



Telemedicine: a Primer

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Published online: 25 August 2018

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Abstract

Purpose of Review Due to rapid advancements in quality of real-time, interactive, audio-visual, and digital technologies as well as impressive gains in internet speed and capacity, medicine delivered over distance is happening faster than many healthcare providers and leaders can grasp.

Recent Findings Depending on which market report you ascribe to, industry projections for the global compounded annual growth rate of telemedicine are between 13 and 27%, with valuation growing to over 20 billion US dollars in the next several years. The Mayo Clinic has reworked its entire telemedicine interest to a model with centralized operations, one virtual technology platform, standardized training, and connectedness for all of its locations. The National Quality Forum spent 2016 and 2017 formulating 70 some pages of recommendations for expanded measures to value telemedicine over the foreseeable future. There are so many patient experience studies indicating high satisfaction with telemedicine, that professionals in the industry accept it as fact. Telemedicine is leaving novel to the past.

Summary This short, informative piece of writing includes expert opinion and research findings about what is telemedicine, why one should practice telemedicine, and how one should approach implementation; a primer from which to grow.

Keywords Contracts · Credentials · Legal · Licensure · Operations · Regulatory · Reimbursement · Telemedicine · Training

Introduction

Merriam-Webster defines medicine as the science and art dealing with the maintenance of health and the prevention, alleviation, or cure of disease [1]. Tele is a combining form meaning distant, at a distance or over a distance [2]. The functional definition of telemedicine is the same as the literal, despite many subtle variations that can be found in the literature. Due to rapid advancements in quality of real-time, interactive, audio-visual, and digital technologies as well as impressive gains in internet speed and capacity, medicine over distance is happening faster than many healthcare providers and leaders can grasp. Markets and Markets forecast a global compound annual growth rate (CAGR) of 27.5% through 2021 [3]. For this review, we will include expert opinion and

research findings about what is telemedicine, why one should consider practicing via telemedicine, and how one should approach implementation; a primer from which to grow.

In the Beginning (Development of TM)

Telemedicine (TM) has been around in some form for millennia. Many relate the first use of telemedicine to be when ancient civilizations sent smoke signals to warn other clans of a contagious illness outbreak [4]. Though this type of communication had a limited bandwidth, it did permit medical information to be exchanged at a distance.

Likely, the most famous example of telemedicine occurred in 1999 when Jerri Nielsen, who incidentally was herself a physician, found a lump in her breast while on a research assignment in Antarctica. Due to the weather conditions, the diagnosis and treatment of her breast cancer was done over distance by satellite connection and the video equipment and chemotherapy dropped by US Air Force pilots [5].

Though these two examples of telemedicine appear to be quite different, it is a certainty that the operational and legal complexities that regulate telemedicine today were not even

This article is part of the Topical Collection on *Telemedicine and Technology*

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considerations at the South Pole or when smoke signals were the quickest way to communicate over distance.

While the need to deliver medical care to distant, underserved patients has existed for a long time, use of telemedicine to meet this need has increased rapidly only in the last few decades. This is largely due to improvements in the underlying enabling digital technology. Now that the technology is available, telemedicine is being used to do more than simply connect patients with providers (Fig. 1). Informal classifications of telemedicine have been created to organize the various ways that this new technology is used to improve health.

Different Types of Telemedicine

Bashshur has defined what he calls a taxonomy of telemedicine in terms of three domains that include functionality, application, and technology [6]. The functionality domain describes the various uses this technology has for managing patients including consultation, diagnosis, monitoring, and mentoring. Consultation refers to communication between providers such as between a specialist and primary care provider regarding a particular patient. Diagnosis involves a process that is usually referred to as store-and-forward in which a diagnostic test such as an X-ray or echocardiogram is sent to a remote specialist for interpretation. This is usually asynchronous since the interpreter does not need to be available when the test is done. Monitor involves the use of remote equipment that is used to monitor the physiologic status of a patient such as an EKG, glucose monitor for diabetes, or serial weights to monitor a patient with congestive heart failure. For asthma, it could include periodic monitoring of peak flows or patient's

Asthma Control Test score. Mentoring is used when a specialist observes and gives advice to another provider in real-time such as in a virtual ICU or during an operation.

