

ORIGINAL INVESTIGATION

Telemedicine Practices of Facial Plastic and Reconstructive Surgeons in the United States: The Effect of Novel Coronavirus-19

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Abstract

Introduction: The objectives of this study among facial plastic and reconstructive surgeons (FPRS), include (1) quantifying the use of telemedicine, (2) examining the impact of novel coronavirus-19 (COVID-19) on telemedicine practices, (3) highlighting the types of telemedicine employed, (4) anticipating how telemedicine will be utilized in the future, and (5) describing FPRS' attitudes and understanding of telemedicine technologies.

Study Type: Cross-sectional survey.

Methods: A 6–13 question survey was sent to the American Academy of Facial Plastic and Reconstructive Surgery membership. Descriptive analyses were performed, along with a Fisher's exact test.

Results: We received 100 responses from a diverse group of surgeons across the United States. Overall, 91% of responders utilize telemedicine, of which 76.9% began during the COVID-19 pandemic. 33.3% of responders thought that their platforms were not Health Insurance Portability and Accountability Act compliant or were unsure. Of those that utilize telemedicine, the two biggest concerns were difficulties with physical examination (69.2%) and lack of human connection (44%). 75.8% of telemedicine utilizers plan to incorporate telemedicine into their practice moving forward. Of all responders, 71% believed that telemedicine will have a positive effect on the field of FPRS, although on univariate analysis those in practice >20 years were more likely to believe that there will be no effect or a negative effect ($p=0.014$).

Conclusions: The COVID-19 pandemic has accelerated the adoption of telemedicine among FPRS in the United States. The great majority of responders plan to incorporate telemedicine into their practice even after the pandemic subsides and believe that telemedicine will have a net positive effect on the field of FPRS.

Introduction

The novel coronavirus-19 (COVID-19) epidemic has radically changed the practice of many specialties, including for facial plastic and reconstructive surgeons (FPRS).¹ With clinics, hospitals, and surgery centers closed for all nonessential care/services, COVID-19 accelerated the adoption of telemedicine modalities among FPRS as a safe alternative to in-person interactions.^{2–5} Telemedicine (also known as telehealth) is a broadly defined term that entails the use of information technology, tele-

communication, and robotic tools to provide health care and transmit medical data across distances.^{2,6–8}

Although the health care and FPRS communities have recently shifted their focus toward safely resuming elective patient care, many of the trends accelerated by the epidemic will likely continue to evolve—including the utilization of telemedicine.⁹ Despite recent attention to and investment in optimizing patient care through telemedicine,^{2–5,10–14} there has been limited research on the extent telemedicine has been adopted by FPRS.

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KEY POINTS

Question: What are the general attitudes toward and practices of telemedicine among facial plastic and reconstructive surgeons (FPRS)?

Findings: Of 100 surveyed American Academy of Facial Plastic and Reconstructive Surgery U.S. members, 91% currently utilize telemedicine, of which 75.8% plan to continue after the pandemic. Of all responders, 71% believe that telemedicine will have a positive effect on the field.

Meaning: The use of telemedicine among FPRS during the COVID pandemic has been substantially accelerated, and will likely continue to become increasingly integrated into modern FPRS practices.

An understanding of how telemedicine is used among FPRS is important both now and in the future. The objectives of this study in FPRS include (1) quantifying the use of telemedicine, (2) examining the impact of COVID-19 on telemedicine practices, (3) highlighting the types of telemedicine employed, (4) anticipating how telemedicine will be utilized in the future, and (5) describing FPRS' attitudes and understanding of telemedicine technologies. To our knowledge, this is the first study examining recent telemedicine practices among FPRS.

Methods**Survey creation, content, and dissemination**

The Yale University Human Investigations Committee determined this study to be exempt from IRB review. Our cross-sectional survey was created utilizing the Yale Qualtrics Survey Tool (Qualtrics, Provo, UT). The survey contained a minimum of 6 and a maximum of 13 questions with inputted logic. Three questions measured demographics information, seven questions assessed telemedicine practice patterns, and three questions gathered beliefs surrounding telemedicine.

