



Sleep Telemedicine Implementation Guide 2

AASiM
American Academy of
SLEEP MEDICINE™

A resource guide updated by the 2020-2021
American Academy of Sleep Medicine Telemedicine
Presidential Committee

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Introduction

Welcome to the Sleep Telemedicine Implementation Guide 2, which is a companion to the 2015 American Academy of Sleep Medicine (AASM) [*Position Paper for the Use of Telemedicine for the Diagnosis and Treatment of Sleep Disorders*](#)¹ and the updated paper published in 2021.² This guide is designed to help your practice develop a telemedicine sleep initiative, evaluate current initiatives in which you or your organization might be involved, or just simply help in understanding various aspects of sleep telemedicine.

To use this guide successfully, certain readers may decide to read this text from beginning to end; whereas others may simply use the chapters or sections that are relevant to their specific questions. In addition, the reader can take advantage of the diagrams and worksheets included in this guide.

Several groups will find this guide of interest, including the following:

- 1) Sleep clinicians, in a variety of settings including solo/small practices, larger multispecialty groups, integrated healthcare systems, and other arrangements
- 2) Practice managers, support personnel, and administrative personnel affiliated with the aforementioned clinicians
- 3) Accredited sleep facilities and sleep-related treating entities (e.g., durable medical equipment (DME) companies)
- 4) Health care-related associations, organizations, payers, and regulatory agencies affiliated with the provision of sleepmedicine and/or telemedicine services

After reading this guide, the user should feel comfortable with developing and maintaining a sleep telemedicine program. An important component of any program plan is to monitor changes in laws, technology and financial aspects of telemedicine in order to update the program as needed.

What is Telemedicine?

Telemedicine is the provision of medical care through telecommunication technologies, delivered across a distance, either synchronously (in real-time) or asynchronously (separated by time).

Synchronous telemedicine refers to live interactions occurring in real-time between patients and providers, who are not located in the same physical space. A patient-provider visit conducted virtually through an electronic platform that allows the patient and the provider to see and hear each other in real time is an example of a synchronous telemedicine encounter. **Asynchronous** telemedicine services do not occur in real-time. Examples include reviewing positive airway pressure (PAP) data or interpreting home sleep apnea tests (HSATs).

Synchronous telemedicine includes two locations, the originating site where the patient is, and the distant site where the provider is. Initially, the originating site was another clinic or center, but the COVID-19 pandemic showed us that telemedicine need not be limited to medical centers—the originating and distant sites can be any safe, private location such as the patient’s home (originating site) or provider’s home office (distant site).

AASM Position Paper for the Use of Telemedicine

Increasing demand for the evaluation and treatment of sleep-related disorders necessitated innovative strategies to address workforce challenges. Therefore, the AASM Board of Directors convened a task force in 2014 to evaluate telemedicine as a potential mechanism to improve access to sleep care, culminating in the publication of the 2015 Position Paper, which assessed and defined the key features, processes, and standards for telemedicine specific to sleep medicine.¹ This position paper was not intended to include all aspects of telehealth but viewed telemedicine as a subset of telehealth applications. At that time, the task force noted that expansion of sleep telemedicine into all aspects of sleep disorders management was limited by technology, facility resources, reimbursement and other financial considerations, as well as the willingness of physicians, patients and health care organizations to accept telemedicine as an alternative to in-person visits. Since publication, increased acceptance by physicians and improvement in reimbursement from insurance, spurred on by the COVID-19 pandemic, led to augmented use of telemedicine in clinical care. Therefore, the AASM updated the position paper in 2021 to reflect these changes,² and this guide has been updated to include the lessons learned.

Telemedicine is a means of advancing patient health by improving access to the expertise of board-certified sleep medicine physicians. However, such access improvement needs to be anchored in attention to quality and value in diagnosing and treating sleep disorders. Telemedicine is also useful to promote professionalism through patient care coordination and communication between sleep medicine and other specialties. Many of the principles and key concepts adopted here are based on US industry standards, with special consideration given to the body of work by the American Telemedicine Association (<https://www.americantelemed.org/>) and abide by standards endorsed by the American Medical Association (www.ama-assn.org).

Practitioners who wish to integrate sleep telemedicine into their practice should have a clear understanding of the salient issues, key terminology and the following guidance from the AASM:

2015 Position Paper Guidance¹

- Clinical care standards for telemedicine services should mirror those of in-person visits, including all aspects of diagnosis and treatment decisions as would be reasonably expected in traditional office-based encounters.
- Clinical judgment should be exercised when determining the scope and extent of telemedicine applications in the diagnosis and treatment of specific patients and sleep disorders.
- Live interactive telemedicine for sleep disorders, if used in a manner consistent with the principles outlined in the position paper, should be recognized and reimbursed in a manner competitive or comparable with traditional in-person visits.
- Roles, expectations, and responsibilities of providers involved in the delivery of sleep telemedicine should be defined, including those at originating sites and distant sites.
- The practice of telemedicine should promote a care model in which board-certified sleep medicine physicians, patients, primary care providers, and other members of the health care team aim to improve the value of health care delivery in a coordinated fashion.
- Appropriate technical standards should be upheld throughout the telemedicine care delivery process, at both the originating and distant sites, and specifically meet the standards set forth by the Health Insurance Portability and Accountability Act (HIPAA).
- Methods that aim to improve the utility of telemedicine exist and may include the utilization of tele-presenters, who are sometimes referred to as patient presenters, local resources and providers, adjunct testing, and add-on technologies.
- Quality assurance processes should be in place for telemedicine care delivery models that aim to capture process measures, patient outcomes, and patient/provider experiences with the model(s) employed.
- Time for data management, quality processes, and other aspects of care delivery related to telemedicine encounters should be recognized in value-based care delivery models.
- The use of telemedicine services and its equipment should adhere to strict professional and ethical standards so as not to violate the intent of the telemedicine interaction while aiming to improve overall patient access, quality, and/or value of care.
- When billing for telemedicine services, it is recommended that patients, providers, and others rendering services understand different payer reimbursement rules, and that there be financial transparency throughout the process.
- As utilization of sleep telemedicine continues to expand, further research into the effect and outcomes of these applications is needed.

Additional Guidance for the Use of Telemedicine in Sleep Medicine (2021)²

- High quality, comprehensive sleep care can be provided via telehealth modalities, which are not limited by geographic boundaries.
- Synchronous telehealth visits may be performed in lieu of live in-person office visits if they mirror the live visits in quality and process and comply with all licensing, state, federal and HIPAA regulations for both originating and distant sites, even when both sites are located outside of the traditional office.
- Asynchronous telehealth modalities may be used to augment clinical care and access to sleep medicine services.
- A telemedicine program must maintain a culture of good patient safety encompassing professional accountability, risk assessment, risk management, and infection control, with special consideration for both the physical and psychological safety of the patient at the time of the telemedicine visit.
- Telehealth may play a vital role in preserving the continuity of sleep health, but advocacy for greater access to telehealth systems to reduce health disparities is needed.
- Moving forward, clinical pathways to diagnose and manage sleep disorders are needed to determine the best way to integrate in-person care with telemedicine, including the incorporation of data from sleep-specific and consumer-based technologies.

Building a Telemedicine Program

Starting a telemedicine program requires development of new procedures, capital outlays for new equipment, identifying the need and population for services, and training of new personnel. It should also include the communication of the telemedicine services provided to all stakeholders. Because there are several models that can be adopted, identifying the right model for your practice requires meticulous planning and preparation to ensure high-quality service and satisfaction with the telemedicine experience.

This guide describes the steps that will help in your planning, decision-making, preparation and implementation. These steps, described in greater detail in each subsequent section, represent a template that can be adjusted to your practice situation. The general steps to starting a telemedicine program are:

- Develop and document a telemedicine strategy
 - + Delineate the services you want to provide
 - + Identify your target audience
 - + Select a model, or mix, that is right for you:
 - Center-to-Home (C2H), Center-to-Center (C2C) or Out-of-Center (OOC) (*see page 14*)
- Identify hardware and software needs
- Identify personnel needs
- Evaluate financial considerations
 - + How do I get paid?
 - + How much does it cost?
- Understand the regulatory, legal and ethical considerations to practical implementation of telemedicine

Developing a Telemedicine Strategy

Efficient and productive telemedicine programs begin with a clear strategy for incorporating telemedicine services into routine clinical practice. Telemedicine practices can range from a traditional clinic model utilizing some store-and-forward technologies to a fully virtual model incorporating remote data monitoring with live, synchronous video visits, or any mix in between. Your own strategy should reflect the needs of your practice and the services you wish to provide, as well as the needs and comfort of your patients and those to whom you wish to provide services.

Considerations in developing a telemedicine strategy:

1. How does telemedicine fit into your practice?

Define your overall desires and pressures for providing telemedicine service(s).

Traditionally, telemedicine has been used to enhance access to care. As seen during the COVID-19 pandemic, not only can telemedicine be used to effectively provide care to geographically remote patients, it can also provide access to care during *times of limited access*, such as during quarantine periods. It is important for you to understand your goals for providing telemedicine services.

Though it requires slightly different skill sets than those used in a traditional exam room, telemedicine is particularly well-suited to the practice of sleep medicine, as most of the clinical visit can be performed through audio/video visits, and pertinent data can be obtained remotely. Your strategy for using telemedicine should include consideration of how it will best enhance your practice. Potential avenues for care delivery using telemedicine include:

- **Patient evaluation and management:** Telemedicine can be used for follow-up visits after establishing a relationship with a patient in person or may be used to conduct the initial evaluation along with ongoing care.
- **PAP management:** Initial setup of PAP devices can be performed remotely, as can troubleshooting problem-directed care. Remote data management and services offered via telemedicine modalities may improve adherence to therapy.
- **Sleep testing:** Assistance with setup of home testing devices as well as troubleshooting during testing can be performed through telemedicine systems.
- **Behavioral health services:** Cognitive behavioral therapy for insomnia and other behavioral health therapies have been shown to be equally efficacious when delivered remotely.
- **Patient education:** Remote learning strategies can be effectively utilized for PAP education. Patient support groups may also be offered on-line.
- **Consultation services:** Telemedicine may facilitate effective provider-to-provider communications.
- **Shared medical appointments:** Individualized care may be provided in a group setting utilizing telemedicine platforms.

As with any health care venture, you need to understand your reasons for using telemedicine and how it fits into the needs of your practice as well as with your personal and professional goals, both short-term and long-term.

2. Who is your target audience?

- Knowing who will use the service will influence decisions on equipment, technology, space, personnel and time.
- Will you be targeting patients only within your health care system or remote to your typical practice catchment area? Will you service patients within your state, outside your state or in foreign countries?
- Will this program be part of a contractual agreement with a specific employer or payer, a result of referral from remote providers or open to self-referred patients?
- Is the program available only to self-pay patients, those with commercial insurance or those with government insurance? If you are offering care to patients in foreign countries, you will need to ensure a method of receiving payment that is convenient to both you and the patients.
- Will you offer telemedicine services for new patient evaluations, follow-ups or a combination? Will you offer group visits or individual services?
- Will you offer other services through telemedicine besides physician visits with patients?

Programs servicing those with United States (U.S.) government-based insurance traditionally had to follow strict guidelines about technology and were restricted to the C2C model with the originating site being a healthcare facility in an underserved location. In 2020, The COVID-19 pandemic led to the waiver of these restrictions and allowed for C2H and OOC models, thereby providing care to patients residing anywhere in any state outside of the traditional clinic setting. In the 2021 Final Rule, the Centers for Medicare & Medicaid Services (CMS) ruled that it does not have the power to permanently waive these restrictions without Congressional legislation. Therefore, you should continue to monitor updates from governmental agencies to ensure compliance with regulations.

Requirements for programs servicing those with commercial insurance are more varied and often allow the use of less restrictive systems that connect the sleep physician directly to the patient via technology (C2C, C2H, or OOC systems). Providers offering care to patients in other countries should ensure adherence to both U.S. and foreign regulations.

Early determination of your target audience will help direct your decisions about the design of the program.

Models of Care

Traditional

The patient goes to a **medical center** to see the provider for an **in-person** visit.



Medical Center

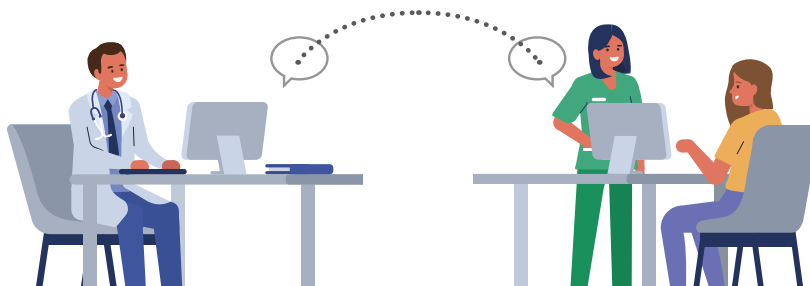


Center-to-Center (C2C)

The provider at **Medical Center A** sees a patient at **Medical Center B** via **telemedicine**.



Medical Center A



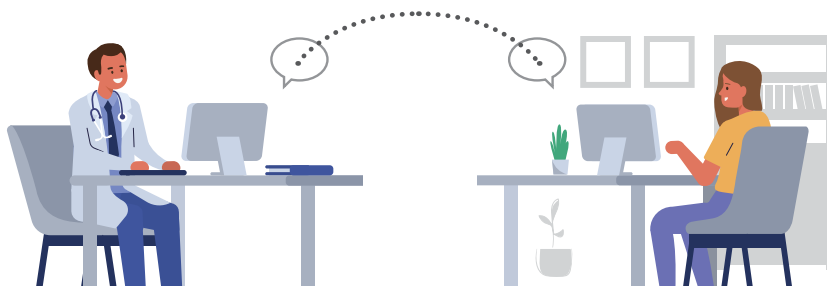
Medical Center B

Center-to-Home (C2H)

The provider at a **medical center** sees a patient at a **location of the patient's choosing** [e.g., their home] via **telemedicine**.



