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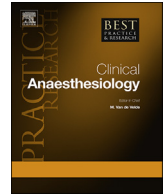


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Telemedicine and current clinical practice trends in the COVID-19 pandemic



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Telemedicine is the medical practice of caring for and treating patients remotely. With the spread of the coronavirus disease-2019 (COVID-19) pandemic, telemedicine has become increasingly prevalent. Although telemedicine was already in practice before the 2020 pandemic, the internet, smartphones, computers, and video-conferencing tools have made telemedicine easily accessible and available to almost everyone. However, there are also new challenges that health care providers may not be prepared for, including treating and diagnosing patients without physical contact. Physician adoption also depends upon reimbursement and education to improve the telemedicine visits. We review current trends involving telemedicine, how pandemics such as COVID-19 affect the remote treatment of patients, and key concepts important to healthcare providers who practice telemedicine.

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Introduction

While telehealth services have been available at medical institutions for the past 20–30 years, the use of telehealth services has expanded rapidly during the coronavirus disease-2019 (COVID-19) pandemic. The Centers of Medicare and Medicaid Services (CMS) broadened access to the use of telehealth during this crisis so that patients could receive a wider range of services without having to travel to a specified healthcare facility. Under Waiver #1135, patients have been able to utilize telehealth services from their place of residence [1].

As there are many types of telehealth services, it is essential to understand the distinctions between them. Broadly, telehealth refers to electronic and telecommunication technologies and services that are used to provide care and services to patients without physical contact. A clinician in one location uses a telecommunication infrastructure to deliver care to a patient at a distant site. Telemedicine is a remote clinical service, while telehealth is a broader term that can also refer to remote nonclinical services. Telehealth incorporates telemedicine and includes indirect benefits, including understanding health indices, providing preventative health support, and medical education [2].

Telemedicine can be conducted through different telecommunication platforms, including audio-only or combined audio-visual. While CMS initially required the use of a combined audio/visual telecommunication system to receive reimbursement, this organization revised this regulatory requirement to enable the use of audio-only visits [3]. Audio-only services are essential for patients who may not have access to real-time video/internet services and can be conducted over the telephone

without the need for a visual component. Challenges with an internet connection (poor connection, broken connection, etc.) can occur even if patients have access to these technologies. While the use of an audio/visual system is generally preferred to audio-only, the use of audio-only visits allows for the expansion of telemedicine services to those who otherwise may have been unable to participate [2].

History

Before the COVID pandemic, several historical telehealth models existed for pain management services [4]. The “Store-and-Forward” approach requires the patient or provider to obtain and electronically store real-time clinical data or information for subsequent use [4]. This has been successfully implemented for cognitive behavioral therapy-based patient education, which produced reductions in pain intensity and improved activity relative to a waitlist control [4]. The “Direct-contact Consultation” model involves generalist physician to specialist physician telehealth consultations regarding the optimization of pain care. The Specialty Care Access Network - Extension for Community Health Outcomes (SCAN-ECHO) is a video teleconferencing-based training program at the Cleveland Veteran Affairs Medical Center, where a multidisciplinary team of pain specialists trained twenty-four primary care clinicians in optimized pain care. Pre- and post-training questionnaires revealed improvements in clinician pain knowledge, perceived confidence in treating pain patients, and enhanced provider satisfaction with specialist communication [5]. The “Direct-contact Hub and Spoke” model utilizes direct interaction between patients (referred from “spoke” nonspecialty general care clinics) and pain providers (centralized in pain center “hubs”). This has been innovatively implemented in Australia’s rural and remote geographical regions with a study, including twenty-one chronic pain patients participating in a single telehealth multisite group treatment session. Results indicated that 65% of participants reported improved function, 61% indicated improved mood, 57% reported improved physical activity, and 50% noted a reduction in pain levels [6]. The “Direct-contact Home-based” model, which has predominated during the COVID pandemic, comprises indirect contact between the patient and provider from the convenience of the patient’s home utilizing essential technology [4]. One example of this model is the use of exercise-based telemedicine for the treatment of chronic pain. Adamse et al. conducted a systematic review from 2000 to 2015, including 14 randomized controlled trials involving 3575 participants. Fifty-six percent of the tele-interventions were delivered by internet or smartphone, 44% by phone, and treatments ranged from general encouragement to low-intensity tailored exercise programs. Telemedicine versus no intervention revealed small reduction in pain scores (mean difference -0.57), but no advantages were observed for telemedicine as compared to usual care or in addition to standard care [7].