The survey was approved by the American Academy of Facial Plastic Surgery (AAFPRS) and disseminated to 989 AAFPRS associates, members, and fellows through email on June 18, 2020. The survey closed on July 12, 2020.

Survey analysis

We provide descriptive analyses on each question and figures were created using GraphPad Prism v8 (GraphPad Software, San Diego, CA). Free text responses (offered to participants who clicked "other" for "major concerns regarding the use of telemedicine") were evaluated individually by two authors (P.P.S. and S.J.T.) to determine whether to recode responses into existing options, create new groups, or to disregard. Disagreements were settled through discussion. A single Fisher's exact test was performed, testing whether there was an association between

years in practice (≤ 20 years or > 20 years) and beliefs about the effect of telemedicine on the field of FPRS (positive effect vs. no/negative effect). Significance was determined at the $p < 0.05$ level. Data were analyzed using SPSS V27.0 (IBM, Armonk, NY).

Results**Survey population and demographics**

One-hundred two complete responses were obtained; the median survey duration was about 2 min. As we only received two international responses (both from Canada), these responses were ultimately excluded. We were left with 100 eligible responses, which represents 10.4% of the 959 United States AAFPRS members.

Of 100 responders, 20% are located in the Northeast, 19% in the Midwest, 26% in the West, and 35% in the South. The majority are in private practice (68%), although 23% are in academics and 9% indicated that they participate in a hybrid practice model. A large portion of our responders have been in practice for > 20 years (45%); 17% indicated being in practice for < 5 years (Supplementary Table S1).

Telemedicine practice patterns among FPRS

Overall, 91% of our responders utilized telemedicine, with 30% using video visits only, 4% using telephone visits only, and 57% using both video and telephone visits (Fig. 1A). Of these 91 responders, the majority (70; 76.9%) did not routinely use telemedicine before the COVID-19 pandemic (Fig. 1B). Of the 57 who use both video and telephone visits, 50 (87.7%) utilize video visits more (Supplementary Fig. S1A). During the pandemic, of the 91 telemedicine-utilizing FPRS members, the majority dedicated < 5 h a week on telemedicine during the pandemic (46; 50.5%), although 24 (26.4%) utilized telemedicine for 5 to < 10 h a week, and 12 (13.2%) utilized telemedicine for 10 to < 15 h a week. Only 9 (9.9%) utilized telemedicine for > 15 h a week (Supplementary Fig. S1B).

Telemedicine video platforms, Health Insurance Portability and Accountability Act compliance, and reimbursements

Among the 87 FPRS members who utilize video telemedicine, the most popular platforms are Zoom (Zoom Video Communications, San Jose, CA) (26; 29.9%), FaceTime (Apple, Cupertino, CA) (15; 17.2%), Doxy.me (Doxy.me LLC, Rochester, NY) (11; 12.6%), Epic MyChart (Epic Systems, Verona, WI) (9; 10.3%), and Doximity (Doximity, San Francisco, CA) (8; 9.2%) (Table 1). Overall, the majority indicated that their platforms were Health Insurance Portability and Accountability Act (HIPAA) compliant (58; 66.7%). However, 14.9% indicated that it was not HIPAA compliant and 18.4% were unsure. This varied by platform utilized

