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# The Impact of COVID-19 on Teledermatology: A Review



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## KEYWORDS

- Teledermatology • COVID-19 • Telemedicine • Telehealth • Store-and-forward teledermatology
- Live-interactive teledermatology • Digital divide

## KEY POINTS

- Before the coronavirus disease 2019 pandemic, teledermatology was limited by lack of insurance reimbursement for telemedicine visits, concern about liabilities, and licensing restrictions.
- Coronavirus disease 2019 prompted regulatory and policy changes; health systems created and adapted protocols to continue care, save personal protective equipment, and decrease unnecessary exposures.
- Teledermatology has been conducive to the constraints imposed by coronavirus disease 2019, but telemedicine may worsen care access for patients without adequate digital connections.
- Expansion of telemedicine reimbursements favored synchronous video visits rather than store-and-forward teledermatology.
- Policy changes established during the coronavirus disease 2019 pandemic, although likely temporary, have set new precedents that will have long-term impacts on teledermatology use.

## INTRODUCTION

Coronavirus disease 2019 (COVID-19) has changed the way that medicine is practiced throughout the world. In March of 2020, the World Health Organization declared COVID-19 a pandemic and created guidelines in an effort to mitigate the spread of the virus. Among these guidelines were recommendations to socially distance, quarantine, and suspend all nonurgent in-person medical visits.<sup>1</sup> As the information known about COVID-19 has evolved, so have the safety guidelines. The unprecedented situation has forced health care providers across all fields of practice to critically look at how to maintain continuity of services in the changing landscape,

and dermatology is no exception. Certainly, dermatology has always been well-suited for telemedicine owing to its reliance on visual examinations. Changes imposed by these recommendations will remain for the foreseeable future; thus, many dermatologists have adopted telemedicine to adhere to social distancing while remaining engaged with their patient populations. Indeed, telemedicine seems especially well-suited for maintaining care during a pandemic.

This accelerated implementation and use of teledermatology during COVID-19 has met with successes and challenges. This review explores, first, how telemedicine was used in dermatology before

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the pandemic, evaluates the regulatory adaptations made in response to the pandemic and the effectiveness of the rapid implementation of teledermatology, and, finally, considers how teledermatology may have expanded for the long term as a result of COVID-19. In addition, we examine lessons learned, how teledermatology's reliance on digital technologies might paradoxically exacerbate health care disparities, and consider the future outlook.

### TELEDERMATOLOGY BEFORE CORONAVIRUS DISEASE 2019

With approximately 1 in 3 people in the United States suffering from skin diseases,<sup>2</sup> new and innovative methods of increasing patient outreach are essential to adequately meet the needs of the patient population. In the decades before the COVID-19 pandemic, the incorporation of teledermatology into practices' offerings was inconsistent and sparse. Limiting factors to implementation included a lack of adequate reimbursement, concerns about liability, and licensing restrictions.<sup>3</sup>

In the United States, teledermatology was first described in the literature as an adequate avenue for care in 1994, when it was used to deliver care in rural Oregon.<sup>4</sup> The use of teledermatology increased through the 2010s, but remained limited.<sup>3,5</sup> A 2018 review article found that only 40 nongovernment sanctioned teledermatology programs were active in the United States in 2016, with a median yearly volume of 263 consultations.<sup>3</sup> Although the number of teledermatology programs available was limited, consultations did show an upward trend. In 2011, the total estimated teledermatology consultations conducted by these nongovernment programs was 6500, and by 2016, the number increased to 20,000.<sup>5</sup> Globally, teledermatology has proven a useful tool, especially given significant variability in patient access to local dermatologists for in-person visits. In the United States, the average dermatologist to population ratio is 1:30,000, whereas in Central and South America the ratio is 1:76,000 in nonrural areas and 1:1.66 million in rural areas.<sup>6</sup> A trend of physician maldistribution is found throughout the world, with high-income countries and regions generally richly abundant with dermatologists, whereas middle- and low-income countries and regions lack such access. This general lack of access to specialists echoes the bigger problem of health care equity. Teledermatology has been implemented in myriad government-sanctioned health systems, commercial telemedicine services, and nonprofit

and charitable organizations.<sup>7</sup> In countries with government-established health systems, teledermatology is primarily used to triage patients.<sup>6</sup> Similarly, the KSYOS Telemedical Center in the Netherlands, a commercial company, has had more than 2000 general practitioners refer more than 25,000 patients for their teledermatology service, decreasing in-person referrals by 65% to 70%.<sup>7</sup> Nonprofit and charitable programs, such as the Institute of Tropical Medicine in Antwerp, Belgium, the Swinfen Charitable Trust, and the African Teledermatology Project, have provided local health professionals in underserved countries with educational resources, training, and decision making support to ensure that the needs of these communities are met.<sup>7</sup>

