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# Patient and Clinician Attitudes Toward Telemedicine for Allergy and Immunology



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**The use of telemedicine has increased in allergy/immunology, with rapid uptake of its use during the coronavirus disease 2019 pandemic. Existing data indicate an overall positive view of telemedicine by patients, particularly during the coronavirus disease 2019 pandemic. However, patients and clinicians prefer in-person visits for specific types of allergy/immunology encounters, such as those requiring a physical examination or diagnostic testing. The most data for telemedicine exist with asthma, and provide a model for treatment technique, therapeutic monitoring, and education in other allergic and immunologic conditions. Clinician satisfaction is also necessary for telemedicine to be an enduring option for patient/clinician interactions, and this is influenced by a multitude of factors, including technology quality, reimbursement, and maintenance of patient/clinician relationships. Areas of future research should include the need for more outcome data in additional disease states, which will likely help facilitate improved logistical policies around telemedicine that would facilitate its adoption. © 2022 American Academy of Allergy, Asthma & Immunology (J Allergy Clin Immunol Pract 2022;10:2493-9)**

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## INTRODUCTION

Patient satisfaction with telemedicine is necessary for use of the technology to continue and to expand. It is important to consider the driving factors for satisfaction with telemedicine to improve the experience for both patients and clinicians. In a collaborative effort between the American Academy of Allergy, Asthma, & Immunology and the American College of Allergy, Asthma and Immunology, a Joint Task Force on Telemedicine and Technologic Innovation was created in 2019.<sup>1</sup> The task force had several goals, most notably acknowledging the emergence of telemedicine in the field of allergy and immunology (AI)

and facilitating its adoption in the appropriate clinical settings to help optimize clinical outcomes. Despite the growing presence and recognition of telemedicine in general, its use by clinicians in the United States was relatively low before the coronavirus disease 2019 (COVID-19) pandemic,<sup>2</sup> and this was particularly true of AI clinicians.<sup>3</sup> During the COVID-19 pandemic, use of telemedicine rapidly increased as clinicians were forced to use it due to restrictions on in-person visits. During the transition to telemedicine, information regarding patient and clinician satisfaction has been obtained along with suggestions for appropriate use of the technology in AI. In this article, we aim to highlight these areas and to identify future areas for research.

## TELEMEDICINE DURING THE COVID-19 PANDEMIC

Attitudes regarding the use of telemedicine for health care services have evolved over time as patients and clinicians become accustomed to its use. With the COVID-19 pandemic, there was an abrupt transition from in-person to telemedicine encounters. Ramsey et al<sup>4</sup> examined appointment characteristics during the initial COVID-19 shut down, and reported that more than half the patients cancelled AI appointments at the beginning of the pandemic, with only 2% being evaluated in-person.<sup>4</sup> Despite most encounters being completed through telephone encounters rather than video visits, 75% of encounters were deemed to be complete by AI clinicians. An incomplete encounter was defined if diagnostic testing (skin testing, spirometry, amoxicillin challenge) would have affected management but could not be completed. The same group evaluated patient satisfaction with telemedicine during the COVID-19 pandemic, and reported that nearly 97% of patients were satisfied with their telemedicine encounters, with 77% saying it was as satisfactory as an in-person encounter.<sup>5</sup> The most commonly cited reasons by patients favoring an in-person encounter included more personal interaction, the desire for a physical examination, or need for skin testing. Similarly favorable patient satisfaction experiences have been reported from other settings. A report from a group in the United Kingdom, also from the beginning of the COVID-19 pandemic, cited that 85% of patients reported a “very good” or “good” experience with telemedicine used for a full spectrum of AI diseases.<sup>6</sup>

Even in specialties that may benefit from an in-person physical examination and procedural evaluation, patient satisfaction with telemedicine was favorable during the COVID-19 pandemic. In patients with chronic rhinosinusitis, in-person evaluations were compared with video visits, with no difference in patient-related outcomes or patient satisfaction as determined by the 18-item patient-satisfaction questionnaire.<sup>7</sup> Patients reported similar experiences in regard to interpersonal interaction and communication, as well as time spent with the physician. Similarly in dermatology, a specialty focused on physical examination,

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**Abbreviations used**

AI- allergy and immunology  
 COVID-19- coronavirus disease 2019

multiple studies have shown similar improvement in clinical outcomes and quality-of-life scores in the management of atopic dermatitis.<sup>8,9</sup> In contrast, an analysis by Ragamin et al<sup>10</sup> from the Netherlands on the management of children with atopic dermatitis during the COVID-19 pandemic through telephone encounters with or without patient-captured clinical images reported a lower satisfaction rate as compared with children managed through in-person encounters.