Telemedicine has been historically utilized for a variety of appointment visits in pain management. While chronic pain care with established patients would seem ideally positioned for telemedicine continuity, there is no evidence to suggest that follow up visits are better suited to telemedicine than new patient evaluations. One form of follow-up continuity care is “Home-Based Telemedicine” (HBT) sessions for patients with chronic neck pain. A 2017 study investigating HBT randomized patients who then completed a ten-session in-person exercise program to either illustrate the review of taught exercises or nurse telemedicine contacts every two weeks. At six months, neck pain and disability declined in both groups. Still, the decline was more substantial in the HBT group, with 87% of the HBT group versus 66% of the control group continuing to perform home exercises [8]. A 2017 study queried patients of the neurology outpatient clinic at the University of Arkansas between 2011 and 2012 to assess their interest in telemedicine for routine follow-up visits. Of the 1441 respondents, 52.4% expressed interest in telemedicine. Significantly, increased interest was noted in those patients traveling long distances to the clinic that required over one hour of travel time, individuals with functional challenges secondary to neurological conditions rendering travel more burdensome, and patients experiencing travel-imposed financial hardship [9].

While benefits of telemedicine are substantial and include increased patient access to specialist pain care in rural areas, increased convenience with reduced driving, reduced wait times, greater flexibility in provider scheduling, and potential cost savings, barriers for telemedicine implementation continue to exist worldwide [6]. A 2016 systematic literature review investigating barriers to adopting

telemedicine worldwide identified the issues with technically challenged staff (11%), followed by resistance to change (8%), cost (8%), reimbursement (5%), age of patient (5%), and the level of education of patient (5%). All other barriers occurred at or less than 4% of the time [10]. This study identifies several issues with telemedicine that can be eliminated by training staff, change-management techniques, and alternating delivery by telemedicine and personal patient-to-provider interaction. Future research should evaluate policies to identify which are redundant and which are most helpful to ensure whether all staff are prepared to practice telemedicine.

Limiting the scope of barriers to pain telemedicine challenges in the United States, McGeary and colleagues discussed historical limitations of high-quality efficacy data related in part to methodological challenges of integrating clinical protocols into telehealth systems. At the time of their study in 2012, the authors lamented an absence of published data on the efficacy of home-based telehealth for pain management. However, available literature on this topic has burgeoned in the last decade [4]. Additionally, estimating the cost impact of pain telemedicine has been historically challenging to interpret given a variety of essential variables, including the type of technology implemented, characteristics of the healthcare system involved, patient volume, and geographic location. Theodore et al. sought to use transaction cost analysis to compare a standard in-clinic pain consultation at an academic medical center with a provider-to-provider direct-contact consultation using telehealth. Although per patient cost was similar (\$332.89 in-clinic versus \$376.48 telehealth), the number of transaction steps involved for telehealth (27) was significantly less than for the in-person visit (46), arguing for a more streamlined and cost-efficient experience using telemedicine [11]. Additional risks of telemedicine can include missed information by the provider, potentially resulting in faulty recommendations. Additional concern was expressed over the lack of standardized procedures to manage medical and psychological emergencies arising during the remote visit [4]. Eccleston and colleagues reflected on further provider concerns, including a lack of a hands-on physical exam, reduced ability to develop patient-provider rapport secondary to physical distancing, potential distractibility of patients due to competing responsibilities at the time of the telemedicine visit, need to retrain staff, and privacy concerns. Additionally, there is potential for socioeconomic inequalities in access and the use of telemedicine secondary to a lack of and familiarity with requisite technology in older or disabled individuals [12].