Before COVID-19, teledermatology research had closely examined its efficacy for diagnosis and treatment. Evidence generally found teledermatology to be reasonably equivalent in diagnosis and management compared with traditional in-person visits.<sup>3,8</sup> Despite this success, adoption remained slow before the pandemic. An academic dermatology clinician may see perhaps 100 patients per week, on average, and by comparison, in 2018 the average program conducted an estimated 283 virtual visits for the entire year, thus indicating significant barriers to implementation.<sup>3</sup> Still, teledermatology programs have succeeded in diverse practice systems: capitated, charitable, and government.<sup>3</sup> A systematic review published in 2010 identified structural barriers to teledermatology implementation in the Department of Veteran Affairs, notably a lack of understanding of organization revenue models and how they might be affected by adaptive changes in workload and compensation.<sup>8</sup> For teledermatology to succeed, the review argued that targeted efforts must address both compensation and workload, with operating budgets possibly reallocated to support changes.<sup>8</sup> However, the predominant fee-for-service health care model in the United States had not adapted the changes necessary for teledermatology to succeed, especially given lack of adequate reimbursement before the COVID-19 pandemic to incentivize use.<sup>3</sup>

### TELEMEDICINE REGULATORY CHANGES IN RESPONSE TO THE CORONAVIRUS DISEASE 2019 PANDEMIC

Before the COVID-19 pandemic, many states had parity laws through Medicare, Medicaid, and private insurance companies that allowed for telemedicine reimbursements, but the level of reimbursement varied by state and payer.<sup>9</sup> In fact, Medicare only paid for telemedicine if the

patient lived in a rural area and when they left their home to go to a designated clinic, hospital, or medical center for the telemedicine service.<sup>10</sup> By 2019, the American Telemedicine Association had found that 40 states increased their coverage parameters to accommodate the increased use of telemedicine.<sup>11</sup> Sixteen states had limited reimbursement to only synchronous telemedicine (real-time video or telephone visits).

Despite the slow progress over the previous decade, with COVID-19, these telemedicine regulatory and policy restrictions evaporated essentially overnight, with the Centers for Medicaid and Medicare Services (CMS) enacting bold changes.<sup>10</sup> In all states, laws were relaxed that required that telemedicine physicians had to have preexisting in-person relationships with patients before any prescription could be written for patients after virtual visits.<sup>9</sup> Some states have even relaxed or eliminated interstate licensure limits, which barred physicians from providing care to patients who lived outside of their jurisdictions, thus providing patients with increased options for care.<sup>12</sup> For example, New Jersey provided a temporary waiver of telemedicine rules to allow for out of state licensed physicians to continue, and perhaps expand, patient care.<sup>13</sup>

Another pre-pandemic law, the Health Insurance Portability and Accountability Act (HIPAA), requires tele dermatology visits to meet certain personal health information confidentiality standards (eg, encryption), but with COVID-19 policy relaxations, the necessity of HIPAA compliance was decreased. Specifically, the CMS waived the enforcement of HIPAA health privacy violations against providers acting in good faith.<sup>12,14,15</sup> Many platforms for telemedicine visits had previously opted out of these agreements, which left the liability for security and privacy breaches solely on the physician.<sup>14</sup> CMS's waiver of HIPAA enforcement during the public health emergency thus allowed telemedicine, for the moment at least, to be conducted over non-HIPAA-compliant platforms.<sup>15</sup> Other regulatory changes brought on during the COVID-19 pandemic included an increased consideration of good faith defenses in relation to HIPAA violations,<sup>12</sup> meaning that leniency would be applied to telemedicine-related HIPAA violations that were made nonmaliciously. Collectively, these regulatory changes led to the increased adoption of telehealth owing to necessity to continue care, expanded financial remuneration, and decreased risk of financial loss, allowance for the use of nonencrypted platforms to conduct patient visits, and the ability to reach patients without geographic restrictions (**Table 1**).

