

Benefits and risks of incorporating virtual visits into an allergy/immunology practice

Morgan R. Waller, R.N., B.S.N., M.B.A., Luisa M. Taylor, R.N., and Jay M. Portnoy, M.D.

ABSTRACT

Telemedicine (TM) involves the use of technology to overcome the patient care barriers of distance and time. Asynchronous TM can be used to monitor patients remotely and for providers and patients to communicate with each other without needing to be online at the same time. Synchronous TM can include direct-to-consumer visits in which patients use their own equipment to communicate with a provider or facilitated visits in which a patient travels to a clinic to use the clinic's equipment with a facilitator. The advantage of the latter is that a physical examination can be performed. Although some patients and providers may prefer in-person visits, patients who are seen by TM report satisfaction that it is as good as or better than that of an in-person visit. TM can be used in the outpatient setting, in the hospital to perform consults, or in the school. The convenience of TM makes it likely that more patients will adopt TM as their preferred mode of obtaining health care. It is important for allergists to become familiar with this new technology because patients will demand it.

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According to the Office of the National Coordinator for Health Information Technology, Telemedicine (TM) can be defined as “the use of electronic information and telecommunications technologies to support and promote long-distance clinical health care, patient and professional health-related education, public health and health administration.”¹ The use of TM has been expanding rapidly over the past decade. According to the Rock Health survey, the use of video-based TM increased from 7% in 2015 to 22% in 2016.² Eighty-three percent of the patients and providers expressed moderate or extreme satisfaction with live video.² Approximately 22% of employers with ≥1000 employees currently offer TM services, and another 37% of employers plan to offer TM services to their employees by the end of this year.³ In addition, approximately 90% of surveyed health-care executives report that their organizations have already begun developing or implementing a TM program.⁴ Seventy-six percent of U.S. hospitals connect with and receive payment for TM services.⁵

WHY USE TM?

TM is used to overcome two important barriers that interfere with a patient's ability to receive health care: distance and time. Although distance

disproportionately affects patients who live in rural communities where specialists often do not practice,⁶ urban centers also are frequently underserved.⁷ The use of electronic equipment that can span distances has the potential to eliminate, or at least reduce, the barriers of both distance and time.⁸ TM applications can be divided into synchronous (live) videoconferencing and asynchronous (not at the same time) communication. Synchronous TM can be between a provider and a patient either without a facilitator (direct to consumer) or with a facilitator (facilitated visit). Asynchronous TM includes store and forward (S&F) of health information to a health provider, remote patient monitoring (RPM) by using connected electronic tools, and mobile health through which information and education is provided to patients. Use of asynchronous TM overcomes the barrier of time.

The more-generic terms e-health (health services and information delivered or enhanced through the Internet and related technologies) and m-health (use of mobile phones and other wireless technology in medical care) encompass a range of services that can be provided by using technology. TM is often used synonymously with e-health. A comprehensive taxonomy of TM was proposed in 2011⁹; however, conceptually, we find it easier to divide it into the two broad categories of patient care and education (Fig. 1). Education includes the use of technology to transmit educational programs, e.g., Conferences On-Line Allergy,¹⁰ and specialist-to-generalist interactive discussions, e.g., project ECHO (Extension for Community Healthcare Outcomes).¹¹ These educational programs are outside the scope of this review.

There are three major divisions of TM that can be used for patient care: (1) triage of patients using

From the Division of Medical Informatics and Telemedicine, Children's Mercy Hospital, Kansas City, Missouri

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Address correspondence to Jay M. Portnoy, M.D., Division of Medical Informatics and Telemedicine, Children's Mercy Hospital, 2401 Gillham Road, Kansas City, MO 64108