Impact of COVID on APCs

The impact of patient volumes related to COVID-19 across the United States and abroad has been tremendous and continues to evolve. This impact extends beyond any single specialty and has not been limited to the specialty of chronic pain [13,14]. During the height of the pandemic, some ambulatory pain clinics were either completely shut down or severely limited in outpatient services. Depending on the location and severity of COVID-19 spread, some clinics also experienced a reduction in patient volume that led to furloughs, layoffs or shifting of providers to high impact COVID-19-related care areas. According to a recent article, approximately 243,000 jobs were lost in physician offices in addition to 205,000 positions in other healthcare provider settings, representing an increase of unemployed people in education and healthcare from last year's number of 512,000 to more than 2.5 million people [15]. Many clinicians nationwide had to be reassigned from their primary specialty to COVID-19-related care, notably in New York and New Jersey, in the early stages of the pandemic. Anesthesiologists, in particular, have been reassigned from performing elective cases to serving in intensive care units [16]. A recent PubMed search has not yet detailed the exact volume data and financial impact of this specific to pain medicine, but news outlets across the country are reporting unprecedented layoffs and the inability of smaller healthcare systems to remain viable [17].

To help offset these decreases in patient care, volume, and access, on March 6, 2020, the CMS signed into law ways by which to increase access to virtual service and to define numerical codes and reimbursement amounts for telehealth visits, audio-only evaluation and management (E/M) services, virtual check-ins, and electronic visits [1]. Additionally, at this time, telehealth services, if provided in a real-time interactive audio and video format, were to be paid similarly to in-person visits. Of note, audio-only visits have been reimbursed at a lower rate, incentivizing many pain medicine practitioners to expand their ability to conduct audio/video visits.

Despite the lower patient volumes and shifting of resources due to coronavirus, the need for comprehensive, multimodal care in pain medicine is as great as ever. Patients who are prescribed opioids for chronic pain may be at an increased risk of infections such as COVID-19 due to opioid-induced immunosuppression [18]. The impact of COVID-19 on job status may lead to changes in physical function and worsening anxiety/depression, which can also hamper pain outcomes [18]. Reports of employees too fearful to return to work are frequently described, and long-term psychological morbidity was reported based on data from the 2002–2003 SARS epidemic [19]. Providers have also worked to find innovative solutions to providing pain care during the pandemic by using telehealth services to reach patients for medication management, pain psychology services, and virtual rehabilitation services. Telemedicine services should be used as much as possible with the minimization of in-person visits during the COVID-19 pandemic [18].

Patient volumes have decreased in ambulatory pain centers due to a number of reasons. During the early stages of the pandemic, CMS made designations and recommendations to postpone Tier 1 (low acuity treatment or service) and Tier 2 (intermediate acuity treatment or service) services [18]. As the majority of outpatient pain medicine visits and interventional pain procedures are classified as Tier 1 or Tier 2, these elective procedures were discontinued entirely in many areas as a consequence [18]. Screening algorithms related to COVID-19 exposure have been established to take place before scheduled pain procedures [20]. Pain centers also have limited patient volumes to minimize patients queuing in waiting rooms and to maximize social distancing. Public transportation services have also decreased services, which may present a barrier to access. Lastly, referrals from outside practices have decreased as other specialties that traditionally refer to pain practices have also negatively been affected.

Telehealth can be considered a reasonable option to deliver Tier One and Tier Two pain medicine care in a pandemic or global emergency [18,20–23]. One barrier to the adoption of telemedicine technology is the unfamiliarity of the technology by healthcare providers. Many pain practices have not yet been educated on its use or have the proper hardware (such as cameras) and software in place to make telemedicine possible. However, when appropriately used, telemedicine in the field of chronic pain can help improve revenue streams by improving access to care while also meeting the needs of patients living with chronic pain. As noted earlier, CMS has detailed and updated reimbursement codes for telemedicine. Still, concerns for decreased patient access in the elderly and disabled populations have been described and continue to be a barrier [24]. Telemedicine is also not an ideal replacement for physical examinations and therapies when treating chronic pain in a multimodal manner, but may have a more promising role in delivering psychological care [25,26].

