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# Telehealth and Allergy Services in Rural and Regional Locations That Lack Specialty Services



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**Secondary to the coronavirus disease 2019 pandemic, telehealth quickly peaked as the dominant health care modality and its use still remains high. Although allergists and health care systems adapted quickly to adopt telehealth, its increased use has both highlighted its benefits for patients and allergists and demonstrated known concerns with delivering allergy specialty care to rural and regional patient populations. With increased concentration of both patients and allergists in urban areas, the ability to provide allergy specialty care to the rural and remote population continues to remain a challenge despite the advantages leveraged through telehealth. Herein, we review aspects specific to the rural patient population, tele-allergy outcomes with these patient cohorts, and efforts, both past and present, taken at different levels within the allergy community to promote our specialty through specific telehealth modalities to address and engage the rural and regional patient. © 2022 American Academy of Allergy, Asthma & Immunology (J Allergy Clin Immunol Pract 2022;10:2507-13)**

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## BACKGROUND

Despite comprising the vast majority of the land area in the United States, rural areas contain only 1 in 6 individuals, or approximately 60 million people.<sup>1</sup> Multiple studies have observed that individuals who live in these rural areas face unique barriers to health care. These include geographic and transportation barriers, reduced access to specialists, reduced insurance coverage, reduced knowledge of telemedicine opportunities, and reduced connectivity with reduced broadband internet access among other factors.<sup>2-4</sup> These factors contribute to worse health outcomes for this population, with some coining this the “rural mortality penalty.”<sup>5</sup> With the continued interest in delivering allergy specialty care to this underserved and vulnerable

population as well as efforts to identify and address health care inequities and disparities, multiple federal, organizational, state, and local initiatives are ongoing with a clear emphasis to leverage telehealth to achieve these goals.<sup>6,7</sup>

In the United States, the National Quality Forum (NQF) is a consensus-based health care organization relied on by the federal government to provide evidence-based recommendations to improve health care. Many of these NQF performance measures have been reviewed by the American Academy of Asthma, Allergy & Immunology/American College of Asthma, Allergy, and Immunology Joint Task Force of Quality Performance Measures and incorporated by allergists. Regarding measures and outcomes for rural telehealth, the NQF published its latest update in November 2021 but lacks significant and specific aspects that pertain to the allergist/immunologist.<sup>7</sup>

Telehealth’s strengths, weakness, opportunities, and threats have evolved over the past 10 to 20 years; however, the coronavirus disease 2019 (COVID-19) pandemic resulted in telehealth quickly becoming the dominant health care modality compared with the standard “brick and mortar” clinical encounter. Before 2020, telehealth accounted for only 1% of health care claims, but it reached a peak of almost 80% of claims in April 2020, decreased to approximately 30% to 40% in late 2020, and has fluctuated since then based on COVID-19 incidence and local and state health restrictions.<sup>8,9</sup> However, a Morbidity and Mortality Weekly Report of the percentage of weekly telehealth visits from June to November 2020 demonstrated significantly fewer visits in the South and rural areas compared with those in urban areas.<sup>9</sup> The shift to telehealth was vital to provide clinical care due to significant limitations for in-person visits caused by the pandemic and to support specialty care delivery to the rural and remote patient population who, even before the pandemic, had significant barriers obtaining specialty care.<sup>7</sup>

This article will review the key components of tele-allergy services to the rural and regional patient, which include the allergy workforce, the rural patient population, the originating site where the patient is located, the distant site where the allergist is located, and aspects of regional tele-allergy efforts to the rural or remote patient.