The difference in patient satisfaction reported by Ragamin et al raises the important point that certain clinical situations may be better suited than others to telemedicine, and the clinical situation may dictate the most appropriate mode of health care delivery in hopes of maximizing outcomes and patient satisfaction during the COVID-19 pandemic and beyond. Mustafa et al<sup>11</sup> evaluated more than 400 patient encounters conducted via in-person, video, and telephone encounters. Although there was similar patient satisfaction among all 3 modalities, both patients and physicians were more likely to deem an in-person encounter as complete. Physicians were more likely to report an in-person encounter to be complete for food allergy and chronic rhinitis as compared with video or telephone encounters, whereas patients reported in-person encounters for food allergy to be more complete compared with other modalities. Importantly, patients across all encounter modalities wished to choose an evaluation modality on the basis of clinical situation (Figure 1).

In an AI practice, clinicians must balance the need for procedures such as skin and lung function testing, food or drug challenges, and administration of immunotherapy, with the benefits of remote care.<sup>12</sup> An initial telemedicine appointment may be helpful to triage patients to determine who needs specific procedures, and may obviate the need for in-person appointments in some cases. In addition, when offering telemedicine, clinicians must be aware of health care disparities, and whether certain patients have the necessary infrastructure and ability to complete remote evaluations. Tsao et al<sup>13</sup> showed that patients who successfully completed telemedicine visits during the COVID-19 pandemic were more likely to be White, English-speaking, and privately insured.<sup>13</sup> Patients who do not have the means or ability to adequately participate in telemedicine encounters must continue to receive care with in-person encounters.

### BEYOND THE COVID-19 PANDEMIC: USING TELEMEDICINE TO BROADEN THE REACH OF AI

Given the demonstrated patient satisfaction with telemedicine in a range of AI clinical scenarios, it would behoove our specialty to leverage the benefits of this modality beyond the COVID-19 pandemic. Several studies demonstrate a potential role of telemedicine in providing care to rural areas and regions impacted by clinician shortages. Du et al<sup>14</sup> showed that travel distance was a predictor of patients opting for telemedicine encounters in an otolaryngology practice. A report from Canada demonstrated that telemedicine allowed for AI care to underserved areas, where an average 2-way drive distance exceeded 6 hours.<sup>3</sup>

The inpatient setting has significant potential for telemedicine growth, particularly given the growing emphasis on antibiotic stewardship, and delabeling of penicillin allergy.<sup>15</sup> Telemedicine may be a way to improve access to this service, particularly in hospitals not staffed with AI clinicians. Staicu et al<sup>16</sup> used telemedicine to evaluate inpatients for reported penicillin allergy with the assistance of an advanced practice provider. Of the 50 patients who were evaluated, 46 had a negative penicillin skin test result, and 33 patients transitioned to a beta lactam antibiotic. The cost savings was estimated to be \$30,000, and active physician time (while off site) was approximately 5 minutes. Another opportunity to use telemedicine is in the transition of patients from a traditional health care setting to their homes. For individuals with primary immunodeficiency, health care-related quality of life remained similar despite transitioning from hospital-based to home-administered immunoglobulin replacement facilitated through a remote assistance program.<sup>17</sup>