Medical Center



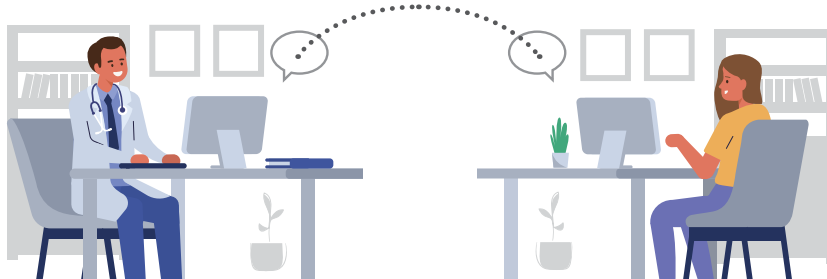
Home

Out-of-Center (OOC)

Both the provider and the patient are at a **location of their choosing** and conduct a visit via **telemedicine**.



Office



Home

3. Understanding Center-to-Center, Center-to-Home, and Out-of-Center models

Center-to-Center (C2C):

This model uses an originating site, typically a medical office or clinic where the patient & equipment are located, and a distant site, typically the provider's clinic/office. A tele-presenter facilitates the patient's interaction with the center's audiovisual equipment and can introduce additional technologies.

The key advantages to the **Center-to-Center (C2C)** model of care include: (1) closest approximation to a traditional in-clinic visit that often facilitates workflow and office coordination during program startup, but also may be important for billing purposes; (2) utilization of a presenter and additional clinical tools may increase the breadth of the physical examination and overall assessment and (3) technical resources such as high-quality audiovisual equipment and signal strength, often greatest with this modality, may facilitate a smooth and effective visit, contributing to patient and staff satisfaction.

However, key disadvantages of C2C include: (1) identification of a distant site and negotiation of an agreement is required to participate; (2) often higher space, equipment and personnel costs (3) less convenience for patients because they must come to the originating site and (4) reimbursement may be different from traditional office visits.

Center-to-Home (C2H):

This model uses the patient's own technology (laptop, tablet, cell phone, etc.) from wherever the patient chooses to access your system.

With the **Center-to-Home (C2H)** model, there are key advantages to the patient using his or her own technology, including: (1) lower implementation costs for the center since space and equipment are not needed for the originating site; (2) easier patient access as patients can use the system from wherever they are and (3) familiarity of patients with their own technology.

However, several key disadvantages for C2H models worth noting include: (1) greater diligence needed in maintaining privacy and patient safety; (2) potential lack of personnel or tools (e.g., magnifying cameras, stethoscopes) to facilitate the visit; (3) variation in signal quality depending on the patient's technology; (4) reimbursement may differ from traditional office visits and (5) identification of patient location at the time of the visit is important to ensure state licensing requirements are met.

Out-of-Center (OOC):

This model uses the patient's and provider's own technology (laptop, tablet, cell phone, etc.) from wherever they choose to access the telemedicine visit.

The **Out-of-Center (OOC)** model offers all the advantages and disadvantages of the C2H model. Additional key advantages include: (1) even lower implementation costs as space and equipment are also not needed for the distant site as it can be done from any private location that the *provider* is at; (2) ease of access for the *provider* also; (3) familiarity of *providers* with their own equipment and technology and (4) limiting spread of communicable diseases.

Additional key disadvantages include: (1) more diligence needed to ensure HIPAA compliance and (2) higher likelihood of technical difficulties or problems with connectivity affecting signal quality, dependent on both provider and patient technologies.

Advantages and Disadvantages of Telemedicine Models:

Telemedicine Model	Center-to-Center (C2C)	Center-to-Home (C2H)	Out-of-Center (OOC)
<p>Advantages</p> <p>⊕</p>	<ul style="list-style-type: none"> + Most similar to in-person visit + Utilization of personnel and diagnostic tools + Reliable and high-quality technology 	<ul style="list-style-type: none"> + Implementation costs lower + Ease of patient access + Patients familiar with own technology 	<ul style="list-style-type: none"> + Implementation costs lower + Ease of access for patient and provider + Patients and providers familiar with own technology + Least exposure to communicable diseases
<p>Disadvantages</p> <p>⊖</p>	<ul style="list-style-type: none"> - Agreement with distant site is required - Higher equipment and personnel costs - Less convenient for patients - Reimbursement may be different from traditional office visits 	<ul style="list-style-type: none"> - Privacy more difficult to control - Less availability of tools or tele-presenters - Variable signal quality/reliability - Differences in licensing requirements if practicing across state lines - Reimbursement may be different from traditional office visits 	<ul style="list-style-type: none"> - Privacy more difficult to control, needed at both distant and originating sites - Less availability of tools or tele-presenters - Variable signal quality/reliability - Differences in licensing requirements if practicing across state lines - Reimbursement may be different from traditional office visits

4. Choosing the Right Model for You

Early telemedicine services modeled the traditional clinic visit through C2C arrangements. However, the COVID-19 pandemic effectively showed us the value of the C2H and OOC models, as many practices quickly adopted them out of sheer necessity, and afforded experience and some level of comfort for both providers and patients. Going forward, whether continuing or expanding telemedicine services, or implementing a telemedicine program for the first time, the aforementioned considerations should influence your decision on which model, or mix of models, is right for you.

Having identified your practice needs and goals, determine what regulations govern telemedicine programs for your target population. The current waivers of traditional U.S. government-based insurer restrictions on telemedicine may or may not continue, so it is important to stay abreast of potential future changes. State regulations provide oversight for commercial insurers and most leave it to the payer to authorize program types, making them more amenable to C2H and OOC programs. Self-pay services, which have previously been C2H programs but can readily be expanded to include OOC programs, must meet country and state telemedicine regulations for both patient and provider locations and abide by federal patient confidentiality rules. If providing telemedicine services to patients outside of the U.S., it is important to adhere to the regulations of the country that care is being offered to, in addition to U.S. federal and state regulations.

Next, consider the limitations inherent to each of the models (C2C, C2H, and OOC). For example, while you may be able to perform a relatively full physical examination in a C2C model, the physical examination is much more limited in the C2H and OOC models because additional tools such as stethoscopes, tongue depressors, magnifiers or even additional lighting sources may not be available. If a good physical exam is important to you, such as when an upper airway evaluation is required to determine eligibility for upper airway surgery, you may consider a C2C model, or develop guidelines in a C2H or OOC model for when a patient should come into the clinic for evaluation. If telemedicine is offered for geographical inaccessibility (i.e., the patient is at a great distance and unable to come to the clinic), then you may need to establish relationships with providers in the patient's local area who can provide additional needed services (refer to cases later in this guide). Regardless of the telemedicine model or platform, you should have a contingency plan if either the patient or provider is unable to connect. Telephone visits may be used as a contingency plan, but as they do not include video, may not be reimbursed in the same manner as telemedicine visits.

If you decide to offer a C2H or OOC program, then the basic tenets outlined earlier should be met. The patient must first consent to the virtual visit in lieu of a traditional office visit, and the meeting should be secure, private and HIPAA-compliant. Although primarily the patient's responsibility, the provider should ensure privacy at the beginning of the visit.

Patient identification should be verified either through the portal used (patient identification scanned in during registration and verified prior to the visit) or directly by the treating provider during the visit. The photo identification presented should match the patient to the satisfaction of the provider. The patient's location and consent should also be documented for licensing requirements and in case emergency systems are needed during the visit (e.g., acute medical or mental health emergency is witnessed by the provider during the visit, necessitating a 911 response).

After identification and patient location have been verified, the visit occurs in a manner similar to a traditional clinic visit. PAP data can be viewed remotely from many devices during or prior to the synchronous telemedicine visit. And upon completion of the visit, follow-up should be arranged, through web-based scheduling systems or via the physician's scheduling staff.

C2H or OOC modalities may be ideal for patients who have limited mobility, are professional motor vehicle operators or travel frequently for work, reside in remote geographical locations (if connectivity is available), are at-risk patients who wish to avoid contact with other patients or staff, or for any patient who desires to have a telemedicine visit in their home.

If at any time the provider or patient think that a telemedicine interaction is inappropriate (e.g., while the patient is driving, or in a crowded location with lack of privacy), they have the right and obligation to communicate this and stop the telemedicine encounter in favor of a traditional clinic visit. This decision can be made at any time during the encounter and should be documented in the visit notes.

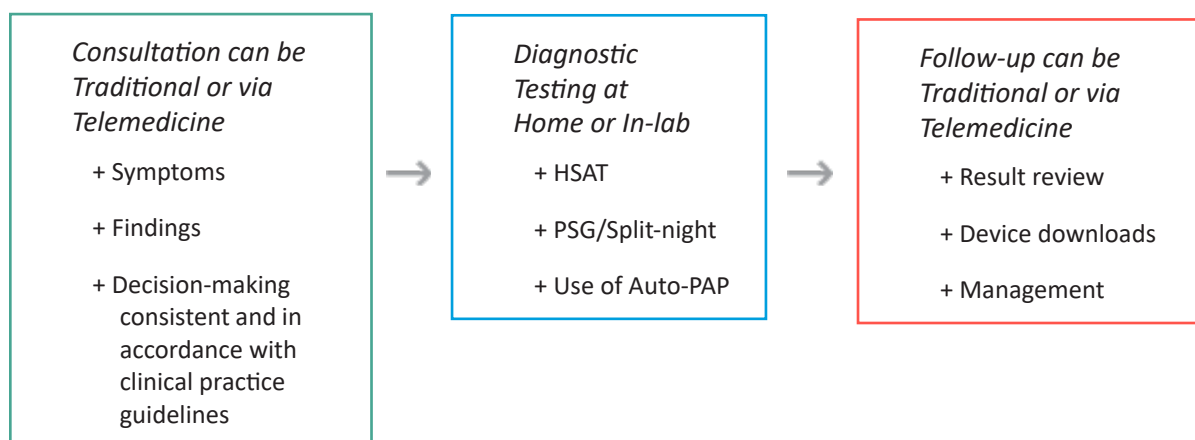
Essential to a successful telemedicine program is pre-planning why and how you will implement your program. Evaluate your current program to see if there is a need and how telemedicine will best fit into your current workflow, patient mix and practice strategy. Once you understand your current practice, you can decide whether or how introducing or expanding telemedicine services will benefit your practice.

Developing a Workflow Plan

When one embarks on a telemedicine outpatient practice, it can be challenging to understand where patients are being serviced and who may be responsible or accountable for specific roles or interventions. Drawing up a plan can be very helpful to understand the overall schematics of the program you design and will help you and others with the other steps in this document. Key considerations to note include:

1. Consider your current sleep market, including the conditions most commonly being treated, and common pathways, algorithms and resources currently used. Where do most patients in your practice come from, where do they go for other diagnostic and treatment purposes, and how often, as well as when and where do they follow-up with you and your office?
2. Is the care coordination done through your office and staff, and does the staff have the training and capacity to handle calls through this arrangement? Determine need, if any, for additional personnel and identify if any training will be required in the telemedicine platform and procedures.
3. Research the equipment and software needed, the location(s) involved and the costs associated with these factors.
4. Factor in your own time, expense, and capacity to integrate telemedicine into your practice. Will the net result of all the aforementioned steps likely lead to a real and/or perceived benefit?
5. Provide a visual guide for how patients will flow from point of referral through testing and follow-up.

Sample Workflow for Patients with Obstructive Sleep Apnea



Understanding Hardware and Software Needs

Telemedicine should complement one's practice, not interrupt or complicate it. Accordingly, telemedicine equipment should be readily available in the clinical practice areas as much as possible. Determining equipment needs for telemedicine should be a collaborative process among the clinical providers and Information Technology (IT) staff. For instance, clinic staff may require a cardiopulmonary evaluation to fully assess a patient, necessitating an electronic stethoscope in a C2C model. With that feedback, IT staff can choose an electronic stethoscope that integrates with currently available technology or may decide software upgrades may be necessary to provide appropriate care measures delineated by the care team. For measurements requiring contact with the patient, you can have the patient collect the information and transmit it to you, including: height, weight, neck circumference, pulse rate and blood pressure. Some measurement may require the patient to purchase medical devices, such as an oximeter or blood pressure cuff. Consumer technologies, such as smart devices that can measure blood pressure, pulse or even EKG, could be incorporated into visits, if available. Digital questionnaires and remote PAP download data may also be used and incorporated into the virtual visit. Hardware and software needs should be re-evaluated as new technologies evolve.

IT staff are integral to a successful telemedicine team. Access to supportive and knowledgeable IT staff is indispensable in developing and using telemedicine, and a business associate agreement may be necessary if working with an outside technology vendor. The technical staff needs experience to troubleshoot, make technical adjustments and to acquire suitable authorizations to make network changes, as necessary. An IT point person is ideal in helping integrate and provide support for telemedicine. Introducing IT personnel between sites may improve ease of technical troubleshooting between sites. Also, IT staff should be well-versed in all the software, hardware and networks associated with telemedicine to prevent issues with incompatible technology prior to launching a telemedicine program.

When implementing telemedicine, the provider should be familiar with the equipment and any software platforms used. You should have a plan for data storage which is HIPAA-compliant, if outside of the electronic health record. Technical support should be available if necessary. An alternative should be available, if the telemedicine equipment fails, to facilitate or reschedule the visit. This alternative plan should be prepared prior to a failure.

Five hardware and software areas that should be assessed prior to implementing telemedicine:

1. **Identify the ways in which telemedicine will be used** – Will telemedicine be used to provide live visits following a C2C, C2H, OOC model or primarily as a store-and-forward type of telemedicine? Or a combination of all these services?
2. **Determine the type of equipment needed for proper assessment** – For example, do you require separate technology to assess airway anatomy for sleep apnea evaluation?
3. **Assess existing hardware and software available** – Choosing technology complementary to current systems should reduce cost and improve ease of incorporating telemedicine into the practice.
4. **Assess storage capacity** – Will data be stored in your electronic health record or in a separate stand-alone, secure, HIPAA-compliant location?
5. **Evaluate financial resources** – What resources are needed to acquire and implement necessary components for telemedicine (including budgeted finances to maintain the equipment)?

