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Ten Rules for Implementation of a Telemedicine Program to Care for Patients with Asthma

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Glossary:

ACT: Asthma Control Test

CMS: Center for Medicare and Medicaid Services

COVID-19: Coronavirus Disease 2019

CPT: Current Procedural Terminology

DTC: Direct to Consumer

FVV: Facilitated Virtual Visits

HIPAA: Health Insurance Portability and Accountability Act

IMLC: Interstate Medical Licensure Compact

M-Health: Mobile Health

RPM: Remote Patient Monitoring

TM: Telemedicine

32 Introduction

33 According to the American Telemedicine Association, telemedicine (TM) is the “the remote delivery
34 of health care services and clinical information using telecommunications technology” (1) The use of
35 Telemedicine to care for patients with asthma and allergies has been increasing recently and its use has
36 accelerated in response to COVID-19. Types of live (or synchronous) TM visits that have been used for
37 asthma care include Direct to Consumer (DTC) and Facilitated Virtual Visits (FVV). Asynchronous
38 methods to care for asthma have included remote patient monitoring (RPM) and use of mobile health
39 applications (m-Health). Asthma is a challenging condition to manage since it presents with varying
40 severities, a multitude of triggers, and variable responsiveness to treatment. TM has been used
41 successfully to improve asthma control, decrease its severity and provide a better quality of life while
42 improving medication adherence and decreasing use of healthcare resources. (2-7)

43 Brown and Odenthal showed success in improving Asthma Control Test (ACT) scores and FEV%
44 using telemedicine among asthmatics during a 12-month period. (8) However, it was not known how
45 this compared to traditional in-person visits. Using TM, asthma control has been found to be not inferior
46 to in person visits in outpatient settings. (4, 9, 10) TM also has demonstrated benefit in helping to
47 improve proper administration of inhaled asthma medication and treatment adherence. (11, 12) A meta-
48 analysis did not show a negative effect of using real time TM to improve asthma education in school
49 aged children. (13) Furthermore, a recent article of TM care delivered by an asthma specialist (allergist
50 or pulmonologist) and a psychologist in an inner-city school demonstrated improvement in Composite
51 Asthma Severity Index (CASI) scores and medication adherence measured and reduced healthcare
52 utilization via a Propeller Health web platform. (3)

53 Information and Communication Technology applications also have been helpful for the
54 management of asthma using TM. These include use of internet-based platforms, use of e-mails and text
55 messages and video chats via computer or other electronic devices (e.g.: smartphones, tablets) (14-16)
56 Online interactions between providers and patients can be helpful in managing a patient’s asthma. One
57 study done in Denmark using an internet based interactive asthma monitoring tool resulted in
58 improvement in asthma symptoms, medication adherence, pulmonary function and airway
59 hyperresponsiveness. (17) However, studies are still needed to show whether asthma telemonitoring
60 with feedback from a healthcare professional is effective in decreasing the onset of exacerbations, visits

to emergency department or hospital stays. (2) The use of traditional instruments with new telemonitoring technologies can be instrumental for improving clinical outcomes. This is important, since traditional instruments for asthma care (for example, written asthma action plans) have shown variable clinical benefit. (5, 7)

According to a 2016 AMA survey of practices that use TM by specialty, an average of 15% of practices in all specialties use TM for visits between providers and patients. (18) Though the use of TM has been shown to be effective for treating patients with asthma, only 6% of allergy practices used TM, making allergy/immunology the specialty with the lowest adoption rate of any of the surveyed specialties. Specialties with the highest use of TM were radiologists, primarily due to their use of asynchronous store & forward. Other specialties with high TM use included cardiologists who did a lot of remote patient monitoring and psychiatrists who rely extensively on talk to manage patients. Allergists, who have traditionally relied on skin tests and allergen immunotherapy to manage patients have not been as quick to adopt TM, though this is likely to change due to COVID-19

The pathway to creating a successful TM program should include a thorough understanding of the different telehealth options. Providers should ask themselves what their goals are. It should be clear how their asthmatic patients will benefit from these new programs. Also, patient goals need to be incorporated into the program. A successful program will adhere to state laws and ultimately must generate a strong return on investment.