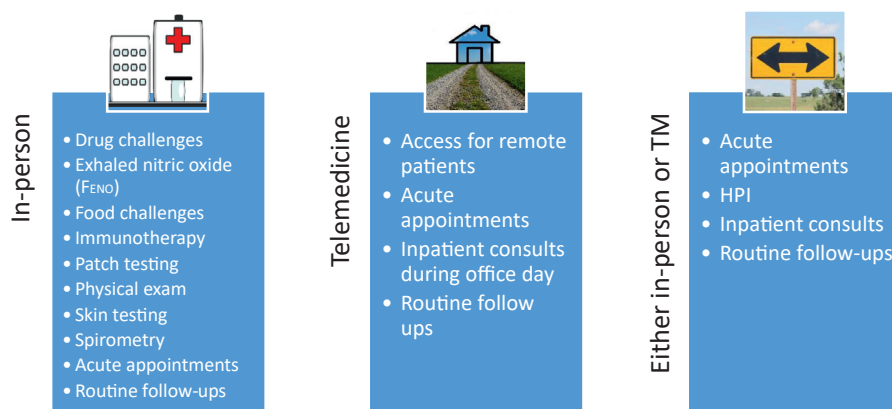
To implement innovative health care delivery via telemedicine, there will need to be consideration in legislation, including aspects of reimbursement. Although Mehta et al<sup>18</sup> demonstrated equivalent reimbursement for telemedicine encounters, office visit models must account for incorporating future diagnostic testing, especially for new patient encounters. In addition, food and drug challenges and immunotherapy are a cornerstone of our specialty and must also be incorporated into a model of care using telemedicine. Lastly, there remains a need to optimize telemedicine platforms that are user-friendly while providing adequate security for personal health information.

### TELEMEDICINE INTERVENTIONS IN ASTHMA AS A MODEL FOR OTHER AI CONDITIONS

Telemedicine has proven to be a means for continuing AI care through the COVID-19 pandemic and for broadening the availability of AI appointments, while preserving patient satisfaction. As stated, certain AI conditions are more easily evaluated and monitored via telemedicine as compared with others. Asthma has the most data regarding patient satisfaction for disease monitoring and evaluation through telemedicine, and this may be used as a prototype for other applications of telemedicine in AI (Figure 2).

#### Telemedicine for device technique

It is well known that asthma medications work only if they are both used and used correctly. Patient inhaler technique can be both taught and monitored via telemedicine. This could be completed by the clinician, nurse, or medical assistant during a telemedicine appointment, depending on appointment structure. A study of 50 patients with asthma or chronic obstructive pulmonary disease evaluated a telemedicine intervention to improve inhaler technique. Patients demonstrated inhaler technique in front of a physician who was monitoring remotely via telemedicine. In 42 patients, there were a total of 71 inhaler errors out of 94 total initial inhaler usages. In follow-up telemedicine evaluations, there were 32 of 81 inhaler errors, which was a significant improvement.<sup>19</sup> The authors tracked patient satisfaction with this intervention, and median patient satisfaction was 9 (interquartile range, 8-10) on a scale of 0 (completely unsatisfied) to 10 (completely satisfied). There are multiple disease states requiring routine observations in AI that could similarly undergo remote monitoring via telemedicine, which could overall improve patient satisfaction with their disease state management.



**FIGURE 1.** Appointment types appropriate for telemedicine, in-person, or both. *HPI*, History of present illness; *TM*, telemedicine.

Proper intranasal spray technique could be demonstrated and confirmed via telemedicine in patients with inadequate symptom control. Subcutaneous immunoglobulin replacement can be fraught with technique difficulties, which could be rectified via telemedicine. Similarly, home administration of Food and Drug Administration–approved biologic agents for asthma could be facilitated through telemedicine. The demonstration of appropriate injectable epinephrine technique for anaphylaxis or “talking through” administration in an emergency scenario is another potential telemedicine application.

### Telemedicine to identify disease flares

There are data surrounding the use of mobile health apps to monitor asthma control. A group of researchers in Seoul, Korea, studied the feasibility of incorporating an asthma action plan into a smartphone app.<sup>20</sup> The app was programmed to “check in” with patients regarding their asthma symptoms and peak flow measurements, and then communicate action steps to patients. Critical emergency values were transmitted to health care team members, who called patients to facilitate management if needed. In this pilot project with 22 subjects in the app intervention group and 22 subjects in the control group, researchers demonstrated that patients found the app easy to use, with 74% of subjects rating the app as “very useful” for asthma care. There was also improved medication adherence in the app group as compared with the control group.<sup>20</sup> Apps with monitoring and “action steps” for patients with a possible acute telemedicine check-in could potentially be designed for patients on immunotherapy to direct how to proceed with a large local reaction or a hypersensitivity reaction outside of a 30-minute window. Atopic dermatitis also lends itself to this type of monitoring, as patients have a baseline care plan that could be intensified through app instruction with flares in disease activity.