Consultation with administrative, clinical and IT staff may help in answering the considerations outlined in this section.

Data Transmission:

Equipment used for telemedicine may vary considerably, but one of the most important considerations when evaluating telemedicine equipment centers on security. Data should be transmitted and stored in compliance with HIPAA regulations. Transmission of telemedicine data may occur in several different ways, and it is important to carefully weigh the pros and cons of each before selecting the best option.

	Pros	Cons
Dedicated institutional or home Broadband networks (T1, T3, dedicated fiber, etc.)	<ul style="list-style-type: none"> • Easy to incorporate additional groups and users • Safe and secure • Dedicated internet line • Guaranteed speed • High reliability 	<ul style="list-style-type: none"> • Requires contracts • Expensive • Limited availability in remote areas
Consumer High-Speed internet (cable or DSL internet)	<ul style="list-style-type: none"> • Less expensive • Easy availability • Good for C2H or OOC visits 	<ul style="list-style-type: none"> • Shared internet connections, makes it less reliable • Less secure
Mobile Broadband 4G LTE or 5G (smart phone)	<ul style="list-style-type: none"> • Easy availability on handheld devices • Mobility (accessible from any location not restricted to a particular site) • Cheapest for provider • Best suited for OOC and C2H visits 	<ul style="list-style-type: none"> • Signal strength is a major issue • Potentially least secure
Audio only connection between provider and patient, (landline telephones or cell phones/tablets etc. without camera or video capabilities) *	<ul style="list-style-type: none"> • High quality audio 	<ul style="list-style-type: none"> • Audio only (no video) • May not be reimbursed after the public health emergency (PHE)

*Audio only transmission, without video, does not meet criteria for synchronous telemedicine service and should not be billed as such.

Telemedicine Platform Options:

Multiple telehealth platform options exist, ranging from stand-alone systems exclusively for telemedicine encounters to 2-way audio-visual systems embedded within electronic health records (EHR). Even mobile app versions are available. Regardless of the type of telemedicine platform used, it is important to ensure these are non-public facing (i.e., only allow intended parties involved in the remote communication to join and restrict any uninvited third parties from joining), are HIPAA compliant, and have end-to-end encryption. Listed below are the basic types of telemedicine platforms:

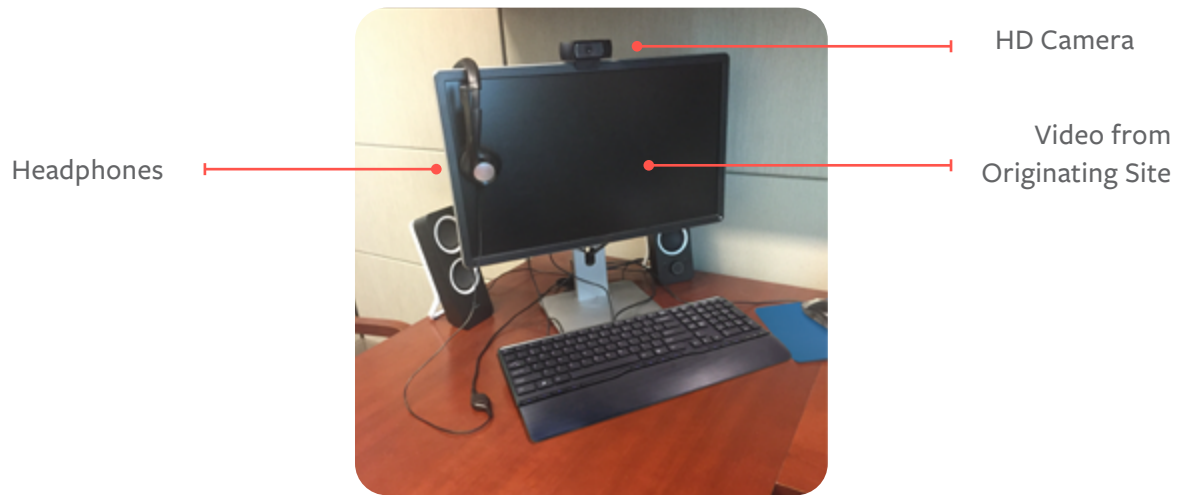
1. **Electronic Health Record (EHR):** Most EHRs have a telemedicine module embedded within their system or are actively working to incorporate one. Inquire with your EHR vendor regarding availability, pricing, and process for deploying. If one is not already built-in, they may recommend a vendor who works with their system.
2. **Telemedicine provider:** There are multiple telehealth companies that you can contract with to provide this service for your practice, including the AASM Sleep™ program. Your center can work entirely within their system or develop a method to transfer data to your EHR.
3. **Chat-based telehealth tools:** Stand-alone systems for synchronous and asynchronous communication allow audio-visual discussions between the center personnel and the patient. These can be utilized for C2C, C2H and OOC systems.
4. **Remote monitoring:** Personal health data can be monitored remotely through wearable technologies, PAP device downloads, digital tracking tools, etc. Some HSAT devices may allow for live, synchronous monitoring of the patient through Bluetooth while others offer more store-and-forward type technologies.

Checklist of Factors in Designing the Telemedicine Environment					
		Traditional Clinic Model	C2C	C2H	OOC
PHYSICAL	Patient Room	X	X		
	Provider Space	X	X	X	
	Audio/Video Equipment		X	X	X
	Examination Equipment [(tele-) stethoscope, oral light, etc.]	X	X		
DIGITAL	Internet Connection		X	X	X
	Data Transmission		X	X	X
	Software (HIPAA-compliant, non-public facing)		X	X	X
SUPPORT PERSONNEL	Clinic Staff	X	X	X	±
	Tele-presenter		X	±	±

X = Required

± = Optional

Equipment set-up example (C2C):



HD Camera

Headphones

Video from
Originating Site

Distant Site

Originating Site



HD Camera

“Shared”
data Screen

Video from
Distant
Site

Electronic
Stethoscope

Portable
Camera

Practical Considerations for Successful Telemedicine Practices:

Equipment and Personnel

Identify and obtain proper equipment needed for a telemedicine visit – video camera (on a desktop, laptop computer, tablet, or smartphone), microphone, high speed internet connection and good lighting at the distant site. Evaluate if existing equipment can be utilized effectively for delivering care through telemedicine or if new equipment purchases are needed. Budget accordingly.

Identify a HIPAA-compliant platform that can be used for telemedicine visits.

Assess differences in connectivity and equipment between different sites involved.

Establish back-up systems in case your primary telemedicine platform fails; this may require additional budgeting of resources.

Identify Personnel and Staff resources needed to help patients prior to or during a telemedicine visit. These could include tele-presenters, translator services, nursing staff, respiratory therapists, medical assistants, social workers, sleep technologists, etc. Consider how these may be incorporated into the telemedicine model.

Develop an education and training plan for competency of personnel.

Maintenance and Quality control

Test equipment thoroughly prior to use and develop detailed workflows and training opportunities for providers during both the initiation and continuation phase of the telemedicine program.

Monitor performance of the telemedicine program at regular intervals to reduce the incidence of technical problems or visit failures.

Create a plan to evaluate and monitor service usage, patient and provider comfort levels with the technologies used, and cost analysis. Continue ongoing training and education as technologies evolve.

Review contingency plans routinely in case of failure of primary telemedicine platforms and update as necessary.

Understand requirements for upgrading resources and identify costs associated with upgrades.

Review available technologies regularly to ensure a high-quality experience during the telemedicine encounter for both staff and patients.

Ensure your program complies with accreditation standards from the AASM or other accrediting bodies.

Routinely monitor changes in the laws, regulations, and payment policies.

Business Aspects of Telemedicine

In addition to excellent clinical care, a successful sleep telemedicine program depends on financial feasibility at its inception and income sustainability over time. Systematic analysis of many factors is essential to balance anticipated expenditures with potential income, as summarized in the following figure:



An early decision point when projecting your program’s financial viability is whether you will use a C2C, C2H or OOC model. Although more equipment and personnel are required for C2C systems, these investments may also allow expanded reimbursement potential (*see Sustainable Income section*). In the following discussion, we will highlight items specific to each model.

Expenditures:

Anticipated expenditures can be divided into two categories: single (i.e., one-time) and operating (i.e., ongoing) expenses.

Initial Capital Expenses:

Initial capital investment will vary depending on the model pursued. The C2C model will require the most substantial investment in technological infrastructure. Key start-up components include:

- Video cameras at both the distant site and the originating site
- HIPAA-compliant, encrypted software allowing video transmission
- Tele-stethoscope at the originating site with headphones at distant site (C2C)
- Mobile examination camera (C2C)

Purchasing a telemedicine console, or cart, that combines these tools may be convenient, but costs vary substantially, depending on vendor, brand, and capabilities. Equipment rental may be available depending on vendor and locality.

Operating Expenses:

After necessary equipment has been purchased, several operating cost sources (i.e. “overhead” should be considered:

- Space at distant site and space at originating site (C2C)
- A tele-presenter at the originating site (C2C); this individual could be a nurse, technician or medical assistant who ensures data integrity, distributes questionnaires, and serves as the distant provider’s “hands” during the visit.
- Another sleep-trained staff member for positive airway pressure (PAP) and HSAT set-up and remote monitoring of adherence.
- Medical licensing for out-of-state originating site(s) or patients
- Advertising near the originating site or desired area for expansion

In practices already functioning at or near maximum capacity, you may want to project potential *lost* in-person clinic revenue during telemedicine clinics and balance potential financial gains. Examples of possible losses in revenue include:

- Telemedicine visits may not be reimbursed at parity with in-person visits (see *Sustainable Income* section).
- Sleep studies, that otherwise meet criteria for in-laboratory testing, may be converted to HSAT due to logistical constraints.
- Sleep facilities near the patients’ originating site may be used, decreasing revenue at the provider’s laboratory.

Income:

Analogous to single and operating expenses, revenue should be considered in terms of start-up and sustainable income.

Start-up Funding:

Financial support to start a program varies widely depending on setting (hospital system center vs. independent practice) and geography (urban vs. rural). Some funding sources include:

- Annual budget through an affiliated hospital/medical center system
- Income surplus from within the sleep facility
- External grants from state, federal and/or private entities

Although external grants are not reliable sources of long-term funding, they can be useful in offsetting initial costs. Telemedicine programs incorporating rural originating sites are particularly likely to access this funding (see [Telemedicine Supplemental Resources](#) for grant-related resources).

Sustainable Income:

Reimbursement for service rendered is the cornerstone of long-term revenue (see [Telemedicine Supplemental Resources](#) for additional online resources). Primary sources include: (1) Medicare, (2) Medicaid, (3) private insurers and (4) patients' out-of-pocket fees.

1. Medicare

Traditionally, Medicare excluded home-based telemedicine and only reimbursed real-time video teleconferencing (C2C) when the originating site was in a health professional shortage area, as defined by the US Office of Management and Budget (see [Telemedicine Supplemental Resources](#) for online tools to identify health professional shortage areas).

These restrictions significantly limited patient eligibility and precluded routine use of telemedicine by practitioners. During the COVID-19 pandemic, CMS expanded telemedicine benefits on a temporary and emergency basis under the 1135 waiver authority and Coronavirus Preparedness and Response Supplemental Appropriations Act. This waiver allowed reimbursement for telemedicine services to patients all over the country, regardless of location, including into patients' homes. It is unclear how long these waivers will continue, or what the reimbursement model will look like as guidelines change. Therefore, it is important to stay abreast of changes directly through the CMS; (see [Telemedicine Supplemental Resources](#) for CMS guidelines and updates).

Presently, CMS classifies telemedicine services into 3 broad categories:

- **Medicare Telehealth Visits:** utilizing synchronous audiovisual telecommunication systems to conduct visits that mimic traditional clinic visits, these visits are considered by CMS to be the same as traditional in-person clinic visits. They are paid at the same rate as traditional in-person clinic visits using the same Evaluation and Management (E/M) codes for the same level of service, followed by the telehealth modifier (-95, POS Code 02 or GT).
- **Virtual Check-ins:** brief technology-based communications between established patients and their providers; can be synchronous (e.g., via telephone) or asynchronous (e.g., secure text messaging, email) and include transmission of images or videos. These are often used to decide if a full visit with a provider, or other service, is needed.
- **E-visits:** asynchronous, patient-initiated communications with providers using online patient portals.

SUMMARY OF BILLABLE CMS TELEHEALTH SERVICE

Type of Visit	Description	Type of Patient	Who can bill for it?	Billing/Coding
<i>Medicare Telehealth Visit*</i>	Provider-patient visit mimicking traditional office visit while utilizing synchronous (real-time) audio-visual communications	NEW** or ESTABLISHED	Only providers who can bill Medicare independently (e.g., physicians, nurse practitioners)	<p>99202 - 99205: Office/outpatient visit, new pt Or</p> <p>99211 – 99215: Office/outpatient visit, established pt + <i>telehealth modifier</i></p> <p>G2211: <i>Visit complexity inherent to E/M (implementation delayed until 2024)</i></p> <p>G2212: Prolonged services; each additional 15 minutes</p>
<i>Virtual Check-In</i>	Brief communication over phone, secure message, etc. ± transmission of data (e.g., image, video); must be initiated by the patient, not related to E/M service or procedure in preceding 7 days or following 24 hours (or next available)	ESTABLISHED	Only providers who can bill Medicare independently (e.g., physicians, nurse practitioners)	<p>HCPCS G2012: Brief communication between patient and provider (5-10 min)</p> <p>HCPCS G2010: Remote evaluation of recorded video and/or images (e.g., store and forward) submitted by an established patient (5-10 min)</p> <p>HCPCS G2250: <i>Remote assessment of recorded video and/or images (e.g., store and forward) submitted by an established patient (billable by QHP who cannot bill E/M)</i></p> <p>HCPCS G2251: <i>Brief communication technology-based service (virtual check-in) by a QHP who cannot report E/M services</i></p> <p>Applicable for 2021, long-term status unclear</p> <p>HCPCS G2252*: Brief communication technology-based service (virtual check-in) of 11 – 20 minutes (can include audio-only communication)</p>

*CMS expanded services to include this type of service during the COVID-19 pandemic and made these permanent in the FY21 Final Rule.