## IMPLEMENTATION OF TELEDERMATOLOGY DURING THE CORONAVIRUS DISEASE 2019 PANDEMIC

The COVID-19 pandemic has led to innovations in tele dermatology that will most certainly set new precedents in how it is practiced for years to come. Not only has tele dermatology served as a patch to help patients in a difficult time, but these disruptive changes pushed telemedicine into the forefront of conversations for reshaping best practices for dermatology care overall as well.

As an intended effect of regulatory changes implemented during the pandemic, patients were given increasingly diverse options for telemedicine care. These new telemedicine options have been met with satisfaction by both patients and dermatologists. Pre-pandemic studies had revealed equivocal patient satisfaction ratings with tele dermatology relative to traditional in-person evaluations, finding no significant differences in satisfaction between patients using solely tele dermatology and patients receiving in-person care.<sup>16,17</sup> During the pandemic, dermatology patients reported positive satisfaction using tele dermatology; for example, an observational study conducted in Italy found that 93% of surveyed patients were satisfied with these virtual visits during the pandemic.<sup>18</sup> An observational study of dermatology patients in Cairo, Egypt, found a 91% overall satisfaction and likelihood for future tele dermatology use, with 94% remarking on its usefulness, 87% describing its allowance for quality interaction, 88% noting its ease of use, and 87% expressing its reliability.<sup>19</sup> For US dermatologists practicing during the pandemic, a study of 184 practices found that 89% used tele dermatology, and 71% intended to use tele dermatology in the future.<sup>20</sup> In a survey of members conducted by the American Academy of Dermatology, 14.1% of dermatologists had used tele dermatology before COVID-19, compared with 96.9% since the pandemic began.<sup>21</sup>

Teletriage in dermatology practices may also increase practice efficiency by decreasing wait times and allowing for patient inquiries to be stratified according to their acuity.<sup>22</sup> During the pandemic, physicians leveraged remote patient monitoring models to collect patient data and triage visits according to importance and severity.<sup>23</sup> One study evaluating the effectiveness of dermatoscopic photos for the diagnosis of skin lesion found that this method increased the urgency score for malignant neoplasms, prioritizing them for in-person visits and thus increasing efficiency for both patients and physicians.<sup>24</sup>

**Table 1**  
**Regulatory changes in tele dermatology in response to COVID-19**

	Regulations before COVID-19	Regulation Changes Made During COVID-19
Reimbursements	Reimbursement schedules varied by state and payer	Expansion to accommodate increased use of tele dermatology, namely, video visits
Interstate licensure limits	Physicians were limited to providing services to patients within their jurisdictions	Physicians were able to provide services to patients outside of their jurisdictions
HIPAA regulations	Services could only be conducted on encrypted platforms	Relaxed limits allowed services to be performed over nonencrypted platforms

Moreover, an analysis of tele dermatology triage implementation at Zuckerberg San Francisco General Hospital determined that the remote system saved \$140 per newly referred patient compared with conventional care systems.<sup>25</sup>

### EXPANSION OF TELEDERMATOLOGY DURING THE CORONAVIRUS DISEASE 2019 PANDEMIC

During the pandemic, tele dermatology has proven capable of successfully managing diagnosis, triage, and subsequent checkups for many visits, with in-person appointments still being offered to patients with more pressing concerns or visits unable to be conducted remotely (namely, skin checks and procedures).<sup>26</sup> Skin conditions proving especially well-suited to telemedicine have included chronic inflammatory conditions such as acne and psoriasis.<sup>27</sup> At the George Washington Medical Faculty Associates' Dermatology department, a study of 168 patients found the most popular reasons for telehealth appointments to be new rash (12%), eczema (10%), and psoriasis (9%).<sup>28</sup> A study of 153 U.S. dermatology practices operating during the pandemic found that 87% of practices offered tele dermatology as an option to patients.<sup>29</sup> Across 12 dermatology clinics affiliated with Massachusetts General Hospital, virtual visits increased from 0 in April 2019 to 1564 in April 2020, and in-person visits for April 2020 represented less than 1% of the in-person visit volume from the year prior.<sup>30</sup> Before March 11, 2020, when the World Health Organization officially declared COVID-19 a pandemic, skin conditions were not listed among the most common telehealth diagnoses in the United States. However, by April 2020, skin conditions were ranked the fifth most common telehealth diagnosis in the United States.<sup>31</sup> Similarly, on July 21, 2020, 13 of the top 50 ranked medical applications in the US Apple App Store were useable for telemedicine, an increase of mean of 210.92 ranked positions compared with January 1, 2020.<sup>32</sup>

