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Telemedicine Technology: a Review of Services, Equipment, and Other Aspects

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Abstract

Purpose of Review Telemedicine uses technology to connect patients with providers at a distance. While the clinical aspects of this have been reviewed extensively, the technical aspects are not as well understood by allergists when they consider adding telemedicine to their practice. This review focuses on the technical aspects of setting up a telemedicine program.

Recent Findings With the advent of new technologies including high-speed Internet, video conferencing solutions, and digital examination equipment, facilitated virtual visits as replacements for in-person visits are now possible. The technical requirements for a successful telemedicine program include secure, high-speed Internet connection, a clinical telemedicine cart to serve as the hub for the interaction, patient access software, and access to IT professionals to set up the program and to be available when the system malfunctions.

Summary A carefully designed telemedicine program is more likely to be successful if the technical aspects are included in the planning process.

Keywords Telemedicine · New technologies · Medical technology · Medical informatics

Introduction

When initiating a telemedicine (TM) program, much of the focus should be on the clinical application of the medical practice. It is important to decide what services to offer and how to offer them to set up a system for billing and financial sustainability of the new practice and to determine how it will fit into the already present system. There is, however, a large technical component to be considered. After deciding that an organization wants to launch a telemedicine program, it is important look at some of the technical aspects of what is required from an information technology (IT) perspective and to consider the best options to select. Some of the most important considerations are cost, sustainability, and scalability. This review will provide a ground floor view of some of the technical issues that an organization should consider to get started in TM from the perspective of telemedicine IT specialists.

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A Note About the HIPAA

When considering any technology platform, it is important that it is Health Insurance Portability and Accountability Act (HIPAA)-compliant. HIPAA is a set of standards for securing protected health information (PHI) which ensures that the required physical, network, and process security measures are in place and that they are followed. Many platforms advertise "HIPPA compliance" as part of their sales pitch; however, true HIPPA compliance comes from the way the product interacts with the existing technology, and as a result, no device or platform is "compliant" on its own. Important aspects of a technology for HIPAA compliance include data encryption, log in controls, and auditing ability. In the end, it is important to consult with knowledgeable security and compliance experts before choosing a technology for TM.

Should You Do TM?

Given the costs and changing technology associated with TM, it is important to consider how fear of technology change can

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negatively affect a program before it even starts. Technology in the world is evolving rapidly today, and it seems like every day there is an announcement of a new breakthrough. This will sometimes lead to administrative decision makers to drag their feet when it comes to buying into a new technology. The feeling of "If we wait the cost will come down" or "A new product will enter the market" is not limited to telemedicine but is prevalent in the entire tech marketplace. It is important to not let this attitude delay the launch of a program. As the TM market expands, it needs to be a business decision that your market is ripe enough and that you have a plan to implement a program that allows you to launch. It is better to identify your needs first and then find the technology that suits those needs. Fear of changing technology can often be worked through with the vendors as they know things are changing as well. Finding a vendor that will be as much a partner as a seller of service is important here as they will keep you abreast of changes and how you may be able to take advantage of new products.

Types of Visits

The field of telemedicine has an abundance of vendors with a solution to sell. The hard part is parsing through the solutions to decide which ones meet your needs today and which can grow as your program grows. The trick is to determine what you actually need for the type of telemedicine you will be doing today and in the future. How you plan to see patients using TM is possibly the biggest question. Will you see patients in an offsite clinic owned by your facility, will they be joining in from home or joining from another medical site such as a local clinic, hospital or school? The answer to this question will drive much of what is done when evaluating vendors and solutions. A partial list of vendors that provide TM equipment and services is shown in Table 1.

While many types of TM have been promoted and studied, three types of TM are commonly used in allergy practice today. These include (1) remote monitoring, (2) consultative visits, and (3) facilitated visits. Each has a specific use in practice that needs to be considered when selecting a platform.