### Telemedicine for education

Using telemedicine to provide patient education may have broad applications in AI. Despite this significant potential, there are few data supporting this approach. A meta-analysis by Culmer et al<sup>21</sup> examined the impact of asthma education delivered via telemedicine and asthma outcomes. The meta-analysis included 5 articles, and demonstrated mixed results in asthma symptom control, with some of the studies showing a significant improvement in symptom-free days after telemedicine-delivered

education.<sup>21</sup> One study showed improved caregiver satisfaction after undergoing education through telemedicine,<sup>22</sup> with another showing improvement in pediatric patient use of asthma control tools and resources over time.<sup>23</sup> Studies have also been conducted looking at quality of life with telemedicine,<sup>22-25</sup> but these data too have been mixed,<sup>21</sup> though there have been some promising results. The employment of education via telemedicine for all AI disease states would be a potential high reward addition to traditional patient care. These educational interventions could be completed by other members of the health care team and could reinforce information delivered at health care appointments. A notable obstacle for such educational interventions would be funding such expertise and time expenditures, which would require improvement reimbursement for such endeavors. Further outcome data in this area are needed to affect this potential growth area.

### Telemedicine for improving patient outcomes and demonstrating patient satisfaction

Some telemedicine research has compared patient outcomes and patient satisfaction between traditional in-person visits and telemedicine visits. A study of 79 pediatric patients compared 39 patients receiving 3 in-person visits to 40 patients undergoing 3 telemedicine visits. Both groups had an initial, 30-day, and 6-month evaluations. The authors demonstrated noninferiority in the telemedicine group for asthma control instruments (Asthma Control Test, Childhood Asthma Control Test, Test for Respiratory and Asthma Control in Kids). The telemedicine patient and their families filled out a satisfaction survey, with telemedicine achieving adequate satisfaction and most subjects reporting they would recommend telemedicine.<sup>26</sup> Another asthma study looked at store and forward telemedicine in 10 pediatric patients with asthma. Inhaler use, peak flows, and asthma symptom diaries were forwarded to health care clinicians. This pilot study demonstrated improvement in caregiver rating of patient quality of life in the telemedicine group and overall satisfaction with telemedicine.<sup>27</sup> There is certainly a role for similar telemedicine approaches with other chronic AI conditions, including atopic dermatitis. Much like asthma, patients with atopic dermatitis may have intermittent flares in disease that significantly impact patient and/or caregiver quality of life. Telemedicine has been shown to increase availability of dermatology access,<sup>28</sup> and it is likely that telemedicine care in atopic dermatitis would not be