### PROGRAM-SPECIFIC APPROACHES TO TELEDERMATOLOGY

Both private and academic practices used tele dermatology only sporadically before COVID-19, and relied mostly on in-person visits as their standard care. In fact, in October of 2019, a J.D. Power consumer report found that about 10% of health care workers in the United States provided any telehealth services.<sup>33</sup> During COVID-19, a global web-based survey of 733 dermatologists found that use of tele dermatology increased to 75% of all visits compared with a previous 26% of visits before the pandemic.<sup>34</sup> Such rapid and widespread adaptation opened opportunities for varied implementation. In this section, we analyze some of the ways that specific programs implemented tele dermatology differently during the COVID-19 pandemic to consider different strategies to adapt, refine, and perfect tele dermatology.

At the start of the pandemic, most planned, nonurgent in-person medical procedures were halted to prioritize the treatment of patients with COVID-19 and decrease transmission of the disease. In dermatology, most visits were considered non-urgent, and some American dermatologists worried their practices might be "vectors for the transmission of COVID-19."<sup>35</sup> Dermatology practices thus turned to video and store-and-forward (SAF) visits, and hybrid models using both, to adapt to the constraints on in-person visits. Across 12 dermatology clinics affiliated with Massachusetts General Hospital, most visits were scheduled live telephone calls where providers conversed with patients while viewing photographs uploaded in advance; asynchronous telemedicine visits comprised a minority (1 in 5) of all visits during April 2020. The potential advantages of asynchronous visits were the convenience of providers and patients operating on their own schedules.<sup>36</sup> Similarly, the Department of Dermatology at Yale School of Medicine concluded that a hybrid between SAF and video proved most effective, using



SAF before scheduled video calls to expedite visits.<sup>27</sup> Similarly, a survey of American Academy of Dermatology member dermatologists found that 72% (406 of 564) perceived the hybrid combination of video visits with stored photographs had the greatest accuracy.<sup>21</sup>

The need for a sudden change in the delivery of care forced new operationalization, especially for those with limited prior telemedicine experience. At Yale, for example, there were no teledermatology services available before COVID-19, so they created their own teledermatology training and office-based teledermatology practice algorithm.<sup>27</sup> Yale developed training videos for staff, departmental algorithms for patient visits, and call scripts for providers. Using a hybrid method, all new patients uploaded videos and images of lesions to their electronic medical records, and could speak directly to a provider. In total, the department's number of telemedicine visits increased from 225 during their first week after implementation to almost 500 during their third week.<sup>27</sup>

Similarly, the Ohio State University Division of Dermatology developed a SAF inpatient algorithm combined with subsequent chart review to assess teledermatology consult appropriateness using physician judgment.<sup>37</sup> If not deemed appropriate, follow-up questions stratified COVID-19 status and/or other respiratory illnesses to triage in-person consults. Other measures reduced physician and patient COVID-19 risk; by minimizing the number of people in rooms, they decreased any potential spread of respiratory droplets, as well as preserved more personal protective equipment.<sup>37</sup>

The SAF method has the largest body of evidence for both triaging and maintaining established care with a patient.<sup>25,38</sup> With COVID-19, SAF proved especially helpful with patients with stable chronic diseases and/or longer term medications (eg, patients doing well and simply needing refills).<sup>19</sup> SAF was also useful in recognizing certain common diagnoses, including acne, dermatitis, psoriasis, rashes, and rosacea. In contrast, as a limitation, pigmented lesions could be triaged but often not definitively diagnosed, requiring in-person visits.<sup>37,39</sup> Similarly, the vast majority of American Academy of Dermatology members surveyed felt that total body skin examination required in-person visits; in contrast, conditions such as acne did not require an in-person evaluation.<sup>21</sup> Indeed, total body skin examinations were a major limitation of teledermatology visits of all kinds, requiring an in-person evaluation. The need to triage skin checks may have led the specialty to reconsider the

appropriateness, for individuals and all patients, default recommendations for yearly skin checks and other regular appointments.