**Although section 1135(g)(3) of the waiver requires an established provider-patient relationship, the Department of Health and Human Services (HHS) announced that it will not conduct audits to check if a prior relationship existed for claims submitted during the public health emergency (PHE).

Type of Visit	Description	Type of Patient	Who can bill for it?	Billing/Coding
<i>E-visit</i>	Asynchronous, patient-initiated communications with providers using online patient portals; initiated by patient. NO real-time face-to-face care provided	ESTABLISHED	Any provider who can bill Medicare independently + Qualified non-physician healthcare professional who cannot bill Medicare independently (e.g., clinical psychologists)	For independent providers: 99421: 5-10 minutes 99422: 11-20 minutes 99423: 21+ minutes For non-independent practitioners: G2061: 5-10 minutes G2062: 11-20 minutes G2063: 21+ minutes
<i>Telephone Visit***</i>	Synchronous, audio-only communication; not related to E/M service or procedure in preceding 7 days or following 24 hours (or next available)	ESTABLISHED	Any provider who can bill Medicare independently + Qualified non-physician healthcare professional who cannot bill Medicare independently (e.g., clinical psychologists)	99441: 5-10 minutes of medical discussion 99442: 11-20 minutes 99443: 21+ minutes

***When telephone visits are performed, use the appropriate codes, shown in the table. Check with your payers before performing phone visits to ensure they are covered services, as CMS has not proposed to continue reimbursement beyond the PHE without Congressional legislation.

Telehealth-specific codes (modifiers added to E/M services to indicate care delivered via telemedicine)

Modifier	Description
95	Synchronous Telemedicine Service Rendered via a Real-Time Interactive Audio and Video Telecommunications system
GT	Via Interactive Audio and Video Telecommunications systems (now only used for institutional claims that cannot bill for a POS)
GQ	Via Asynchronous Telecommunications systems (can only be reported by distant sites in Alaska or Hawaii)

Although not technically modifiers, Place of Service (POS) codes are used on professional claims to specify the entity where services were rendered. Effective January 1, 2018, CMS eliminated the requirement to use a GT modifier on professional claims for telehealth services, as use of the telehealth POS Code 02 certifies that the service meets the telehealth requirements. The GT modifier is still required for distant site services billed under Critical Access Hospital (CAH) method II on institutional claims.

Physicians and practitioners who bill for Medicare telehealth services during the public health emergency should report the POS code that would have been reported had the service been furnished in person. This will allow CMS systems to make appropriate payments for services rendered via Medicare telehealth which would have been provided in person, if not for the public health emergency.

2. Medicaid

Similar to private insurer parity laws, Medicaid coverage for telemedicine visits is state-specific. Additionally, individual states put restrictions on which type of telemedicine visit can be covered (i.e., real-time video telemedicine visit only).

3. Private Payer

Coverage rules vary based on the originating site's state. Most states require that payers reimburse telemedicine visits the same as (at parity with) in-person visits based on E/M coding rules (see [Telemedicine Supplemental Resources](#) to access current, state-specific reimbursement policies).

For reimbursement details from specific third-party payers, it is best to check with those entities directly.

4. Patients' Out-of-Pocket Fees

There is evidence that patients are willing to pay out-of-pocket costs for telemedicine services. Nevertheless, viability of this funding source depends on careful analysis of the population served. Additional expenditures may be incurred due to enhanced marketing, advertising, and direct-to-patient billing.

Although many of these financial considerations are not unique to sleep telemedicine, they are particularly relevant to new clinic development. Costs and reimbursements vary substantially among and within states, making these considerations just as helpful in formulating strategic questions as furnishing their answers. The case study that follows illustrates how to leverage the aforementioned resources and utilize cost analysis tools to inform implementation.

Sleep Business Practice Case Study: Telemedicine or Satellite Clinic?

Introduction:

A board-certified sleep medicine physician in Georgia wants to expand her practice over a wider geographic region, including nearby Tennessee and Alabama. Instead of opening conventional satellite clinics, she considers using telemedicine. The physician inquires about the financial feasibility of this strategy in comparison to in-person satellite clinics.

Questions to Consider:

How will my costs compare if I utilize telemedicine versus satellite clinics?

Satellite clinics are staffed in-person by clinical personnel who travel from a central, parent facility for designated patient care sessions. These medical professionals may include physicians, advanced clinical practitioners, and nurses. Utilizing satellite clinics typically obviates the need for telemedicine and mimics more traditional health care delivery at the providers' primary facility.

There are two overarching telemedicine provision options, C2C or C2H/OOC. C2C programs can potentially see all patients as a satellite clinic. C2H/OOC were historically restricted to non-Medicare patients due to CMS reimbursement limitations, but this changed during the COVID-19 emergency and may or may not persist in the future. Several costs are common to these programs, whereas others are unique to the paradigm chosen (*See the cost source comparison*). In either case, actual cost amounts are highly site-specific; the physician used a cost analysis worksheet to estimate her monthly costs for possible scenarios. (*See the sample cost analysis worksheet*).

How would I get reimbursed for telemedicine? Do Georgia, Alabama and Tennessee's private payers pay for telemedicine visits at parity with in-person visits? How do Medicaid rules compare among the states?

To understand telehealth policies the physician checked with the private payers in the desired states and learned that Georgia and Tennessee require private payers to reimburse telemedicine visits just as they do in-person visits, if real-time video teleconferencing is used. At the time, Alabama did not have such a law, making reimbursement less likely. She also learned about state-specific stipulations for Medicaid coverage. For instance, Alabama and Georgia required written consent from the patient for reimbursement, whereas Tennessee did not. Providers should check payer and state websites frequently for updates.

Would Medicare cover my telemedicine patients?

Medicare coverage rules remain complex, so the physician visited the CMS website ([cms.gov](https://www.cms.gov)). She found that, during the pandemic, CMS was waiving requirements and authorizing use of telehealth for all areas during the emergency. Previously she would have had to use the [Medicare Telehealth Payment Eligibility Analyzer](#) to check if she could offer telemedicine services to potential clinic sites or patient locations.

She then reviewed appropriate coding for telemedicine visits by reviewing CMS's List of Telehealth Services.

Cost Analysis Worksheet:

	C2H Telemedicine (\$)	C2C Telemedicine (\$)	In-Person Satellite Clinic (\$)
Monthly Revenue	New patient visit reimbursement	+ _____	+ _____
	Follow-up visit reimbursement	+ _____	+ _____
	HSATs	+ _____	+ _____
	PSGs	+ _____	+ _____
	Remote Adherence Monitoring	+ _____	+ _____
	Other	+ _____	+ _____
TOTAL REVENUE		+ _____	+ _____
Monthly Costs	Clinic space	N/A	- _____
	Telemedicine technician/presenter	N/A	- _____
	Other staff	N/A	- _____
	Practitioner travel	N/A	N/A
	Staff travel	N/A	N/A
	Software platform	- _____	- _____
	Public awareness/advertising	- _____	- _____
	Lost new in-person visits at primary clinic ^a	- _____	- _____
	Lost follow-up in-person visits at primary clinic ^a	- _____	- _____
	Lost HSATs from primary clinic ^a	- _____	- _____
	Lost PSGs from primary clinic ^a	- _____	- _____
	Other	- _____	- _____
Single Costs	Web camera	- _____	N/A
	Telestethoscope	N/A	N/A
	Interoral camera	N/A	N/A
	Other	- _____	- _____
TOTAL COSTS		- _____	- _____
NET GAIN/LOSS		_____	_____

^a Applies to practices already at or near maximum capacity. Other practices may indicate "\$0."
HSAT = home sleep apnea test; **PSG** = polysomnogram.

Cost Source Comparison:

Cost Source	Telemedicine C2H	Telemedicine C2C	Satellite Clinic
Medical licensing (AL, GA, & TN)	X	X	X
Clinic space		X	X
Clinic staff		X	X
Public awareness/advertising	X	X	X
Telepresenter		X	
Video camera (one-time cost)	X	X	
Tele-stethoscope, portable oral camera (one-time costs)		X	
Software (HIPAA compliant & encrypted; one-time cost)	X	X	
Travel			X
Lost revenue during transit			X

X = Present | C2C = Center to Center | C2H = Center to Home | HIPAA = Health Insurance Portability and Accountability Act.

After familiarizing herself with reimbursement strategies (including rural medicine grants) and potential costs in each of the three states, the board-certified sleep medicine physician pursued a telemedicine program only within Georgia. She then began logistical planning for her new program.

Regulatory, Legal and Ethical Considerations in Implementation of Telemedicine

The first practical consideration in enacting telemedicine is to investigate state laws regarding telemedicine practice. State-specific telemedicine policies differ in many ways but can be summarized into five main areas: out-of-state practice licensure requirements, physician-patient encounters, tele-presenter requirements, informed consent, and e-prescribing.

It is important to understand state licensing requirements for practicing telemedicine (see [Telemedicine Supplemental Resources](#) to access state-specific licensing requirements). Some states allow reciprocity for bordering states, physician-to-physician consultation exemptions and conditional telemedicine licenses. Patient location should be verified at the start of each patient visit.

States have also instituted telemedicine policies pertaining to activities before, during and after a patient encounter. For instance, some states mandate an in-person visit in addition to evaluation via telemedicine. Other states mandate policies distinct to telemedicine compared to in-person visits.

State policies regarding use of telemedicine can affect the provider's licensure and permissibility to practice medicine.

States vary on presence of tele-presenters and type of tele-presenters available. Some states require the tele-presenter be a licensed health care provider and be available in the room with the patient; whereas others only require a health care provider be available on the premises, and the least stringent states do not require a tele-presenter.

Informed consent can be the most variable policy from state to state when referencing telemedicine. Some states do not require informed consent preceding a telemedicine encounter, whereas some require a written acknowledgment from the patient.

States have policies regarding internet prescribing as well, especially when prescribing occurs out of state. Both the medical and pharmacy boards of each state can dictate policies regarding internet prescribing, and these should be assessed and reviewed by physicians pursuing implementation of telemedicine programs.

As mentioned in the 2021 AASM guidance on the use of telemedicine,² telemedicine providers should be familiar with, and adhere to, federal standards regarding real or perceived conflicts of interest, including receiving or providing services solely to induce referrals or providing free equipment.

Malpractice should cover telemedicine visits equivalent to face-to-face visits, but verifying with the insurance provider is recommended.

To ensure compliance with privacy regulations, encrypted communication and storage systems are paramount, and all telemedicine visits should be conducted in a manner ensuring patient confidentiality.

Telemedicine Legal Considerations Checklist:

The chart provided below may be used as a checklist for legal considerations regarding implementing telemedicine.

Legal Considerations	Advice	Notes
Conflicts of interest	Be mindful of federal regulations such as those that are explicitly noted by the Stark Law.	
Privacy issues and data security	Be knowledgeable of applicable aspects of the Health Insurance Portability and Accountability Act (HIPAA) (e.g., see Telemedicine Supplemental Resources to access information about current waivers on HIPAA violation during the pandemic).	
Provider-patient interactions	Structure sessions in accordance with local state policy. Be mindful of local state laws regulating patient-provider interactions and if an in-person relationship needs to be established first (see Telemedicine Supplemental Resources to access search results for the latest state telehealth information).	
Tele-presenter	Be mindful of scope of practice issues regarding the provider performing the tele-presenter role according to local state policy.	
Informed consent	Check with your legal experts on verbiage, recognizing that your standard informed consent may not be sufficient.	
Licensing	Determine what the state licensing requirements are, both for where you practice and where your patient will be.	
Internet prescribing	Check with state medical boards and pharmacy boards as well as local and state policies.	
Malpractice	Check with insurance provider to make sure the policy covers telemedicine and coverage extends across states.	

Ethical Considerations in Telemedicine:

Care provided through telemedicine modalities must follow the same ethical principles as all in-person medical care,^{3,4} following the American Medical Association (AMA) code of medical ethics.⁵ Additional considerations regarding the competency of care delivered, maintenance of privacy, informed consent, and continuity of care may also be needed.

Competency of Care

The provider must consider the appropriateness of the care delivery model (and limitations therein) to ensure the highest standards can be met, *prior* to patient scheduling. For example, if a physical exam is required to affect clinical decision-making but the needed exam cannot be performed over video (e.g., evaluation of neuropathy, interrogation of an implanted neurostimulator), a traditional office visit instead of a telemedicine visit may be needed.

Data Security, Privacy, & Informed Consent

Ensuring patient privacy and confidentiality is just as vital in the telemedicine model as it is in the traditional office model, and providers may need to exercise extra care to maintain privacy in the telemedicine setting. Appropriate protocols must be in place to ensure the privacy and security of not only synchronous provider-patient interactions, but also asynchronous interactions, at every step—from the encounter itself, to data transmission and storage, as well as interaction between the healthcare team.⁶

Patients should be informed of these privacy and data security risks, and existing protocols to mitigate such risks. Informing the patient may take many forms: written disclaimers on websites and virtual platforms, written informed consents, and verbal communication at the start of the virtual encounter are a few examples.

Scheduling staff should be well trained and educated to ensure patients are given the option to consent to, or decline, care delivered through telemedicine modalities if both in-person and telemedicine visits are available and appropriate for the patient encounter.

A common bias is that telemedicine may be easier or more convenient for patients because travel to the appointment is not needed. However, technology-based care may not be readily available to lower socio-economic groups or to geographically remote populations and may unintentionally pose added stress or fear to patients, especially the elderly, if they are not comfortable with the technology. Therefore, it is important to train not only staff on the technology, but also offer training to patients to allay fears and provide successful visits without furthering health inequities.