Rules for Starting a Telemedicine Program

The use of TM has increased in part because COVID-19 has encouraged patients and providers to maintain social distancing which reduces the risk of infection. After all, as mentioned in a recent editorial, the only infection that can be transferred using TM is a computer virus. (19) Because of the increased need to use virtual visits for patient care, providers have needed to convert to a new technology quickly. To help with this process, we propose the following 10 rules for converting to TM.

Rule 1: Understand the different types of telemedicine and use appropriate ones to treat your asthma patients

Several types of TM can be used to provide care for patients with asthma. (Figure 1) Depending on the goals of treatment these can consist of direct to consumer (DTC), facilitated virtual visits (FVV),

remote patient monitoring (RPM), communication via patient portals, m-health and use of E-consults. Each of these can be used to help patients with asthma depending on what is needed. It is important to choose a platform based on whether the visit needs to be synchronous or asynchronous, ongoing or intermittent and monitored or patient-managed.

Direct to Consumer (DTC)

During the pandemic, this has become the most commonly used type of TM. With DTC the patient is located at an originating site (e.g.: personal residence, school, workplace) and the provider is located at a distant site (e.g.: hospital, office, provider's home). In a typical scenario, a provider located at their office connects to a patient who is located at their home using 2-way live video. The patient uses their own equipment making it possible for them to be seen at their home. Therefore, they need to have use of a smart phone, tablet device or computer with video camera and a reliable internet connection.

A physical exam using digital exam equipment is limited to whatever can be observed using the device that the patient has available. While patients can report their current weight, height, pulse and respiratory rate, this usually limits the exam to the skin and general impressions of respiratory distress. Blood pressure can be documented if the patient has a blood pressure cuff at home. An example of a physical exam that can be documented using limited equipment is shown in Table 1. Such visits generally are limited to evaluation of established patients where a physical exam is not required. For an initial encounter, a limited physical exam can be performed and documented, however, the most common model when seeing a new patient is to bill the patient directly and not to use CPT codes. Some of these requirements have been relaxed during COVID-19; however, the waivers are likely to expire as the pandemic continues.

Facilitated Virtual Visit

Some patients do not have access to the necessary infrastructure (Wi-Fi, Smartphone, etc) for a DTC visit or they have a condition that requires a physical exam. For these patients, a facilitated virtual visit (FVV) may be needed. To have this type of visit, the patient needs to travel to an accessible location that has digital equipment required to perform a physical examination. In addition to 2-way video equipment, FVVs also require the presence of a telefacilitator and digital exam equipment. The telefacilitator should be trained to operate the video equipment and to use diagnostic equipment so that the provider can properly evaluate the patient. Depending on the type of examination required, equipment may include

digital stethoscope, blood pressure cuff, thermometer, scale, otoscope, ophthalmoscope, dermascope or even ultrasound. This type of visit usually is done synchronously; however, an asynchronous visit for a physical exam to supplement a DTC video visit also is possible.

Remote Patient Monitoring

Remote patient monitoring (RPM) involves collecting personal medical data from an individual in one location and electronically transmitting that information to a provider or case worker at a distant site. It has been available in various forms for several decades and its use is now increasing with newer wearable technologies. (20) For asthma care the information also may include home spirometry results, peak flow readings and monitoring of asthma diaries. The results are forwarded to the asthma provider for interpretation followed by recommendations.

Some key trends in RPM include monitoring patient's temperature, oxygen saturation, pulmonary function, peak flow, blood pressure/glucose and weight. Information obtained with a home spirometer is comparable to a standard benchtop sized commercial spirometer for measuring parameters such as FEV₁ and FVC. (21) Once the diagnostic tools are identified, providers need to know about their availability/integration and interoperability and the ease of use for their patient population. Since 2018, Medicare has paid for remote patient monitoring devices billed under the Current Procedural Terminology (CPT) code 99090. The benefits of using RPM include its convenience and the ability for ongoing continuous monitoring of patient response to treatment.