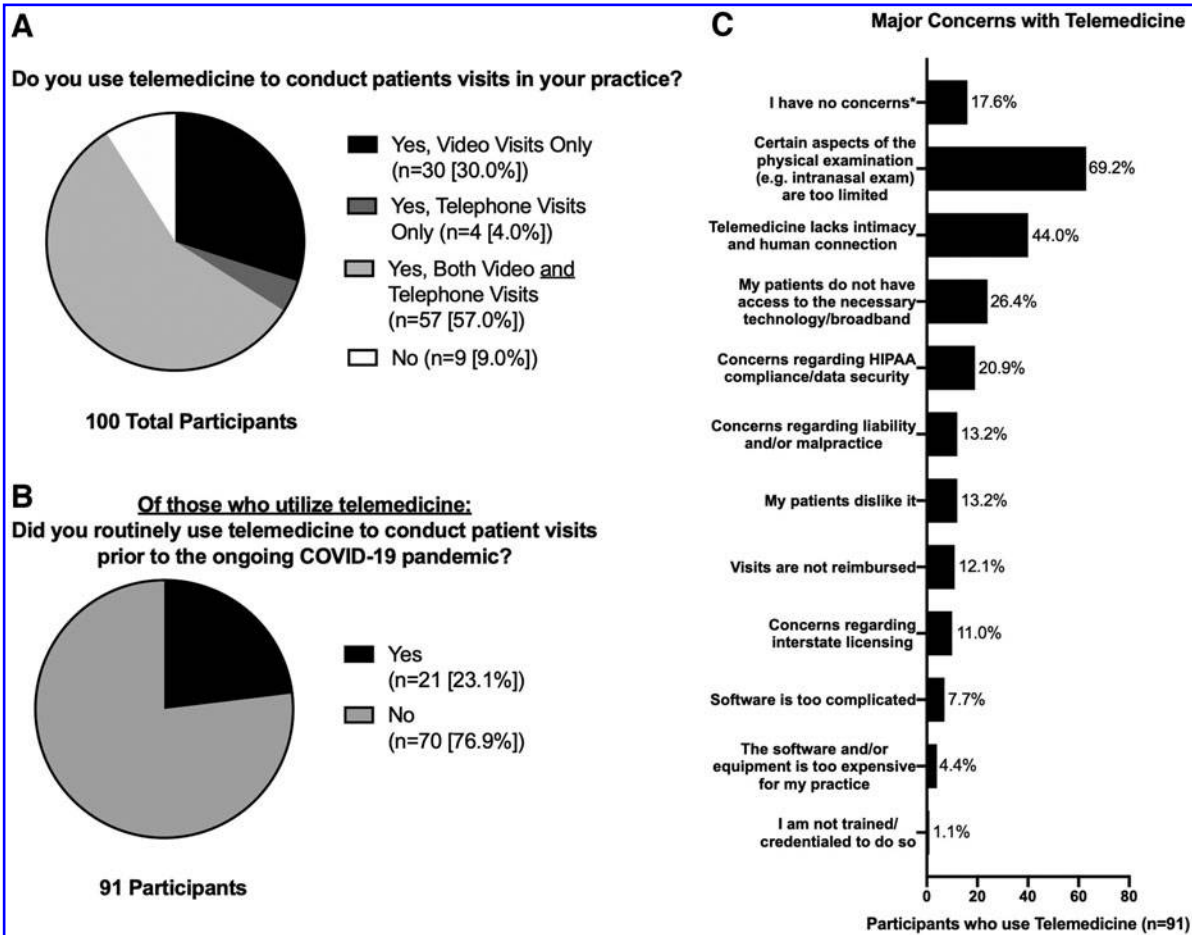


Fig. 1. Telemedicine practices and concerns among FPRS. COVID-19, novel coronavirus-19; FPRS, facial plastic and reconstructive surgeons; HIPAA, Health Insurance Portability and Accountability Act.

(Table 1). With regard to insurance reimbursements, 41 (49.4%) indicated that their video visits are covered by insurance, but 18.4% indicated it was not. Twenty-two (25.3%) do not bill insurance in their practice (Supplementary Fig. S2).