Continuity of Care

More diligence may be needed in ensuring continuity of care with the telemedicine model. A clear patient-physician relationship exists when synchronous telemedicine visits are performed but may be more nebulous for asynchronous care if, for example, a sleep provider in a geographically distant site interprets a sleep study without meeting the patient. Therefore, it is important to explicitly define roles and responsibilities between the specialist and the local provider when care is delivered remotely.

Patient Safety

In the traditional office model, the clinical space is a controlled environment designed to ensure the physical and psychiatric safety of the patient. When care is delivered outside the traditional office, special attention may be needed to ensure patient safety.

Physical Safety

The provider should try to ensure the physical safety of the patient during the encounter. For example, if a patient appears to be sitting in a motor vehicle, the provider may ask the patient to pull over and park before proceeding with the virtual visit or else reschedule the visit. Providers and staff should be adequately trained on identifying and activating emergency medical services (EMS) when needed.

Many telemedicine platforms offer e-911 services and activating EMS may be as simple as using the e-911 link on the platform—you may need to provide the address of the patient and nature of the emergency to activate e-911. If e-911 is not available through the virtual platform and the patient is in local area, call 911 and provide the location of patient along with nature of emergency. If the patient is not local, obtain and call the 10-digit phone number for law enforcement in the community where assistance is needed.

Psychiatric Safety

Psychiatric safety may require more vigilance on the part of the provider during telemedicine visits than in-person visits, as cues that may have been visible in the clinic setting (especially regarding suicide or abuse), may not be visible through a limited video screen. Providers and staff should be adequately trained on identifying and activating emergency services when needed.

Data Safety

To ensure the highest levels of privacy and data safety, it is important for providers to use only HIPAA-compliant platforms for synchronous visits and understand the security practices of all allied online resources for asynchronous care. All transmission of data should be encrypted.⁷

Tips for a Successful Synchronous Telemedicine Encounter

When implementing telemedicine, design layout and size of the facility are important considerations. The telemedicine environment should reflect the office environment and include similar considerations such as lighting, space, acoustics, wall color and camera distance. Utilizing trial runs to optimize the telemedicine environment from both a provider and patient perspective is integral to successful implementation of a program.

In addition, have contact information for support services readily available in case of technical difficulties (see the *“Troubleshooting Contact List”* section of this guide for a list of information you should keep on hand).

Consider visiting other telemedicine facilities to experience how telemedicine works in practice and how providers use it, which may differ from vendor recommendations. Other telemedicine sites may also demonstrate examples of personnel and processes necessary to provide care uncompromised by its reliance on technology.

A successful telemedicine encounter should mirror the live visit as much as possible. Close attention should therefore be paid to the technical quality of the encounter, starting with the audio and video specifications. The system utilized must allow for uninterrupted, fluid interaction between the provider and the patient. As such, adequate bandwidth and high-resolution video should be utilized.

The audio must allow for two-way, fluid communication between the patient and physician. The video should adequately facilitate a seamless live-stream of the patient-physician encounter without significant interruptions that would impede normal conversation.

Patients should be offered a choice between traveling for an in-person visit or utilizing technology for a virtual visit. The provider-patient relationship can be established virtually in many states. Both the originating site and the distant site should be housed in a quiet, private, HIPAA-compliant environment.

In many states, CMS specifies the need to document an upper airway as well as cardiopulmonary physical examination. This can be accomplished either by first seeing the patient in-person or by utilizing diagnostic equipment.

Between visits, asynchronous communications may occur through secure patient portals that may be part of an existing EHR or a separate messaging platform.

Before the Telemedicine Encounter:

- Check with your EHR and virtual platform to identify options for creating links/notifications for entering the virtual encounter. This link can be sent to patients before the visit (or on the same day) via secure patient portals, emails, or text messages.
- On the day of the visit, support staff (clerical staff, medical assistant (MA), or nurse) may contact the patient before the patient meets with the provider to perform tasks such as: confirming patient identity and location, obtaining consent from the patient (if not obtained within the past year), reviewing medications, obtaining vital signs, and completing questionnaires.
- During this “virtual check-in” support staff should verify if the patient location is appropriate for a virtual visit. It is good practice to document the address/location of the patient during virtual check-in, not only to verify compliance with state regulations, but also to deliver emergency services if needed. In addition, patient safety can be assessed – in particular, patients who are driving should be instructed to park in a safe location before proceeding with the visit.
- Support staff may also help the patient troubleshoot technical issues and enter the virtual waiting room, if needed.

During the Telemedicine Encounter:

- As with a traditional office visit, ensure patient privacy. This may necessitate using a private room instead of a shared office space, with the door closed to prevent the patient being seen or heard by others.
- Position the equipment unobtrusively so the patient can focus on the physician’s image rather than the equipment or other things behind the provider. Position the camera so that the provider’s face, neck, and shoulders are visible and centered on the screen. Pay particular attention to reduce any clutter visible in the space that may lead to distractions.
- Ensure good lighting at the provider location. Lighting should be adequate to illuminate the provider’s full face without casting shadows.
- Position the microphone and speakers so that the patient can speak naturally without having to direct his or her view toward the microphone or turn toward the speakers to hear adequately.
- Even with adequate bandwidth and technical capabilities, occasionally the live streaming will have a slight delay. When patients are made aware of this possibility ahead of time, they typically are accepting of this minor technical issue.
- Utilize the picture-in-picture feature to display a self-view on the distant site (your) screen. This will allow the provider to view the image being shown to the patient and to adjust it accordingly. Pay attention to the horizontal and vertical eye lines – you should appear to be looking at the patient. One way to achieve this is to look directly into the camera, instead of the patient’s eyes; if you look at the eyes of the patient on the screen, then it looks to them as if you not making eye contact. Another way to appear to make

eye contact with the patient is by dragging the picture-in-picture window across your screen, so it is just beneath the camera. This way, by looking at your own image, you appear to be looking directly at the patient. This does require practice as it may appear that you are looking elsewhere when you are in fact looking at the patient.

- At times, you may need to look elsewhere, such as to review records or take notes. It is best to inform the patient in advance that if you look away from the camera, it is to do something that is relevant and clinically important to the visit.
- It is highly recommended that the encounter be practiced prior to a live visit to become familiar not only with the specific application utilized but also the technical aspects of creating a realistic virtual visit.
- Communication with the patient is essential. The patient should be aware that the visit will take place virtually but is otherwise identical to an in-person visit. You should highlight to the patient that a telehealth visit is equivalent to a live in-person office visit.
- Communication with the referring provider is also crucial. Everyone involved should understand that the visit occurs virtually.
- State laws may dictate that the initial visit must occur in-person in order to prescribe medications. Please consult your local policies.
- If diagnostic equipment is utilized (e.g., electronic stethoscope), they should be tested ahead of time to ensure the sound is of adequate quality and volume to appropriately discern auditory physical examination findings.
- Since it is not routine to record an in-person visit, recording either the physical examination or the entire telemedicine encounter is optional, but uncommon.

Strategies for Using Interpreters during the Telemedicine Encounter:

Interpreters can help facilitate clinical visits when patients and providers do not speak the same language.^{8,9} Interpreters may be employed and easily available at large institutions or hospital systems, or interpreter services may be hired as needed.

- Ask if an interpreter is needed at the time of scheduling and document the patient's primary language if an interpreter is needed. You may want to allow more time for the visit in the case an interpreter is needed.
- Schedule the interpreter service for the time of visit, in advance if possible. If you are using a new interpretation service, you may want to meet with the interpreter prior to the patient visit to set expectations etc.
- Have the interpreter join the visit at the virtual check-in and document the identity of the interpreter (name of interpreter service or interpreter, name and relationship of family member if a family member is used as interpreter, etc.).

- Some methods of communication with patients using an interpreter include:
 - + 3-way virtual visit (if virtual platform allows for participants from 3 or more separate sites to join simultaneously)
 - + 3-way phone call
 - + Combination of 1+2 above (patient and provider on video + interpreter on phone)
 - + If virtual platform does not allow for more than 2 participants simultaneously, use an additional device (e.g., tablet) linked with the interpreter and held up to the virtual visit (to include interpreter through the tablet)
 - + At times, the interpreter may need to initiate the phone call/virtual visit and add healthcare provider to the call once the patient/patient’s caregiver has been reached.
 - + Live interpreter service, phone, or third-party application device at the clinic.
 - + If a household member is used as an interpreter, they may be physically available at the patient location.

Special considerations for the hearing or speech impaired in Telemedicine:

The Americans with Disabilities Act (ADA) requires providers to ensure equal access to care to patients with disabilities,¹⁰ including care delivered through telemedicine modalities using internet-based and digital communication technologies.¹¹

- For patients who are hearing impaired or have difficulty with speech and communicate through American Sign Language (ASL), high speed audio-video communication (not audio-only) with the interpreter will be necessary for both the patient and provider to communicate.
 - + The video should show an unobstructed view of the interpreter’s face, arms, hands, and fingers, and the patient’s/caregiver’s face, arms, hands, and fingers, regardless of their body position.¹² It is important to use high speed, high quality video without lag, buffering, or fuzziness in image quality to facilitate clear communication with these patients.
 - + Ideally, interpreters should be on the same screen or platform for direct, real-time interpretation, but remote interpreting or captioning may be performed on a separate screen or device (as listed above under “strategies for using interpreters during the telemedicine encounter”).
- Communication access real time translation (CART—also known as video captioning) is an alternative if ASL interpretation is not available. In this method, a qualified captioner (or digital voice-to-text automation) provide captions on the screen during the visit.

- If 2-way, interactive video communication is not an option and phone services are used, the following telecommunications relay services (TRS) are acceptable by the Federal Communications Commission (FCC).¹³
 1. Text-to-Voice Teletypewriter (TTY)-based TRS
 2. Voice Carry Over
 3. Speech-to-Speech Relay Service
 4. Shared Non-English Language Relay Services
 5. Captioned Telephone Service
 6. IP Captioned Telephone Service
 7. Internet Protocol Relay Service
 8. Video Relay Service

Details of each of these services can be found on the FCC website:

[Telecommunications Relay Service - TRS | Federal Communications Commission \(fcc.gov\)](#).¹³

Troubleshooting Contact List

When providing telemedicine services, it is important to have contact information for key personnel at all sites you provide care to, so that you are prepared to troubleshoot any issues that may arise.

Local Coordinator:

Contact Name:

Telephone Number: (ext):

Email:

Distant Site Coordinator:

Contact Name:

Telephone Number: (ext):

Email:

Tele-presenter:

Contact Name:

Telephone Number: (ext):

Email:

Hardware Issues

General Information Technology Help Desk: *(Local Computer Issues)*

Contact Name:

Telephone Number: (ext):

Email:

Computer make, model, serial number:

Internet Service Provider: *(Networking Issues)*

Contact Name:

Telephone Number: (ext):

Email:

General Information Technology Help Desk: *(Remote Computer Issues)*

Contact Name:

Telephone Number: (ext):

Email:

External Webcam:

Model Number:

Contact Name:

Website Address:

Contact person:

Telephone Number: (ext):

Email:

Other Peripheral Plug-Ins: *(Digital Stethoscope, etc.)*

Model Number:

Contact Name:

Website Address:

Contact person:

Telephone Number: (ext):

Email:

Software Issues

Operating System: *(Windows, Mac Issues)*

Version:

Contact Name:

Website Address:

Contact person:

Telephone Number: (ext):

Email:

Conferencing Software:

Version:

Contact Name:

Website Address:

Contact person:

Telephone Number: (ext):

Email:

Cloud-Based Services

Durable Medical Equipment Compliance Data:

Company Name:

Website Address:

Contact Person:

Telephone Number: (ext):

Email:

Billing:

Company Name:

Website Address:

Contact Person:

Telephone Number: (ext):

Email:

Novel Telemedicine Strategies to Expand Your Practice

So far, this guide has focused on live, synchronous telemedicine visits with patients. However, telemedicine can offer much more. Telemedicine platforms may be used to provide guidance to other providers either synchronously through teleconsultations or asynchronously through electronic communications. In addition, telemedicine platforms may also be used asynchronously for the diagnosis and management of sleep disorders. Some examples of other beneficial uses of telemedicine systems include:

- Interpretation of sleep studies
- Remote PAP management
- Provider-to-provider reviews and electronic consultations
- Patient education
- Behavioral sleep interventions (e.g., review of sleep diaries, actigraphy, CBT-I apps)
- Education and supervision of trainees and allied health professionals

Interpretation of Sleep Studies:

Typically, sleep physicians interpret sleep studies performed at their own sleep labs. Telemedicine allows a sleep physician to interpret studies at geographically remote sites without having to travel to the remote lab. Remote access gateways, such as Citrix and VPN, enable remote raw data review and report generation from off-site locations. A sleep study performed by a sleep lab in one city could be stored at that originating facility and forwarded to a sleep physician at a distant site for interpretation. Unscored studies may also be forwarded to facilities that have sleep technologists if scoring assistance is needed. Home sleep apnea tests may be ordered by a patient's local facility, performed in the patient's home, and scored and/or interpreted at a distant site. These “store-and-forward” telemedicine technologies can increase access to the specialized expertise of sleep physicians and sleep technologists, not only in remote or underserved areas, but also when demand for studies exceeds the number of providers available at the facility for timely interpretation, potentially generating income from interpretation fees. Integrative platforms also exist that allow access to different sleep systems from a single portal for ease of access, interpretation, and incorporation into EHR.

Remote Management of Positive Airway Pressure (PAP) Devices:

Remote PAP monitoring deserves special attention, as monitoring of PAP devices is a routine component of sleep apnea management. Most manufacturers of PAP devices now offer remote monitoring capabilities with either built-in or external modems, obviating the need to collect or transmit data using data cards. Data can now be transmitted bidirectionally between the patient and provider sites. This has enabled sleep centers and durable medical equipment (DME) providers to streamline processes and improve efficiency.