E-mail address: jportnoy@cmh.edu

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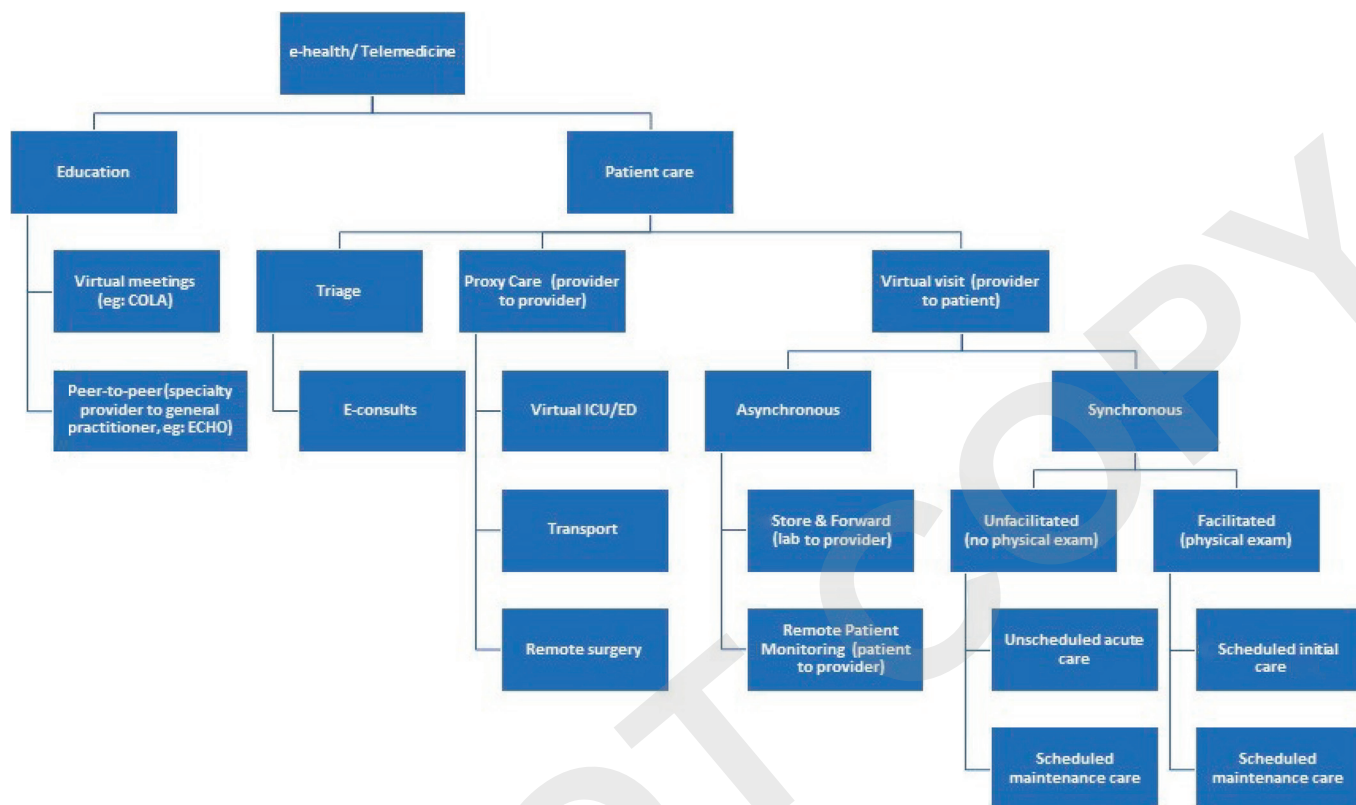


Figure 1. A taxonomy of e-health/telemedicine. COLA = Conferences On-Line Allergy; ECHO = Extension for Community Healthcare Outcomes; ICU = intensive care unit.

e-consults, (2) virtual visits, and (3) medical care by proxy.¹² E-consults can be used by providers when deciding whether to refer a patient to a specialist. To perform an e-consult, a brief description of a patient's medical history is sent to a specialist service by the potential referring provider and a reply is generated either with suggestions for treatment, a recommendation to refer the patient to that specialist, or to get additional tests before a recommendation can be made. This serves to triage patients before a specialty service is consulted, which improves the efficiency of care and reduces inappropriate referrals.¹³

A virtual visit is one in which a patient encounter occurs with the use of technology to overcome barriers of distance or time. Such visits improve the efficiency of care and, in some cases, can serve to replace a traditional in-person visit. Medical care by proxy involves delivery of acute care to patients by a specialist who is in a different location than the treating provider and patient. Instructions are given to a local provider who carries out the procedures by proxy. Although each of these uses of TM is important, the current review focused on the use of TM as a virtual visit.