## THE ALLERGY WORKFORCE

Leveraging telemedicine for allergy/immunology is more important than ever as the US population is predicted to grow by 10% over the next 20 years while the allergist workforce is predicted to have a shortfall of nearly 500 allergists by 2025.<sup>10</sup> Second, the geographic disparity of urban- versus rural-based allergists is significant. A 2019-2020 American Board of Medical Specialties report listed 5705 allergists in the United States, with a range of 2 in Wyoming to 716 in California; most

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*Abbreviations used**COVID-19- coronavirus disease 2019**NQF- National Quality Forum**SBTM- school-based telemedicine*

allergists practice in urban or suburban locations.<sup>11</sup> Although training complementary providers such as a physician assistant, nurse practitioner, primary care provider, respiratory therapist, or asthma educator to perform skin testing, spirometry, and drug testing will extend the knowledge of and clinical care rendered by the allergist, it may not be able to meet the demand, particularly for rural-based clinics, hospitals, and patients.<sup>12,13</sup>

## THE RURAL POPULATION

A “rural” area in the United States is defined by the Census Bureau as any area that is “not-urbanized.”<sup>14</sup> The Census Bureau identifies 2 types of urban areas: (1) urbanized areas, which are composed of 50,000 people or more, and (2) urban clusters, which have between 2,500 and 50,000 people. Approximately 60 million individuals in the United States live in a rural area. Within these rural areas, there are approximately 3500 rural health clinics, which provide primary care services but seldom provide specialty services such as allergy/immunology. In addition, rural health clinics are disproportionately dependent on Medicare and Medicaid as the primary payers, which may limit interest from specialists due to lower reimbursements compared with commercial insurance or self-pay patients. Although telehealth has improved gaps for the rural patient population that existed long before the COVID-19 pandemic, barriers remain such as reduced broadband internet connectivity, increased travel distances, and fewer available specialists.<sup>1,2,7</sup> Furthermore, rural and remote patients have higher rates of chronic medical conditions, reduced access to health education, and reduced health literacy.<sup>7</sup> In a cohort of 36 million individuals with commercial insurance, telehealth visits increased from 0.3% of persons pre-pandemic to 23.6% of patients during the pandemic<sup>15</sup>; 6.4% of all patients lived in rural areas, and their telehealth usage was significantly less when compared with that of their urban counterparts.<sup>15</sup>

A retrospective Canadian study evaluating 1862 patients aged 14 to 45 years who were hospitalized for asthma observed that 14% lived in a rural area. Compared with nonrural patients, rural patients were less likely (11.2% vs 21.2%) to receive specialty care after discharge.<sup>16</sup> Thus, even when the rural patient was admitted to the regional hospital, specialty follow-up occurred less often for rural-based patients.

The presence or absence and type of health insurance is also a key driver for rural and remote patient health outcomes. In a US insurance census from 2017, counties were defined as “completely rural” if 100% of the population was rural, “mostly rural” if greater than 50% of the population was rural, and “mostly urban” if more than 50% of a county’s population lived in an urban location.<sup>17</sup> Although nearly every county saw a decline in the percentage of uninsured individuals in 2017 compared with 2013, 12.3% of individuals living in completely rural counties lacked health insurance compared with 11.3% in mostly rural and 10.1% in mostly urban counties.<sup>17</sup> Also, individuals younger than 65 years who live in rural areas are less

likely to have private insurance coverage and are more likely to be uninsured than individuals located in urban and suburban areas.<sup>7</sup>