The application domain can be divided into medical specialty, disease entity, site of care, and treatment modality. Medical specialty has led to a variety of tele-terms such as teledermatology, telepsychiatry, and even teleallergy depending on the specialty practiced by the provider using the technology. This can also be used to refer to specific diseases such as teleasthma, telediabetes, and so on when patients being treated have the same diagnosis. Site of care refers to where the patients are seen including ambulatory clinics at a distance, an ICU, or an Emergency Department. Treatment modality is reserved for types of treatment such as rehab, physical therapy, and others when done at a distance.

The technology domain will not be discussed here as it is being addressed in another review in this issue. The components of that domain include synchronicity, network, and connectivity, all of which are essential if telemedicine is to function.

Definitions

In addition to understanding the categories of telemedicine and how it can be used, it helps to be fluent in the lingo (Table 1). Asynchronous communication refers to exchange of information that occurs when the provider and patient are not connected at the same time. Examples of this include e-mail exchanges (usually via EMR-enabled patient portals), interpretation of diagnostic tests, and pre-visit completion of surveys by patients. The advantage of this type of visit is that

Fig. 1 Telemedicine using real-time digital technologies. (Photo published with permission from Children's Mercy Kansas City 2018_08)



Table 1 A glossary of telemedicine terms

Asynchronous—(of two or more objects or events) not existing or happening at the same time; diagnostic images, exams, studies, surveys completed at a location and time differing from the location and time of the interpretation.
Synchronous—Existing or occurring at the same time; two-way, live, interactive, audio-visual exchange for the purposes of delivering care over distance.
Facilitated—ensure the standard of care is met.
Non-facilitated—Also referred to as direct to consumer (DTC); no additional persons are with the patient during the delivery of care over distance.
Ambulatory—Medical care and/or treatment provided without the need for hospital admission. This care happens both inside and outside of hospitals, generally on a same-day basis.
In-patient—A patient who stays in a hospital while under treatment. Specialists may do virtual consults and or virtually round on patients in the hospital.
Remote patient monitoring—Type of ambulatory healthcare where patients use mobile medical devices to perform a routine test and transmit the test data to a healthcare professional. Remote monitoring includes devices such as glucose meters for patients with diabetes and heart or blood pressure monitors for patients receiving cardiac care.
mHealth—Practice of medicine and public health supported by applications (apps) on mobile phones, tablets, and computers.
eHealth—Healthcare practice supported by electronic processes and communication. Typically refers to email, patient portals, provider portals, and text messaging.
Telehealth—Health education/training or ancillary healthcare services delivered over distance.

visits do not have to be coordinated to occur at the same time. In addition, participants in the information exchange have time to think about the information leading to more thoughtful responses. Synchronous communication refers to exchanges in which the provider and patient are connected at the same time. This usually occurs in the form of video conferencing. It requires time coordination of the visit and responses to clinical questions need to take place in real-time. This is an advantage when discussing sensitive issues requiring interpretation of body language and verbal inflection.

Synchronous direct to consumer (DTC) visits generally occur with the patient located at their home or other nonmedical facility. Such visits are done without the aid of a healthcare worker and are therefore termed non-facilitated visits. Synchronous visits that include the use of digital examination equipment are of necessity facilitated visits. A facilitator is needed to operate the equipment and to perform other parts of a physical exam that cannot be done at a distance by video. The facilitator can also measure vital signs, provide education, and perform diagnostic tests such as spirometry and venipuncture. Depending on the level of clinical practice needed in order to deliver the standard of care, a telefacilitator can be a parent, a technician, a nurse, or a

physician. Registered nurse (RN) telefacilitators can do very complex assessments within their scope of practice as long as they relate their findings to the distant provider for interpretation. For example, an RN can assess and report liver measures 3 cm below costal margin; however, cannot report enlarged liver.