### THE IMPACT OF TELEMEDICINE FOR CORONAVIRUS DISEASE 2019 ON RESIDENT EDUCATION

The pandemic and its subsequent guidelines caused academic dermatology programs to reevaluate resident involvement and education.<sup>40</sup> Any significant changes to resident education that lasted more than 4 weeks had to be reported to the Executive Director of the Accreditation Council for Graduate Medical Education, because it would affect board certification eligibility. Thus, a focus on adjusting resident education through teledermatology allowed for residents and fellows to maintain the quality of their education.<sup>40</sup> Not unlike the standard of studying unknown photographs with kodachromes practicing teledermatology with both the asynchronous and synchronous methods allowed residents to triage diagnosis, conduct examinations, discuss assessments and plans, and present information to patients.<sup>37,41</sup> Programs also instituted virtual grand rounds featuring teledermatology to aid in resident education,<sup>40,41</sup> thus expanding telemedicine's reach in new ways.

The impact of the COVID-19 pandemic was not limited to current dermatology residents. Major adjustments to the residency application process were suggested in a dermatology program director consensus statement, which was released ahead of the application cycle. These changes included limiting the number and availability of away rotations, encouraging virtual rotations where applicable, and planning for remote interviews.<sup>41</sup>

### LESSONS LEARNED DURING THE CORONAVIRUS DISEASE 2019 PANDEMIC

Early in the COVID-19 pandemic, some felt that dermatology practices could serve as vectors for COVID-19 transmission and recommended that all nonessential visits be canceled for the safety of patients and staff.<sup>35</sup> Many dermatology practices heeded this warning by converting to telemedicine for patient care. This pivot to teledermatology directly helped to mitigate the spread of COVID-19 by decreasing the risk of exposure of patients and staff.<sup>18</sup> Evidence shows that, within the inpatient setting, the use of teledermatology, when compared with in-person dermatology visits, saved personal protective equipment and decreased unnecessary exposure to patients

and health care professionals.<sup>37</sup> One study also found that newly implemented COVID-19 teledermatology algorithms allowed for the most effective triaging and preparation for in the event that it may necessitate an in-person visit, increasing the efficiency of practices.<sup>22</sup>

Teledermatology's efficacy may vary in different populations. The elderly, for instance, may require assistance using digital devices.<sup>42</sup> A lack of education into the proper use of technology can limit the efficacy of teledermatology. We must also consider the emerging American population whose first language is not English. Even without the constraints of a pandemic, language barriers can be a social determinant of health impeding the delivery of optimal care. Thus, we must anticipate and proactively address how a lack of English fluency may affect proficiency and the ability to partake in teledermatology.<sup>42</sup>

Despite these challenges, these new approaches during the pandemic to teledermatology implementation serve as proof of concept with the intention to revise and adapt. For instance, additional services could provide caregivers for the elderly and translators for non-English speakers to improve adaptation.

### ***Patient Data Security***

When the CMS relaxed HIPAA regulations for telemedicine, the intention was to expand access to care.<sup>15</sup> Still, we must remain vigilant about quality standards to prevent security breaches. Many platforms being used for telemedicine appointments were developed primarily for insecure chats and are not encrypted or have security standards inadequate to protect patient information. These include FaceTime, Facebook Messenger, Google Hangouts, Zoom, and Skype.<sup>43</sup> The major benefits of these platforms include their low barrier for entry and ease of use for most patients and providers. Encryption standards vary; guidance must be provided to avoid any compromise of patient information. An uptick in cyber attacks on health care networks during COVID-19 certainly warrants additional scrutiny. Many hospitals have been targeted in ransomware attacks, in which patient data have been captured and withheld in exchange for money.<sup>44</sup>

### ***Teledermatology and the Digital Divide***

Telemedicine may overcome the barriers of distance and time, but it may also paradoxically worsen access for some people in unanticipated ways. Essentially, the most well-resourced patients may be overrepresented among telemedicine visits given their access and literacy,

whereas other populations (resource limited) may have greater more difficulty adapting to this new system.<sup>45</sup> Barriers to health equity exist across many sectors including education, planning, housing, labor, and health. Unfortunately, this well-described digital divide may be an important contributing factor in disparities. Access to a reliable, high-quality Internet connection and a smart device correlates with income. In fact, in 2019, 26% of Americans in households earning less than \$30,000 per year were solely reliant on smartphones for their Internet access.<sup>44</sup> That same year, it was also reported that 37% of adults in rural areas in the United States lacked broadband Internet and 31% lacked access to a computer. In addition, 25% of adults in urban areas lacked access to broadband Internet and 27% lacked access to a computer.<sup>46</sup>