Telepsychiatry

Impact of COVID on chronic pain patients with addiction disorders

Chronic pain and addiction have been intertwined for years. First seen in the 1990s, the opioid epidemic began in response to another epidemic: untreated pain [27]. The past two decades reveal the increased use of opioids for chronic pain, which contributed to increased misuse [28]. Typically, comorbid addiction and chronic pain patients are diagnosed with addiction before developing chronic pain [29]. Overall, 58% of addiction patients develop chronic pain [30]. The prevalence of prescription opioid abuse in chronic pain patients varies across settings, with a report of up to 50% of chronic nonmalignant pain patients and 7.7% of cancer patients [29]. Additionally, patients with a comorbid substance use disorder are more likely to receive prescription opioids in higher doses than chronic pain patients without substance use disorders (SUDs) [30].

The coronavirus epidemic and harms of substance abuse in response to chronic pain are escalating [30]. By March 2020, over 512,000 people were infected with COVID-19 and 23,495 died worldwide [31]. Harms related to COVID-19 include increases in mental health challenges, substance use behaviors, and behavioral addictions [31]. There is evidence that past widespread crises severely impacted vulnerable populations, which resulted in increased substance use, increased onset of SUDs, and the progression from mild to severe diagnoses [32]. These trends are becoming evident in the current pandemic, leaving treatment providers facing complications related to patient care.

Treatment centers worldwide closed in response to COVID-19 [26]. Patients and clinicians risked exposure to COVID-19 while carrying out routine clinical visits (3). Treatment centers that remained open faced obstacles to deliver patient care. Patient resources were diverted due to an array of complications, including procedure cancellations in response to social distancing guidelines, panic buying creating medication and supply shortages, and travel restrictions limiting access to remaining resources [26]. Outside of treatment, isolation, and social distancing removed environments such as parties or celebrations and consequently reduced other avenues to many substances [31]. When patients with opioid use disorders (OUDs) suddenly stop taking opioids, due to shortages or tapering, they face withdrawal symptoms that can lead to increased pain and emotional struggles with indignities and hopelessness [33]. Physical withdrawal symptoms can include fever, chills, headache, nausea, anxiety, muscle aches, insomnia, sweating, vomiting, and diarrhea [31]. These stressors create triggers, factors stimulating an urge to use, for patients living with addiction and chronic pain. Patients who relapse after periods of abstinence are vulnerable to overdose due to diminished tolerance to the substance [34].

Withdrawal symptoms easily overwhelm patients, and they often turn to using outside substances or “street drugs” [32]. Others revert to doctor shopping, forging prescriptions, or diversion schemes to obtain medications [29]. Diversion schemes include providing false information to obtain multiple prescriptions simultaneously, finding “pill mills” that readily prescribe medications without medical justification or in excess, seeking dual treatment across multiple levels of care (LOC), or purchasing medications online [35].

On top of reduced resources, the patient population is at high risk for COVID-19 infection. Chronic pain patients are susceptible to immunosuppression, which results from the deleterious effects of chronic pain on the immune system and the direct effects of opioids [36]. Addiction patients are high risk due to clinical, psychosocial, and psychological factors: substance use facilitates and aggravates respiratory infections; smoked and inhaled substances, including from vaporizers, produce pulmonary complications, and diseases; isolation triggers relapse and increases substance use; and homeless and incarcerated patients are subjected to crowded housing environments [32]. Complications are heightened by shortages in personal protective equipment (PPE) and increased need for specialized training of healthcare professionals to ensure the delivery of appropriate care to comorbid patients with addiction disorders and chronic pain.