Telemedicine is also usually divided into in-patient visits (in which the patient is hospitalized) and ambulatory visits. TM in the inpatient setting is often used to monitor patients who are in intensive care units though they can also be used to facilitate inpatient consults by specialists and to monitor nonintensive care patients who require extra care such as suicidal patients. Its use can reduce the need to transport patients to a facility where specialists are located. The most common use of TM in the ambulatory setting is to reduce the distance that a patient needs to travel to see a provider [7, 8].

Does It Work?

Relatively speaking, the volume of randomized control trials (RCTs) specifically addressing clinical outcomes with telemedicine is limited [9••]. There are several potential explanations. Telemedicine in earnest is a twenty-first century phenomenon and can be delivered in a large variety of ways within numerous healthcare specialties. RCTs are complex and time consuming to conduct. Providers may surmise that as long as the standard of care is met using telemedicine, the clinical outcomes should be no different than those from the same care delivered in person.

Due to the scarcity of RCTs involving telemedicine, the National Quality Forum (NQF) [10], a non-profit and nonpartisan organization for the advancement of healthcare, formed a telemedicine committee that released in August of 2017 a 78 page document that addresses the creation of telemedicine measures [9••]. It is intended to be a guide for researchers interested in the advancement of telemedicine by highlighting areas of greatest need and processes for measurement that can be repeated in various telemedicine programs.

Studies of synchronous asthma management have primarily consisted of facilitated visits. In a retrospective study that compared outcomes and indirect cost savings between traditional and real-time telemedicine allergy consultations, 59% of patients were new consultations with diagnoses that included food allergy, rhinitis, and urticaria. Of those seen in person, 76% subsequently were referred for a TM visit while 93.5% of patients seen initially by TM continued being seen by TM. Follow-up phone calls and prescriptions were the same regardless of how the patients were seen. The authors estimated that of 112 TM visits, 200 work-days or school-days were saved and \$58,000 in travel-related costs and 80,000 km in driving was avoided [11].

In another study, Portnoy et al. compared asthma control in 100 children seen in person with 69 who were seen via telemedicine. While asthma control (as measured by the Asthma Control Test™) improved in both groups, the question being asked was whether it improved as much in the TM group as in the in-person group. To determine this, a non-inferiority analysis was done. The authors concluded that there was a 95% likelihood that a clinically meaningful difference was not present for patients seen in these two ways and therefore asthma care over distance is comparable to care delivered in person [12].

More recently, Halterman et al. reported that asthma management in the school setting, which included administration of preventive medications and telemedicine encounters with primary care providers, produced significantly better outcomes than asthma management via traditional in person methods [13]. In particular, of 300 enrolled children, those in the intervention group had more symptom-free days per 2 weeks (11.6 vs 11.0) and that they were less likely to have an ED visit or hospitalization (7 vs 15%) for asthma.

Australian researchers studied an asynchronous form of TM using remote monitoring of symptoms and use of an asthma action plan in 72 pregnant women. The intervention group used a handheld device connected to a smart phone to measure lung function along with a written asthma action plan while the other group received usual care. After 6 months, the telemedicine group experienced improved asthma control and improved asthma-related quality of life when compared to the control group. The two groups did not differ in lung function, number of acute healthcare visits, missed work/school, or amount of oral corticosteroid used [14].

Despite the lack of controlled trials of TM in the scientific literature, there is agreement regarding telemedicine's ability to improve access to care, decrease cost of care either directly or through reducing role functioning losses, and improve the quality of care through access to the right type of provider and improved patient experience. There is, for example, no question that a board-certified allergist who lives in Los Angeles and sees patients by TM in Junction City, Kansas improves access to allergy care in that underserved community. The alternative is that the family would have to drive to Kansas City to see a comparable specialist.