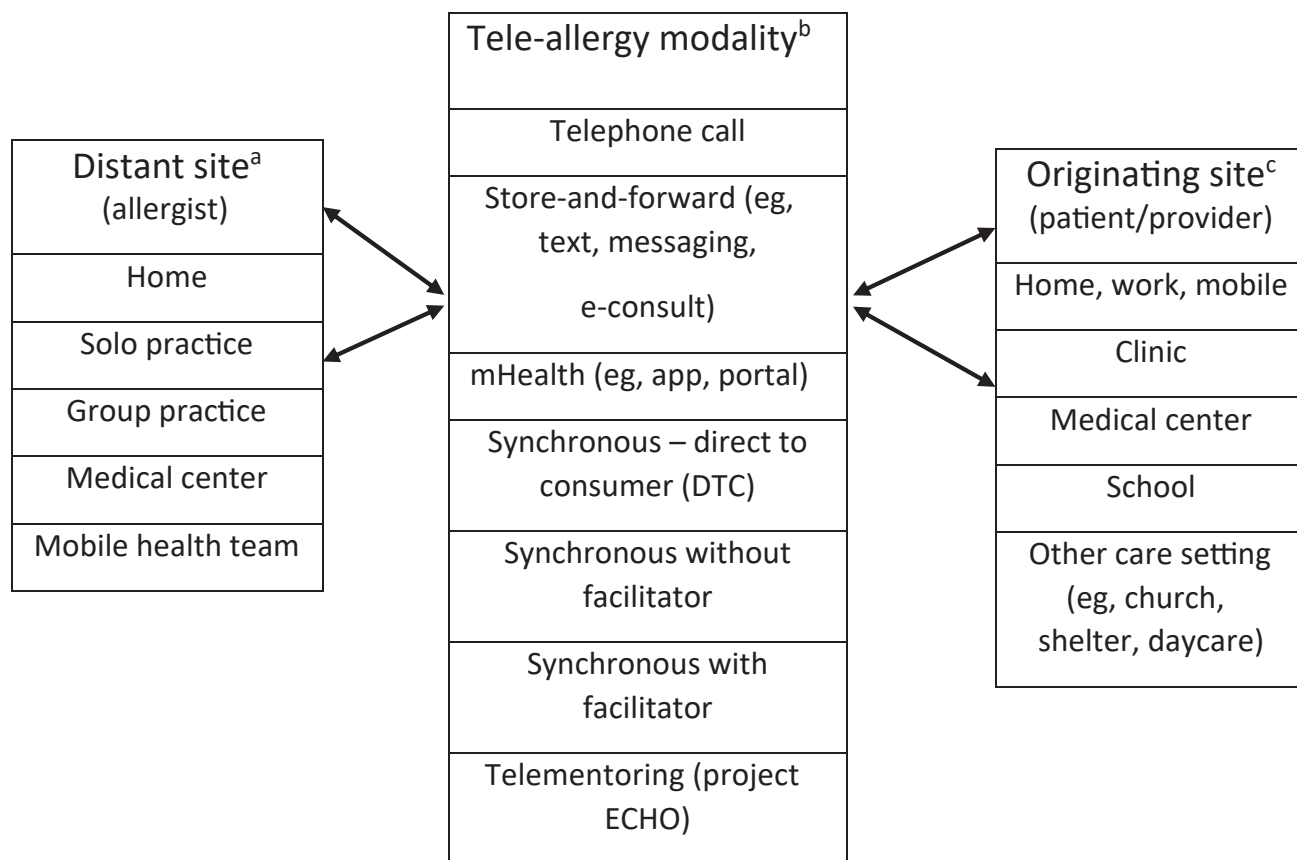
## THE ORIGINATING SITE

When conducting a telehealth encounter, the 3 main aspects of the visit are the originating site, the distant site, and the telehealth modality being used (Figure 1). The originating site is defined by the Centers for Medicare & Medicaid Services as where the patient is located during the telehealth encounter or visit. Other terms used for the originating site have included the spoke site, patient site, remote site, or rural site.<sup>18</sup> Depending on the patient’s resources, different telehealth scenarios can occur. Originating site options can include a personal cell phone, home landline, internet, school, church, local community clinic, nursing home, or hospital to connect with the allergist. However, the rural patient has a greater risk of a “digital divide.”<sup>7</sup> Rural patients are less likely to have high-speed internet compared with urban-located patients (60% vs 95%), have fewer devices that access the internet, and spend less time “connected” to the internet.<sup>19</sup> Although reliance on telephone calls can support this population, the lack of the visual assessment and “connectivity” with the patient, particularly if they are a new patient, can result in an incomplete assessment. A prospective study evaluated 518 encounters performed by 4 urban allergists over 45 days at the height of the COVID-19 pandemic.<sup>20</sup> They observed that 42% of telemedicine encounters were deemed incomplete. Furthermore, no new patient visit was conducted telephonically—a modality that rural or remote patients may rely on more than a suburban- or urban-located patient.<sup>21</sup>

