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The Use of Electronic Communications to Perform Determinations of Fitness

Technical Letter Report

August 2017

KM Branch
EP Kennedy



Prepared for the U.S. Nuclear Regulatory
Commission
under an Interagency Agreement with the U.S.
Department of Energy
Contract DE-AC05-76RL01830

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Pacific Northwest National Laboratory
Richland, Washington 99352

Abstract

The regulations in § 26.189(c) in Title 10 of the *Code of Federal Regulations* (CFR) Part 26, “Fitness for Duty Programs,” require licensees to evaluate an individual’s fitness for duty in several circumstances. When the observed behavior or physical condition of an individual who is subject to the rule indicates possible substance abuse (i.e., a “for-cause” determination of fitness), the rule requires that the evaluation must be conducted by a qualified professional in-person and face-to-face. Part 26 does not impose a requirement for face-to-face interaction for other circumstances, specified in § 26.189(b), in which licensees must conduct a determination of an individual’s fitness for duty. PNNL conducted a literature review, documented in this report, to support a re-evaluation of whether the face-to-face interaction required in Part 26 continues to be necessary. This literature review assessed how improved technology and additional research and experience have affected the use, effectiveness, and acceptability of providing medical and mental health assessments via electronic communication. The report discusses the circumstances in which medical and mental health assessments via electronic communication are considered an acceptable alternative to in-person, face-to-face assessments. Since Part 26 was amended in 2008 to include the face-to-face requirement, electronic communication technology has become more sophisticated, capable, and widely used. Further, practitioners have gained considerable experience in determining the situations in which its use in medical and mental health assessments is effective and acceptable to both practitioners and patients. In recent years, many institutional barriers that delayed adoption of telemedicine—and telemental health—have been resolved; however, some important limitations pertinent to determinations of fitness exist (e.g., where uncertainty concerning the “cause” of the observed behavior or physical condition is an essential feature and the potential exists that immediate therapeutic intervention may be needed). To overcome these limitations, an expert conducting a determination of fitness by electronic communication (e.g., videoconference with audio) would require onsite support from a health care professional (referred to as a “host” practitioner) and access to a high-quality, appropriately configured, and reliable communication system linking the two locations. In most cases, these requirements are likely to make the assessment process more expensive and less convenient than in-person, face-to-face determinations. However, if the host practitioner is not appropriately qualified to assess the specific fitness issue, accessing an expert with the specific medical expertise via electronic communication may be an acceptable alternative. If the NRC were to permit electronic means to conduct a for-cause determination of fitness, the results of this review suggest it would be advisable to develop procedures to clarify when, by whom, and under what circumstances this alternative could be implemented.

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The accuracy of the information and the views presented in this report are the responsibility of the authors and do not necessarily represent the opinion of the NRC or of any particular individual or licensee.

Acronyms and Abbreviations

AMA	American Medical Association
APA	American Psychological Association
APsA	American Psychiatric Association
ATA	American Telemedicine Association
CFR	Code of Federal Regulations
DOF	determination of fitness
ER	emergency room
FFD	fitness for duty
FR	Federal Register
HIPAA	Health Insurance Portability and Accountability Act
NRC	U.S. Nuclear Regulatory Commission
PNNL	Pacific Northwest National Laboratory
SAMHSA	Substance Abuse and Mental Health Services Administration
SOC	Statement of Considerations

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1.0 Introduction

1.1 Purpose and Scope

This report examines changes in electronic communication technologies and medical and mental health practices that have occurred since the NRC issued a substantial revision in 2008 to Title 10 of the *Code of Federal Regulations* (CFR) Part 26, “Fitness for Duty Programs.” The purpose of this literature and state-of-practice review is to assess whether the requirement for in-person, face-to-face interaction between the subject individual and the professional making the determination continues to be advisable when a for-cause determination of fitness must be performed under § 26.189(c) in the rule. This report focuses on the use of electronic communication technologies (i.e., telephone, e-mail, electronic transmission of images and videos, and videoconferencing with audio [videoconferencing]) by medical and mental health practitioners to conduct initial medical and mental health assessments or diagnoses such as those that might be required in a for-cause determination of fitness, specifically, as well as in other circumstances in which the rule requires a determination of fitness to be made.