There is a wealth of information available regarding patient satisfaction with telemedicine. A recent systematic literature review on telehealth and patient satisfaction by Kruse et al., originally published in the British Medical Journal Open [15••], can be found on the National Center for Biotechnology Information website. With few exceptions, the results are overwhelmingly favorable toward TM. Patients are equally or more satisfied when seen by telemedicine when asked to compare the experience with traditional in person healthcare. In their review, the authors noted the following:

- In recent years, 20% of the factors for satisfaction related to improved effectiveness were due to improved outcomes
- The technology is now easy to use, and cost is no longer a barrier
- Communication between providers and patients is improved
- TM does improve access to care
- TM empowers patients to care for their chronic conditions
- It decreases wait times and improves medication adherence

Telemedicine Regulations

Regardless of all the new terms and use cases, there is a consensus among telemedicine industry professionals that when possible, the process of practicing medicine at a distance should be no different than when practicing in person. Standards of care must be met. There are, however, considerations when implementing telemedicine that may be novel to many with experience in traditional healthcare practices.

It was not until the mid-1990s that regulatory and legal entities started to craft language that would directly affect the practice of telemedicine [16]. Federal initiatives, like the National Information Infrastructure (NII), the Joint Working Group on Telemedicine, and High Performance Computing and Communications (HPCC), all of which were launched in 1995, would come to impact the use of telemedicine [17] in the USA. At the state level, in 1992, only 5 states had adopted language specific to telemedicine; 15 states were on record as recognizing telemedicine and by the end of 1995, 28 state telemedicine programs were assessed on level of development by Lipson and Henderson [18].

Today, there are telemedicine laws and bills in constant motion in all 50 states and in the federal legislative branch [19]. Providers and/or program managers wanting to offer telemedicine services need to understand the federal laws as well as the laws in each state where the patients they want to treat are located. In the beginning, telemedicine was not regulated separately from in person care, but then fear of the unknown and cautious lawmakers regulated the practice placing restrictions on its growth. It has just been in the last few years, with the improvements in broadband technology, better video compression, and consumer demand that federal and state telemedicine statutes have started to address the use of telemedicine in a realistic and rational manner.

Medicare, Medicaid (CMS), and Commercial Insurance

The majority of legal complexities related to telemedicine result from billing. Medicare is largely national and

reimburses for the care of adults while Medicaid is largely operated by the states and provides for the care of children. In general, commercial insurance companies follow the rules set forth by the Center for Medicare and Medicaid Services (CMS). There are many exceptions to this rule however; as commercial insurers are discovering through their own analytics the cost savings of some telemedicine use cases. Many health plans have decided to pay and/or to contract with healthcare systems for certain services (including the virtual health care of their own employees) even if it is not covered by Medicare.

While Medicare has held out on making changes to policy restricting originating sites (what type of facility the patient (s) is located in during the encounter), providers (which types of providers are eligible for reimbursement), and what types of services will be reimbursed, the majority of states have passed Medicaid expansion bills for coverage of telemedicine. For example, over half of the states now recognize the home and school as Medicaid-eligible originating sites, whereas Medicare still restricts originating sites to some type of healthcare facility located in a non-metropolitan area.

Because state laws vary and have evolved at different rates, an excellent resource for anyone wanting to promote telemedicine legislation is the ATA Policy web page. There are examples of model telemedicine language to share with lawmakers and yearly assessments of each state's legislative changes [20–23]. (Note: at time of submission for publication, CMS released a 1500-page proposal to expand Medicare coverage for telemedicine in 2019) [24].

Credentials and Privileges

As with traditional care, a physician or advanced practice registered nurse (APRN) must be credentialed and privileged in order to care for a patient located in a provider-based facility (i.e., hospital system). In 2011, CMS changed the credentialing requirements for access hospitals in order to relieve them of the administrative burden involved when contracting for telemedicine services [25]. Both CMS and The Joint Commission support an access hospital accepting the credentials from the distant site's (where the provider is located) medical staff office and the granting of privileges based on these credentials. This process is often referred to as credentialing by proxy. It is wise to include this method of credentialing in the contract for services as many small healthcare facilities may not be familiar with this option or unwilling to ask their board to change the med staff by-laws to include this method. It saves a tremendous amount of time for both organizations.