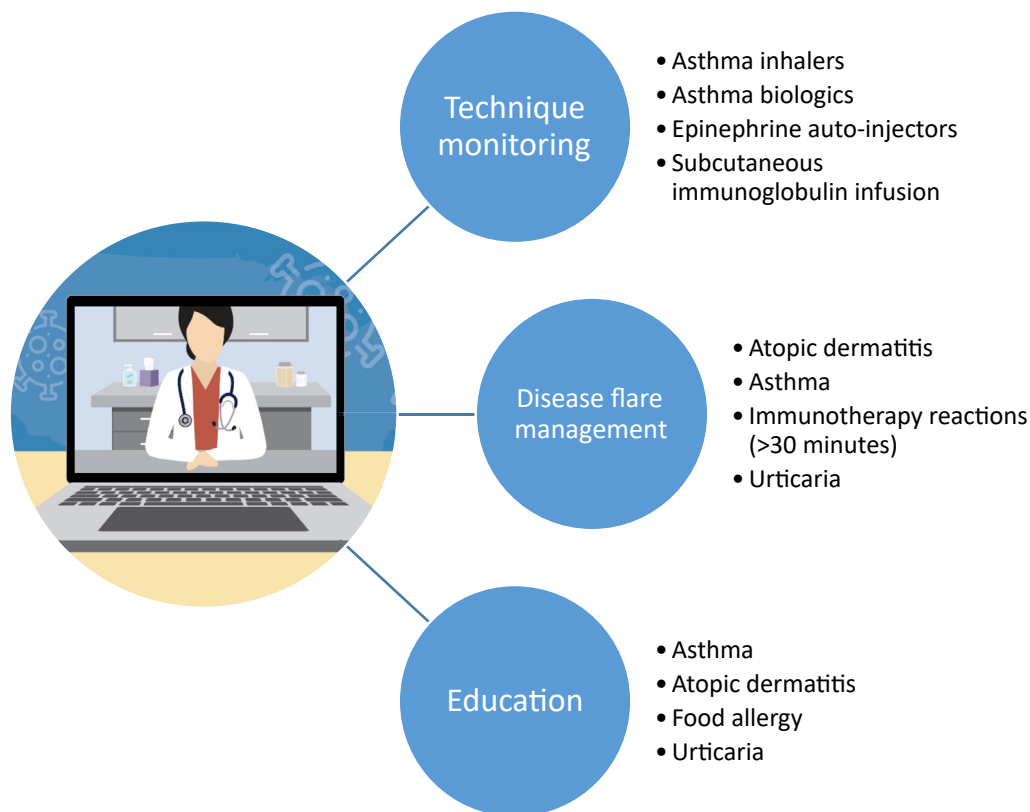


FIGURE 2. Applications for telemedicine.

inferior to in-person care, particularly when a treatment plan is in place and only adjustments in care are needed. Quality of life in patients with chronic urticaria also has potential benefit from treatment modifications delivered via telemedicine. Again, outcome data and patient satisfaction information in these conditions and others is lacking, and future research in these areas is warranted.

### CLINICIAN PERCEPTIONS OF TELEMEDICINE

Most studies of telemedicine tend to focus on patient satisfaction; however, clinician attitudes and satisfaction (both referring and performing clinicians) also are important for a telemedicine program to be successful (Table I). A framework for studying clinician satisfaction was developed using a group of 12 osteopathic and allopathic physicians. This framework included 5 components of satisfaction with care delivery using telemedicine: professional demographics, care settings, motivations, experiences, and overall satisfaction<sup>29</sup> (Table II). Demographic factors include age, sex, race and ethnicity as well as training, specialty, and experience with technology. Care settings include the type and size of practice, location and the availability of technology, and support services. The motivation for clinicians to use telemedicine include a desire to benefit patients (save time, improve satisfaction, reduce costs, and improve relationships), benefit clinicians (less time to prepare, more time with patients, less documentation time, improved efficiency), and benefit quality of care (reduced errors, safer care by avoiding COVID). Experience includes

general expectations of telemedicine, its software and hardware, the quality of video and audio connection, and experience with technical support. Table II indicates which of these factors serve as barriers to use of telemedicine and which may encourage its use.

In a narrative review, Rangachari et al<sup>30</sup> identified factors that influence the use of telemedicine from the clinician perspective. These factors were categorized into macro-level or policy-level factors, meso-level or organizational-level factors, and micro-level or individual-level factors.

Macro-level factors included those that related to policy and regulation such as national coverage and reimbursement restrictions along with variations in coverage for telemedicine services, particularly across states and private payers. From the AI clinician perspective, these may be barriers to providing telemedicine.<sup>31</sup> Reform of these policies will be necessary before telemedicine can be seen as equivalent to in-person visits where these barriers are not present. Other macro-level factors that are seen as barriers include those related to law and ethics such as variations in requirements for clinician licensure and credentialing from state-to-state as well as concerns about privacy and security of data as well as liability issues. Although most malpractice coverage provides protection that includes telemedicine, because this is not universally true, clinicians need to check with their liability insurance and if necessary, obtain supplemental telemedicine coverage. Clinicians also need to make sure that coverage extends to patients who are seen while out-of-state under a licensure waiver if the clinician is not licensed in that state.