This report reviews the literature on trends in the use of these technologies by health care practitioners. It summarizes the findings of studies evaluating the effectiveness of medical and mental health assessments conducted via these communication technologies, with a special focus on videoconferencing. It discusses the factors found to affect those outcomes and the guidelines that the various health-care sectors have developed to institutionalize best practices in the use of these technologies to deliver medical and mental health services. This report also reviews studies that examined the benefits, costs, and potential disadvantages to patients and the providers associated with the conduct of these health assessments or diagnoses via electronic communications, again, with a special focus on videoconferencing—the technology most pertinent to medical or mental health assessments for determinations of fitness. The report focuses primarily on electronic communications pertinent to for-cause determinations of fitness. However, much of this information is also applicable to the conduct of the other types of determinations of fitness specified in Title 10 of the *Code of Federal Regulations* (CFR) Part 26, Section 189 “Determination of Fitness.”

1.2 Background

A determination of fitness (DOF), as stated in § 26.189 is “the process entered when there are indications that an individual specified in § 26.4(a) through (e), and at the licensee's or other entity's discretion as specified in § 26.4(f) and (g), may be in violation of the licensee's or other entity's FFD [fitness for duty] policy or is otherwise unable to safely and competently perform his or her duties.” Because it is a qualitative judgment, the rule states that a DOF must be made by a licensed or certified professional who is appropriately qualified and has the necessary clinical expertise to evaluate the specific fitness issues presented by the individual (§ 26.189(a))¹. A qualified professional called on by the licensee or other entity may not perform a DOF regarding

¹ The rationale for this requirement is provided in the Statement of Considerations (SOC) that was part of the final rule published in the *Federal Register* on March 31, 2008 (73 FR 17117).

fitness issues outside of his or her particular area(s) of expertise. Section 26.189(a) provides examples of four types of professionals who may have such expertise, along with the FFD issues he or she might be qualified to address in a DOF, including, but not limited to substance abuse experts (SAEs), clinical psychologists, psychiatrists, and medical review officers (MRO).

Section 26.189(b) requires a determination of fitness to be made in at least the following circumstances:

1. When there is an acceptable medical explanation for a positive, adulterated, substituted, or invalid test result, but there is a basis for believing that the individual could be impaired while on duty;
2. Before making return-to-duty recommendations after an individual's authorization has been terminated unfavorably or denied under a licensee's or other entity's FFD policy;
3. Before an individual is granted authorization when potentially disqualifying FFD information is identified that has not previously been evaluated by another licensee or entity who is subject to this subpart; and
4. When potentially disqualifying FFD information is otherwise identified and the licensee's or other entity's reviewing official concludes that a DOF is warranted under § 26.69.

The rule permits the use of electronic communication to conduct the DOFs required in these four circumstances.

Section 26.189(c), however, prohibits the use of electronic communication when a for-cause DOF is required. A for-cause DOF must be performed when an individual's observed behavior or physical condition suggests the individual may be unable to safely and competently perform his or her duties. The Statement of Considerations the final rule published in the *Federal Register* on March 31, 2008 (73 FR 17117) notes the time urgency associated with making a DOF in these circumstances and the importance of ensuring that the professional making the determination has complete information available. The SOC states, "This provision ensures that the professional who is performing the determination has available all of the sensory information that may be required for the assessment, such as the smell of alcohol or the individual's physical appearance."

The NRC staff recognizes the logistical difficulties this requirement may pose when an appropriately qualified professional is not immediately physically available to conduct a for-cause DOF. Therefore, the staff tasked PNNL to review the literature regarding advances in telecommunications that have occurred since this requirement was promulgated in 2008 and how the practice of telemedicine and telemental health have evolved.

In this report, the individual subject to a DOF is referred to as the individual to be assessed or as a patient, and the healthcare professional qualified to conduct a DOF is referred to as an expert practitioner. A healthcare professional who is not qualified to conduct a DOF but is onsite and face-to-face with the individual to be assessed is referred to as a "host practitioner."