Federal and State Medical/Healthcare Boards and Licenses to Practice

States govern the practice of medicine through licensure requirements in order to protect their citizens. Therefore, you must be licensed in every state where the patients for whom you provide care are located. Bigger telemedicine companies have their own licensing departments that do nothing but complete applications for additional state licenses. In just the last few years, a national medical licensing compact was created and currently includes 24 state members [26]. There are also compacts for APRNs, psychologists, registered nurses, and physical therapists. Although there are advocacy groups for National Medical licensure, the intent of these compacts is not to forgo the requirement to obtain additional licenses, but to speed up the process of getting those additional licenses.

Anti-Fraud and Abuse Laws

Just about the time you think you understand what it takes to implement care over distance, you will hear someone say: "That can't be done. It's a STARK violation." What is a STARK violation? There are a handful of laws that originated well before Wi-Fi to prevent larger hospitals from bribing smaller hospitals or practices to preferentially refer them patients. STARK is anti-self-referral law and is very similar to anti-kickback laws. You may have the best intentions to help create value and improve access by partnering with a rural hospital to provide consults; however, if you provide the equipment or connectivity, it may be considered a form of inducement. These laws do not apply to all types of business and may seem illogical as the country tries to move from fee for service to quality and value models [27]. Determining fair market value for your contracted services is another example of how you might unintentionally violate regulation. You must pay someone to determine how much you can be paid, so you are not paid too much.

Operational Necessities

Due to the various ways healthcare can be delivered over distance and the multitude of other variables involved, one start-up kit will not suffice for all providers wanting to incorporate telemedicine into their practice. There are however some commonalities and sage advice upon which someone new to telemedicine can capitalize. Foremost, one should identify true champions. People may say they are "all for telemedicine" or that they are "telemed champions"; those statements do not a true champion make. True telemedicine champions believe that delivering healthcare over distance is part of vital healthcare reform, is essential in order to keep

healthy a world that is adding 227,397 people per day to its global population [28], and that it is inevitable. You need true champions because they are the ones that will be committed to the success of implementation and program development regardless of the challenges.

It is best to start with examples of telemedicine that are billable/reimbursable. Just as many innovative or beneficial ancillary services delivered in person are not reimbursed, those and more may not meet requirements for claims submission when delivered over distance. In April of this year, the Office of the Inspector General (OIG) released a report on Medicare reimbursement of telemedicine from the years 2014 and 2015 in which they found \$3,699,848 of the total \$26,810,937 was paid out to claims not meeting reimbursement criteria [29].

Even though the state and national trends are favoring reimbursement for healthcare delivered over distance, identifying billable scenarios should be done in conjunction with revenue and coding specialists and repeated annually. As mentioned, regulations involve specifics on what types of providers, types of care, location of patient and provider (type of facility and geographical area), and nuances regarding facility billing. Some current procedural terminology (CPT) codes allow for telemedicine, many do not.

Starting with reimbursable services will help assure that administrative leadership, at the highest levels, is committed to strategic and financial support of telemedicine implementation. Unlike just a few years ago, most healthcare executives are investing in telemedicine programs. According to Foley and Lardner LLP, between years 2014 and 2017, telemedicine programs went from 0% having an expansive program to 53% being in a growth/expansive phase and in 2014, 8% of healthcare organizations were still not even considering telemedicine; by 2017, that number was zero [30].

Program Organization/Staffing

In a telemedicine interview by Polycom in 2014, Morgan was quoted as saying “hire tough because getting started is not for the weak” [31]. With the rapid change in telemedicine interest noted by Foley and Lardner, this statement is not perhaps as true today as it was in 2014; however, implementing telemedicine is still full of challenges that require patience, persistence, and the ability to remain positive despite being told “no” often by legal, compliance, revenue integrity, business development, and even marketing.

Part of executive leadership’s commitment to telemedicine needs to be the recognition that telemedicine implementation will not be successful without dedicated full-time employment (FTE) of talent [32] (Table 2). Still today with all of the attention given to telemedicine, organizations are assigning one person from the C-suite to learn about and get telemedicine started. Or, one physician champion that already has too many

responsibilities is relied upon to recruit additional providers to practice with telemedicine. The most challenging yet is an organization with a handful of areas offering telemedicine via different technology applications due to individual provider or specialty start-ups.