**TABLE I.** Perceived advantages and disadvantages of telemedicine as seen by the patient and by the clinician

<b>Patients</b>	
Advantages	
<ul style="list-style-type: none"> <li>• Shorter distance to travel or no travel</li> <li>• Time savings</li> <li>• Possible cost savings</li> <li>• Improved access to AI expertise</li> </ul>	
Disadvantages	
<ul style="list-style-type: none"> <li>• Unable to have a physical examination completed</li> <li>• Procedures such as skin test, immunotherapy injections, and oral challenges cannot be done by telemedicine</li> <li>• Requires technology and an adequate internet connection</li> <li>• Lack of in-person communication/inability to optimize physician/patient relationship</li> </ul>	
<b>Clinicians</b>	
Advantages	
<ul style="list-style-type: none"> <li>• Ability to see patients who live at a distance</li> <li>• Time savings from not needing to travel (eg, to hospital or rural area)</li> <li>• Lower overhead for telemedicine visits</li> <li>• Provides a competitive advantage over other clinicians who do not use telemedicine</li> <li>• Ability to see patient in their homes and potentially determine environmental exposures</li> </ul>	
Disadvantages	
<ul style="list-style-type: none"> <li>• Concerns about reimbursement</li> <li>• Need to be licensed in the state where the patient is located and possibly to be credentialed in a local hospital</li> <li>• Liability issues</li> <li>• Unable to perform physical examination, skin testing, challenges, spirometry, immunotherapy via telemedicine</li> <li>• Lack of in-person communication/inability to optimize physician/patient relationship</li> </ul>	

Societal-level changes that could be seen by clinicians either as barriers or as facilitators for the use of telemedicine depending on specific circumstances include the increasing cost of health care (telemedicine has higher initial costs but fewer ongoing overhead costs), shortages of clinicians and allied health personnel, increasing preference for telemedicine among patients, improving technology for delivering care via telemedicine, the growing use of wearable devices by patients, and the long-term increase in demand for specialty services. Given the current widespread staffing shortages seen throughout health care facilities, telemedicine can allow for continued care with less reliance on ancillary personnel.

At the meso level, the specialty of AI historically has been a low user of telemedicine relative to most other specialties. Although there may be many reasons for this underuse of telemedicine, such as the preference for in-person diagnostic testing, AI clinicians also may simply feel uncomfortable not being physically present, or with sharing the interaction with a telefacilitator. These concerns may be allayed by reassuring data demonstrating that clinicians still report excellent satisfaction with interpersonal relationships, even if they are made through telemedicine.<sup>32</sup> Some of these concerns may be changing due to COVID-19 as AI specialists realize that care can be given using telemedicine without losing the personal connection that they desire, and it can serve to triage in-person visits. In addition, as

**TABLE II.** Framework for evaluating clinician attitudes toward telemedicine

Professional demographics (age, sex, race and ethnicity as well as training, specialty, and experience with technology)
<ul style="list-style-type: none"> <li>• Lack of telemedicine training in fellowship programs—barrier</li> <li>• Older clinicians spend more time documenting with telemedicine—barrier</li> <li>• Need to be flexible and comfortable with technology—favors younger clinicians</li> </ul>
Care settings (type and size of practice, location, and the availability of technology and support services)
<ul style="list-style-type: none"> <li>• Higher initial cost for set up—barrier</li> <li>• Lower ongoing cost due to reduced need for overhead—facilitator</li> <li>• Input into development of the telemedicine program—facilitator</li> <li>• Telemedicine is more likely to be used in larger facilities than in smaller ones—facilitator or barrier</li> </ul>
Motivations (benefits patients, benefits clinicians, improves quality of care)
<ul style="list-style-type: none"> <li>• Inconsistent reimbursement and variations in coverage for telemedicine services—barrier</li> <li>• Various requirements for licensure and credentialing—barrier</li> <li>• Liability concerns with use of telemedicine—barrier</li> <li>• Preference for telemedicine among patients—facilitator</li> <li>• Improved efficiency of documentation—facilitator</li> <li>• Reduced distance traveled and time spent by patients—facilitator</li> </ul>
Experiences (general expectations of telemedicine including software and hardware, quality of connection, technical support)
<ul style="list-style-type: none"> <li>• Concern about changes in the physician-patient relationship—barrier</li> <li>• Loss of control over the visit—barrier</li> <li>• Administrative support for telemedicine—facilitator</li> <li>• Technology that is reliable and easy to use—facilitator</li> <li>• Concerns about patient technical competence—barrier</li> </ul>

novel ways to perform procedures that are traditionally done in-person such as allergy testing and immunotherapy are identified, use of telemedicine may become more acceptable. Mack et al,<sup>33</sup> for example, reported on facilitating home introduction of peanut in high-risk infants through telemedicine. New ways to enhance the patient/clinician relationship could include increased use of asynchronous modalities, monitoring of inhaler use with digital inhalers, and remote monitoring of asthma control. As mentioned at the beginning of this review, both of the national professional societies (American College of Allergy, Asthma and Immunology and American Academy of Allergy, Asthma, & Immunology) have developed tools and resources to facilitate adoption of telemedicine by society members.