The use of digital inhalers for real-time monitoring of inhaled medications has the potential to improve adherence and modify behavior by using real-time feedback. The devices use bluetooth to connect to a smartphone app that stores usage data and can alert the user if any of the programmed parameters are outside of the recommended range. The two most studied devices are Propeller (Propeller Health) and the ProAir Digihaler (TEVA). The Digihaler is a digital inhaler with built-in sensors that can detect, record and store information related to use of the inhaler and measure inspiratory flow rates (L/min). The initial inhaler contained albuterol, however, another device with an inhaled corticosteroid (fluticasone) is also in development. Digital inhalers have been shown to improve medication adherence (22) (23) and to improve asthma control or symptoms. (24) (25) (26) Reduced utilization due to asthma also has been reported. (27) (28)

146 M-health

147 If there was a “silver lining” to the COVID-19 pandemic, it is that providers and patients have
148 become familiar with mobile health (m-health) applications. (6) M-health involves the use of electronic
149 devices to bring about a health change. This can range from patient self-management of asthma using an
150 electronic diary to use of pollen count or air quality information that might trigger asthma symptoms. M-
151 health does not necessarily require active monitoring by a physician. It is most commonly used to
152 reinforce patient education, provide medication reminders and appointment reminders. (10)

153 In 2020, there were more than 400,000 healthcare apps available in the app stores; however, very
154 few of them have been shown to accomplish a targeted goal. (29) Similarly, numerous types of
155 electronic devices have been used to positively affect asthma outcomes but have not met specified
156 objectives or have not been validated. In fact, apps are not regulated or approved by the FDA unless they
157 are connected to a medical device for a specified purpose. (30) However, innovative mobile asthma
158 applications continue to try to improve on traditional asthma resources such as asthma action plans and
159 asthma diaries.

160 Many apps that claim to improve asthma outcomes have not been reviewed or validated to ensure
161 that they do indeed benefit patients with asthma. In 2013, a Cochrane review found insufficient evidence
162 for the use of an App in routine asthma care. (31) One study evaluated a mobile health application that
163 did not decrease ED visits, Urgent Care visits, or hospitalizations. (6) Another recent app,
164 ASTHMAXcel, was found to improve asthma education as measured using the Asthma Knowledge
165 Questionnaire. However, the authors concluded that although knowledge scores were increased, better
166 knowledge scores were attained with the human-educator group. (32) Despite this, the authors continue
167 to improve on their app using patient engagement strategies, such as periodic updates and gamification
168 for the pediatric population. Another app, the Scripps Asthma Coach, demonstrated improved Asthma
169 Control Test (ACT) scores, decreased use of corticosteroids and improved lung function. (33) Many
170 other apps have demonstrated improvement in different aspects of asthma care and potentially lowering
171 the overall cost for asthma care. (14, 24, 34-38)

172 E-consults

173 E-consults have been used successfully to avoid unnecessary or inappropriate consults and can lead
174 to a more efficient use of a specialist’s time. E-consults also can be a good source of referrals for asthma

175 specialists. The University of California- San Francisco and San Francisco General Hospital were
176 successful in reducing the numbers of consults in which specialists were unsure of the reason for
177 consultations by almost 50 percent in medical specialty clinics, and by almost 75 percent in surgical
178 specialty clinics. (39) A service like this would tend to discourage services of low value and make
179 proper use of the specialist's time. One study done at Massachusetts General Hospital found that most
180 e-consults can be completed in about 10 minutes, and referring providers usually received
181 recommendations within one 1 day. (40) With the shortage of asthma specialists and the wait time for
182 getting an appointment, E-consults are likely to become a very popular option.

183 Patients can benefit significantly if community providers use E consults to triage referral to
184 allergists. Allergists are experts in conditions that require their expertise. As healthcare transitions to
185 value-based reimbursement, asthma specialists will be incentivized to deliver care-based services that
186 are not redundant or of low value. Specialists can encourage management of low acuity asthmatics by
187 the primary care provider either the use of e-consults. Since primary care providers can get an answer
188 regarding the appropriateness of a referral in a timely manner, the relationship between the generalist
189 and specialist can be further strengthened.

190 Rule 2: Stay Up to date with State and Federal Telemedicine Laws

191 During the COVID-19 pandemic there have been almost daily changes in TM laws and regulations.
192 As federal, state and local regulatory laws and licensure requirements change, providers need to keep up
193 to date. Organizations such as the National Telehealth Policy resource center can provide information
194 regarding current laws and regulations for all fifty states and the District of Columbia. (41) Other
195 organizations such as the Joint Commission for Accreditation of Hospitals have agreed to allow
196 hospitals that receive telemedicine services to accept the credentialing and privilege status of providers
197 who practice in another hospital. (42) Furthermore, there is no requirement that TM be delineated as a
198 separate privilege. Still, one should always check directly with the patient's health plan to determine its
199 requirements for TM services.