Table 1 Vendors that provide telemedicine technologies

Video conferencing	Web site
• Polycom	• http://www.polycom.com
• Cisco	• https://www.cisco.com
• Vidyo	• https://www.vidyo.com
• Zoom	• https://zoom.us
• Skype for business	• http://www.skype.com
• Click Meeting	• http://clickmeeting.com
• Join Me	• http://www.join.me
• Amazon Chime	• http://business.vonage.com
Direct to consumer	Web site
• American Well	• https://www.americanwell.com/
• Doctor on demand	• https://www.doctorondemand.com/
• MDLIVE	• https://www.mdlive.com/
• TelaDoc	• https://www.teladoc.com/
Provider Access Software	Provider Access Software
• Agnes	• https://www.amdtelemedicine.com
• Intouch Health	• https://intouchhealth.com
• Avizia telemedicine	• Recently acquired by American Well

Each technology changes frequently so it is important to visit their web site for information about current offerings. Note: It is important to check with each company to determine HIPAA compliance and to verify it with an IT security expert

Remote Monitoring

Patient monitoring/population health management platforms focus on taking periodic, biomedical measurements from the patients on a tablet, smartphone, or computer web browser, often with the aid of very low cost, basic medical devices like blood pressure cuffs, thermometers, and digital scales [1]. Asthma treatment can be monitored with use of connectors that attach to or fit over metered dose inhalers that monitor when and how often the inhaler is actuated [2]. Digital peak flow meters can record and report a patient's lung function [3]. Measurements are sent electronically to be processed by software algorithms that can provide feedback to the user. Some systems permit measurements to be supervised and interpreted by skilled medical professionals that monitor for deviations from baseline values that are entered as ranges appropriate for the individual patient [4].

These platforms rarely include a live video component and instead tend to use simple diagnostic tools that are self-administered by the patient. This limits the measurements that can be taken to only the most basic and error tolerant methods and devices. When a reading is missed, or the values do not conform to the patient's target range, the software can alert care providers leading to a follow-up contact by telephone. When issued to at-risk patients who have been recently discharged from the hospital, remote monitoring platforms aim to reduce avoidable hospital readmissions by identifying changes in the patient's medical condition early enough to be effectively treated at home.

Remote monitoring platforms should not be confused with home health aides, which are not connected to a central monitoring system. Health aides generally carry the disclaimer, "This product is not intended to diagnose, treat, cure, or prevent any disease." Examples of home health aides include Fitbit™, Apple HealthKit™ devices, and Samsung Health™.

Consultative Visits

Consultative visits involve both sides of a conversation being present by video after which an opinion is offered. There are many routes to take to make this happen; however, the

common thread is that no diagnostic tools are used during the visit. This type of visit can be divided into teleconsultation in which one clinician consults with another clinician regarding a patient [5] or direct to consumer in which a clinician provides medical advice to a patient.

Consultative visits are much easier to arrange since it is not necessary to acquire compliant medical devices, worry about facilitation, or even arrange for a patient go to a clinic. Even so, the need for care when choosing a platform for consultative visits should not be underestimated nor should the need for ongoing technical support be ignored. A secure and reliable connection is still necessary even for consultative visits. A variety of options are available for this type of video conferencing by vendors such as Polycom, Cisco, Vidyo, Zoom, and a host of others. Most video conferencing services offer business agreements that allow the service to be used in health care where HIPPA is a concern. An advantage of these types of systems is that they can do double duty if your organization needs to use video conferencing for administrative or business purposes in addition to the telemedicine program.

DTC Visits

Direct to consumer TM is a quickly growing segment of the industry. These platforms offer apps that the patient can download to their smart devices or use on a home PC to schedule and have appointments directly. Many of the platforms also offer the ability to schedule visits. Direct to consumer (DTC) platforms also frequently offer the option to staff a program with their in-house physicians if desired. One important caveat in the current direct to consumer landscape is that in many states, this is not a billable service. Therefore, most DTC vendors use a pay up front model where a payment is collected from the patient at the time of service. If a practice provides DTC services, it is important to ensure revenue integrity and to keep an eye on changing rules that come from state legislatures [6••].

Direct to consumer TM is usually provided through an app that allows interactive video between a patient and on-demand clinician. This is the most basic of the synchronous diagnostic telemedicine modalities. To use this service, patients usually open an app on a smartphone or PC web browser and navigate to a site. After answering a few questions about the medical condition of concern and paying an up-front fee for the visit, a patient then waits in an online virtual queue to be served. After a short wait, a provider connects by video to discuss the medical condition of concern. Since diagnostic tools are not available for most DTC platforms, treatable conditions are limited to those that the physician can address through a video interaction and patient-supplied information. While this is a substantial improvement over audio-only phone consultations, tactile examination and the use of diagnostic medical devices are not generally possible. Healthcare professionals providing this type of service can be employed by the platform vendor, the health system offering the service, or they can operate as an independent contractor. Often, these platforms are owned by a vendor and serve as an end to end solution.