At the micro level, individual practices may have a culture that either facilitates adoption of telemedicine or resists it. This will tend to be practice-specific and may partially depend on the type of practice (academic, employed, private). Because AI clinicians tend to enjoy a close in-person relationship with their patients, those who do use telemedicine tend to prefer real-time video over other modalities. This is augmented in part by the availability of reimbursement for telemedicine services.<sup>18</sup> In addition, the realization that many types of encounters can be done by telemedicine has stimulated its use, though in AI, the necessity for in-person testing and challenges remains. Facilitators of telemedicine use include the desire to recruit additional patients and to keep those who are already in the practice. In addition, clinicians cite decreased travel time (both for them and for their

patients), decreased cost, and the ability to avoid exposure to COVID as factors that encourage use of telemedicine.<sup>34</sup>

In one review, clinicians tended to be more satisfied with a telemedicine program if (1) they had input into its development, (2) there was administrative support of the program, (3) the technology was reliable and easy to use, and (4) there was adequate reimbursement for its use.<sup>32</sup> Another aspect of telemedicine that favors its use is its ability to improve the efficiency of documentation. One study found that with telemedicine, clinicians were able to finish more notes on the same day as the patient encounter and they spent less time with documentation outside of normal working hours. The study also observed that older clinicians as well as female clinicians spent more time documenting in the electronic health record after hours than their younger male colleagues.<sup>35</sup> In a study of telemedicine visits by various specialists at a large children's hospital, all clinicians felt that it was safe for their patients to conduct visits by video, and 72.7% reported completing at least some component of a clinical examination using telemedicine.<sup>36</sup> In addition, use of telemedicine encourages evidence-based approaches because clinicians who use telemedicine tend to stay updated in their fields.<sup>37</sup>

Another study of patient and clinician experiences evaluated satisfaction with telemedicine across 3 otolaryngology practices. Patients perceived "no" or "minor negative" impact on the encounter due to use of telemedicine with a limited ability to do a physical examination. Patients also expressed high satisfaction when telemedicine enabled them to travel shorter distances to receive care. A total of 25 clinicians expressed high satisfaction with use of telemedicine but they were concerned about reimbursement (40%) and liability (32%).<sup>38</sup> Although most clinicians, when surveyed, express an interest in incorporating telemedicine into their practice, about 80% are also concerned about whether patients are technically competent enough to use the technology and they were also concerned about whether they would have sufficient internet connectivity for a high-quality encounter.

Most clinicians see use of telemedicine as an opportunity to improve access to care for geographically distant or homebound patients. Primary care clinicians are most likely to offer telemedicine visits to patients who find it physically challenging to attend a clinic appointment and who have chief complaints that are likely to not require a physical examination.<sup>39</sup> Telemedicine is particularly well accepted by both patients and clinicians who live in rural areas, because it can save them a lot of time. Because of that, clinicians who serve patients who live in rural areas need to provide technical and administrative support (eg, by providing training), to facilitate the use of telemedicine in their region.<sup>40</sup>

The COVID-19 pandemic has increased the use of telemedicine in AI, and patient satisfaction with encounters during the pandemic has been reassuringly positive. However, some encounter types in AI, such as lung function testing, skin testing, or food/drug challenges, or those needing a physical examination, will still generally require an in-person visit. Data regarding telemedicine in asthma have shown that it is an opportunity to monitor device technique, disease control, and provide education. There is great opportunity to apply lessons learned in asthma to other allergic and immunologic conditions. Clinician satisfaction will be necessary for telemedicine to endure in AI. Important considerations surround this, including

reimbursement, liability, ease of technological use, and preservation of the patient/clinician relationship.

## CONCLUSIONS

Knowledge gaps to be addressed by future research regarding telemedicine are currently just scratching the surface. Further research is needed regarding outcomes data in all allergic and immunologic conditions to ensure patient/clinician satisfaction and disease control compare favorably with in-person visits. Such outcomes data will help inform payer policy and potentially alleviate concerns surrounding liability. Information regarding the effectiveness of education delivered via telemedicine will help to inform patient education approaches. Lastly, further research is also needed to determine the best telemedicine platforms and telemedicine models to optimize patient and clinician satisfaction.

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