ASYNCHRONOUS TM

Asynchronous TM is used to overcome the barrier of time by using technology to eliminate the need for the

provider and patient to be online at the same time. Types of asynchronous TM include RPM and S&F. Mobile devices (m-health) can be used either for RPM or S&F; however, both also can be done without such devices. Technically, it is possible for a patient to be managed entirely by asynchronous TM; however, there are nuances of communication that get lost when a synchronous visit does not occur, so in-person visits are still needed under certain circumstances. Asynchronous TM should not be used if a quick response is desired; this is usually stated when patients sign up for a patient portal. Prescriptions can be requested asynchronously but not if they are needed quickly.

RPM

RPM is used to track various aspects of a patient's health. RPM can be done either by tracking output from consumer electronic devices or from self-reported health information entered into an app.¹⁴ Examples of RPM include serial measurements of pulmonary function (peak flows, spirometry), self-reports of asthma control, and tracking of inhaler actuations.¹⁵ RPM permits a more detailed and objective assessment of a patient's interval health status than reliance on a patient's recall during periodic visits; however, it is dependent on patient's compliance with the monitor.

Studies are not clear whether RPM improves asthma outcomes.¹⁶ In some situations, RPM results can be transmitted electronically either to the patient's provider or to his or her health plan where health-care professionals monitor the results. The health professionals then need to intervene when necessary. Before using RPM, the question of who is responsible for informing the patient about abnormal findings and recommending action needs to be addressed.

S&F

S&F involves the storage of medical information obtained either from a patient (*e.g.*, a picture of a rash, communication through a patient portal) or a medical service (*e.g.*, laboratory results, pulmonary function tests, imaging studies) for forwarding to a health professional for interpretation and recommendations. S&F overcomes both distance and time barriers because patients can go to a local facility to have the tests done. In principle, a complete history and physical examination could be forwarded to an allergist for interpretation, which would circumvent the need for an in-person or TM visit. This rarely is done and currently is not considered to meet allergy standards of care, although that may change over time.

SYNCHRONOUS TM

Synchronous TM involves real-time communication between a patient and provider, which includes 2-way video or audio telephone communication. Two types of synchronous TM visits include direct-to-consumer (DTC) and facilitated visits. In a DTC visit, the patient uses his or her own equipment for communication, whereas, for a facilitated visit, the patient travels to a clinic to use the clinic's equipment. The facilitator is a trained health-care professional, usually a registered nurse, who can operate the TM equipment at the patient's site, including aiding in performing a physical examination by using digital equipment. It is important to note that the provider is doing the examination and that the facilitator merely serves as the hands for the provider. The ability to perform a complete physical examination is the primary determinant between the need for a facilitated or an unfacilitated visit.

DTC

A DTC visit can be used for management of an acute problem and, when used for this purpose, can replace or at least triage an urgent care or walk-in visit.¹⁷ A DTC visit also can be used for routine management of established patients when a physical examination is not necessary. DTC encounters can be initiated either by the patient or by the provider, and they can be scheduled or unscheduled. The patient can be almost

anywhere that has Internet connectivity. During a DTC visit, the patient uses his or her own equipment (usually a smartphone, tablet, computer, or, if audio only, a telephone) for the connection. Because digital examination equipment is not available, a physical examination is restricted to rashes and findings that can be seen by using the camera on a patient's device.

DTC visits have most frequently been used for management of low-grade acute problems in lieu of in-person visits to an urgent care clinic or unscheduled visits to a primary care provider. Such visits overcome the issue of distance but not time because the visits are synchronous. They provide convenience and immediacy because these visits usually are available during off-hours. To offer this service, providers need to be on-call so that they can respond when the patient needs them. Because Current Procedural Terminology (CPT) codes used to code medical services for billing purposes do not accommodate this type of visit, these visits are usually billed on a flat fee-for-service basis. Health plans frequently subsidize this type of visit to encourage subscribers to use this less-expensive service.

An unfacilitated virtual visit is scheduled in advance and usually is initiated by the provider, although the patient also has this ability. Such a visit is ideal for patients who require routine follow-up visits for stable conditions, such as monitoring of laboratory test results, immunotherapy checkups, and food allergy in which a physical examination is not necessarily required. Such visits can be offered to the patient; however, if the patient prefers to be seen in a clinic, a facilitated visit should also be an option.