Concerns and beliefs about telemedicine

Of the 91 telemedicine-utilizing responders, 17.6% had no concerns. Sixty-three (69.2%) were concerned that the physical examination was limited, 40 (44%) were concerned about telemedicine lacking intimacy/human connection, and 24 (26.4%) stated that their patients do not have access to the necessary technology/broadband. Less commonly cited concerns included HIPAA compliance/data security (20.9%), liability/malpractice (13.2%), and patients disliking telemedicine platforms (13.2%) (Fig. 1C). Of the nine participants who do not use telemedicine, their top two concerns were a limited physical examination (7; 77.8%) and a lack of intimacy and human connection (4; 44.4%) (data not shown [dns]).

Of the 91 telemedicine utilizers, 69 (75.8%) surgeons plan to incorporate telemedicine into their practice, even after the COVID-19 pandemic subsidies. Specifically, 44% indicated that they would incorporate more video visits, 1.1% would incorporate more telephone visits, and 30.8% would incorporate both. Five (5.5%) surgeons stated that they would not, but a sizable number denoted they were not certain (18.7%) (Fig. 2A).

Of all 100 participants, 71% believed that telemedicine will have a positive effect on the field of FPRS, although 23% thought there will be no effect, and 6% felt there will be a negative effect (Fig. 2B). We hypothesized that participants' years in practice would modulate their beliefs (i.e., a surgeon who has practiced longer may not believe that telemedicine will have a positive effect). As such, a Fisher's exact test was performed. We found that 19 (42.2%) of the 45 surgeons in practice >20 years believed that telemedicine will either have no effect or a negative effect on FPRS, statistically more than that the 10 (18.2%) of the 55 surgeons in practice for ≤20 years ($p=0.014$; dns).

Table 1. Most commonly used telemedicine video platforms among those who utilize video visits (N = 87), and the percentage who believe that their platform is Health Insurance Portability and Accountability Act compliant

Most commonly used video platform	Total (% in column)	HIPAA compliant?		
		Yes (% in row)	No (% in row)	Not sure (% in row)
Zoom	26 (29.9)	14 (53.8)	6 (23.1)	6 (23.1)
FaceTime	15 (17.2)	3 (20.0)	4 (26.7)	8 (53.3)
Doxy.me	11 (12.6)	11 (100.0)	0 (0.0)	0 (0.0)
Epic MyChart	9 (10.3)	9 (100.0)	0 (0.0)	0 (0.0)
Doximity	8 (9.2)	7 (87.5)	0 (0.0)	1 (12.5)
Nextech	4 (4.6)	4 (100.0)	0 (0.0)	0 (0.0)
Skype	3 (3.4)	1 (33.3)	2 (66.7)	0 (0.0)
American Well	1 (1.1)	1 (100.0)	0 (0.0)	0 (0.0)
Digital Limelight Media ^a	1 (1.1)	1 (100.0)	0 (0.0)	0 (0.0)
Doctor.com ^a	1 (1.1)	1 (100.0)	0 (0.0)	0 (0.0)
Google Hangouts ^a	1 (1.1)	0 (0.0)	1 (100.0)	0 (0.0)
InTouch Telehealth ^a	1 (1.1)	1 (100.0)	0 (0.0)	0 (0.0)
Klara ^a	1 (1.1)	1 (100.0)	0 (0.0)	0 (0.0)
Microsoft Teams ^a	1 (1.1)	1 (100.0)	0 (0.0)	0 (0.0)
Symplast ^a	1 (1.1)	1 (100.0)	0 (0.0)	0 (0.0)
Thera-LINK ^a	1 (1.1)	1 (100.0)	0 (0.0)	0 (0.0)
Webex ^a	1 (1.1)	1 (100.0)	0 (0.0)	0 (0.0)
WhatsApp ^a	1 (1.1)	0 (0.0)	0 (0.0)	1 (100.0)
Total	87 (100.0)	58 (66.7)	13 (14.9)	16 (18.4)

^aNot a predefined choice. Participants clicked "other" and typed it in. HIPAA, Health Insurance Portability and Accountability Act.