Administration can say all areas of the hospital and clinics must incorporate telemedicine and it may seem fiscally responsible to identify one leader and rely on decentralization; where each department is responsible for their own telemedicine adoption, but experience and the Mayo Clinic’s internal analysis of its telemedicine program advise otherwise. As you can see from this little primer, just the amount of information to be mastered is enough for a full-time job. For a small healthcare organization, to be effective, the chief position or named provider is empowered to hire a full-time program coordinator that will be responsible for learning everything there is to know about telemedicine, leading and organizing the program while communicating one message in clinical terms to the organization’s providers and clinical department leaders. This position will be empowered to hire a training coordinator and telemedicine technology and network professional. The training coordinator creates credentialing and privileging criteria, works with the Medical Staff Office, shares reputable telemedicine practice guidelines, and ensures providers are aware of legal and statutory regulations related to telemedicine. The analyst will find telemedicine technology that is compliant, reliable, and delivers a high-quality experience. This part-time position will also be the interpreter for tech speak, they will trouble-shoot issues, assist end-users, and maintain competency in the industry as it evolves.

These are the minimum recommended FTEs to get started. Other roles to consider are for asynchronous oversight and growth, telefacilitation of complicated encounters, clinical and technical coordinators and/or inpatient versus ambulatory coordinators, and telemedicine technologists to support end-users.

The Mayo Clinic recommends teams rather than a couple of dedicated FTEs. These teams of FTEs are for large healthcare organizations (HCOs) looking to implement telemedicine across the system. The similarities to the recommendations above which are based on experience is noteworthy. An over-arching team simply referred to as the telemedicine team, with a centralized operations team, acute care team, outpatient care team, implementation team, unified technical support team, and partnership with existing enterprise training department are a large part of what the Mayo Clinic believes is vital to the success of telemedicine implementation [32].

Business Models

A telemedicine program with centralized operations, oversight of all telemedicine initiatives, and its own cost center is the

Table 2 Staff required to implement a telemedicine program

Minimum FTEs		
Strong, assertive operations and business coordinator/manager	1.0	With sufficient clinical experience to relate and communicate effectively with providers To lead and organize the program
Physician or advanced practice leader (such as the Chief Medical Officer or Chief Nursing Officer)	0.1	To visibly represent the organization's commitment to telemedicine and to work, on behalf of the coordinator, with decision makers
Network and audio-visual analyst II	0.3	Tech interpretation, selection, implementation, maintenance of telemedicine solutions and devices
Training coordinator	0.8	To provide individual and group education/training on telemedicine solutions and devices in context of applicable professional organizations' guidelines
Examples of Contractual Models		
Large medical center	Type of contracted service	Smaller healthcare facility
Endocrine and allergy Immunology expertise Team of intensivists	Inpatient consults	Inpatients receive high-quality access to care
	Virtual ICU	ICU patients that would otherwise not have access to an intensivist are monitored and rounded on by ICU nurses and physicians over distance 24/7
Radiology division	Asynchronous	All diagnostic imaging is interpreted by radiologists 24/7 for patients who would otherwise have to wait hours or longer for results or receive interpretations from providers not specialized in radiology.
Dermatology and nutrition	Ambulatory	Clinic family practice providers consult with dermatology and nutrition in real-time during routine visits

contemporary recommendation for long-term success [33]. Once established, be it on a grand scale for a healthcare organization (HCO) or on a small scale for an Allergy, Asthma, Immunology Practice, there are common telemedicine business models.

Grant Funding

Many large telemedicine programs with a relatively long history began with a grant. In 2007, the University of California Davis was awarded 22 million dollars to update rural healthcare via a telemedicine network [34]. They now have over 200 telemedicine partner locations [35].

The University of Arkansas, funded by Arkansas Medicaid [36], started the Antenatal Neonatal Guidelines and Educational Learning System (ANGELS) in 2003 [37]. This program has evolved into a state-wide, multi-center, telemedicine program for the coordination of pre-term births and high-risk deliveries that is a national model of excellence [38].