200 The Center for Medicare and Medicaid Services (CMS) has relaxed guidelines to allow the use of
201 non-certified HIPAA compliant telehealth tools. Permitted tools included HIPAA-compliant vendors
202 (e.g.: Zoom for HealthCare, Skype, Doxy.me, Go to Meetings) and non HIPAA-compliant platforms
203 (e.g.: Zoom, Teams, FaceTime, What's App, Google Hangout). Some platforms generally not allowed

due to security concerns include FaceBook Live, twitch and TikTok. It is likely that some of non-HIPAA compliant platforms will no longer be allowed after COVID-19 since they could pose serious security risks.

States laws specify that a provider needs to be licensed in the state where the patient is located. However, The Interstate Medical Licensure Compact (IMLC) allows physicians to practice in a state without a license in that state if the state is a member of the compact agreement. (43) Before physicians can participate in the compact, they must designate their State of Principal Licensure, complete an application, and then receive a formal letter of qualification from that state verifying that they meet the compact's strict eligibility requirements. The IMLC currently includes 29 states, the District of Columbia and the territory of Guam. Other states have pending bills to join the compact that are awaiting passage.

Credentialing and privileging depend on the requirements of the facilities where the physician practices. Still, many insurance companies have specific recommendations for appropriate credentialing requirements. Furthermore, medical boards define what constitutes a proper patient-physician relationship for a telehealth encounter.

Rule 3: Pick a Platform

Since COVID-19 began, the number of video platform options for TM has increased. Typical platforms are web-based with video conferencing abilities. Providers are now able to connect with their patients almost anywhere if there is an adequate internet connection available. Ideally platforms should be cloud-based making it easier to provide care from different locations. Simplicity is the key. A platform that can be used with a simple link that avoids the need for downloading an application is more likely to keep your patients satisfied. Since many patients are not digitally literate, some hand holding will be necessary in many cases.

The platform needs to be HIPAA-compliant, easy to use and reliable with low latency. Some platforms are integrated into a TM environment that includes an Electronic Health Record (EHR) while others consist of stand-alone video services. Examples of integrated platforms include American Well, Intouch Health/Teledoc Solo and AMD Connect and Care. Examples of stand-alone platforms include Zoom, Microsoft Teams, Citrix Gotomeeting, Doximity, Polycom Realpresence, Doxy.me, and Facetime.

Some features to consider when choosing a platform are shown in Table 2. (44) Examples of commercial platforms include InTouch/Teledoc, American Well, AMD, Chiron Health. Doxy.me has been very popular during the Pandemic due to ease of use. Another popular alternative includes Doximity. Many providers are using Microsoft Teams that is part of Office 365. Since there has been a temporary waiver of strict HIPAA compliance, several platforms are being used when normally they would not be permitted including What's App, Skype and Zoom.

Some questions that should be considered when selecting a platform include:

- Does it support a spike in traffic?
- Are an adequate number of licenses available for all providers who need one?
- How accessible is provider support? Since support can be an issue, we must stress that ease of use is vital, and products need to be simple. Providers don't want to be bogged down with technological issues. TM is a tool that needs to be almost invisible to the user while at the same time allowing good patient care.

Rule 4: Build the Infrastructure

Before seeing patients by TM, ensure that you have an adequate infrastructure to perform a DTC or FVV visit. This includes having the necessary equipment and a reliable internet connection. To most efficiently see patients by TM, it helps to use a computer with a double monitor in which one is used to communicate with the patient by video and the other is used for the electronic medical record. If a single monitor is used, it may be necessary to reduce window sizes or to switch from one application to another during the visit, which can reduce the efficiency of documentation. Some electronic medical records have an integrated TM capability so that the video window is embedded in the health information, however, greater monitor screen area is always helpful.

It also helps to use a professional-looking background to do TM. This can consist of an image of an exam room or of an office with bookshelves. Some platforms permit the background to be blurred while others allow for the insertion of an image of a background. The goal is for the virtual consultation room to have a professional atmosphere so that a proper physician-patient relationship is achieved. (45)

Rule 5: Offer Telemedicine Appointments

Once the TM infrastructure is in place, it is time to offer patients a choice of an in-person visit, a TM visit, or possibly even a telephone visit. Many patients who are used to being seen in-person may prefer to be seen using DTC, particularly if they have experienced it during COVID-19. It helps to ask rather than to assume that they should resume in-person visits once they become available.