Community hospitals are an important source of care in rural areas, particularly for medical specialists. However, since 2010, a total of 136 rural hospitals have closed, further reducing access for rural areas.<sup>22</sup> In 2017, more than 17 million people lived in rural counties without rural health clinics and 15 million people lived in rural counties without federally qualified health clinics.<sup>22</sup> When rural hospitals close, patients must travel further to access services, thus increasing known barriers for this population. Until improved, these factors adversely affect rural-based patients and increase the importance for telehealth growth and utilization.

If available, a local clinic, hospital, or school often has the advantage of increased technology and internet access with video connectivity. When connecting with a location such as a school or a rural clinic as the originating site, the importance of stakeholder engagement cannot be understated. Aspects of cost, information technology, cybersecurity, and leadership engagement are paramount for adoption and long-term success.<sup>1-3</sup>

The School-Based Allergy, Asthma and Anaphylaxis Management Program (SA<sup>3</sup>MPRO) is a school-based engagement program developed by the American Academy of Allergy, Asthma & Immunology in collaboration with the National Association of School Nurses and can improve access to allergists and reduce asthma and allergy-related adverse outcomes such as absenteeism.<sup>23</sup> This type of program could benefit rural populations using telemedicine to connect members of the care team with parents, students, and school nurses. In 2019, it was estimated that 1800 public schools, which represented almost 1 million students, had a school-based telemedicine (SBTM) platform. However, this represents only 2% of the students and public schools in the United States.<sup>24</sup> Although several models for parental involvement in SBTM have been proposed, only a



**FIGURE 1.** Telehealth scenarios for allergists and patients. Conducting a telehealth visit has 3 main aspects: the distant site, the modality used, and the originating site. (A) The distant site is where the allergist is located. (B) The modality is the platform used by the health care provider and the patient to communicate, while the (C) originating site is where the patient is located. Additional descriptions of each modality can be found in this article’s Online Repository at [www.jaci-inpractice.org](http://www.jaci-inpractice.org).

few studies have reported allergy/immunology outcomes. In 1 study, parents had the option to join the SBTM visit by coming to their child’s school or could join remotely.<sup>25</sup> Limited time due to work or transportation factors adversely affected parent participation. In another SBTM model, the parent and the child’s primary care provider would receive a summary by the provider after the SBTM visit was completed.<sup>26</sup> However, the financial resources to support SBTM have typically originated from grants or financial support from the hospital-based allergist. Long-term funding to support the allergist’s time to build and sustain those relationships is typically not included in the funding.<sup>25</sup> In a cross-sectional survey of more than 1000 schools in Illinois, rural schools were less likely to have undesignated epinephrine devices and written procedures for food-induced anaphylaxis than their urban counterparts.<sup>27</sup> Although multiple studies have been conducted to assess asthma intervention programs within schools, only a few have been conducted in rural settings.<sup>28,29</sup>

Perry et al<sup>28</sup> conducted synchronous telehealth visits with 393 children aged 7 to 14 years (81% Black) who attended schools in a rural and socioeconomic disadvantaged region of Arkansas. Similar sessions were also provided to the school nurse and participants’ caregivers over a 2- to 3-month time frame. Although 88% of children and 61% of caregivers completed all

telehealth sessions, there was no change in symptom-free days compared with usual care and 27% of caregivers did not attend any sessions. Romano et al<sup>29</sup> evaluated 17 children aged 5 to 18 years (71% Hispanic) in rural Texas who received asthma telemedicine follow-up visits over 24 weeks and observed improvement in symptom-free days and quality of life compared with baseline although there was no comparative group in this small, prospective study.<sup>29</sup> In an accompanying editorial regarding school-based telemedicine for schools, a critical factor was discussed—the school health care provider.<sup>30</sup> One barrier rural school staff face compared with their urban peers is fewer opportunities to engage in asthma education programs.<sup>31</sup> In addition, common barriers identified by school nurses for SBTM included inadequate nursing time and challenges engaging caregivers.<sup>32</sup> One study reported responses from 36 under-resourced South Carolina schools. Both inadequate time to complete tasks and lack of caregiver involvement in care planning were identified in most locations.<sup>33</sup> In a study evaluating 2 public school systems in Colorado and Connecticut, the average time the school nurse time committed for the study was 2 hours each week.<sup>34</sup> In another study, a bilingual asthma nurse educator was embedded in the school full-time for the initial year.<sup>35</sup> Both these studies were conducted in urban locations. Recommendations to create a shared vision, build engagements with