Facilitated Visits

Although a physical examination is not always required to make a diagnosis and to recommend treatment, it is necessary to bill for a new patient visit.¹⁸ For example, new patient CPT codes 99201 through 99205 require a physical examination. CPT codes 99211 through 99215 require documentation of medical decision-making and the presenting problem without also requiring a physical examination. If a physical examination is needed to properly diagnose and treat a patient, then a facilitated visit would be necessary. The location of TM visits that take place in a medical clinic with a facilitator is referred to as the origination or patient site. It can be in a medical office building, hospital, or even in part-time space that is rented from a private practice. Ideally, the origination site is located nearer to where the patient lives so that it is more convenient to be seen there than where the provider is located, termed the receiving or provider site.

Resources that should be available at the origination (patient) site and receiving (provider) site are shown in Table 1.¹⁹ The origination site should have a sending

Table 1 Resources to have at the origination (patient) site and the receiving (provider) site when conducting a facilitated virtual visit by using telemedicine

Location	Resources	Purpose
Origination (patient) site	Sending room	Location where the patient is seen; should be set up as a regular examination room
	Telemedicine cart	Device permitting 2-way video communication and transmission of signals from digital examination equipment
	Digital examination equipment	Digital stethoscope, otoscope, high-resolution camera, dermascope
	Spare wires, parts	To replace defective parts when technology fails
	PFT equipment	When used during telemedicine, serves as a type of store and forward
	Venipuncture	Can be used to test for allergies in place of skin tests and for immune function
	Printer or fax machine	To provide patients with educational material and instructions
Receiving (provider) site	Facilitator	Operates the equipment and serves as the remote presence for the patient
	Connection device	Computer, tablet, smartphone to connect to the origination site
	Access to an EMR	Needed to document patient information

PFT = pulmonary function test; EMR = Electronic Medical Record.

room, where a patient can be seen. It should be set up as a standard examination room with an examination table and equipment that would normally be found in a medical facility. This creates a familiar environment and downplays the presence of TM technology. To provide 2-way video communication, the sending room should have a TM cart that has a video screen, a camera that is capable of zoom and pan, and a microphone and speaker capable of providing high-quality voice communication. The TM cart runs provider access software that, when connected to digital examination equipment, can display images and sounds to the provider. Digital examination equipment commonly used for an allergy evaluation includes a digital stethoscope, otoscope, and high-resolution camera. The facilitator usually is a nurse or respiratory therapist who should be trained to operate the equipment and to troubleshoot equipment malfunctions should they occur. Because a virtual visit serves as an alternative for an in-person visit, options for spirometry, laboratory, radiology, and other diagnostic tests should be available if needed.

THE ENCOUNTER

When seeing a patient *via* TM, the provider should introduce him- or herself as he or she would for an in-person visit.²⁰ The provider should state his or her location, note the patient's location, and confirm that he or she can be heard. Because the patient only sees what the camera shows, it is important for the provider to look at or at least be near to where the camera is

located. It helps for the patient's image to be on the screen near the camera because that is where one tends to look when using video equipment. In practice, it can be difficult to look directly into the camera. Patients occasionally complain that they do not know where the provider is looking, when looking away from the camera. One study found that, if the provider looks in the vicinity of the camera, then the patient perceives direct eye contact.²¹ The provider should mention that he or she will look away from the camera periodically to refer to the chart so that the patient is not disoriented when that happens.

After performing a history and physical examination, instructions should be printed to the patient's location, either by using a networked printer or by fax. Prescriptions can be sent electronically to the patient's pharmacy, and blood tests can be ordered to test for allergies and/or immune function. Other tests, *e.g.*, spirometry, can be ordered, depending on the equipment that is available at the patient's location. Staff should be trained to maintain the equipment and to perform tests properly. Because a provider is not necessarily on site, potentially risky procedures, such as skin tests, challenges, and immunotherapy injections, should not be performed by TM.