1.3 Report Structure

This report is organized into seven chapters, including the introduction. Chapter 2 discusses the consistent requirement in Part 26 for a face-to-face assessment in for-cause situations concerning an observed behavior or physical condition. Chapter 3 discusses how context influences the requirements and practical considerations of for-cause determinations of fitness. Chapter 4 summarizes advances in electronic communications technology over the past decade. Chapter 5 presents a review of the literature on the use and effectiveness of electronic communications and telemedicine. Chapter 6 summarizes the benefits, costs, and potential disadvantages of telemedicine and Chapter 7 presents the conclusions of this report.

2.0 Requirements for Face-to-Face Assessment

Part 26 requires that FFD programs include policies and training in behavior observation and self-reporting of impairment. It requires assessment or testing of individuals whose observed behavior or physical condition has been identified as a potential indication of impairment or untrustworthiness and a determination of fitness for individuals whose fitness has been called into question by their past behavior, test results, or potentially disqualifying information. The requirements are designed to protect the individual from inaccurate or false accusations and the public and other workers from an impaired or untrustworthy individual (§ 26.23 and § 26.27). As part of this assessment, Part 26 requires that an individual whose observed behavior or physical condition has triggered a for-cause assessment must interact in-person, face-to-face with the individual conducting the assessment or administering the test.

The rationale for the face-to-face requirement for for-cause assessments is provided in the SOC of Part 26:

The final rule clarifies that a face-to-face interaction is required only when there is observed behavior or a physical condition. This provision ensures that the professional who is performing the determination has available all of the sensory information that may be required for the assessment, such as the smell of alcohol or the individual's physical appearance. The NRC does not require a for-cause determination of fitness to be conducted under this section if there is an absence of physical or sensory information (i.e., based solely on receiving information that an individual is engaging in substance abuse). The immediacy of the decision limits the amount of information that can be gathered and made available to the professional by others. The provision does not require that determinations of fitness for other purposes be conducted face-to-face. These other purposes may include, but are not limited to, the determination of fitness that is required when an applicant for authorization has self-disclosed potentially disqualifying FFD information. Determinations of fitness in these other circumstances would focus primarily on historical, rather than immediate, information. In these cases, the professional would have access to information that could be gathered by

others about the individual, and no time urgency would be involved in the evaluation (73 FR 17117:17118).

Part 26 is consistent in this requirement for for-cause assessments of fatigue, drug or alcohol use, and problems of unknown origin (e.g., illness or a side effect of a prescription drug).

Although § 26.77, “Management actions regarding possible impairment,” does not use the term “for-cause,” it specifies the management actions the licensee or other entity must take immediately “when an individual who is subject to this subpart shows **indications that he or she may not be fit to safely and competently perform his or her duties**” [emphasis added]. These indications include “an observed behavior or physical condition” that “creates a reasonable suspicion of possible substance abuse” (§ 26.77(b)(1)), “fatigue” (§ 26.77(b)(2)), or “**other indications of impairment**” (§ 26.77(b)(3)) [emphasis added]. If the individual appears to be impaired or of questionable fitness, the licensee or other entity is required to take immediate action to prevent the individual from performing the duties that require him or her to be subject to the FFD requirements. Part 26 does not specify a time interval within which the drug and alcohol testing, fatigue assessment, or fitness determination must occur in response to a for-cause condition. However, the implication is that there is some urgency, and that the time to the assessment should be as short as possible. A prompt assessment provides the best opportunity to determine the reason for the observed behavior or physical condition. It also limits the time an individual is prevented from performing his or her duties if the concern that triggered the fitness determination is shown to be unwarranted.

If the observed behavior or physical condition clearly indicates either substance abuse or fatigue, Part 26 specifies the drug and alcohol testing and fatigue assessment procedures the licensee or other entity must follow. If those testing or assessment results explain the observed behavior or the observed physical condition of the individual, a DOF by a qualified professional is not required because the rule provides detailed guidance for the required response to suspected substance abuse or fatigue. However, if the indications of possible impairment do not create a reasonable suspicion that the cause is substance abuse or fatigue or if substance abuse and fatigue are shown not to be the cause, § 26.77(b)(3) requires an assessment of the individual by a qualified professional and a positive DOF before the individual is permitted to return to his or her duties.