After an appointment is made for a DTC visit, the patient should be provided with information about connecting to the visit. An example of this type of information using Microsoft Teams as the DTC platform is shown in Table 3. This can be sent via a patient portal or by sending a direct URL link via e-mail. If e-mail is used, it is important to avoid personal health information because e-mail is not HIPAA compliant. Some patient portals can allow patients to schedule either an in-person or DTC visit depending on the provider's availability. The patient should be asked whether they have internet access and equipment to do a video visit during this pre-planning phase. If patients do not have that ability, then an in-person visit or possibly a telephone visit should be offered. It also helps to verify the patient's communication preference for future visits. Staff also should update insurance information and pharmacy location during this initial contact.

If you plan to see patients both by TM and in-person, you should decide whether to schedule one type of visit in a block of time or whether to mix the two types of visit together. There are advantages and disadvantages to each strategy. A disadvantage of scheduling one type of visit per block of time is that the number of TM and in-person visits that you can offer is fixed. If more patients prefer one type of visit, your schedule may not have enough open slots to accommodate them. An advantage is that you don't have to switch from one type of visit to another during a busy clinic as you would if the types were mixed.

It is likely that one type of visit will tend to have a different duration for one type of patient than for another. In general, TM visits tend to be shorter since the visits usually are more problem-focused with less chit chat. Even though less time is spent with each visit, patients usually are as satisfied or more satisfied with TM visits than they are with in-person visits. The best approach may be to see patients using both types of encounter and determine how long each takes. Schedules can then be adjusted for the appropriate amount of time.

Rule 6: Get Informed Consent

Medicaid rules state that the patient must consent to being seen by TM. (46) This consent can be obtained either by the referring, consulting or distant site provider. The requirement for a separate consent specific to TM is due to concerns over health information security and ensuring that the patient fully understands what takes place during a TM encounter. When obtaining consent, it is important to explain what TM is, the expected benefits and possible risks associated with it, and to explain security measures that will be used to protect patient privacy. Patients should also have the option to decline a TM visit, especially if they would prefer an in-person visit instead.

While rules may vary with each State, most informed consents are valid for 1 year and do not need to be obtained prior to each visit. Informed consent may be documented either as a written consent or verbal consent. Consent is required both to provide a TM visit and for treatment using TM. Consent forms can be filled out using a patient portal if one is available. Pediatric patients may require consent from parents. Though legally it is necessary to document consent, it is more important for the patient to understand what a TM consult consists of. Sample telehealth informed consent forms can be obtained from the Telehealth Resource Center at <http://telehealthresourcecenter.org/>.

Rule 7: Prepare for the visit in advance

Ideally you should prepare for a TM visit in the same way that you would prepare for an in-person visit. You should review the patient's asthma history and review lab work, consultation reports, previous images, spirometry, vital signs, hospitalizations and other data that might affect a patient's asthma status. Information from an e-device (i.e. inhaler usage, asthma diary, etc.) should be reviewed prior to the visit if available.

Rule 8: See the Patient

At the beginning of a TM visit, it helps to verify that you can be seen and heard by the patient and that you can see and hear them. You should state your location and verify the location of the patient at the start of a visit. Remember, you may see the patient only if they are located in a State where you are licensed to practice medicine (see rule 2). If the patient tells you that they are located in a State where you are not licensed, you will need to determine whether licensure requirements have been waived for TM in that state. If you are not able to see the patient due to license issues, it may be necessary to reschedule the visit.

When taking a history, you should ask the same questions for a TM visit as for an in-person visit. Remember to look into the camera when talking to the patient and to explain what you are looking at if you need to look away to see the electronic medical record or for another reason. Consider sending questionnaires for standardized instruments such as the asthma control test (ACT) electronically to the patient prior to the visit so that the results are available when the patient is seen. During the visit, results of labs and other types of information can be reviewed with the patient using a screen share option if available.