Children's Mercy Kansas City was awarded a grant by the Kansas City Area Life Sciences Institute and Blue Cross Blue

Shield in 2013 to demonstrate the quality of asthma treatment via telemedicine by looking at outcomes from patients treated in traditional clinic and those from patients treated over distance [39]. From that one specialty, Children's Mercy Kansas City now offers telemedicine in 31 pediatric specialties [40].

Organizations pushing for grant awards to fund and develop their telemedicine programs should be cautious of initiative arrest. If the grant does not address sustainability or support the beginning of an organizational strategy, the program will cease to exist with the end of the grant period.

Contractual Services

Another way healthcare systems fund their telemedicine programs is through partnerships with other, often smaller, healthcare systems. Large academic medical centers offer many services via telemedicine to facilities that cannot recruit or maintain specialized providers. Business development professionals create contracts for these services based on fair market value assessments. They may involve live interactive two-way video or asynchronous secure file transfer for interpretation of

diagnostic studies such as radiologic (X-rays, CT scans, MRI's), EKG's, cardiac ECHO studies, or neurologic EEG's.

Patient Billing/per Encounter Charges

Healthcare Organizations (HCOs) with multiple locations under one legal entity have an enormous advantage when implementing care over distance. Unless they operate sites in more than one state (in which case the providers have to be licensed in all states where patients reside when receiving care), they can share the expertise at their tertiary or quaternary centers via telemedicine to any of their other locations without having to create and negotiate contracts, obtain medical staff privileges, trouble-shoot disparate fire walls and other network security solutions, train or rely on another organization's staff to telefacilitate, obtain ongoing professional practice evaluations annually, establish invoicing and collections, etc., all of which have to be completed when partnering with an outside healthcare facility. HCOs can scale telemedicine rapidly within their organization and for pediatrics and patient originating sites located in non-metropolitan areas, bill the patients' insurance as they do in person encounters.

Population Health/Cost Avoidance

The most recent advances in communications technologies have led to the rapid diffusion of non-facilitated or direct to consumer telemedicine solutions. Organizations foreseeing changes in patient expectations and under pressure to control the costs of healthcare have contracted with these vendors that supply simplistic graphic user interfaces, high-quality video on limited bandwidth, and the option to label the solution with the organization's brand. Patients desiring a more efficient conduit to medical care can pay out of pocket for this on-demand service or accountable care organizations (ACO) can offer this service to the patients for whom they carry the insurance risk. As an alternative to expensive urgent or emergent care for non-critical conditions [41], a no charge virtual visit that provides the same quality of care, for an ACO, is worth the investment [42, 43].

Conclusions

Advancements in technology are supporting the rapid growth of medicine over distance. This pace of change is difficult for many providers to comprehend. There are countless ways in which differing specialties may incorporate telemedicine into their practice resulting in research that can be difficult to interpret if looking for proof of the benefits of telemedicine. There is, however, a dearth of information regarding patients' satisfaction with this method of healthcare delivery. They love it. Experts in the industry of telemedicine and global

healthcare markets agree that medicine over distance is value added and becoming an integrated part of how we support patients/healthcare consumers. We have attempted to provide support for providers who want a short, informative piece about what is telemedicine, why it should be incorporated into practice, and how to implement successfully.

Telemedicine research is disparate; however, there is no doubting that patients and families appreciate this method of healthcare delivery. Underserved populations can have access to healthcare like never before. There are types of medicine over distance and terminology specific to the industry to organize and define. The capital investment in and expansion of telemedicine by insurance companies and entrepreneurial start-ups with market forecasts of double digit ACGR indicate it works and is cost-effective. The evolution of this method started a long time ago but is mimicking Moore's law and other exponential growth curves. In order to catch up with this area of change or to demonstrate conversational competence, our primer covers what we feel are the vitals of telemedicine. In order to implement successfully, we suggest that each section starting with telemedicine regulations be addressed.

Compliance with Ethical Standards

Conflict of Interest The authors declare no conflicts of interest relevant to this manuscript.

Human and Animal Rights and Informed Consent This article does not contain any studies with human or animal subjects performed by any of the authors.

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