 2017;152(5):958–63.
49. Tang Z, Dubois S, Soon C, et al. A model for the pandemic and beyond: telemedicine for all outpatient gastroenterology referrals reduces unnecessary clinic visits. J Telemed Telecare 2020;20. 1357633X20957224.
50. de Jong MJ, van der Meulen-de Jong AE, Romberg-Camps MJ, et al. Telemedicine for management of inflammatory bowel disease (myIBDcoach): a pragmatic, multicentre, randomised controlled trial. Lancet 2017;390(10098):959–68.
51. Serper M, Nunes F, Ahmad N, et al. Positive early patient and clinician experience with telemedicine in an academic gastroenterology practice during the COVID-19 pandemic. Gastroenterology 2020;159(4):1589–91, e4.
52. Bensted K, Kim C, Freiman J, et al. Gastroenterology hospital outpatients report high rates of satisfaction with a Telehealth model of care. J Gastroenterol Hepatol 2022;37(1):63–8.
53. Keihanian T, Sharma P, Goyal J, et al. Telehealth utilization in gastroenterology clinics amid the COVID-19 pandemic: impact on clinical practice and gastroenterology training. Gastroenterology 2020;159(4):1598–601.
54. Parmar P, Mackie D, Varghese S, et al. Use of telemedicine technologies in the management of infectious diseases: a review. Clin Infect Dis 2015;60(7):1084–94.
55. Frank AP, Wandell MG, Headings MD, et al. Anonymous HIV testing using home collection and telemedicine counseling. a multicenter evaluation. Arch Intern Med 1997;157(3):309–14.
56. Touger R, Wood BR. A review of telehealth innovations for HIV pre-exposure prophylaxis (PrEP). Curr Hiv/Aids Rep 2019;16(1):113–9.
57. Smith E, Badowski ME. Telemedicine for HIV care: current status and future prospects. HIV AIDS Auckl 2021;13:651–6.

58. Spinelli MA, Hickey MD, Glidden DV, et al. Viral suppression rates in a safety-net HIV clinic in San Francisco destabilized during COVID-19. AIDS 2020;34(15): 2328–31.
59. Ohl ME, Richardson K, Rodriguez-Barradas MC, et al. Impact of availability of telehealth programs on documented hiv viral suppression: a cluster-randomized program evaluation in the veterans health administration. Open Forum Infect Dis 2019;6(6):ofz206.
60. Dandachi D, Lee C, Morgan RO, et al. Integration of telehealth services in the healthcare system: with emphasis on the experience of patients living with HIV. J Investig Med 2019;67(5):815–20.
61. Tahan V, Almashhrawi A, Mutrux R, et al. Show Me ECHO-Hepatitis C: a telemedicine mentoring program for patients with hepatitis C in underserved and rural areas in Missouri as a model in developing countries. Turk J Gastroenterol 2015;26(6):447–9.
62. Lai S, Farnham A, Ruktanonchai NW, et al. Measuring mobility, disease connectivity and individual risk: a review of using mobile phone data and mHealth for travel medicine. J Travel Med 2019;26(3):taz019.
63. Burnham JP, Fritz SA, Yaeger LH, et al. Telemedicine infectious diseases consultations and clinical outcomes: a systematic review. Open Forum Infect Dis 2019; 6(12):ofz517.
64. Wechsler LR, Tsao JW, Levine SR, et al, American Academy of Neurology Telemedicine Work Group. Teleneurology applications: report of the telemedicine work group of the American academy of neurology. Neurology 2013;80(7): 670–6.
65. Patel UK, Malik P, DeMasi M, et al. Multidisciplinary approach and outcomes of tele-neurology: a review. Cureus 2019;11(4):e4410.
66. Zhai YK, Zhu WJ, Hou HL, et al. Efficacy of telemedicine for thrombolytic therapy in acute ischemic stroke: a meta-analysis. J Telemed Telecare 2015;21(3): 123–30.
67. Hatcher-Martin JM, Adams JL, Anderson ER, et al. Telemedicine in neurology: telemedicine work group of the american academy of neurology update. Neurology 2020;94(1):30–8.
68. Chirra M, Marsili L, Wattley L, et al. Telemedicine in neurological disorders: opportunities and challenges. Telemed J E-health Off J Am Telemed Assoc 2019; 25(7):541–50.
69. Domingues RB, Mantese CE, Aquino E da S, et al. Telemedicine in neurology: current evidence. Arq Neuropsiquiatr 2020;78(12):818–26.
70. Lavin B, Dormond C, Scantlebury MH, et al. Bridging the healthcare gap: building the case for epilepsy virtual clinics in the current healthcare environment. Epilepsy Behav 2020;111:107262.
71. Noutsios CD, Boisvert-Plante V, Perez J, et al. Telemedicine applications for the evaluation of patients with non-acute headache: a narrative review. J Pain Res 2021;14:1533–42.