Current guidelines recommend that patients with asthma should have measurements of pulmonary function such as spirometry or fractional exhaled nitric oxide (FeNO), however, this can be problematic during COVID-19 since these procedures can generate aerosols. In a recent update on COVID-19, The AAAAI concluded that “Nebulizer therapy, spirometry, sputum induction and rhinoscopy are all considered high-risk exposure.” (47) The American Thoracic Society recommended that “pulmonary function testing be limited to tests that are only essential for immediate treatment decisions and that the type of pulmonary function testing be limited to the most essential tests when possible.” (48) One advantage of using TM to treat asthma is that appropriate patients can be encouraged to obtain personal devices that can measure pulmonary function tests such as FEV1 and peak flow without the risk of COVID-19. The results of such home tests can be used to assist management of patients in lieu of office measurements.

The use of asthma action plans and decisions regarding what treatment to recommend doesn’t really change when patients are seen by TM. Allergy testing can be done using in-vitro tests. Similarly, measurement of total and specific IgE along with eosinophil levels, both required to determine the optimal biologic to recommend for patients with severe asthma, can be done at any laboratory equipped to do those tests regardless of how the patient is seen.

Telehealth can be used to care for asthmatic patients who are new or in need of a follow up visit. However, at times the diagnosis of asthma can be unclear and the patient will need to have an in person visit to undergo objective measures. The use of office based testing such as spirometry, oximetry, FeNO, can help to distinguish conditions that mimic asthma. In these cases the patient will be encouraged to follow up with the asthma specialist in their office. Once the diagnosis of asthma is clear

via history or previous objective measures then future visits can be done via telemedicine. Patients on home biologics can then be followed via a virtual visit.

Rule 9: Perform a Physical Examination

One common lesson taught during medical training was to be able to determine whether a patient is well or not well simply by looking at them. This principle also applies when observing a patient with asthma by TM. You should be able to determine whether the patient demonstrates any signs of respiratory distress such as nasal flaring, coughing, pallor, use of accessory muscles, cyanosis, chest retractions, unable to speak in complete sentences and prolonged expiratory phase. At times you may be able to hear wheezing with the proper speakers and microphone. Sound-reduction headphones may improve your ability to hear subtle sounds. If the patient seems unstable or is clinically worsening during the evaluation, they should be instructed to call 911 or go immediately to the emergency room. TM is not the proper venue for seeing patients with acute medical conditions that require immediate attention.

Virtual examinations using a facilitated telemedicine platform can be quite simple since objective measures can be attained using digital medical equipment. Peripherals that can assist in the evaluation of an asthmatic include a digital stethoscope with which a patient's lung sounds can be heard and possibly recorded. High resolution cameras with an otoscope or a dermascope can be used effectively with the help of a trained tele-facilitator. Facilitators also can be trained to perform spirometry at the origination site if needed. Some patients might have digital equipment at home such as a blood pressure cuff, pulse oximeter or thermometer. Although peak flows can be effectively measured at home, home spirometry is also available. (21, 49) Home spirometers can be quite helpful in providing additional objective measures but the cost might be prohibitive for many patients. Furthermore, a respiratory rate can be determined visually.

The patient's medications and pharmacy information should be confirmed by a staff member before the visit with the provider occurs. Medications can be prescribed and renewed at the time of the visit. This can be done either by a picture in picture or a double screen. While discharge instructions should be described verbally, the patient should be provided with written instructions that can be sent ideally using a patient portal or less ideally via text, email, fax or by mail to the patient's home.

Rule 10: Bill for the Encounter

Changes in legislation have allowed for TM encounters to be paid for at parity with in-person visits. Though many health plans paid for TM before COVID-19, it was not necessarily at a rate that was equivalent to an in-person visit. On April 1, 2020, CMS encouraged the use of Place of Service (POS 11) to bill office visit codes 99201-99215 with modifier 95 on every telehealth visit performed with patients via audio-video. This was regardless of where the patient or the providers were located. (50) Currently facilitated, direct to consumer and even telephonic visits for some insurers can be billed at full parity depending on state regulation and insurance guidelines. However, CMS, Medicaid and commercial plans have been known to have different guidance on billing. It is important to keep up to date with respect to changes in reimbursement and the use of codes necessary to obtain it.

Sample Workflows

When seeing patients by TM it helps to create a workflow similar to that used for an in-person visit. (Figure 2) TM is not meant to change the way you currently see your patients. It has been common practice for workflows to change, staff to be retrained and job description to change to accommodate these workflows. A simple video capability that has become popular among providers is Doxy.me, especially for private practitioners. A diagnostic telemedicine option that is commonly used is AMD Global. Below are two examples of how these platforms can be used in a direct to consumer scenario. Note that these are only examples and that many other platforms have similar capabilities. You should determine your own preferences when evaluating which platform is best for their practice.