Discussion

Our study found that the majority of responders are using some form of telemedicine (more commonly video visits) in their practice, the majority of whom had not been routinely using telemedicine before the pandemic. We

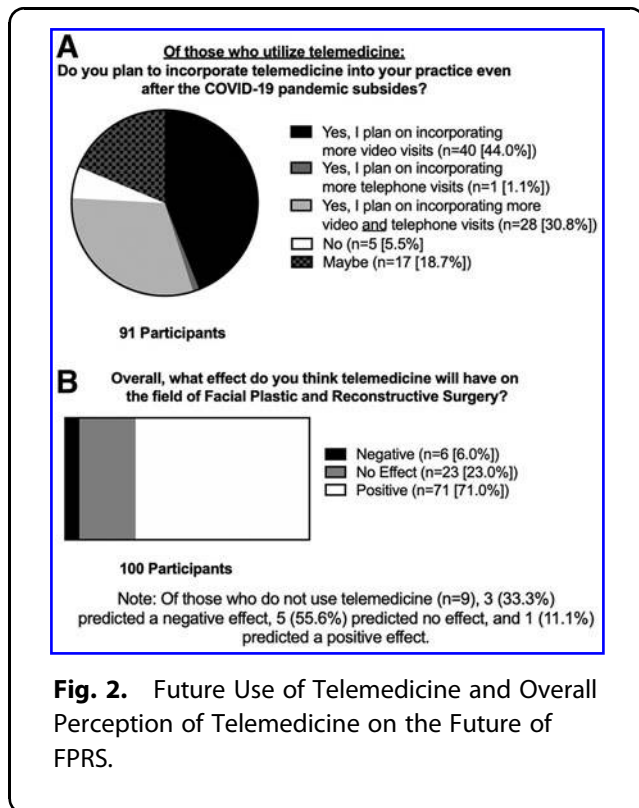


Fig. 2. Future Use of Telemedicine and Overall Perception of Telemedicine on the Future of FPRS.

emphasize the effect that COVID-19 has had in accelerating the adoption of telemedicine among FPRS across the United States. Moreover, we found that the great majority of responders not only plan to incorporate telemedicine into their practice even after the pandemic subsidies, but also believe that telemedicine will have a net positive effect on the field of FPRS. These findings support previous studies describing the benefits of telemedicine,^{2-5,10-14} the concerns and logistical obstacles preventing widespread adoption of telemedicine,^{2,6,8,12,15-18} and the idea that telemedicine will continue to evolve as part of the modern plastic surgery practice.^{6,17}

Even before the COVID-19 pandemic, the use of telemedicine was increasing within health care. Telemedicine has been studied across specialties^{6,19} and been shown to improve care in diverse health care settings.^{7,8,19,20} Benefits of telemedicine are numerous, including, but not limited to, improved health care access in rural communities, usefulness in natural disasters, increased access to subspecialists,^{2,6,12} enhanced postoperative monitoring, convenience for patients, increased likelihood of follow-up, cost savings for health care systems, and a novel avenue for surgical education.^{5,6,8,12,15-17,19,21} In plastic surgery, telemedicine has been studied in the management of free tissue transfers, trauma, burn, wound care, and cleft lip/palate.^{2,6,12,15,17,18,20,22} Studies have found that for certain ailments, telemedicine demonstrates comparable or superior efficacy to in-person consults.^{6,8,18,19} In fact, a recent systematic literature review found that 96% of plastic and reconstructive surgery (PRS) articles on the topic of telehealth found a beneficial impact.¹⁸