**TABLE 1.** Advantages, disadvantages, and unintended consequences of a regional telehealth platform

Advantages
<ul style="list-style-type: none"> <li>• Expansion of connected health to more population groups</li> <li>• Co-location of required support staff (ie, information technology, credentialing, schedulers, nurse call center, etc)</li> <li>• Allergists embedded within larger organizational structure</li> <li>• Improved position to adapt to ever-changing regulations</li> <li>• Centralized efforts and strategy</li> <li>• Improved communication between regional medical center specialties and originating site locations</li> <li>• Increased involvement with Graduate Medical Education and telehealth training</li> <li>• Focused on “value” aspects of telehealth (eg, emergency department visits, readmission rates, drug allergy evaluation, and reduced carbon footprint)</li> <li>• Reduced time from referral to specialty visit</li> </ul>
Disadvantages
<ul style="list-style-type: none"> <li>• Significant start-up costs (eg, staff, peripheral carts, and peripheral medical devices)</li> <li>• Success requires strong C-suite support and specialty “champions”</li> <li>• Initial efforts may focus on one specialty over another</li> <li>• Provider reluctance to use telehealth (“late adopters”)</li> <li>• Initial efforts can waver without sustained financial investment and staffing</li> <li>• Underuse of originating site(s) without dedicated full-time equivalent assets</li> </ul>
Unintended consequences
<ul style="list-style-type: none"> <li>• Information technology aspects (eg, patient portals and internet connectivity) may be a barrier for patients with limited connectivity</li> <li>• Telehealth support assets may not increase with increased provider visits</li> <li>• Increased telehealth appointments may result in increased need for “in-person” visits, which may be a preexisting geographic barrier for rural and remote patients</li> <li>• Increased telehealth may reduce clinical or laboratory visits with local community providers</li> <li>• Increased work for health care and information technology teams at originating sites</li> </ul>

stakeholders and families, and grow strong program-school partnerships exist, but these take time and significant effort, which are not reimbursed financially.<sup>31</sup> Despite the known limitations and barriers to SBTM, the school remains a valuable originating site because approximately 10% of school-age children have asthma, with rural children often having worse outcomes compared with their urban peers.

### THE DISTANT SITE AND TELEHEALTH MODALITY

The distant site is defined by the Centers for Medicare & Medicaid Services as the telehealth site where the provider (ie, allergist) is located. Other telehealth synonyms for the distant site include hub site, specialty site, provider site, consulting site, or referral site. Similar to the various options a patient has in the originating site, the allergist may also conduct the telehealth visit at any location (eg, home, clinic, and hospital). One key aspect for the allergist is to block off time for synchronous telehealth visits because these visits usually have a specific start and stop time. Although there is often less “chit chat” in a telehealth visit

compared with an in-person visit, provider recognition of all aspects of a synchronous visit is key.<sup>36</sup>

With multiple telehealth modalities to connect with patients, allergists have more than 175 permutations for a tele-allergy visit (Figure 1). However, the “aspects” of the visit (ie, how, when, why, where, to whom, and for what) are details each individual, group, training program, service, or department will decide. Although a recent publication reviewed telemedicine from a private practice perspective, allergists located in a regional or academic hospital may desire to be embedded or “nested” within the hospital’s telehealth efforts.<sup>37</sup> Hospital systems that implement telehealth often start with behavioral health, intensive care, pulmonology, and cardiology, with other pediatric and internal medicine specialties following. The advantage for the allergist in this scenario is that much of the workflow processes, technology, and staffing requirements are already established. The allergist can thus identify where their specialty can best fit within the existing hospital system(s) to extend their telehealth capabilities.