Allergy practices can use this type of platform to offer DTC to its patients either after hours or for urgent care triage. The vendor's providers can provide this service if the practice's providers do not want to be on call. It is difficult for an allergy practice to build this type of platform on its own. For that reason, most programs that incorporate DTC into their practice seek a vendor to provide a platform that meets the needs of the program. There are an ever-growing number of vendors offering this type of service. It is important for a practice's clinical and technical teams to sit down with representatives from several platform providers to determine whether its needs can be met, since customization is difficult, expensive, and may not even be available. With this model, physician workflows are "locked in" to those that the platform provides. For that reason, shopping around for the "right fit" is a critical initial consideration. This step should be done carefully since it is difficult to change platform vendors once the program has started. Examples of DTC platforms include American Well, TelaDoc, MDLIVE, and Doctor on Demand.

Facilitated Virtual Visits

For visits that require a physical exam, it is necessary to use a platform that integrates Medical Devices into the live visit. These platforms run applications generically referred to as Provider Access Software (PAS) [7••]. Given the increased complexity, there are fewer platforms that have this capability than there are for video conferencing alone. Examples of platforms that run PAS include AGNES by AMD Telemedicine, Intouch Health, and Avizia telemedicine. These platforms allow integration of class 1 (devices that have a low to moderate risk to the patient and/or user) and sometimes class 2 (devices that have a moderate to high risk to the patient and/or user) medical devices into the live video stream. For allergy, the most common devices are a digital stethoscope for listening to breath sounds and there is an array of camera options that vary by specialty [8]. A description of several cameras commonly used in allergy practice is shown in Fig. 1.

The biggest advantage of using a platform designed for this is the attention to detail given to the use of the devices during a visit. They usually offer an easy way for the provider to switch between devices and the live video feed. Digital stethoscopes generally have the option to switch between frequencies (Bell and Diaphragm modes) on the fly instead of having to stop and start device. Another advantage of these platforms is in having a full range of visit options in one "portal" rather than needing to switch between interfaces to have the same experience.

AMD 2500 	Pros: • High Quality optics • Sturdy and reliable, hard to Break • Optical zoom vs digital zoom • Auto focus • Ease of use after set-up Cons: • No USB output, must be converted for some systems • Requires some set up, not plug and play to PC
GlobalMed Total Exam 3 	Pros: • HD Image quality • USB plug and play • Allows attachments to change use across specialties Cons: • Not auto focus • Pen design for focus and use not intuitive (though easy to use once comfortable)
Horus HD Digital Scope System 	Pros: • Cost Effective • Screen allows direct view on camera for easier use • USB plug and play • Allows attachments to change use across specialties Cons: • More delicate than competitors • Not auto focus • USB connection can be loose

Fig. 1 Digital examination cameras that can be used for telemedicine (Figures are in public domain)

During a visit that requires a physical exam, it is necessary for a facilitator or clinician to be with the patient to operate the medical devices. The facilitator serves as an extension of the clinician doing the exam to ensure proper use of the medical devices and to perform sanitation tasks at its completion. As medical equipment changes, there are an increasing number of consumer-based devices that the patient can use at home by themselves without a facilitator. Such devices generally are not FDA approved to provide reliable information to the provider. Given the limitations of these devices, it is better to have an experienced facilitator during the visit for the best outcomes.

Many allergy practices use TM to perform facilitated virtual visits [9•]. A facilitated virtual visit requires the patient to travel to a medical facility, usually more conveniently located than where the provider is situated, where a healthcare professional assists with the visit. The site where the patient is located is referred to as the "originating site." This type of visit involves the use of electronically enhanced diagnostic medical devices that are operated by facilitators who are trained in their use to perform a physical exam. Facilitators do not need to be licensed professionals, though they often are. These platforms aim to increase access to convenience or frequency of diagnostic, specialty, or follow-up care and to reduce avoidable hospital readmissions.

Due to favorable CMS reimbursement policies regarding the types of places that can serve as "originating sites," these platforms are most widely used in rural access hospitals, physician offices, federally qualified health centers, schools, corrections institutions, and skilled nursing facilities outside of metropolitan statistical areas (MSAs). They can also be located within federally designated rural Health Professional Shortage Areas (HPSAs) where many telemedicine services can be reimbursed. Because of the equipment and staffing requirements of this platform, patients must still travel to the exam site, but that site could be close to them compared to a

traditional point of care. Proximity to skilled and specialty care can be greatly enhanced in captive (jails and prisons) or semi-captive (schools, workplaces, skilled nursing facilities) patient settings using this type of platform.