Despite the potential benefits, several substantial barriers have prevented widespread adoption of telemedicine in the United States, such as lack of commercial and government reimbursements, interstate licensing concerns, legal/malpractice concerns, data security/HIPAA compliance fears, and lack of widely available technology for patients.^{2,6,8,12,15-18} As a result, a 2016 study found that only 15.4% of physicians used a component of telemedicine to interact with patients, with only 11.2% of physicians working in practices with telemedicine capabilities.¹⁶ After the COVID-19 outbreak, there was an unprecedented shift in policy, which resulted in an acceleration of telemedicine use. These policies—aimed to mitigate exposure of the virus, minimize overutilization of health care facilities, and preserve personal protective equipment—removed many of the aforementioned obstacles.^{2,12,15}

Our findings support our hypothesis that the COVID-19 pandemic has accelerated the use of telemedicine among FPRS. Our results demonstrate that the majority of FPRS within our diverse sample (91% of responders) have routinely employed telemedicine since the pandemic started (Fig. 1A). The vast majority of

these participants (76.9%) were not regularly using telemedicine before the pandemic (Fig. 1B).

Interestingly, we found that the majority of participants dedicated <10 h of their week to telemedicine during the pandemic (76.9%), with the minority dedicating >15 h per week (9.9%). This finding suggests either that FPRS are using telemedicine as an adjunct to supplement in-person visits, or that the pandemic decreased demand for FPRS services among patients. The reason for this finding is likely multifactorial and impacted by local regulations on nonessential services and current confines of telemedicine visits (e.g., limitations on physical examinations). Although it is likely that demand for FPRS visits declined immediately after the outbreak began,¹ reports have since shown demand returning—especially for aesthetic procedures.²³

Our findings also highlight FPRS' concerns surrounding telemedicine. The most commonly cited concern among adopters of telemedicine is the limitations in conducting physical examinations, followed by the lack of intimacy and human connection of virtual visits (Fig. 1C). These two concerns were the most commonly cited reasons for not using telemedicine among participants who do not use telemedicine at all. Both of these concerns suggest that the greatest negative of telemedicine is inherent to its virtual nature. The virtual medium of telemedicine not only hinders the physical examination, but also handicaps providers from performing procedural visits (e.g., chemodenervation, fillers) prevalent in the field of facial plastic surgery.^{2,10} Expanding the use of telemedicine is likely contingent on addressing these drawbacks. Despite recent innovative proposals suggested to improve the “virtual physical examination” and foster human connection during virtual visits,^{3,4} further research is still needed.

Although start-up costs of telemedicine have been cited as a barrier to telemedicine use before the epidemic,⁸ only 4.4% of responders highlighted expense concerns. The recent rapid expansion of available telecommunication technologies (e.g., Wi-Fi, smartphones) in the United States has likely made such Internet technologies more readily available. Of note, a substantial number of participants (26.4%) noted concerns regarding patient access to the necessary technology. This concept of a “digital divide” among patients has been highlighted before; in short, some patients are unable to participate in telemedicine visits either because of lack of access to or knowledge about the necessary technologies.^{13,17} Hence, although the rapid adoption of telemedicine has likely benefited many patients, others—particularly elderly and lower socioeconomic status patients—face barriers to taking advantage of this technology. Finding ways to increase access to telemedicine among patients merits study; one proposal is partnering with large technology firms (e.g., Apple, Google) to find solutions.^{5,24}

Moreover, as technology continues to become more accessible in society,⁵ so will access among patients.⁷

Interestingly, we found that although 66.7% of responders indicated that their platforms were HIPAA compliant, 33.3% felt their telemedicine platform of choice was either noncompliant with HIPAA or were unsure of its HIPAA status. We found similar confusion surrounding the ability to receive insurance reimbursement for telemedicine services among responders. In response to the pandemic, the Centers for Medicare and Medicaid Services and many commercial insurance payers quickly updated reimbursement, interstate licensing, and HIPAA policies (retroactive to March 1, 2020) to support the use of telemedicine during the public health crisis.^{2,12,25} As a result, nonmedical software platforms such as Skype, Zoom, and Facetime have all been approved when used in “good faith” for any treatment/diagnostic purposes, patients may be seen virtually across state lines, and most payers have updated reimbursement policies.²⁵ Our findings reflect that among FPRS, there may be misinformation—or at the very least uncertainty—about patient privacy and reimbursement policies with telemedicine services. The FPRS community may benefit from more updated and readily available resources on this topic.