### REGIONAL AND RURAL TELEHEALTH AND TELE-ALLERGY

Specialties located in a regional hospital that identify and engage with rural and remote locations can provide significant benefit to the hospital organization. In a series of articles, Waibel et al<sup>38,39</sup> reviewed the growth of facilitated, synchronous specialty care telehealth visits from a regional military hospital to remote clinics in Europe. A “facilitated” visit has the benefit of having a health care provider at the originating site with the patient. This provider who is located with the patient can be trained by the specialist, conduct a physical examination with or without peripheral medical devices attached to the telehealth cart, and provide education before, during, or after the telehealth visit. Over a 4-year period, facilitated synchronous telehealth visits grew from 150 to more than 500 encounters per month and supported 27 distinct specialties.<sup>38</sup> In a 12-month analysis, the hospital’s regional telehealth platform supported 3778 synchronous encounters to 2962 unique patients at 22 distinct originating sites. The estimated indirect savings to the military was 1.5 million miles not traveled, 8307 patient-work days saved, and \$2.1 million not spent on per diem travel and meal costs.<sup>39</sup> Over a 4-year period at the same location, Waibel et al<sup>40,41</sup> summarized tele-allergy-specific outcomes. Over the first 2 years, 112 facilitated, synchronous tele-allergy visits were conducted to outlying clinic, with an additional 423 visits the following 2 years. These visits represented an increase from 3.8% to 12% of all outpatient clinic visits over these two 2-year time periods, respectively. Furthermore, only 23.4% of new consultations and 9.5% of follow-up visits were recommended for an in-person visit.<sup>40,41</sup> The average savings per encounter for these remotely based patients who had no local access to a board-certified allergist were estimated to be \$485 in travel expenses, 438 miles not driven, and 2.3 days of school or work not missed.<sup>40</sup>

Similar to observations from SBTM programs, facilitated synchronous telehealth encounters and overall sustainability increased when dedicated staff were present at the originating site—specifically a specialty-trained patient presenter. One study compared the benefit of a “dedicated” and specialty-trained patient presenter compared with a medical assistant or other clinic

**TABLE II.** Reportable telehealth metrics

Metric	Outcome
No. of visits	In-person, tele-allergy
Patient characteristics	Age, sex, ethnicity, socioeconomic status, insurance type, etc
Type of appointment	New vs follow-up
Modality of patient communication	In-person, telephone, synchronous without facilitator, mHealth, telementoring, etc
Originating site (patient location)	Home, clinic, school, medical center, etc
Population density at patient location	Urban, suburban, rural
Distance from allergist	miles, km
Time “saved” by using telehealth	Work and/or school days “saved”
“Green” effect	Environmental implications if driving not required (eg, CO <sub>2</sub> emissions, etc)
% follow-up recommended	Percentage
% follow-up completed	Percentage
Standardized outcomes	ACT, UCT, UAS7, SNOT, ED visits, hospitalizations, QOL surveys, etc
Allergy visits conducted via telehealth	Percentage
Telehealth visits per service compared with overall hospital visits	Percentage
Patient satisfaction	Percentage satisfied/dissatisfied
Provider satisfaction	Percentage satisfied/dissatisfied
No. of patient engagements	Number (eg, telephone call, home visits, and school visits)
No. of originating sites	Number
No. of encounters per originating site	Number
wRVUs generated	Originating site; distant site
Specialty no-show rate	In-person vs telehealth
No. of days to first open appointment	In-person vs telehealth
Appointment availability	Weekday vs weekend; business hours vs “after hours”

ACT, Asthma Control Test; ED, emergency department; QOL, quality of life; RVU, relative value unit; UAS7, Urticaria Activity Score 7; SNOT, Sino-Nasal Outcome Test; UCT, Urticaria Control Test.