Video Conferencing

Currently, there are many ways to deliver video conferencing that can be used in telemedicine and administrative settings. The traditional way is to purchase a solution from a vendor and have it installed in a practice's data center. This is often referred to as an "on prem" solution, meaning it is on your premises. The biggest advantage of this is that you have security control of the solution, and it can be managed more easily by your staff. The deployments can come in many sizes and flavors, including the possibility of going off network to communicate with other systems. It takes time to fully evaluate all of the available options. An important consideration is scalability which means that the selected solution is not outgrown too quickly given the investment made in acquiring it. On prem solutions require IT staff with the expertise and resources to maintain and administer complex video systems in addition to their existing duties.

The other option for video, and one quickly growing in popularity, is the hosted solution. This solution involves buying video conferencing as a service from a vendor. The vendor "hosts" all of the hardware in their own data center and provides maintenance for the equipment. This approach provides more flexibility for growth since it reduces the need to upgrade a set of equipment that you own. Instead, you can simply increase your agreement with the vendor and it is their responsibility to provide the necessary upgrades. For hosted video, it will be of extra importance to work with your internal security team to ensure that it is an option since many health systems still prefer on prem solutions. It will also be important to engage your legal team to see if a Business Associate Agreement (BAA) is appropriate or required before a patient visit takes place over a hosted video solution. This is necessary to ensure HIPPA compliance.

Another aspect of the evolution of video conferencing that impacts telemedicine is the movement away from dedicated, hardware-based video room systems, referred to as video codecs (a Codec is a piece of electronic equipment that Compresses and Decompresses a digital video signal), to software-based applications. Previously, to use digital medical devices for TM, it was necessary to have a hardware Codec with the necessary inputs to plug the devices into. Now, most medical devices that support USB can be used with a variety of software-based platforms. This trend will continue, so it is important to consider the cost of any solution that uses hardware codecs vs software solutions. The cost of hardware usually is higher than the cost of a similar software solution. In addition, hardware usually requires costly maintenance and support from the vendor to operate each year.

Technical and Support Staffing

A frequently overlooked aspect of starting a telemedicine program is technical and support staffing. There are few things that will kill a program faster than users having difficulties and not being able to receive help. Whether it is something that was missed in training or a onetime blip, lack of support will make a platform seem unfriendly and unusable and will make program adoption incredibly difficult to drive. The details of how you offer service and support will vary with how and when you are running your program. There will also have to be some discussion about what department or group the support people are a part of. If you have an existing IT/IS department, they could take on the role of handling support for some aspects of support, especially if you also are using a video conferencing platform. It is helpful to retain a specialist as part of a core telemedicine team in an analyst/support role to offer more direct support to users.

When considering support options an early consideration needs to be what hours support is going to be provided. This is important to think about early in the process as it can affect vendor contracts or agreements. There are two basic support sets: Business hours or 24/7. Business hours can vary but is usually seen as 8 h a day for 5 days a week or 8 × 5. If you are running a program that is only scheduled during a set time space, this works well. An important note for business hour support is to make sure the hours start a shortly before clinic time to identify issues before patients arrive and to be aware of the occasional need for maintenance or upgrades outside of operating hours. The more encompassing 24 × 7 support is good for programs that either run at any time, or that have variable hours. It is better to have more complete coverage than for support to be needed but unavailable. This consideration needs to be balanced against the costs of the support system to avoid overpaying for unneeded hours. One way to make the most of "off hours" with 24/7 support is to arrange for your vendor to perform updates, maintenance, and improvement tasks during the time when the clinic is closed. This will improve the reliability and security of your program and minimize clinical disruption.

Supporting a telemedicine program can require a unique set of skills compared to a standard IT position. You will want someone who can interface with the clinical staff without being out of their depth. This person will also need to be an excellent communicator and should have the ability to speak in a plain, nontechnical language that end users can understand. This is important in all aspects of IT but is

especially important when troubleshooting with clinical staff. The skill set should also include a good understanding of how video works, networking, firewall, and basic PC skills. Finding someone who has experience in a telemedicine program is a positive, especially if it is with the platform that is chosen. If using an external vendor, make sure you select one that has a dedicated staff for telemedicine support.