Future of telemedicine for the management of addiction disorders

Telemedicine has been used for decades, with origins in the 20th century [37]. Before COVID-19, telemedicine was still in development [26]. Technological and financial barriers to transmissions hindered its implementation [37]. Additionally, healthcare professionals debated telemedicine's ethics, confidentiality, and security. It was an alternative tool used primarily when facing obstacles to deliver patient care, as with rural populations or patients on business travel assignments. With the sudden worldwide impact of COVID-19 in early 2020, pressure was placed on finding safe ways to deliver care to patients. Remote treatment uses telephones, online platforms, and other electronic media such as online psychotherapy [26]. Digital therapeutics (DTx) provides evidence-based interventions through software programs along with other therapies, such as medication, to improve patient care and outcomes [26].

Treating addiction through telemedicine and telepsychiatry is now possible. Currently, ~80% of developing nations around the world offer some form of mobile health program [37]. Clinicians can continue to prescribe controlled substances, as many countries have made temporary policy changes to accommodate telemedicine [36]. While using telemedicine platforms, clinicians can obtain informed consent, conduct pill counts, review patient medications, provide patient education, and review medical history as they would during face-to-face visits [36].

Healthcare professionals are not limited to prescribe opioid therapy for chronic pain patients. Treatment can involve steroids or nonsteroidal anti-inflammatory drugs (NSAIDs) [36]. Bio-psychosocial therapy is encouraged alongside pharmacological therapies. Telepsychiatry commonly utilizes cognitive behavioral therapy (CBT) to deliver interventions, including stress management, sleep hygiene, mindfulness, healthy lifestyle education, and peer support programs [36]. Research

shows that telemedicine and tele-psychiatry successfully increase patient satisfaction, accessibility, and quality of life while decreasing depression and financial burdens [38].

Addiction treatment has expanded through telemedicine and tele-psychiatry. It moved from marginal, used mostly in private practice, to mainstream [39]. Healthcare professionals are learning to navigate telemedicine and telepsychiatry platforms, while also gaining increased education on treating addiction patients. Treatment options vary based on patient needs, current resources, and restrictions. Clinicians and patients must be open to utilizing various treatments, such as opioid versus nonopioid prescription therapy and inpatient versus outpatient treatment. Overall, a comorbid substance use disorder and chronic pain require access to maintenance treatment centers for stability [30]. Future implications include monitoring increases in morbidity and mortality, increasing physician involvement in addiction education and treatment, and furthering investments to reach more patients through telemedicine and telepsychiatry.

Contemporary telemedicine

The contemporary definition of telemedicine is the usage of any electronic technology, including audio-video two way, real-time interactive communications that facilitate the administration of healthcare to patients who are geographically separated from providers [26,40,41]. The COVID-19 pandemic has triggered a significant transformation in the healthcare system [42]. The surge of cases catapulted The U.S. Department of Health and Human Services (HHS), responsible for enforcing regulations under the Health Insurance Portability and Accountability Act of 1996 (HIPAA), to grant permission to providers to utilize telecommunication in providing healthcare to those in need. Furthermore, the HHS has issued a waiver that allows clinicians to prescribe opioids through telehealth visits [43]. The nature of the COVID disease and the potential to spread infection rapidly necessitated the need for early adoption of telemedicine. Reports suggest that telemedicine has been of great value for treating chronic pain in terms of patient satisfaction, comfort, eliminating the stress and inconvenience due to the need of transport, affordable and improved specialist care access, reduced costs, and wait times [18,44–46].

The impact of COVID-19 infection on chronic pain patients who require continuity of care and medications has been enormous [18]. Inevitable cancellations of elective procedures and pain clinic visits due to the implementation of social distancing measures negatively affected overall health status [20] and the quality of life of patients with chronic pain. Altered immune response due to the medications and respiratory depressant effects of opioids, in turn, increases the susceptibility of these patients to COVID-19 and other superadded infections [18]. The risk benefits of steroid administration needs reevaluation, and the reduction of dosage is to be considered for high-risk patients in this pandemic era [41]. The financial stresses and isolation imposed by the pandemic add to psychological impairment, which cannot be overlooked. Reports suggest the association of severe pain with more severe levels of depression in 50% and suicidal thinking in 34.6% [26,47]. Consensus recommendations from an international expert panel suggest using a biopsychosocial model of pain management to address these issues [18]. Telemedicine can invariably be utilized to address many of these situations to educate and treat patients and communicate with other healthcare team members involved in patient care. Pain by itself is a reason for 45%–75% of patients who present to the emergency department [20,48].