staff whose responsibility was to only ensure the patient and specialist established the connection through the telehealth cart but did not remain in the room during the encounter.<sup>42</sup> Despite taking place in the military health care system where travel costs are reimbursed, 3 remote clinics who had a specialty-trained patient presenter, compared with 9 locations that used a medic or medical assistant to support the visit, had a 1-year growth of 240% compared with a 122% and negative 11% growth with 2 types of non-specialty-trained presenters.<sup>42</sup> Dedicated patient presenters reported that they gained appreciable specialty knowledge from regional specialists, were engaged with their community clinic’s morning staff meeting, and increased primary care providers’ knowledge and “acceptability” of telehealth visits through meetings and local community articles.<sup>42</sup>

However, allergy condition management often requires guidance from the allergist rather than testing. Within the

Massachusetts General Hospital Division of Rheumatology, Allergy, and Immunology, the allergy service used the hospital’s asynchronous “e-consult” secure messaging service to offer “provider-to-provider” consultation and education.<sup>43</sup> An e-consult or electronic consultation is a clinician-to-clinician, asynchronous communication modality. E-consults can improve access to specialists, reduce unnecessary consults, and streamline future in-person consultations.<sup>36</sup> Over a 2-year period, the intrahospital allergy e-consult service for immunodeficiency and adverse drug reactions grew from 1% to 10% of the division’s allergy service clinical encounters. Outcomes observed included a reduced wait time for in-person evaluation because only 59.8% of e-consults required an in-person allergy visit. Prescreening patients via this process also streamlined clinic readiness for drug testing and challenges.<sup>43</sup> Allergists should continue to explore uses of an e-consult modality to not only support colleagues within a single hospital system but also extend that service to rural providers who often need to determine whether they can support the patient locally, or recommend patient travel to the distant tertiary regional specialty center.

Outcomes from regional telemedicine platforms have been described from other countries such as China and Australia; however, allergy-specific outcomes were not discussed.<sup>44,45</sup> Importantly though, aspects of infrastructure, utilization, and provider satisfaction were emphasized. In 1 study, increased asynchronous provider-to-provider tele-consultation led to an increase in time to specialist responses, albeit from 17 minutes to 26 minutes.<sup>44</sup> Another group identified barriers including lack of access to clinicians providing telehealth services, lack of knowledge of telehealth, and lack of internet in the remote Northwest Territory of Australia.<sup>45</sup> Other factors in the rural Aboriginal population included using prepaid mobiles and a 76% less likelihood to have internet access compared with their metropolitan indigenous counterparts.<sup>45</sup> Before COVID-19, the Romanian Ministry of Health recognized the importance of growing telehealth services as it determined that 46% of the population was rural.<sup>46</sup>

Successful regional telehealth from a centralized or “hub” medical center to support multiple outlying “spoke” locations requires a shared vision, strong leadership, early adopters, quick “successes,” and a versatile and dedicated information technology team and telehealth educators. Promoting tele-allergy within a hospital system should begin with discussions of what is important to the hospital. When engaged with outlying health care systems such as community-based hospitals, clinics, or schools, clear communication on workflow processes, resource expenditure, and written and signed memorandum of understanding from both the originating site and the distant site are vital because changes in leadership can result in disruption and change. Finally, infrastructure cost for “regionalization” of telehealth services is not insignificant. Technology, information technology staff, triage and scheduling staff, credentialing staff, telehealth carts, peripheral medical devices, patient presenters, and online translations services should all be considered when implementing or scaling regional telehealth services.