One last aspect of staffing that is important to consider is the kind of support the chosen vendor offers. In many situations, it is appropriate to outsource support needs to the vendor/partner in the program. This moves the onus of support from the on-site team to the technology partner supplying the platform you are working with. The partner can often offer a larger staff of experts than would be feasible to hire, especially for a small program. They can also provide support for large systems that may already be struggling with IT staffing issues. Vendors offer varying levels of service, so it is important to have a frank conversation about costs, offerings, and limitations of vendor supplied support. It is important to spend time to ensure that you have a solid and capable support system in place when launching a program whether you choose to support your program in-house, by using a partner model or with a blend of the two.

Integrating TM with Electronic Health Record Systems

When evaluating a telemedicine platform, it is important to consider how it will integrate with existing electronic health record systems (EHRs). Depending on the type of platform you select, several interface options are available. The universal common denominator is the international standard known as Health Level Seven (HL7). HL7 defines the technical specifics for sending messages containing health data to and from medical software. Almost all vendors support the HL7 interface standard. Though widely supported, its capabilities are constrained by the history of its development. HL7 was designed to serve the needs of a large, diverse range of users, and therefore is slow to adopt novel methods [10]. Additionally, HL7 is simply a framework of standards, not an application that can be installed. Every vendor implements the standards in their own way. Though the product you select for TM will likely support the HL7 standard, custom HL7 interface development for allergy-specific applications may be required [11]. Many EHR vendors view these services as high-margin sales opportunities that can add significant cost to your telemedicine program. For pilot-level programs, HL7 integration is usually too costly to implement.

Another nimbler and, sometimes, more cost-effective strategy are to leverage any application program interface (API) capabilities your telemedicine solution may offer. APIs are proprietary means whereby software applications can share data in structured ways with external systems. Since APIs generally are built into software by the original developer, you can access a wider variety of data and take advantage of proprietary methods not exposed in the more generic HL7 standard. If you have ever received a Facebook notification on your phone's lock screen, it is because Facebook provides an API call for that. However, because APIs are proprietary by nature, the capabilities and compatibility with any given EHR will vary widely. As with HL7, custom interface programming may be required, and some vendors charge a licensing fee to access the application's API. Still, finding a developer to work with a well-documented API is often easier and less expensive than hiring one to implement an HL7 interface. Because most vendors tend to implement APIs using similar methodologies, and APIs are used in almost every modern information-sharing application, the number of developers that will tackle an API integration job far exceeds developer's adept in HL7 development (which is used exclusively in healthcare applications).

The most common and, usually, the least expensive option is to simply copy and paste data into your existing EHR client. In modern, software-driven telemedicine systems, both the facilitator at the near site and the clinician at the far site will be using the telemedicine interface on common Windows-based PCs or Apple Macintosh computers. It is easy and minimally disruptive to use the EHR client alongside the telemedicine application, copying and pasting information back and forth as needed.

Open and Closed Systems

A decision that should be made early in the process is whether to use an open or closed system as this will have lasting effects on the direction of the program. A closed system is one in which all of the components, hardware and software, are designed, developed, provided, and supported by a single manufacturer as a turn-key product and that does not support the use of third party devices or components. An open system of integrated components allows the use of hardware and software from third parties and can come as a turn-key system or be sold as a component of a telemedicine system that you assemble yourself.

Both approaches have advantages and disadvantages. Closed systems can be more "polished" with highly specialized workflows that target very specific clinical modalities. The user experience is generally more congruous and can be easier to use; however, what you gain in simplicity,

you pay for in flexibility and capability. If the software workflow concepts do not match your clinical operating style, you will have to change the way you run your clinic to accommodate the software's limitations. With a closed system, you are limited to the offerings of a single vendor, so you must take extreme care to insure the vendor's capabilities are closely aligned with your program goals. Once you are locked in, you will likely have to scrap your entire technology investment to change course and start over.

With an open system, you get the freedom to use the devices and software of your choosing, while maintaining the ability to change direction without starting over. Upgrades can be more incremental, and workflows can be designed to map closely to your existing clinical procedures. You will also have access to a much wider variety of medical devices and integration opportunities. While this will require that you spend a good deal of time explaining your process to your integrator, the result can be highly rewarding. For new programs, this flexibility to tweak the solution after installation can be invaluable to program adoption and utilization. Users will appreciate the fact that the system adapts and responds to them, rather than being told to work the way the system requires.