Remote PAP monitoring can occur synchronously or asynchronously. Often called “PAP downloads,” data can be pulled from the PAP device remotely prior to the start of a patient-provider

visit (be it a virtual or in-person visit) to help guide medical decision-making during the visit. Any changes to PAP therapy (e.g., adjustments in pressure, ramp time) can be transmitted back to the patient's device remotely during the visit. These are examples of synchronous PAP management.

Asynchronous PAP monitoring can occur through store-and-forward systems. That is, the PAP download is pulled by another team member and forwarded to the provider to review at a time when the patient is not with the provider in real time. The provider may use the data from the PAP download to guide medical decisions and make adjustments to therapy as needed. Adherence to PAP therapy can be improved by monitoring patient usage and intervening with signs of problems, such as decrease therapy usage, high leak or increasing apnea-hypopnea index. CPT Code 99091 and the new CPT codes 99453, 99454, 99457 and 99458 may allow reimbursement for health care provider time spent monitoring PAP data, adjusting therapy and communicating with the patient.

Additionally, PAP devices can now be remotely programmed at initial setup. This is especially useful during times of national emergency (such as the COVID 19 pandemic) where PAP devices can be remotely programmed and mailed to patients, with education on the device performed through synchronous or asynchronous modalities.

Using Telehealth for Patient Education:

Patient education is the backbone of successfully managing chronic health conditions, and telehealth platforms can serve as powerful tools to instruct patients. Education delivered to patients with chronic diseases virtually is comparable to, if not more effective than, education delivered by "usual care."³ The education and training codes (CPT codes 98960, 98961) can be reported for telehealth, however, a standardized curriculum must be used in order to report these codes.

Using telemedicine, education may occur individually or in groups, synchronously during a visit with a provider, or asynchronously through online sites or patient portals. Many of the new telehealth platforms allow sharing of screens during synchronous visits to educate patients using pre-recorded images or videos. For example, during a virtual visit, a provider may share images of upper airway anatomy with a patient to demonstrate the role of the airway in the pathophysiology of sleep apnea, video clips of how PAP opens the airway to treat sleep apnea, or images of masks the patient may wish to try. Shared telemedicine appointments may encourage patient engagement when successful patients share their stories with those struggling with their therapy. Educational videos may even be played in the virtual waiting rooms during synchronous visits.

Asynchronous modalities of patient education may include a repository of online videos, handouts, or links to other online sites for further education. These can be housed on patient portals, hosted on the facilities' websites or available through a third party. For example, videos on how to use PAP devices or setup of home sleep apnea test equipment in the home may be available for patient reference and review. Education on processes, such as what to expect during a patient's sleep study or how to request PAP supplies may also be helpful resources for patients. These can be viewed by patients and caregivers in the comfort of their home, at a time most convenient for them. The AASM offers a variety of educational videos and tools at [sleepeducation.org](https://www.aasm.org/sleepeducation.org)

Provider-to-Provider Reviews and Electronic Consultations:

Consultations between providers can be delivered through telemedicine modalities both synchronously and asynchronously. Evaluation of patients followed by electronic transmission of results via telemedicine portals occur commonly for both ambulatory patients and inpatients. A second opinion review of patient records is a form of asynchronous electronic consultation. Peer-to-peer review with insurance carriers for prior authorization is an example of a synchronous consultation.

Behavioral Sleep Interventions:

Mental health therapies and interventions are routinely delivered through telemedicine modalities. Cognitive behavioral therapy for insomnia (CBT-I) and brief behavioral therapy for insomnia (BBT-I) have been shown to be as effectively delivered via telemedicine as via in-person office visits. Sleep diaries, actigraphy data, data from smart devices, digital health apps such as online CBT-I may be reviewed remotely to augment therapy asynchronously.

Supervision and Training in the Era of Telemedicine:

As telemedicine use to manage patients has increased, so has the need to train new providers on proper use of telemedicine. Lessons learned about how best to conduct a telemedicine visit need to be incorporated into training program curricula. In addition, most telemedicine platforms allow the participation of multiple providers during the remote visits. This allows supervising physicians to observe how trainees conduct the visit as well as participate in provision of care in real time. Furthermore, visits can be recorded and reviewed later by both the supervisor and trainee. This type of supervision can also be used for physician participation with allied health care providers. Supervision of sleep study interpretation can also be conducted synchronously and asynchronously. Case 12 represents an example of trainee supervision using telemedicine.

In 2021, CMS finalized a permanent policy permitting teaching physicians to meet the requirements to bill for their services involving residents through virtual presence, but this is only applicable to services furnished in residency training sites that are located in rural areas. For all other settings, CMS is allowing supervision of residents in teaching settings through audio/visual real-time communications technology to remain in place for the duration of the public health emergency (PHE). This will provide flexibility for communities that may experience resurgences in COVID-19 infections. Supervision of residents through audio/visual real-time communications technology will no longer be acceptable once the PHE has ended.

Case 1: Obstructive Sleep Apnea

Mr. J was a 58-year-old man living in rural North Carolina who was referred for evaluation of possible obstructive sleep apnea (OSA). He had a history of hypertension, type II diabetes mellitus, and increasing weight gain. He was referred for a sleep medicine evaluation by his primary care physician because of increasing daytime somnolence, decreasing energy level, and increasing snoring to the point his snoring was severely disturbing his wife's sleep. Because of the long distance required for travel to the nearest board-certified sleep medicine physician, the patient used his smart phone to connect to a telemedicine platform available through his health care system. During a telemedicine appointment from his home, a thorough sleep history was elicited by a board-certified sleep medicine physician, and physical examination performed through use of the patient's smart phone camera. Based on the results of this assessment, a home sleep apnea test (HSAT) was ordered.

The patient received the HSAT device and instructions through the mail several days later, and the test was interpreted by the sleep physician. A sleep technologist was available by phone to answer any questions about the HSAT procedure. Test results revealed severe OSA (apnea-hypopnea index [AHI] = 42/hour) with periods of significant oxygen desaturation down to a nadir of 72%. The sleep physician reviewed results of the HSAT with the patient via the telemedicine portal, and copies of the sleep study were sent to his primary care provider as well as the local durable medical equipment (DME) company along with an order for auto-titrating positive airway pressure (APAP). After starting on APAP the patient noted prompt improvement in symptoms and was satisfied with the therapy; his sleep physician accessed and reviewed adherence and efficacy data remotely and continued to support the patient during regular follow-up via the telemedicine portal.

Learning Points:

- In the practice of sleep medicine, much of the information needed to make clinical decisions can be derived through basic telemedicine-ready tools.
- Conditions such as OSA can be readily evaluated and managed through telemedicine modalities.
- Diagnostic studies such as polysomnography, HSAT and actigraphy are often accessed and interpreted remotely, facilitating accurate diagnoses and effective treatment options. PAP adherence data is routinely reviewed remotely to monitor response to therapy.
- Providers should review state regulations and payer requirements prior to initiating a telemedicine evaluation.

Case 2: Upper Airway Assessments

A 41-year-old woman received a diagnosis of moderate OSA (AHI = 22 events/hour). After 6 months of continuous positive airway pressure (CPAP) therapy, she remained unable to tolerate the treatment. The patient subsequently reported to a telemedicine clinic to discuss upper airway surgery and oral appliance therapy (OAT). A C2C model was employed, whereby the patient traveled to a local clinic to access telemedicine services.

Although PAP therapy remains the gold standard for OSA treatment, OAT and surgical interventions are viable alternatives. Therefore, identification of individuals most likely to benefit from these interventions is important. Craniofacial and upper airway anatomy assessments are essential during in-person visit; telemedicine-based care need not differ.

Telemedical Upper Airway Assessment Offers Several Benefits to Patients:

- Focused physical examination from a board-certified sleep medicine physician without having to leave home (C2H, OOC models) or a local clinic (C2C models)
- Early assessment for OAT or surgery candidacy
- Basic assessment for upper airway/craniofacial pathology
- Facilitated referral to local dentists and surgeons

There Are Two Primary Components of the Telemedical Upper Airway Examination:

1. Craniofacial Anatomy:

Equipment needed to facilitate Craniofacial Anatomy exam:

HIPAA-compliant webcam with monitor



(originating and distant sites)



Smart phone camera

(at originating site for C2H and OOC models)

Next Steps:

Full front and lateral views of the head and neck are assessed for:

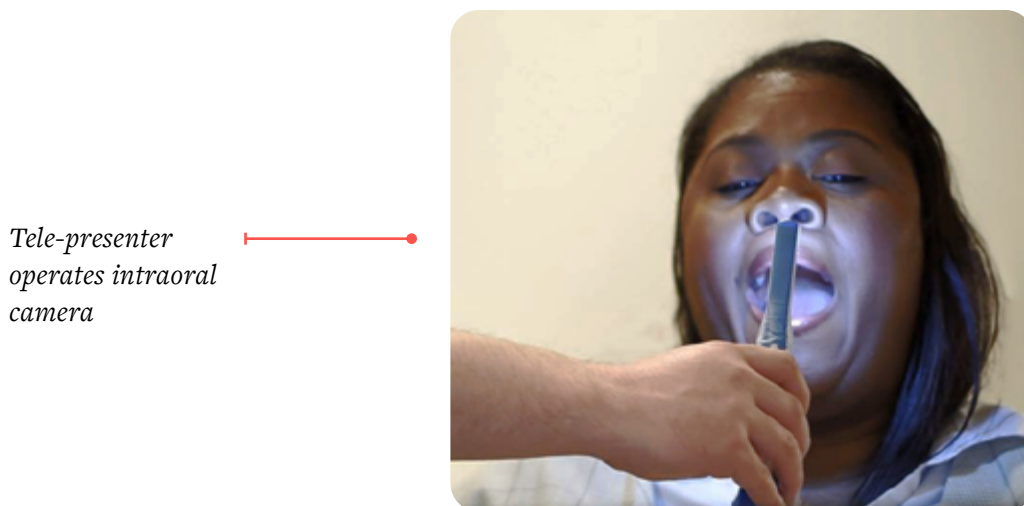
- Micrognathia
- Retrognathia
- Lower jaw mobility
- Other anatomic abnormalities

Patient Findings:

The encounter with the patient reveals no significant retrognathia or other abnormality. The patient demonstrates adequate jaw mobility with protrusion. She does not report any temporomandibular joint pain.

2. Upper Airway Assessment:

Equipment needed to facilitate upper airway assessment (C2C):



Equipment needed in the C2H or OOC models:

The upper airway examination may be performed via mobile devices in the patient's home. The patient should be asked to open the mouth, tilt the head back as needed and point the camera into the back of their mouth. If needed, a flashlight may be used to shine light into the airway.

Next Steps:

Patient follows usual directions for the oral examination (open mouth, etc.) and is assessed for:

- Tonsillar/soft-tissue hypertrophy
- Airway size (i.e., Mallampati score)
- General dentition

Patient Findings:

The portable examination camera reveals a Mallampati class II airway. Tonsils are surgically absent, and dentition is good, with all teeth present.



Because the patient was deemed an appropriate candidate for OAT, she was referred to a local qualified sleep dentist for appliance fabrication. After commencing OAT, she was subsequently scheduled for follow-up in the sleep telemedicine clinic. The telemedicine provider maintained a current list of qualified sleep dentist facilities near the patient's originating site. If tonsillar hypertrophy or redundant soft tissue had been observed, then referral to a local otolaryngologist for surgical intervention could have been considered.

Learning Points:

- Specialized devices (webcam, portable camera) allow telemedicine providers to obtain an appropriate upper airway assessment.
- In comparison with C2H models, C2C models are particularly advantageous for upper airway assessment because they enable use of a:
 - + Specialized portable camera
 - + Trained patient tele-presenter to help capture appropriate views
 - + Light source within the upper airway (a component of most portable cameras)
- An up-to-date list of local specialists (e.g., dentists, surgeons) should be maintained to broaden treatment options nearer the patient's home. Those practitioners should have the distant site telemedicine providers' full contact information to facilitate long-term data sharing.

Case 3: Caregivers

An otherwise healthy 6-year-old boy experiencing recurrent sleepwalking and night terrors was brought to his pediatrician for evaluation. His mother described him as a very restless, sweaty sleeper with chronic light to moderate snoring, bedwetting, and rhinorrhea. The child had one younger sibling who had no sleep difficulties. Upon examination, his pediatrician noted enlarged tonsils along with a drop in the child's growth curve and recommended a formal sleep evaluation. Unfortunately, there were no pediatric board-certified sleep medicine physicians in the child's hometown, and his mother could not financially afford to miss time from work to travel to the nearest university sleep facility to access a provider. The university offered a convenient center-to-center telemedicine arrangement for specialty care with her local clinic, and her son was soon evaluated by a board-certified sleep medicine physician via a telemedicine encounter (with his mother present).

During the telemedicine visit, although initially engaged, the child quickly became inattentive and began to disrupt the camera positioning. A tele-presenter was on-hand to reposition the camera and assist the examination with positioning of the portable intraoral camera attachment. On examination, the child was at the 15th percentile for both height and weight, had allergic shiners and a nasal crease. Use of the portable intraoral camera attachment allowed for proper assessment of the upper airway and revealed size 4+ tonsils bilaterally. The remainder of his examination was unremarkable.

A diagnostic polysomnogram at a nearby accredited sleep facility was recommended. The test revealed obstructive sleep apnea. There was no evidence of epileptiform activity and no night terrors were caught on the study. The patient was ultimately referred to a local surgeon for tonsillectomy. After surgery and adjunctive allergy treatment, repeat sleep testing showed resolution of his snoring and sleep apnea.

At a routine follow-up telemedicine visit, he and his mother no longer reported bedwetting, snoring, restless sleep or acting out behaviors during sleep. Moreover, his height and weight had rebounded to the 40th percentile, consistent with his earlier trajectory. The mother reported improved attention and behavior at school and home and was pleased with the high quality and convenient care provided through telemedicine.