Although there are known advantages and disadvantages for establishing a regional telehealth platform that supports all specialties, there are also unintended consequences that may affect the rural or remote patient population (Table I). Specifically, care conducted via telehealth may result in a recommendation for an in-person assessment. Just as virtual health reduces travel, an in-

person visit recommendation will lead to a travel requirement, which can disproportionately affect patients of low socioeconomic status or rural patients.<sup>7</sup> Another concern discussed in the NQF report is that increased telehealth usage could harm local physicians by funneling patients into a centralized location, particularly for follow-up visits and potentially laboratory tests.<sup>7</sup> Engaging with local rural physicians will improve communication regarding goals and expectations to minimize potential effects on the rural provider. Lastly, data security and personal privacy is one of the highest-ranked barrier to telemedicine. Rural populations, who often have lower health literacy than their urban counterparts, may be less willing to adapt telehealth as a health care modality due to information privacy concerns.<sup>7</sup>

Currently, telehealth workload is reimbursed the same way as “in-person” visits—based on Evaluation and Management coding and relative value units assigned to specific Evaluation and Management codes. However, telehealth’s “value” is more often from indirect and intangible savings (eg, reduced patient productivity loss<sup>39,47</sup> and less travel<sup>38,39</sup>), hospital improvement (eg, lower no-show rates<sup>38</sup>), and the overall health care system (eg, improved access,<sup>38</sup> addressing health care disparities,<sup>7</sup> and reduced carbon footprint<sup>48</sup>). Although the COVID-19 pandemic resulted in telemedicine being a necessary health care delivery system, standardized metrics from regional telehealth efforts should be reported to demonstrate its value, particularly to the rural, remote, and underserved populations. In addition to the main 5 domains outlined by the National Quality Forum Telehealth Measurement Framework, we recommend considering additional tele-allergy-specific metrics when reporting individual or regional efforts (Table II).

## FUTURE CONSIDERATIONS

In November 2021, the NQF published its final report titled “Rural Telehealth and Healthcare System Readiness Measurement Framework.”<sup>7</sup> It focuses on 5 domains: access, costs and logistics, effectiveness, experience, and health equity. Furthermore, within the United States, the National Consortium of Telehealth Resource Centers is a collaboration of 12 regional centers that are closely aligned to American Academy of Asthma, Allergy & Immunology’s regional, state, and local societies and can be a valuable resource to establish and promote allergy specialty care to rural and regional patients. Coupled with the availability of telehealth, patient satisfaction, and acceptance of tele-allergy, allergists should continue to seek opportunities to incorporate efforts within their community to expand their reach to rural and remote patients who are afforded less opportunity and face more barriers to receive allergy/immunology specialty care.<sup>49,50</sup>

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**ONLINE REPOSITORY****Telehealth Modalities**

1. Telephone call. Use of a landline or mobile telephone or digital device
2. Store-and-forward. Store-and-forward represents the asynchronous telehealth modality. A provider or patient initiates the communication. Over time, messages are communicated between the 2 parties, resulting in the recommendations or guidance.
3. mHealth. Also called mobile health, mHealth allows the provider and/or patient to interact virtually or on a stand-alone platform to manage health conditions. Its specific aim is to help and support all health care processes, ranging from prevention to detecting health problems, from diagnosis to disease treatment. Health care applications (apps) are a common mHealth example.
4. Synchronous—direct to consumer (DTC). DTC visits are “on-demand” visits between the patient and the provider. DTC visits are generally patient-initiated phone or video visits to the patient’s specialty choice.
5. Synchronous without facilitator. These are “real-time” phone or video visits between the patient and the provider. There is no additional health care staff with the patient.
6. Synchronous with facilitator. These are “real-time” video visits between the provider and the patient. The patient is typically located in a fixed medical facility with a health care provider in the room to assist the distant site provider with the interview or examination. Common locations for these include intensive care units, nursing homes, clinics, or hospitals.
7. Telementoring (Project ECHO). Use of audio, video, and other telecommunications and electronic information processing technologies to provide individual guidance or direction. Telementoring provides a method of transferring specialist knowledge and experience to other providers. The ECHO method uses audiovisual technology to connect a team of medical experts, based in a tertiary hospital (termed the hub) simultaneously with many health care professionals based in a number of community settings (termed the spokes). The method aims to enable community-based providers to provide advanced levels of care for their patients and potentially for patients of other providers in the community.