Example 1: Direct to Consumer- using Doxy.ME

Doxy.me has become a very popular platform for DTC TM during the COVID-19 Pandemic. It comes as a free app (an optional paid clinic or professional version is available), that is easy for patients to use since it does not require them to download anything. It also is HIPAA compliant and it offers the option of signing a Business Associate Agreement. You can send a text to the patient only with a paid subscription, however, with the free version only an email can be sent which is less secure.

Originating Site: Patient is in their personal residence

Distant Site: Provider is in their medical office

1. Submit the patients email or text them (paid version). You can use the free version and send the link via a free text platform (. i.e. textfree.us) Patient does not need to download an App.

2. Patient will receive the invite and will need to permit access to their microphone and camera
3. Provider is notified when the patient arrives in a virtual waiting room. If the provider is available, the patient is allowed to enter the visit. If the provider is busy, the patient waits in the virtual waiting room. The provider or an assistant can send a chat to the patient letting them know the status of their visit.
4. The patient is seen and a limited examination is performed as appropriate.
5. Documentation can be done in the electronic medical record at the same time as the patient is seen using picture in picture or by using a double monitor.
6. Prescriptions are sent to the patient's pharmacy and discharge instructions are sent to the patient.

Example 2: Facilitated Virtual Visit- using a platform that supports digital exam equipment

Intouch Health/Teledoc has become a popular platform for facilitated virtual visits. The provider interacts either with a stand-alone app or in some cases with an app that is integrated into their electronic medical record. The originating site with the patient usually is a satellite clinic that is closer to where the patient lives than the provider's primary clinical location. The equipment at that location can consist of a telemedicine cart with 2-way video and remotely controlled camera or any computer can be set up to serve as a telemedicine sending station by installing Intouch/Teledoc's software. Digital exam equipment can be attached to either device.

Originating Site: Patient is at a satellite clinic

Distant Site: Provider is in their medical office

1. An appointment is made for a facilitated virtual visit.
2. On the day of the visit, the patient arrives at the clinic.
3. Routine check-in procedures occur. This includes filling out forms, obtaining vital signs and then taking the patient to a TM sending room.
4. The telefacilitator notifies the provider when the patient is ready to be seen.
5. The patient is seen. A physical examination is performed with the facilitator operating digital exam equipment at the direction of the provider.
6. Documentation can be done in the electronic medical record at the same time as the patient is seen using picture in picture or by using a double monitor.
7. Prescriptions are sent to the patient's pharmacy
8. Discharge instructions and other information is printed to the origination site for the patient to take with them
9. Blood tests can be obtained in the clinic if venipuncture services are available

Conclusions

Allergists are in a unique position to care for patients with asthma and allergic disorders. The use of TM offers the ability to see patients at a distance, either in a more convenient clinic or in their personal residence during COVID-19. This should be seen as another option for providing patient care that is

more convenient and potentially safer than in-person visits. Although some clinical services should be reserved for in-person visits, many visits can be done using TM.

During this difficult time, TM has been instrumental in providing care to patients who were unable to be seen in-person. We should continue to build on this experience by expecting insurance carriers to continue providing appropriate coverage and payment for TM encounters. Organizations such as Association of American Medical Colleges' have been in contact with CMS and state governments to ensure that legislation that current TM waivers including payment and licensure become permanent.

Telemedicine is a tool that can help enhance existing quality metrics and patient outcomes in asthma care. With its current widespread usage, telemedicine data tools are being used to generate telemedicine specific metrics. Recently, the National Committee for Quality Assurance (NCQA) in its updates to the Healthcare Effectiveness Data and Information Set (HEDIS) removed restrictions on the number of telehealth visits to improve the Asthma Medication Ratio. (51) Health systems will be able to improve metrics like these to optimize asthma care using various forms of telehealth options. Still, other telemedicine specific metrics related to asthma are lacking and needs to be developed. Metrics on usage, patient satisfaction, quality of technology, etc. for care provided by asthma specialists are needed. The authors of this article envision that organizations that invest in telehealth will have an advantage in improving these quality metrics and outcomes in asthma care. This will enable these organizations to show who really is providing the best care which will translate to the eventual acquisition of a greater market share.