Although both rural and urban populations may have limited Internet access, many specific populations may be especially at risk when care depends on this access, namely, Medicare patients, minorities, and patients whose first language is not English. Measures taken by agencies such as the CMS had their intended impact by allowing physicians to expand telemedicine access; for instance, Medicare patients are able to complete visits from the comfort and safety of their homes. However, it is important to note that 26% of Medicare patients lack home digital access.<sup>47</sup> Additionally, Medicare patients older than 85 years of age, those with a high school education or less, patients experiencing homelessness, Black and Hispanic patients, and patients with disabilities all have decreased digital access.<sup>48</sup> During the COVID-19 pandemic, the number of Spanish-speaking patients seeking teledermatology services was decreased when compared with 2019.<sup>49</sup> In 2019, 1 study found that 9% of Spanish-speaking patients scheduled teledermatology appointments through an outpatient academic clinic compared with 2020, where only 5% scheduled appointments.<sup>49</sup> Dependence on digital frameworks may disproportionately affect these populations already experiencing health disparities; in a specific example, many of these patients do not have reliable email addresses, making it harder to create teledermatology portals for communication.<sup>49</sup>

Certainly, it remains important to consider how different telemedicine models could mitigate any possible exacerbation in disparities. A study from Sao Paulo, Brazil, focused on the use of teledermatology consultation by primary care providers in individuals older than 60 years of age and they found that 67% of patients were treated via teledermatology without in-person visits and

subsequently sent back to primary care providers for continued care.<sup>50,51</sup> Another retrospective study, assessing primary care provider use of the American Academy of Dermatology's free Access-Derm program looked at the initiation of SAF teledermatology consults in a clinic serving uninsured patients.<sup>52</sup> In this study, 65% of patients did not require an in-person evaluation.<sup>52</sup> Additionally, they found an 82% discordance between primary care provider and teledermatologist preconsult management plans.<sup>52</sup> The use of teledermatology decreased the costs and wait time associated with in-person visits and inappropriate care.<sup>52</sup> These provider-to-provider teledermatology models can circumvent any limited patient access to broadband Internet. Even as demand may push the market toward more direct-to-consumer or direct-to-patient models, direct partnerships between primary care providers and dermatologists may prove valuable in many ways—for example, as a learning outlet for primary care providers who frequently participate in referrals,<sup>51</sup> with 1 study demonstrating how primary care providers learned to manage dermatologic concerns from the repeated use of such a system.<sup>53</sup>

Moving forward, many other barriers can be anticipated and addressed to ensure care continues with telemedicine. For example, financial barriers that limit access can be decreased by offering waivers that cover devices and Internet access in underserved populations.<sup>54</sup> In addition to funding, training programs can promote technology and health literacy for both patients and providers, done through the mail, or in person with a technology support team.<sup>54</sup> For patient populations with especially difficult circumstances (eg, those experiencing homelessness), telemedicine programs may need to work directly with other established centers, such as housing shelters, to ensure successful connections.<sup>55</sup>

Last, we must be especially mindful of cultural and language barriers in telemedicine implementation. Platforms should operate in multiple languages so that patients can easily navigate systems. To better direct focus toward local needs, governments and programs should work directly with local public health organizations that know and understand the people they wish to serve. These organizations' preexisting relationships may not only facilitate culturally competency and community buy-in, but may also help with implementation directly.

Addressing the digital divide to ensure telemedicine does not worsen disparities will require a concerted effort from physicians, regulatory bodies, and public health services to ensure access is not limited, and that Internet access does

not become a new social determinant of health<sup>52</sup> (Table 2).

## FUTURE OUTLOOK FOR TELEDERMATOLOGY

Before the COVID-19 pandemic, teledermatology was an already expanding field, albeit used sparingly compared with in-person visits. The option to use teledermatology had been stymied by limited insurance reimbursement for telemedicine visits,<sup>9</sup> concern about medicolegal liabilities,<sup>9</sup> and medical licensing restrictions.<sup>3</sup> Thus, without adequate support before the COVID-19 pandemic, most physicians opted out of using teledermatology.<sup>14</sup>