Working with Outside Clinical Groups

One way to offer specialty services to patients in underserved communities is to rent office space and hire staff that lives there. This would require a full set of TM equipment to be placed at the outside location. Another option is to use space and to work with staff that are employed by a local provider. Because anti-inducement laws prohibit one practice from supplying equipment to and paying for the staff of potentially referring providers, it is possible to "rent" the space and staff from the outside provider for fair market value. Another option is for the outside provider to obtain their own TM equipment and supply the room and staff. In that situation, the outside provider would bill for the facility costs independent of professional fees.

Rural hospitals should be encouraged to obtain TM equipment and to provide space and staff for use by a range of outside providers that are scarce in the local community. In addition to outpatient visits, this approach would permit specialty consultations to hospitalized patients.

Technology Is Advancing at an Accelerating Rate

Telemedicine technology is advancing at an ever-increasing rate, owing largely to the advancement of computer and Internet technologies in general. We are all familiar with the fact that computers get faster, smaller, more capable, and less costly by the day. Advancing alongside is the quality, speed, availability, and cost of Internet connectivity. Gone are the days when expensive point-to-point networks had to be installed at fixed facilities to ensure quality telemedicine encounters. Today, a wide range of affordable fixed and mobile network types are well-suited to support the two-way audio and video upon which telemedicine relies. While a full treatment of subject of telemedicine connectivity is beyond the scope of this article, there are a few up-and-coming technologies of particular utility for modern telemedicine programs. Previously, network connections required expensive, bulky, and complex equipment to provide secure and dependable service to the user. Configuration was laborious and required the expertise of highly skilled network and security engineers. The connections were hardware-based and inflexible. Most required is extensive coordination between an IT department and the Internet service provider (ISP) to configure correctly, so they were hard to move. Given these limitations, "traveling programs" or systems that supported multiple exam sites (particularly in rural areas where they are often needed most) often involved multiple IT teams working together. The ability to access another organization's network was a nightmare for IT security compliance personnel, and many programs never got off the ground because of the difficulty of setting up a secure and robust connection. Today, the prospects are far better.

Software-defined wide area network (SD-WAN) technology allows all of the features that used to be locked into the hardware to be dynamically configured in software instead. This also allows remote administrators and monitoring systems to keep an eye on connections and make configuration changes by simple, menu-driven interfaces. It is now possible to put your telemedicine system on the network at a distant facility, owned by another organization, and use their existing Internet connection while remaining completely isolated from all other devices on their network. This turns an otherwise complex IT project into a phone call to answer few simple questions.

Now, the answer to unreliable network connection is simply to take your own Internet connection with you. 4G LTE and the soon-to-be-released 5G wireless data networks operated by carriers like Verizon, AT&T, Sprint, and T-Mobile provide excellent nationwide coverage that is suitable for telemedicine use with the right equipment. Combined with SD-WAN technology, wireless can literally bring your health system network with you to most places in the country (even rural areas). This can give you secure access to your EHR, provide live telemedicine sessions, and can even make your IP office desk phone work wherever you are.

Fiber-connected cities are popping up around the country providing Internet speeds that are difficult to imagine. In these cities, customers can sign up for Internet speeds of 1 Gigabit per second at trivial prices. Speeds this high are several orders of magnitude higher than what was available

to telemedicine programs just a few years ago. In the future, 3D video may replace the HD television quality experiences available in today's telemedicine systems. 3D visualizations created from MRI scans of the patient will be able to be rotated in mid-air to explain conditions. In some cities, hospitals, schools, and libraries are connected to these fiber networks at no cost, allowing doctors to treat school children without a trip to the hospital.

Conclusions

With any technology used for medical purposes, it can feel like there are more questions than answers. What is important is to make clear decisions and check the necessary boxes to ensure that your program will be successful. You should consult with all possible users of the program so that it can deliver a useful service. One of the quickest ways for a program to run into trouble is to say "no" when asked whether the program has an important, but overlooked, feature [12]. Also, you need to be realistic with scale and volume. Be sure that you do not over-buy technology such that the expense becomes onerous when trying to get started. The best platforms offer scalability, so you can grow your program as needed and keep the same technology.

Finding a partner that you can trust and that is interested in the success of your program is critical. Make sure that prospective vendors answer your question clearly and honestly and that they do not gloss over unfavorable facts. Any platform will have something that it does not do well. The best vendors will tell you what that is and how to overcome or work around it. Finally, do not be afraid to ask questions. Ask lots of questions and get answers to them that you are satisfied with. Nobody has ever said, "I asked too many questions in presales." There are innumerable examples of the opposite situation. With due diligence and careful planning, it should be possible to have a TM program that is highly rewarding to all who are involved.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

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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