Pain clinicians must recognize incidences of malfunction of pain pumps leading to serious withdrawal effects or evidence of the onset of infection and the need for an urgent intervention [18]. Early recognition and resolving of problems help in reducing the overcrowding of the emergency room and also limit the increased risk of exposure to infection.

Technical problems can be a hindrance at times with telemedicine, and it is better to have a backup plan of action discussed with the patient ahead of time in case such a situation arises [26]. The elderly may not be comfortable using the technology, and hearing impairment might interfere with patient engagement with a clinician during the telehealth visit. Ultimately, the goal of using telemedicine is to be able to reduce the systemic consequences of untreated pain, deliver safe and effective treatment in times of a pandemic, and ensure that the critical factor in achieving the desired results in response to

any such endeavor is taking utmost care that patient privacy is maintained. They should also be continuously engaged during the visits.

How did medicare change telemedicine?

Because of the ongoing COVID-19 pandemic and the desire of both providers and patients to reduce unnecessary in-person interactions, the CMS expanded upon its available telehealth services under the Waiver 1135 authority and Coronavirus Preparedness and Response Supplemental Appropriations Act. The waiver, which was signed into law on March 6, 2020, and is effective retroactively as of March 1, 2020, made several significant changes to telehealth. Audio-video telehealth encounters, which previously reimbursed significantly less than those performed in-person, now reimburse at a rate equal to in-person visits [49]. Initially, CMS changed the status of audio-only, time-based telehealth (CPT codes 99441–99443) from non-covered to covered services [49]. Once covered, these services reimbursed only from \$14 to \$41 [50]. On April 30, 2020, CMS increased reimbursements from \$46 to \$110, equaling that of their in-office counterparts (CPT codes 99212–99214). Similar to the 1135 waiver, these changes were made effective retroactively as of March 1, 2020. Thus, both audio-only and audio-video telemedicine services have the potential to reimburse clinicians for outpatient services at the same rate as in-office visits. Additionally, telehealth services can now be billed based on the complexity of time spent, with the old requirement that 50% of a healthcare provider's time be spent counseling or coordinating care being waived when complexity is met. These changes came as a direct result of a number of medical societies pleading with CMS to increase accessibility to patients who may not be proficient in technology.

While CMS previously required that patients be located within specific rural areas and did not allow them to remain at home for telehealth encounters, the Waiver 1135 permits patients in any region of the country to stay at home. This is of particular importance, given that fewer patients are willing to leave their homes due to fears of contracting COVID-19. Additionally, cost sharing in the form of copays and deductibles is no longer being enforced. Though the Waiver 1135 technically requires a preexisting relationship between patients and providers, HHS announced that it would not enforce this condition, effectively allowing both established and new patient telehealth encounters to take place.

To make telehealth interactions more feasible, specific standards outlined by the Health Insurance Portability and Accountability Act (HIPAA) have been waived [51]. In particular, HHS allows telehealth to take place over any “non-public facing” application (those which can be viewed and heard only by the provider and patient), regardless of whether that application is HIPAA-compliant. Clinicians are also able to use telehealth to supervise other clinicians or providers. Further broadening the scope of telemedicine, the Drug Enforcement Administration (DEA) is allowing practitioners to prescribe controlled substances, including buprenorphine (if the practitioner is qualified), using telemedicine, which previously was not permitted unless patients were located in a hospital or clinic registered with the DEA. The Waiver 1135 also allows healthcare professionals who previously were not granted access to telehealth services such as physical and occupational therapists to participate.