72. Wechsler LR. Advantages and limitations of teleneurology. JAMA Neurol 2015; 72(3):349–54.
73. Rametta SC, Fridinger SE, Gonzalez AK, et al. Analyzing 2,589 child neurology telehealth encounters necessitated by the COVID-19 pandemic. Neurology 2020;95(9):e1257–66.
74. Olszewski C, Thomson S, Strauss L, et al. Patient experiences with ambulatory telehealth in neurology: results of a mixed-methods study. Neurol Clin Pract 2021;11(6):484–96.

75. Caffery LJ, Taylor M, Gole G, et al. Models of care in tele-ophthalmology: a scoping review. J Telemed Telecare 2019;25(2):106–22.
76. Parikh D, Armstrong G, Liou V, et al. Advances in Telemedicine in ophthalmology. Semin Ophthalmol 2020;35(4):210–5.
77. Ramakrishnan MS, Gilbert AL. Telemedicine in neuro-ophthalmology. Curr Opin Ophthalmol 2021;32(6):499–503.
78. Perez J, Niburski K, Stoopler M, et al. Telehealth and chronic pain management from rapid adaptation to long-term implementation in pain medicine: a narrative review. Pain Rep 2021;6(1):e912.
79. Flynn DM, Eaton LH, McQuinn H, et al. TelePain: primary care chronic pain management through weekly didactic and case-based telementoring. Contemp Clin Trials Commun 2017;8:162–6.
80. Liddy C, Smyth C, Poulin PA, et al. Supporting better access to chronic pain specialists: the champlain BASE™ eConsult service. J Am Board Fam Med 2017;30(6):766–74.
81. Poulin PA, Romanow HC, Cheng J, et al. Offering eConsult to family physicians with patients on a pain clinic wait list: an outreach exercise. J Healthc Qual 2018;40(5):e71–6.
82. Alter BJ, Navlani R, Abdullah L, et al. The use of telemedicine to support interventional pain care: case series and commentary. Pain Med 2021;22(12):2802–5.
83. Deer TR, Esposito MF, Cornidez EG, et al. Teleprogramming service provides safe and remote stimulation options for patients with DRG-S and SCS implants. J Pain Res 2021;14:3259–65.
84. Silva LB, Pereira DN, Chagas VS, et al. Orthopedic asynchronous teleconsultation for primary care patients by a large-scale telemedicine service in Minas Gerais, Brazil. Telemed J E-Health 2021;3.
85. Theodore BR, Whittington J, Towle C, et al. Transaction cost analysis of in-clinic versus telehealth consultations for chronic pain: preliminary evidence for rapid and affordable access to interdisciplinary collaborative consultation. Pain Med Malden Mass 2015;16(6):1045–56.
86. Finucane AM, O'Donnell H, Lugton J, et al. Digital health interventions in palliative care: a systematic meta-review. NPJ Digit Med 2021;4(1):64.
87. Allen Watts K, Malone E, Dionne-Odom JN, et al. Can you hear me now?: improving palliative care access through telehealth. Res Nurs Health 2021;44(1):226–37.
88. Kidd L, Cayless S, Johnston B, et al. Telehealth in palliative care in the UK: a review of the evidence. J Telemed Telecare 2010;16(7):394–402.
89. Oliver DP, Demiris G, Wittenberg-Lyles E, et al. A systematic review of the evidence base for telehospice. Telemed J E-health Off J Am Telemed Assoc 2012;18(1):38–47.
90. Cameron P, Munyan K. Systematic review of telehospice telemedicine and e-health. Telemed J E-health Off J Am Telemed Assoc 2021;27(11):1203–14.
91. Leochico CFD, Mojica JAP, Rey-Matias RR, et al. Role of telerehabilitation in the rehabilitation medicine training program of a COVID-19 referral center in a developing country. Am J Phys Med Rehabil 2021;100(6):526–32.
92. Webster J, Young P, Kiecker J. Telerehabilitation for amputee care. Phys Med Rehabil Clin N Am 2021;32(2):253–62.
93. Subbarao BS, Stokke J, Martin SJ. Telerehabilitation in acquired brain injury. Phys Med Rehabil Clin N Am 2021;32(2):223–38.

94. Havran MA, Bidelspach DE. Virtual physical therapy and telerehabilitation. Phys Med Rehabil Clin N Am 2021;32(2):419–28.
95. Verduzco-Gutierrez M, Lara AM, Annaswamy TM. When disparities and disabilities collide: inequities during the COVID-19 pandemic. PM R 2021;13(4):412–4.
96. Cramer SC, Dodakian L, Le V, et al, National Institutes of Health StrokeNet Telerehab Investigators. Efficacy of home-based telerehabilitation vs in-clinic therapy for adults after stroke: a randomized clinical trial. JAMA Neurol 2019; 76(9):1079–87.