With TM, visits tend to be shorter because they tend to be more problem focused than in-person visits. Providers tend to look at the electronic medical record (EMR) more frequently and to multitask because information and orders can be entered into the EMR while speaking with the patient. Because the provider is not

physically present, contact tends to be more oriented toward the facilitator. For that reason, providers need to feel comfortable giving some control of the visit to the facilitator while retaining enough control to provide patient care. Patients are generally comfortable with that arrangement, although some providers may feel that their caregiver role is threatened.

Outcomes

Few studies have compared outcomes of a TM visit with in-person outcomes for management of asthma. In one study, control of asthma in patients seen by TM were compared with those of patients seen in person.⁸ Asthma control, measured by using the Asthma Control Test (Quality Metrics and GSK group of companies, Research triangle Park, NC) was determined at baseline, and at 1 and 6 months. The investigators found that there was a <5% likelihood that a clinically significant difference was present in asthma control between the two types of visit.

In our experience, patients tend either to be as satisfied with TM visits as they are with in-person visits or they prefer TM visits. Patients who are dissatisfied with a TM visit usually have experienced technical issues during the encounter, which is why it is important to have contingency plans for when the technology fails. Studies of satisfaction surveys indicate a 95-100% patient satisfaction rate in comparison with traditional in-person appointments.²² The most common drivers for patient satisfaction toward TM include reduced distance driven, time, and convenience; curiosity about the TM technology; and the close relationship the patients have with the staff, including facilitators, that is not always present during an in-person visit.²³ Patients who have had a TM visit are likely to request future ones if they have had a positive experience with earlier visits. Patients also are more likely to see the same provider because there usually are a limited number of TM providers. Finally, patients often can get a quicker appointment if they agree to be seen by TM because they are not competing for appointments with patients who are not using TM and they experience less time away from school and work.²⁴

Other Uses of TM

In addition to ambulatory clinic visits, inpatient consultations can be performed by using TM. Because most allergists practice in ambulatory settings, they tend to provide consult services either before or after their workday. Hospitals that provide an origination site for TM could enable allergists to do consults from their office and would permit allergy/immunology consultation services even if there are no specialists in the local community. In one study, patients were skin tested for antibiotic allergy by a physician assistant,

followed by consultation with an allergist by TM to interpret the results and recommend subsequent treatment.²⁵ Patients were able to use less-expensive medications with fewer adverse effects, and the penicillin allergy label was removed from their chart. The ability to perform potentially risky procedures in this case was contingent on the availability of a specialty-trained physician assistant at the hospital.

TM also has been studied to improve asthma control in a cohort study of three California schools in which students were seen by an asthma expert by using TM.²⁶ Students in the intervention group experienced a significant improvement in family social activities and in the number of asthma exacerbations. More than 90% of the families rated the program as good or excellent.²⁶ In another school-based study, children seen by TM, with persistent asthma had more symptom-free days, and they were less likely to have an emergency department visit or hospitalization for asthma than did children in a control group.²⁷

PRACTICE ISSUES

Other than the technical and management aspects of TM, the most important issues include licensure and payment for services. Payment has been an evolving issue, primarily because it is regulated at the state level. Similarly, licensure is regulated by states, with the result being that providers who practice using TM have needed to obtain a license for each state in which their patients are seen. Payment for TM services through Medicaid programs is largely regulated by state laws.²⁸ Currently, 49 states and Washington, D.C., provide reimbursement for some form of live video in Medicaid fee-for-service. This number has remained the same since the spring of 2018. Payment by private health plans is governed by laws in 39 states and Washington, D.C. Although coverage parity is common, only a few private payer laws require reimbursement parity for TM services.

The Interstate Medical License Compact is an agreement between 28 states, the District of Columbia, and the Territory of Guam, where physicians are licensed by 41 different medical and osteopathic boards.²⁹ A licensed physician who practices in a state that is part of the compact can also practice medicine in other member states if they meet the eligibility requirements, which 80% of physicians do. The application process for licensure in other member states within the compact is expedited by using information previously submitted in the state of principal license.

CONCLUSION

TM is here to stay and is expected to grow. Allergists can use it for a variety of patient care purposes, including asynchronous and synchronous visits, and for

facilitated and unfacilitated visits. The type of TM that is used and its specific implementation depend on the needs that the patients and allergy practice have for delivering care when using this new technology. Although several barriers remain, they are rapidly being overcome. Eventually, it is likely that use of TM will be as common as in-person visits.

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