The expansion of telemedicine in health care has been hailed by many physicians, medical societies, and even the World Health Organization as an opportunity to revolutionize and increase health care access.⁴ We found that the vast majority of participants not only plan to incorporate telemedicine into their practice after the pandemic subsides, but also feel that telemedicine will have a positive effect on the field of FPRS (Fig. 2). This suggests that FPRS believe that telemedicine has enhanced their practice and ability to care for patients. Despite the mostly positive response regarding telemedicine among FPRS, we found a statistically significant association between perception of telemedicine and years in practice, with individuals in practice >20 years statistically more likely to believe that telemedicine will either have no effect or a negative effect when compared with individuals in practice for ≤20 years ($p=0.014$). This suggests that more experienced surgeons are more apprehensive when it comes to adopting telemedicine, and that telemedicine practices will likely continue to expand and evolve as more junior surgeons join the FPRS community and progress through their careers.

Since maximizing patient experience and optimizing outcomes are important goals for FPRS practices, patients' perceptions of telemedicine demand further study. A prepandemic PRS study found that although initially hesitant at first to opt for a telehealth encounter, 100% of patients were satisfied with the telehealth experience and 97% would use telehealth again in the future.¹⁷ Understanding patients' perspectives is crucial to the

continued evolution of telemedicine use, as patient experiences will likely dictate its growth or decline. Moreover, creating assessment tools to analyze telehealth outcomes is important, as there is currently no standard method to do so.¹⁷ Incorporating research tools, such as epidemiological data collection, is another domain of telemedicine that has been largely untapped.^{4,19} Given the positive reception to telemedicine among FPRS thus far, our specialty should continue to study and improve our use of telemedicine, for it is likely to become an increasingly integral part of patient care in the future.

Limitations

Owing to the nature of our cross-sectional survey, our major limitation is response bias. Although we received a large sample size, it is possible that we captured only those motivated to respond. Thus, we cannot claim that 91% of all FPRS utilize telemedicine. In addition, we created a short survey to maximize response yield; this may have limited the comprehensiveness of our survey. Finally as all the responders practice in the United States, our findings may not be applicable internationally; for instance, adoption and efficacy of telemedicine may be much lower in nations with limited access to the necessary technologies.⁶

Conclusions

In conclusion, our results indicate that the COVID-19 pandemic has substantially accelerated the adoption of telemedicine among FPRS in the United States; the majority of participants noted using some form of telemedicine in their practice since the pandemic started, substantially higher than the number doing so before the epidemic. The most commonly used platform is Zoom, followed by Facetime, with video visits more commonly conducted than telephone visits. Interestingly, many participants using telemedicine demonstrated uncertainties about the HIPAA compliance and insurance reimbursement policies of their platform of choice. Moreover, our findings suggest that telemedicine utilization during the pandemic has served as an adjunct, not a replacement, to typical in-person visits. The most common concerns regarding the use of telemedicine are related to elements lost in the virtual medium (e.g., limited physical examination and intimacy/human connection), followed by concerns regarding patients' access to necessary technology, and HIPAA compliance/data security. Nevertheless, the great majority (70.8%) of responders plan to incorporate telemedicine into their practice after the pandemic subsides, suggesting that telemedicine will likely become increasingly integrated into modern FPRS practices. Similarly, our findings suggest that the majority of FPRS believe that telemedicine will have a net positive effect on the field,

although those in practice >20 years were more likely to be dubious or indifferent.

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Author Disclosure Statement

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Supplementary Material

Supplementary Table S1
Supplementary Figure S1
Supplementary Figure S2

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