97. Spivak S, Spivak A, Cullen B, et al. Telepsychiatry use in U.S. mental health facilities, 2010-2017. Psychiatr Serv 2020;71(2):121–7.
98. Zachrison KS, Boggs KM, Hayden E, et al. A national survey of telemedicine use by US emergency departments. J Telemed Telecare 2020;26(5):278–84.
99. Fox KC, Connor P, McCullers E, et al. Effect of a behavioural health and specialty care telemedicine programme on goal attainment for youths in juvenile detention. J Telemed Telecare 2008;14(5):227–30.
100. Bashshur RL, Shannon GW, Bashshur N, et al. The empirical evidence for telemedicine interventions in mental disorders. Telemed J E-health Off J Am Telemed Assoc 2016;22(2):87–113.
101. Chen JA, Chung WJ, Young SK, et al. COVID-19 and telepsychiatry: early outpatient experiences and implications for the future. Gen Hosp Psychiatry 2020;66: 89–95.
102. Sasangohar F, Bradshaw MR, Carlson MM, et al. Adapting an outpatient psychiatric clinic to telehealth during the COVID-19 pandemic: a practice perspective. J Med Internet Res 2020;22(10):e22523.
103. Dubin JM, Wyant WA, Balaji NC, et al. Telemedicine usage among urologists during the COVID-19 pandemic: cross-sectional study. J Med Internet Res 2020;22(11):e21875.
104. Nourian A, Smith N, Kleinman L, et al. A 5-year single-institution experience integrating telehealth into urologic care delivery. Telemed E-Health 2021;27(9): 997–1002.
105. Castaneda P, Ellimoottil C. Current use of telehealth in urology: a review. World J Urol 2020;38(10):2377–84.
106. Chao GF, Li KY, Zhu Z, et al. Use of telehealth by surgical specialties during the COVID-19 pandemic. JAMA Surg 2021;156(7):620–6.
107. Gan Z, Lee SY, Weiss DA, et al. Single institution experience with telemedicine for pediatric urology outpatient visits: Adapting to COVID-19 restrictions, patient satisfaction, and future utilization. J Pediatr Urol 2021;17(4):480.e1–7.
108. Chrapah S, Becevic M, Washington KT, et al. Patient and provider satisfaction with pediatric urology telemedicine clinic. J Patient Exp 2021;8. 2374373520975734.
109. Khorsandi N, Gros B, Chiu YW, et al. Telemedicine provides enhanced care for low-acuity pediatric urology patients. Telehealth Med Today 2020;5(3).
110. Canon S, Shera A, Patel A, et al. A pilot study of telemedicine for post-operative urological care in children. J Telemed Telecare 2014;20(8):427–30.
111. Viers BR, Lightner DJ, Rivera ME, et al. Efficiency, satisfaction, and costs for remote video visits following radical prostatectomy: a randomized controlled trial. Eur Urol 2015;68(4):729–35.
112. Park ES, Boedeker BH, Hemstreet JL, et al. The initiation of a preoperative and postoperative telemedicine urology clinic. Stud Health Technol Inform 2011;163: 425–7.

113. Kaczmarek BF, Trinh QD, Menon M, et al. Tablet Telerounding. Urol 2012;80(6):1383–8.
114. Chu S, Boxer R, Madison P, et al. Veterans affairs telemedicine: bringing urologic care to remote clinics. Urology 2015;86(2):255–60.
115. Medicare and telehealth: coverage and use during the COVID-19 pandemic and options for the future. KFF. 2021. Available at: https://www.kff.org/medicare/issue-brief/medicare-and-telehealth-coverage-and-use-during-the-covid-19-pandemic-and-options-for-the-future/. Accessed December 11, 2021.
116. Patel SY, Mehrotra A, Huskamp HA, et al. Variation in telemedicine use and outpatient care during the COVID-19 pandemic in the United States. Health Aff (Millwood) 2021;40(2):349–58.
117. Alkureishi MA, Choo ZY, Rahman A, et al. Digitally disconnected: qualitative study of patient perspectives on the digital divide and potential solutions. JMIR Hum Factors 2021;8(4):e33364.
118. Javier-DesLoges J, Meagher M, Soliman S, et al. Disparities in telemedicine utilization for urology patients during the COVID-19 pandemic. Urology 2021;4295:01193–6. Published online December 31.
119. Liu X, Goldenthal S, Li M, et al. Comparison of telemedicine versus in-person visits on impact of downstream utilization of care. Telemed J E-health Off J Am Telemed Assoc 2021;27(10):1099–104.
120. Calendar year (CY) 2022 medicare physician fee schedule final rule | CMS. 2021. Available at: https://www.cms.gov/newsroom/fact-sheets/calendar-year-cy-2022-medicare-physician-fee-schedule-final-rule. Accessed December 11.