Telehealth utilization has been on the rise for a number of years. A 2019 survey of 800 clinicians found that from 2015 to 2019, telemedicine use had increased by 340% and the percentage of clinicians willing to use it had increased from 57% to 65% [52]. The same survey found that the primary barrier to utilization was reimbursement, which was cited by 77% of clinicians polled, highlighting the importance of improved reimbursement rates to ensure physician buy-in. An article published in JAMA in 2018 found that the average compound annual growth rate of telemedicine visits from 2005 (when 0.02 per 1000 people in the study participated in telemedicine) to 2014 was only 52%; however, that number skyrocketed to 261% from 2015 to 2017 (when 6.57 per 1000 people in the study participated in telemedicine) [53]. In 2010, 35% of U.S. hospitals utilized telehealth technology in some capacity, while in 2017, that number more than doubled to 76% [54].

The ongoing COVID-19 pandemic, in combination with CMS's expansion of telehealth services, has rapidly accelerated these trends. Earlier this year, only 0.1% of outpatient visits were telemedicine visits

[21]. This number reached a peak of 13.8% in mid-April, though it has trended down to 7.4% as of mid-June. Meanwhile, in-person outpatient encounters plummeted to 69% by early April, with surgical and procedural specialties being hit particularly hard. Fortunately, these numbers have been rebounding, and as of mid-June, the deficit is only 18%. According to Medicare claims data, 1.3 million Medicare beneficiaries used telehealth services during the week ending April 18, an increase of more than 11,718% as compared to the week ending March 7, when only 11,000 beneficiaries participated in telehealth [55]. Analysts predict that there could be more than 1 billion telehealth encounters by the end of 2020 [42]. Of these, more than 200 million will be related to general medical care, a tremendous increase from pre-pandemic models that estimated between 39 and 60 million would take place [56].

Future of telemedicine

The most commonly known telemedicine program, the ECHO (Extension for Community Healthcare Outcomes) program, was developed by the University of New Mexico Healthcare Center as a platform to deliver specialty medical care to the underserved population. First developed for managing Hepatitis C, it also expanded for the treatment of other diseases [57]. The US military has utilized telemedicine for several years. The Walter Reed National Medical Center has been offering chronic pain consults to a remote military training force (MTF) within the national capital center since 2009 [58]. In recent years, telemedicine continued to expand and showed significant value in remotely treating mental health issues in rural areas [55]. An excellent application of telemedicine just before the pandemic was the proper treatment of patients with OUDs living in remote and isolated areas [59]. However, one of the limitations of telemedicine use in these situations might have been the Ryan Haight Act of 2008. In this document, aimed to shut down the online pill mills, it was emphasized that patients must be examined in person before receiving prescriptions for controlled substances.

With the rise of COVID-19 pandemic, telemedicine took a very upswing course. As shelter in place became the norm around the world, patients and clinicians adapted to a new, yet not novel, way to provide medical care. For patients suffering from chronic pain, telemedicine during the pandemic provided a connection with their clinicians while maintaining social distancing recommendations during peaks of infection [26]. Whether telemedicine will continue in the post-pandemic world will depend on several factors. Some of those factors are related to patients, some to the physician and their practices, and some are related to reimbursement. They are described below as follows:

Patient-related factors

While many patients do want to still see their clinicians in regular office visits, it is clear that some of these visits can be performed remotely using telemedicine. Some follow-up returns after procedures that do not require a full physical exam and are more related to health education and review of systems that rely primarily on patient responses can be placed in this category. While televisits are generally well embraced by patients, particularly in the geriatric and disabled population, one of the significant limitations is patients' access to technology and their computer literacy [60]. Additionally, televisits may require more communication and set up with clinic personnel and more responsibility and willingness from patients to troubleshoot the virtual visit together with their physician.