Future research on the delivery of asthma care using TM is needed. Controlled studies are needed to evaluate how the patient-provider relationship is altered when TM is used. In addition, we have encountered that in the South Bronx that many asthma patients and/or their parents have poor digital literacy and lack of technological infrastructure to perform an adequate telemedicine visit.-Additional investigation into ways of using different technologies to achieve these goals is important, keeping in mind that access to the internet is now a social determinant of health. We must also determine what happens to high utilizers of medical care during this Pandemic. In particular, it is important to determine whether TM can provide care that is comparable to an in-person visit. After reviewing this information,

463 we will be able to answer the simple question of whether TM can meet the standard of care in the
464 management of asthmatic patients.

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Tables

Exam:

Vital signs: Weight- Height- Resp Rate- Pulse-

General: No apparent distress. Awake, alert, well-appearing.

HEENT: Normocephalic and atraumatic. Mucous membranes are moist. No periorbital edema. Facial muscles move symmetrically.

Neck: Neck is symmetrical with trachea midline.

Eyes: Conjunctiva and eyelids normal bilaterally. Pupils equal and round bilaterally.

Sinuses: Patient/guardian was able to touch the face with no tenderness. No frontal or maxillary tenderness.

Respiratory: breathing unlabored, no tachypnea, no nasal flaring, no coughing, use of accessory muscles, chest retractions, unable to speak in complete sentences or prolonged expiratory phase.

Cardiovascular: No edema, no pallor, no cyanosis.

Abdomen: Non-distended.

Skin: No concerning rash or lesions observed on exposed skin.

Extremities: Normal range of motion observed. No peripheral edema.

Neuro: Mood and behavior appropriate for age.

Musculoskeletal: Symmetric and appropriate movements of extremities.

Table 1: An example of documentation of a physical exam that can be done using limited digital equipment.

487

Feature of Platform	Description	Used for which type of TM
2-way video	Patient and provider can see and hear each other in real-time	Synchronous DTC and facilitated visit
Multipresence	More than 1 provider and/or patient can participate at a time.	When parents are at a different location than their child. To to invite a consultant to participate
Mobile Apps available	Can permit patients and providers to participate in video conferencing using a smart phone or tablet when a computer is not available Permits tracking of biomarkers	Synchronous DTC and facilitated visit Remote patient monitoring and e-diaries for tracking patient-generated information
Screen Sharing	Permits providers to show information to patients including test results and instructions Permits patients to show information to providers such as pictures and symptom charts	Synchronous DTC and facilitated visits
Digital Exam Transmission	Permits output from digital exam equipment to be viewed by a provider Can be used to send pictures and patient data to providers.	Facilitated visits DTC if the patient has exam equipment Store & forward and RPM.
Integrated environment	The platform is integrated into the provider's Electronic Health Record. Permits scheduling of appointments, billing and other administrative tasks	Synchronous DTC and facilitated visits
HIPAA Compliant	Transmits information to and from provider in a secure manner consistent with HIPAA regulations.	Any TM activity should be HIPAA compliant

488

489 Table 2: Features to consider when selecting a Telemedicine Platform

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493 **Below there are few steps to be taken prior to your appointment date/time that are essential**

- 494 ▪ Download the TEAMS APP to your smart phone/computer <https://teams.microsoft.com/downloads>
- 495 ▪ Click on the link below if you need assistance. Please choose instructions in language of your choice.
- 496 <https://Domain/form>
- 497 ▪ Click on this pre-registration link provided, verifying the information on your account
- 498 <https://Domain/form>

499

500 **At the time of the visit do the following:**

- 501 ▪ For a video visit, click the Join Teams Meeting link. This is preferred.
- 502 ▪ If you are having difficulty with the video connection, call the indicated phone number and use the
- 503 access code to connect.
- 504 ▪ Please keep in mind this is a virtual meeting room and you may need to wait for the care team just
- 505 as you would in an in-person setting

506 Table 3: Instructions sent to patients prior to a meeting using Microsoft Teams.

507

508 **Legends for Figures**

509 Figure 1: Telemedicine Options to Improve Asthma Care

510 Figure 2: Potential Work Flow in Private Practice for a Synchronous Direct-to-Consumer Visit

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