Learning Points:

- Telemedicine increases access to specialists in underserved areas and provides a convenient option that minimizes life disruption to the family. It can extend the reach of scarce pediatric board-certified sleep medicine physicians and provide quality care efficiently at a potentially reduced cost and burden to patients and their families.^{15,16}
- Pediatric sleep disorders including behavioral insomnia, bedwetting, snoring, sleep apnea, parasomnias, restless legs syndrome and circadian rhythm sleep-wake disorders can be evaluated and managed via telemedicine, and C2C, C2H and OOC models offer options for care that may be more convenient for caregivers.
- Interviews require caregiver involvement for accurate history taking and assessment of familial interactions.
- Airway examinations are often difficult in children and may require the use of specialized equipment such as a portable camera, a tele-presenter, adjunctive allied provider evaluation or in-person assessment.
- Minor children represent a vulnerable population with implications regarding consent and mandatory reporting of suspected abuse.
- Children with behavioral problems or other special needs may complicate evaluation and management. A well-trained patient tele-presenter can provide support as needed to optimize the encounter.
- Care should be coordinated with a pediatrician to ensure proper utilization of local resources, but these may be inadequate to provide readily accessible polysomnography and standard specialist treatments (e.g., surgery and orthodontics). As needed, referrals should be provided to facilities that provide comprehensive pediatric sleep care.

Case 4: Traveling Patients

A 53-year-old man was referred by his Department of Transportation medical examiner for a sleep evaluation. He denied excessive sleepiness or snoring but reported a history of hypertension. On examination, his neck circumference was 18 inches and body mass index (BMI) was 38 kg/m². He was on the road 5 nights per week but traveled through his home state 1 day each week.

He presented to a board-certified sleep medicine physician via a telemedicine platform. He reported no overt sleep complaints, but based on his BMI, neck circumference, hypertension, and high-risk profession, an HSAT was ordered. The tele-presenter provided the patient with a chain-of-custody device at the originating site; the patient spent the night in his truck with the HSAT and returned the following morning to review the results of his study. His HSAT demonstrated an AHI of 45 with oxygen desaturations to 80%. Although initially reluctant, he ultimately agreed to try nasal PAP. APAP of 4-20 cm H₂O was ordered, and the DME company provided adherence and treatment data 2 weeks later. After the patient was on therapeutic PAP, he was allowed to return to work after demonstrating adequate adherence.

Given that untreated OSA is associated with a higher rate of motor vehicle accidents,¹⁷ some trucking companies require routine monitoring of PAP adherence in their drivers with OSA. Telemedicine may have several distinct advantages in the care of this population:

1. Treatment and coordination can be done in a manner that is potentially more flexible for the work lifestyle, as many patients may be traveling for work during normal clinic visit times.
2. The potential volume of patients and the care coordination of such practices may be difficult to manage; a telemedicine component to the care may facilitate and enhance testing, treatment, and care coordination.

As CMV operators are incentivized to both minimize their symptoms and demonstrate PAP adherence, one concern may be identifying whether the correct information is being obtained. If utilized, a tele-presenter can serve as a liaison between the physician and the patient and can reinforce the collaborative nature of the interaction.

Learning Points:

- CMV operators require medical evaluations assessing their fitness to drive. To maintain certification, OSA must be effectively treated and adherence demonstrated.¹⁸⁻²⁰
- Telemedicine can facilitate the evaluation and treatment of commercial drivers as they are able to undergo sleep testing and treatment in different locations.
- Evaluating CMV operators in this fashion may encourage greater willingness of patients to be tested and treated for sleep disorders and, thereby, improve public health and safety.
- Coordination of care is feasible through telemedicine applications including use of chain-of-custody testing, adherence monitoring and visual confirmation of patient identity.
- Remote monitoring of adherence and therapy data using asynchronous store-and-forward technology allows for more timely and efficient treatment and interventions. In the case of nonadherence or suboptimal clinical results, objective measurements can be assessed in a timelier fashion through telemedicine applications.

Case 5: Insomnia

Mr. T is a 67-year-old retired business executive with a 30-year history of difficulty initiating and maintaining sleep. He was evaluated through a telemedicine sleep encounter with a sleep medicine provider. Prior to his visit, a comprehensive intake packet including validated questionnaires and a sleep diary was mailed to the patient.

The questionnaires and sleep diary revealed evidence of both sleep-onset and sleep-maintenance insomnia. Total sleep time was 4 hours 50 minutes with “poor” subjective sleep quality. During his telemedicine interview, Mr. T reported his sleep difficulties began during a period of high work and family stressors, which included frequent international travel, and led to marital strain. His clinician reviewed his lifestyle habits, medical history, medications, family and social histories in detail and noted that the patient exhibited moderately severe anxiety during the interview.

The patient elected to enroll in an online cognitive behavioral therapy for insomnia program, which included use of stimulus control, sleep compression and mindfulness training. He purchased a wearable fitness tracker and reviewed the data with his sleep provider; results were generally consistent with the reported sleep pattern. With periodic telemedicine visits with his sleep provider, he demonstrated improved objective sleep parameters over time.

Learning Points:

- There is a dramatic and unmet need for specialty insomnia care, and telemedicine may afford increased access to this care.
- Insomnia is highly amenable to telemedicine management, and treatment may be aligned with existing telemedicine resources for mental and behavioral health disorders such as anxiety and depression.
- Sleep diaries, sleep questionnaires and wearable devices/fitness trackers can augment clinical decision-making during telemedicine encounters for insomnia.
- Online cognitive behavioral therapy programs, and other internet resources, may offer additional tools to help care for patients with insomnia.

Case 6: Hypersomnolence and Regulated Prescriptions

Ms. W is a 22-year-old college student. She sees a board-certified sleep medicine physician (BCSMP) in Alabama, where her family resides, but most of the year, she lives in Virginia where she attends college. She complains of excessive daytime sleepiness and often finds it hard to maintain wakefulness in class. These symptoms started in high school, but she attributed them to sleep deprivation at the time. Now, she finds that even with 8 hours of sleep per night, she finds it hard to stay awake throughout the day and frequently gets complaints about falling asleep at study groups. She often feels better after 10-15 minute naps and sometimes dreams during short naps. A multiple sleep latency test performed after a normal overnight polysomnogram recording 8 hours of sleep reveals a mean sleep latency of 2.3 minutes and 2/5 sleep-onset rapid eye movement periods. The BCSMP makes the diagnosis of narcolepsy and prescribes modafinil, effectively improving the patient's wakefulness without side effects.

The patient plans to continue telemedicine follow-up with the BCSMP in Alabama, who verifies Virginia's medical and pharmacy board requirements as well as state policy regarding interstate prescribing. The BCSMP obtains a medical license in Virginia and registers into Virginia's prescription drug monitoring program to continue to prescribe this medication to the patient. With each new prescription, the BCSMP checks the state's prescription drug monitoring program to ensure proper patient use. Because of side effects from modafinil, the patient is switched to an amphetamine derivative for hypersomnolence. In order for the BCSMP to e-prescribe amphetamine derivatives, however, specific software compliant with electronic prescription of controlled substances (EPCS) is needed. The Drug Enforcement Administration legalized EPCS in 2010, with the last state (Vermont) legalizing it locally in 2011. After the appropriate software is selected, verification of physician identity occurs through a third-party authentication service that often requires detailed personal information, including credit reports.

A limitation to e-prescribing schedule 2 drugs is the acceptance by pharmacies; although much more common than in the past, not all pharmacies accept EPCS prescriptions or have EPCS-certified software. Some physicians may find that even pharmacies with EPCS capabilities occasionally refuse to fill e-prescribed schedule 2 medications.

Learning Points:

- Conducting telemedicine visits and prescribing medications across state lines often requires a medical license in the state where the drug prescription is being filled. Check with local medical and pharmacy boards to determine requirements.
- Some states require registering with a prescription drug monitoring program to prescribe schedule II – IV substances. These should be checked before writing or refilling any prescriptions. All states require EPCS-certified software for e-prescription of schedule 2 substances.
- Some pharmacies do not accept EPCS prescriptions.

Case 7: Restless Legs Syndrome and Use of Laboratory Results

Mrs. D is a lean, healthy 44-year-old woman with difficulty falling asleep. She does not snore. She describes uncomfortable sensations in her legs at night when she gets into bed that make it difficult for her to lay still, and she frequently walks around her room to relieve these uncomfortable sensations. She eventually falls asleep but wakes up in the mornings feeling tired. She has tried various over-the-counter remedies, such as diphenhydramine, with no relief.

She chooses a C2H sleep evaluation with a board-certified sleep medicine physician, because it is more convenient. The sleep physician diagnoses her with restless legs syndrome and recommends discontinuation of her over-the-counter diphenhydramine as it may be contributing to her symptomatology. The physician also orders serum iron studies after discovering that the patient experiences menorrhagia. The patient lives 200 miles away, but there is a local clinic with full laboratory facilities in her town. The sleep clinic staff contacts that facility and provides them with the physician's National Provider Identifier, state license number and physical address with appropriate contact information.

The physician sends a signed order for the bloodwork to the patient's local laboratory with instructions to send the results to their office. The patient's serum ferritin level is found to be low, and the physician reviews these results with the patient during a C2H follow up visit, utilizing the telemedicine screen-sharing option. Iron with vitamin C is recommended and arrangements are made to check serum ferritin level in two months. The patient is also advised to follow-up with her primary care provider to further evaluate her low serum ferritin level.

When she is seen again in clinic, both her sleep onset insomnia and her sleep maintenance insomnia have improved as her legs are no longer bothersome. She stopped utilizing the over-the-counter sleep aid and is tolerating her iron. Repeat serum ferritin level from the same laboratory has normalized.

Learning Points:

- Local facilities can facilitate testing and enhance the diagnostic and treatment options of patients managed through a telemedicine encounter. By establishing a relationship with a local laboratory, patients can be tested at a facility closer to their residence.
- Providers ordering laboratory studies remotely need to verify laboratory policies and procedures, as well as communicate and manage results as they would during in-person visits.
- Restless legs syndrome is a clinical diagnosis that can be made by eliciting an appropriate medical history through telemedicine applications.

Case 8: Coding and Billing

A 78-year-old man complains of vivid dreams and nonrestorative sleep. He fell out of bed twice while dreaming and once hit his wife while asleep. His wife notes that, at times, he appears to be fighting someone in his sleep. She also indicates that he snores intermittently but has not witnessed any apneas. He has a history of diabetes and hypertension with no known history of neurologic disease. He is evaluated through a telemedicine sleep consultation and the polysomnogram ordered reveals findings consistent with REM sleep behavior disorder without significant sleep-disordered breathing.

During the follow-up telemedicine encounter, polysomnography findings were discussed with the patient and management options presented. The patient and his wife were both educated regarding bedroom safety measures and the possible use of medications. The provider billed a level 4 initial new patient visit followed by a level 4 office visit follow-up with the 95 modifier.

The telemedicine visit is billed similar to an in-person visit using the current Evaluation and Management (E/M) code structure. The level of service is determined based on the new office/out-patient E/M guidelines, which, as of 2021, require selection of service level based on Medical Decision Making or total time with the patient. A 95 modifier is added to indicate that the service was provided via synchronous telemedicine service. The use of the telehealth modifier does not indicate a reduced level of service and does not decrease the reimbursement for that service. For C2C visits (as compared with C2H visits), an additional facility fee (Q3014) may be charged. Reimbursement will vary from region to region and payer to payer.

Learning Points:

- Telemedicine visits are billed in a manner similar to an in-person visit using the current evaluation and management code structure with the exception of adding a 95 modifier for some payers.
- Medicare allows billing an additional facility fee for C2C visits.
- Guidelines for reimbursement should be verified with payers, especially as many changes occurred during the COVID-19 pandemic.

Case 9: Complex Sleep Disorders

A 54-year-old woman with OSA and morbid obesity is admitted for the third time this year to a rural hospital for an episode of acute diastolic congestive heart failure (CHF) and concomitant atrial fibrillation. With treatment the patient's condition improves, and empiric bilevel positive airway pressure therapy (BPAP) is tried at night. She had never been on CPAP therapy but thinks OSA was diagnosed 10 years ago. The hospital physician and cardiologist consider a sleep evaluation to facilitate her expedient diagnostic and treatment evaluation in order to manage her cardiovascular disease. Moreover, the hospital would like to avoid being penalized for 30-day hospital readmissions for CHF, so staff are incentivized to enable the patient's sustained clinical improvement. Because the patient lives 2 hours away from any board-certified sleep medicine physician and has transportation issues, a sleep telemedicine visit is elicited.

After interview, review of the patient's electronic medical record (including results of her echocardiogram), and virtual examination, the sleep physician also inquires about her pulmonary history because of her smoking history. The sleep physician then requests the referring physicians to order pulmonary function studies at the hospital, ambulatory oxygenation saturation monitoring, room air blood gas, and follow-up chest radiographs. It is thus determined the patient has hypoxemia out of proportion to sleep-disordered breathing, likely due to concomitant moderate chronic obstructive pulmonary disease (COPD). In addition to her new cardiovascular regimen, she is started on supplemental oxygen and bronchodilators. She is then discharged to a local accredited sleep facility, which confirms severe OSA and performs optimal titration of the patient's PAP. She follows up with her local primary care provider and cardiologist, and with her board-certified sleep medicine physician through a telemedicine platform; the latter physician reviews her compliance data rigorously and provides ongoing education and assistance.

Learning Points:

- Sleep telemedicine clinicians often can partner with local clinicians to obtain diagnostic aids that might facilitate clinical decision-making in complex cases (e.g., skillful use of the electronic health record, requesting results of pulmonary function studies, laboratory studies and other diagnostic methods).
- In this example, the hybrid approach of both the C2C model of telemedicine (while the patient was hospitalized) and the C2H or OOC model (after discharge) can be used effectively to manage this patient with local resources.
- Opportunities exist for sleep telemedicine programs to aid in disease management programs targeted at high-risk patients (e.g., COPD, CHF).