The COVID-19 pandemic prompted disruptive changes in the regulatory and policy landscapes, opening a new age of telemedicine growth and innovation. Dermatology practices and health systems created and adapted new protocols of care for both inpatient and outpatient settings.<sup>26,27</sup> Practices were able to save personal protective equipment and decrease unnecessary exposure of staff and patients to the coronavirus.<sup>27,48</sup> Residency programs were also able to institute teledermatology into resident education,<sup>27</sup> which further ameliorated the concern of exposure. Additionally, the implementation of teledermatology resulted in improved efficiency<sup>37</sup>; practices and health systems found that they were able to better prepare in advance for procedures and triage patients, thus saving both time and money while continuing follow-ups with established patients.<sup>22</sup> The increased use of teledermatology may open up spots to patients who require in-person visits and increase the efficiency of daily practice. Evidence

**Table 2**  
Areas for improvement in the digital divide

Area of Concern	Suggestions for Improvement
Financial assistance	Financial waivers could mitigate cost of devices and internet access
Interpretation services	Modeled after interpretation services used in patient, can increase quality of communication during the visit.
Community-based interventions	Community-based teledermatology programs can serve as an adjunct to assist with ease of use



also showed that teledermatology was an excellent option for common skin diagnoses and follow-up treatments; these common skin disorders include acne, rosacea, psoriasis, and eczema.<sup>27,36</sup>

Continuity of care has proven a primary concern during the pandemic, and teledermatology allows physicians to continue patient follow-up, especially for patients with chronic diseases and for patients on medium- to long-term treatment regimens.<sup>22,51</sup> Many of these patients are on immunomodulatory drugs, so teledermatology also conveys increased protection against COVID-19 for these patients. Moreover, teledermatology at its core allows physicians to care for patients at a distance, in situations where they may live far from a dermatologist or if they are quarantining.<sup>51</sup>

Teledermatology has been well-suited to the constraints of the COVID-19 pandemic, but limitations must be addressed. In addition to the medicolegal concerns, one rate-limiting step to teledermatology is access. Patient access to both secure Internet and the necessary technology for teledermatology visits limits many patients who lack digital access in their home or who lack the technological insight to participate in teledermatology.<sup>46,51</sup> Additionally, the expansion of telemedicine reimbursements frequently favored synchronous video visits and not SAF. Furthermore, evidence has shown that SAF is much more efficient in terms of response time for consultations, where a SAF dermatology consultation integration improved dermatology consultation time from 84 days to about 5 hours.<sup>17</sup> Reimbursement expansion was an important outcome to boost teledermatology, but the prioritization of synchronous visits over SAF could lead to the possible overuse of synchronous visits in situations where a SAF would be more appropriate for day-to-day efficiency.

Telemedicine policy changes will continue for at least the duration of the public health emergency. This uncertainty poses a potential threat to teledermatology advancement. However, there is a growing need for dermatology services, and during this pandemic teledermatology has proven to be efficient and effective. Therefore, as in-person care returns closer to prepandemic levels, we anticipate that teledermatology's use will remain significantly higher than before the pandemic and that it will continue to grow, especially for follow-up care and triaging visits. In the long term, the success of teledermatology will depend on federal and state policies and laws, as well as payers. Future policies must consider telemedicine expansion beyond geographic restrictions and further reimbursement increases and the use of SAF.

For sustained growth, government policymakers, physicians, insurance companies, and patient advocacy organizations must partner to create a system to fortify telemedicine with the many challenges of reimbursement, HIPAA compliance, and disparities in patient access to telemedicine.

## CLINICS CARE POINTS

- Before the COVID-19 pandemic, the use of teledermatology was limited, presumably due to a lack of parity in reimbursement, liability concerns, and geographic licensing restrictions.
- The increased use of teledermatology during the pandemic was incentivized by the desire to maintain continuity of care, relaxation of regulatory restrictions which allowed for expanded financial reimbursement, and expanded options for communication methods used to conduct patient visits.
- The store and forward method has the most evidence-based support for superiority in both triaging patient inquiries and continuity of care with established patients. This method proved to be especially suitable for patients with chronic illness and was helpful in diagnosis of common diseases. More complex diagnoses still required in-person consultation.
- The expansion of teledermatology during the COVID-19 pandemic may have paradoxically increased access for some patients while leaving other vulnerable populations unaddressed.
- Measures taken during the pandemic have provided a framework that can be used to guide possible expansion of teledermatology use post-pandemic. Extra care should be taken in susceptible populations such as Medicare patients, those with a high school education or less, undomiciled patients, Black and Hispanic patients, and those with disabilities.
- A concerted effort must be taken by multiple stakeholders to thoroughly investigate and remedy the digital divide in order to avoid exacerbating pre-existing health care disparities and avoid creating new ones.

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