Physician-related factors

While extremely useful during the pandemic, the future of telemedicine is still uncertain. Though possibly appropriate as a means to provide follow-up visits that do not require a comprehensive physical exam, virtual visits are more challenging for complex new consults when comprehensive evaluations are needed. In addition to a proper set up aligned with the Health Insurance Portability and Accountability Act (HIPAA) compliance, to schedule virtual visits may be a challenge in itself. In a busy

practice, mixing in-person, virtual visits, and procedures create inefficient system flow. Therefore, clinicians may opt for compartmentalizing the day to address the challenges of each type of office visit.

Virtual visits may be additionally challenging for patients suffering from chronic pain where clear communication of goals and expectations is the key to a successful patient-physician relationship. In the absence of an in-person examination, a detailed interview, passive evaluation of movement and function, communication with caregivers, and various movements are essential to create a thoughtful assessment and treatment plan [60]. As technology can sometimes be unpredictable, clinicians may need to exercise extra patience and learn technological troubleshooting tactics for a successful televisit. We anticipate that many practices will incorporate separate dedicated arms for telemedicine billing and scheduling to streamline efficiency.

Insurance-related factors

As the coronavirus pandemic peaked and shelter in place was introduced in various states, Medicare responded with the introduction of several codes that allow clinicians to conduct telehealth activities. A telephone visit for example, while nonreimbursable by CMS before March 1, 2020, allowed an E/M charge of \$14–41 until 4/20/2020 with a subsequent increase to \$46–110 thereafter. As for video visits, growing in numbers currently, Medicare reimbursement currently reached similar levels with in-person visits. Other insurance companies may not follow this pattern. Similarly, early in the pandemic days, many more codes were introduced through Medicare for billing remotely (9) to allow clinicians to care for their patients in need [61].

The future of telemedicine will depend on the willingness of clinicians to participate in telemedicine encounters and patient demand for this product. Ultimately, this will be decided by reimbursement rates and evidence-based research, which may identify the lack of inferiority of telemedicine visits with in-person evaluations. Many telehealth codes may disappear, but the following will continue as permanent telehealth codes (category 1 codes):

1. Visit Complexity Associated with Certain Office/Outpatient E/Ms –Healthcare common Procedure Coding System (HCPCS) code GPC1X·
2. Group Psychotherapy-HCPCS code 90853·
3. Neurobehavioral Status Exam –HCPCS code 96121·
4. Care planning for patients with cognitive impairment –HCPCS code 99483·
5. Domiciliary, Rest Home, or Custodial Care Services –HCPCS code 99334 and 99335·
6. Home Visits-HCPCS code 99347 and 99348

Unfortunately, various insurance companies do have different policies, with some aligned and some not aligned with the CMS rules. The authors believe that an evidence base is needed to secure telemedicine payments in the future. The pandemic has encouraged a change in medical trainee education. Telemedicine is incorporated as a training tool for the new generation of pain practitioners. The possibility that telehealth may not dissolve has pivoted training programs to include telemedicine training as part of their curriculum [62]. Millennial trainees may absorb this information and direct the improvement of the telemedicine platform.

Conclusion

In conclusion, while not a new concept, telemedicine has been revitalized because of the coronavirus pandemic and is generally well-received by patients. Physician adoption depends upon reimbursement and education to improve the telemedicine visits. Payers will likely sustain the telemedicine environment pending data that demonstrates efficacy, safety, and cost effectiveness. It is hard to imagine how the telemedicine future will take shape, but we expect that it will exist to move into the post COVID-19 era.

Practice points

- Telemedicine is the medical practice of caring for and treating patients remotely.
- With the advent of the COVID-19 pandemic, telemedicine has become increasingly prevalent.
- Internet, smartphones, computers, and video-conferencing tools have made telemedicine easily accessible and available to almost everyone.
- There are new challenges that healthcare providers may not be prepared for, including treating and diagnosing patients without physical contact.

Research agenda

- More data are needed on the current trends involving telemedicine in perioperative care.
- Further research is needed on how pandemics such as COVID-19 affect the remote treatment of patients, and key concepts important to healthcare providers who practice telemedicine.
- Further research is needed to assess the effect of telemedicine on operating room efficiency and patient outcomes, as compared to in-person evaluations.

Declaration of competing interest

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