Case 10: Facilitating Team-Based Care

Mr. S is a 45-year-old man who lives in a remote area in Southern California with the closest accredited sleep facility 50 miles away. He presents to his nearby primary care clinic with complaints of snoring and excessive daytime somnolence and is referred to a sleep facility for suspected OSA.

The sleep facility activates the remote ambulatory OSA program for this patient, which includes the following steps:

A sleep facility medical assistant (MA) discusses next steps in the work-up with Mr. S over the telephone. He is emailed a digital sleep intake questionnaire (subsequently reviewed by the MA for completeness and to screen for answers requiring an urgent response) and a link to an internet based, interactive OSA educational program. The MA then schedules the patient with the nearby primary care clinic to undergo an HSAT.

The primary care clinic nurse (RN) sets up a type III HSAT device, which the patient takes home to perform the study. Data from the device are eventually uploaded to the cloud.

A board-certified sleep medicine physician reviews the intake questionnaire, interprets the HSAT study and diagnoses Mr. S. with moderate OSA.

During a C2H video visit, the MA prepares the patient in the virtual waiting room, then the physician obtains further history, performs a relevant physical examination and discusses results and recommendations with the patient.

The local DME provider sets the patient up with an APAP device with remote monitoring capabilities as well as an automated PAP self-management platform on Mr. S's smart phone.

The sleep respiratory therapist (RT) case manager responds to an automated alert from the device platform indicating that Mr. S's PAP use has been suboptimal for 3 consecutive nights along with excessive mask leak. The RT sets up a C2H video visit and the patient indicates he has not been able to sleep with PAP because the air is blowing into his eyes. Mr. S demonstrates his mask fit, and it is apparent he is putting on his mask upside down. The RT demonstrates proper mask fit over the video. As part of this encounter, Mr. S also asks about alternative treatments, and the RT shows a model of a mandibular advancement device and emails him further information to review.

An automated follow-up questionnaire is emailed to Mr. S three months after PAP was ordered. The RT reviews the results, which indicate that the patient is symptomatically improved, and his Epworth Sleepiness Scale score has decreased from 12 to 6. Remote access of PAP data indicates that the patient meets the program's definition for PAP compliance. The board-certified sleep medicine physician reviews this overall case.

Learning Points

- Team-based care delivery can be enhanced with synchronous and asynchronous mechanisms that can streamline and automate aspects of care, enhance the capability of providing population health management and augment interdepartmental care coordination.
- Equipping multiple team members with telemedicine capability can enhance their ability to effectively deliver care relevant to their scope of practice.
- Leveraging telemedicine capabilities across multiple team members can allow for team-based care even in care areas where such resources are limited.

CASE 11: Shared Medical Appointments

Mr. B is a 52-year-old male with uncontrolled hypertension who was referred to a board-certified sleep medicine physician (BCSMP) by his primary care provider for loud, disruptive snoring and difficulty staying awake at work in the afternoons. His wife reported to the BCSMP that she sometimes saw Mr. B stop breathing while he slept. On examination, Mr. B was an obese gentleman with a BMI of 31.4, blood pressure of 152/96 mmHg, and a crowded oropharynx. The BCSMP ordered a home sleep apnea test (HSAT) to confirm suspected obstructive sleep apnea (OSA) and a follow-up appointment to review the sleep study results and consider treatment options, if indicated.

At checkout, Mr. B was offered the option of participating in a shared medical appointment (SMA) for his follow-up visit, either in-person or virtually. At these SMAs, he would meet with providers and 6-8 other patients with a similar condition to learn about their illness, hear about treatment options and share their experiences. The SMA, run by a nurse practitioner (NP), would last 30-60 minutes, and the BCSMP would be available for consultation. Each SMA would start with some patient education in a group setting, and then each patient would have an individualized discussion with a provider. The sleep center offered two types of SMAs: one to review sleep study results and discuss treatment options, and a second to see patients within 90 days of a new PAP setup for ongoing routine PAP management. Mr. B agreed to scheduling a virtual SMA to review his study results, and it allowed him to be seen in follow-up sooner than he would have otherwise.

Mr. B received an email the day before the appointment with a link that allowed access to the meeting through the sleep center's web portal. Prior to the visit, he was also contacted by the practice staff to walk him through how to use the system.

On the day of the appointment, Mr. B initially had some difficulty accessing the portal, as it was his first virtual visit ever. He called the clinic and the staff helped him enter the appointment through the link. During the first part of the SMA, Mr. B learned about the pathophysiology of OSA and treatment options. He was then directed to a breakout room where he received one-on-one care with the NP. During his individual session, he opted for positive airway pressure (PAP) therapy and was prescribed an auto-titrating PAP device that was mailed to his home.

After receiving the device, he met with a respiratory therapist via the electronic portal and was instructed on proper PAP use and care. He returned after 2 months to the virtual PAP management SMA and reported improved sleep quality and decreased daytime sleepiness. During the SMA, his PAP compliance data was downloaded and reviewed, and questions were answered about problems with nasal dryness. He shared his experience with the other participants and gave patients suggestions on how they could improve their own use, in particular how he had switched masks early on when it was irritating his nose, and suggested they engage with their RT to get a more comfortable fit.

Learning Points

- Shared medical appointments (SMAs) are a good model of care for chronic conditions like sleep apnea where patients follow a standard timeline for the delivery of care.
- SMAs can increase access to providers in busy practices, standardize education, utilize limited resources more efficiently and increase exposure to a broader array of providers (MDs, NPs and RTs can participate at the same time).
- SMAs can be performed via telemedicine systems with similar outcomes.
- Virtual SMAs can increase access by improving the efficiency of visits, allowing multiple patients to be cared for simultaneously, and allowing patients in remote locations to attend more easily.
- Since each person is getting individualized care (reflected in the clinic note), billing does not change, even though the care is being delivered in a group setting.

Case 12: Supervising Trainees and Allied Health Care Professionals

A 6-year-old boy is referred to a board-certified sleep medicine physician (BCSMP) by his pediatrician for difficulty falling and staying asleep. Because the hospital is limiting in-person appointments during the COVID-19 pandemic, a center-to-home (C2H) virtual evaluation with the sleep provider is offered, and the parents agree.

At the time of the telemedicine visit, the patient's mother logs into the virtual platform and is greeted in the virtual waiting room by the sleep physician's medical assistant (MA). The MA confirms the identity of the patient and his mother, their location, and their consent to proceed with the visit through the virtual platform. She then sends a direct message through the hospital network to the sleep medicine fellow to inform him that the patient is ready to be seen. She asks the patient and his mother to wait in the virtual waiting room for the provider and logs off.

The sleep medicine fellow introduces himself to the mother and child through the virtual platform and lays out the protocol for the visit—that he will meet with them first after which they will all meet together with the Attending physician. The mother agrees and the visit begins. She reports that her son has had difficulties sleeping independently since he was an infant. He needs to be held close when falling asleep and will not go to sleep without a parent present in the room. Moreover, although the parents have successfully transitioned him to his own bedroom to initiate bedtime, he will often come to his parents' room in the middle of the night to sleep and refuse to go back. He examines the patient through the virtual platform with the aid of the patient's mother.

The sleep medicine fellow elicits a history consistent with behavioral insomnia of childhood and asks the mother (and child) to wait in the virtual waiting room while he discusses their case with his Attending physician. He calls the sleep medicine physician to discuss the case, his impression, and next steps. After careful discussion, the trainee and BCSMP both join the patient in the virtual room through a three-way encounter. They discuss the suspected diagnoses with the mother and the Attending directly elicits clarifications to the history. They provide suggestions to treat the child's insomnia with a focus on bedtime associations and answer all questions the patient and caregiver have. At the conclusion of the visit, the patient leaves the virtual visit, and the trainee and physician remain online to address any questions the trainee may have regarding the case and the management of behavioral insomnia of childhood. They then submit a return to clinic order for the clerical staff to call the patient to schedule follow-up care.

Learning Points

- Trainees can successfully participate in telemedicine visits commensurate with their level of training and expertise (e.g., medical students, residents, fellows).
- Allied health professionals (NP/PA) can seek input on patient care from their supervising or collaborating physicians through telemedicine platforms.
- Teaching can be incorporated into virtual visits and mimic that provided during in-person encounters.

Additional Considerations

The above case outlines only one example of a clinical visit incorporating a fellow. There are many pathways for supervision and training, and these may depend on the telemedicine platform utilized. Below are possible strategies to train and supervise learners (e.g., medical students, residents, fellows) and advanced practice professionals in clinics and sleep study interpretations using telemedicine platforms.

Trainees may shadow virtually during a synchronous telemedicine encounter just as they would during an in-person encounter, by entering the same virtual room with the patient and provider. Different workflows may allow trainees, depending on their level of training, to evaluate patients first before the supervising practitioner interacts with the patient. For example, after the initial interaction between a trainee and patient occurs, a breakout room can be used for the trainee and the supervisor to discuss the case before re-entering the virtual exam room. Alternatively, after evaluating the patient, trainees may mute their video and audio and call their supervisor to discuss the case. After the case is discussed, the supervising provider would join the trainee and the patient in the virtual room. If the platform does not allow for multiple providers with the patient, then the supervising provider could meet separately with the patient after staffing the trainee.

Sleep studies can also be reviewed virtually with trainees using telemedicine platforms. The simplest way is to have a virtual meeting with one person (often the Attending physician) sharing their screen as they review a study, while questions are asked by one or more trainees. Alternatively, a trainee may share their screen with the Attending as they review the study, and important learning points can be highlighted by the Attending. Specific workflows may differ depending on the system used to acquire the sleep study. If the sleep study platform allows for multiple scoring files for the same study, a fellow could review and/or score a file first, then the Attending can go through the file and make any changes as needed. Having multiple versions of a sleep study can facilitate learning; in particular, the same MSLT can be scored and reviewed by multiple people, and the different scoring files can be reviewed by the attending in a group setting. If the sleep study platform only allows for one scored version of a study, trainees may watch the Attending go through the study. In any of the workflows, if trainees add comments in the study and track their changes, those actions can help focus the discussion about each study.

Supervision and education of trainees during clinical visits and sleep study reviews can be performed using telemedicine platforms. Different workflows can be used to allow trainees to see patients first before a supervising provider interacts with the patient together with, or separate from, the trainee.

Since the first version of this guide, telemedicine has grown exponentially. It has become commonplace and has improved access to healthcare throughout the nation. It will continue to change as technologies evolve. Further research is needed to evaluate if telemedicine also improves quality and value in the care of patients with sleep disorders.

GLOSSARY

Asynchronous: Not occurring in real time, such as a provider's encrypted response to a patient's encrypted email message.

Broadband: Communication systems (e.g., broadcast television, microwave, and satellite) capable of carrying information, images, and data via a wide range of frequencies over a segment of the total bandwidth available.

Confidentiality: The fundamental requirement whereby personal information is safeguarded and accessible only in agreed-upon circumstances.

Center-to-Center (C2C) telemedicine: This model utilizes a medical office or clinic where the telemedicine equipment is located (originating site). A presenter facilitates the patient's interaction with the audiovisual equipment and can introduce additional technologies.

Center-to-Home (C2H) telemedicine: This model utilizes the patients' own technology (laptop, cell phone, etc.) from wherever they choose to access the physician's system.

Distant Site: Any safe, private location the provider is located; also referred to as remote site.

Out-of-Center (OOC) telemedicine: This model utilizes the patients' and providers' own technology (laptop, cell phone, etc.) from wherever they choose to access the physician's system.

e-Health: The application of information and communication technologies across the whole range of functions that affect the healthsector.

Electronic Health Record (EHR): An electronic record that can be maintained directly by providers and patients that securely holds information and data relating to patient health history, medication, and care received.

Informed Consent: Voluntary permission given, in a context of understanding by the patient (or where appropriate their caregivers), to the purpose, procedures, benefits, risks and rights relating to their use of a technology or service.

Live interactive: Synchronous telemedicine in which information exchange such as two-way audiovisual interactions are occurring real-time between the originating and distant sites.

Originating Site: Any safe, private location the patient is located.

Peripheral Device: Devices that communicate with a computer, phone, or other device (e.g., scanners, mouse pointers, printers, keyboards, pulse oximeters, weight scales, fall detectors). Includes some diagnostic equipment such as electronic stethoscopes, digital otoscopes, etc.

Privacy: The state afforded to patients whereby their right to control information (including images and data) relating to their health and lifestyles is both recognized and respected.

Store and Forward (S&F): A type of asynchronous telehealth encounter or consultation where digital images of a patient are forwarded asynchronously in order to assist in diagnosis or treatment.

Synchronous: Occurring in real time, typically an interaction between a patient and provider occurring over an audio-video communication platform. Live, interactive visits occur synchronously (in real-time).

Teleconferencing: Interactive electronic communication between multiple users at two or more sites that facilitates real-time voice, video, and/or data transmission.

Teleconsultation: The means by which clinicians and other health care practitioners use telephone or videotelephony to consult with patients and their care providers.

Telehealth: The means by which technologies and related services at a distance are accessed by or provided in order to facilitate patient's empowerment, assessment, or the provision of care and/or support in relation to needs associated with their health (including clinical health) and well-being.

Telemedicine: The delivery of medical care at a distance by clinicians and other health care staff, via telecommunications technologies.

Telemonitoring: The use of communications technologies to remotely collect/send data relevant to the health and well-being of a patient to a monitoring facility to assist in diagnosis and monitoring.

Tele-presenter: An individual, located at the distant site, who provides support to the patient and the telemedicine consulting provider in completing the physical examination and/or telemedicine activity.

Videoconferencing: Real-time two-way transmission of digitized video images between two or more locations

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TELEMEDICINE SUPPLEMENTAL RESOURCES

Please see the [Telemedicine Supplemental Resources](#) for additional online tools and information about telehealth practices, laws, regulations, and reimbursement.



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