The face-to-face and in-person requirements for for-cause testing apply when the potential cause of the observed behavior or physical condition is the use of proscribed drugs or alcohol. “For-cause” is one of the five conditions for drug and alcohol testing under § 26.31(c)(2), which specifies that for-cause drug and alcohol testing must occur “[i]n response to an individual's observed behavior or physical condition indicating possible substance abuse or after receiving credible information that an individual is engaging in substance abuse, as defined in § 26.5.”² When addressing these for-cause situations, the licensee or other entity is not limited to the drug testing panel specified in § 26.31(d), but may test for any drugs listed in Schedules I

² Substance abuse is defined in § 26.5 as “the use, sale, or possession of illegal drugs, or the abuse of prescription and over-the-counter drugs, or the abuse of alcohol.”

through V of the Controlled Substances Act (21 U.S.C. 812) that an individual is suspected of having abused. The licensee or other entity may consider any drugs or metabolites detected in this test when determining its response. In this for-cause situation, the individual must present himself or herself at the collection site for drug and alcohol testing, at which, by the nature of drug and alcohol testing, he or she interacts with the collector face-to-face and in-person.

“For cause” is also one of the conditions for conducting/requiring a fatigue assessment. As stated in § 26.211(a)(1),

In addition to any other test or determination of fitness that may be required under § 26.31(c) and § 26.77, a fatigue assessment must be conducted in response to an observed condition of impaired individual alertness creating a reasonable suspicion that an individual is not fit to safely and competently perform his or her duties, except if the condition is observed during an individual's break period.

Section 26.189(c) states that “[A] determination of fitness that is conducted for-cause (i.e., because of observed behavior or a physical condition) must be conducted through face-to-face interaction between the subject individual and the professional making the determination. Electronic means of communication may not be used.”

Part 26 is thus consistent in its requirement that “for-cause” assessments and testing be performed face-to-face and in person, whether that assessment involves drug and alcohol testing, fatigue assessments, or determinations of fitness. It is also consistent in its silence or positive endorsement of the use of electronic communications in the conduct of non-for-cause determinations of fitness.

3.0 Requirements and Practical Considerations

3.1 Determinations of Fitness

As discussed above, for-cause determinations of fitness primarily address the assessment of individuals whose observed behavior or physical condition is not clearly attributable to either substance abuse or fatigue. Consequently, the DOF process must be capable of addressing a wide range of potential causes and consequences. It also means that those establishing the procedures for the DOF process must be prepared for this complexity.

In some cases, the observed behavior or physical condition of an individual may indicate a need for immediate medical assistance or other intervention to protect the health and safety of the individual, other personnel, or the public. In such cases, the necessary intervention would be implemented and the DOF would be deferred until later, if necessary. Similarly, there may be instances in which the individual to be assessed is not capable of participating in the assessment without assistance and oversight. In addition, it is likely that in at least some for-cause situations there will be considerable uncertainty about how long the observed behavior or physical condition that led to the requirement for a DOF will persist. Consequently, the expert

practitioner conducting the DOF will likely benefit from being able to observe the behavioral and physical indicators that have led to the need for a DOF as soon as possible after the need for an assessment has been identified. For example, medication-related symptoms may be transitory and available for detection for only a limited time. If too much time passes before the DOF occurs, the opportunity to detect these indicators may be lost, making both assessment and follow-up more difficult. For these reasons, some cases may require considerable urgency in initiating the for-cause DOF with an appropriate expert practitioner.

Uncertainty about the cause of the observed behavior or physical condition also makes it important that the expert practitioner conducting the for-cause DOF is in a position to acquire the information about the patient that is pertinent to the diagnosis or assessment. This may include information derived not only from visual observation, but also from smell, touch, and hearing. The expert practitioner may also need to supplement his or her physical examination with laboratory tests or therapeutic intervention.

These possibilities reinforce the importance of promptness in presenting the individual to an appropriately qualified expert practitioner and of ensuring that the for-cause DOF procedures do not stand in the way of providing immediate medical care for an individual. Consequently, procedures governing the for-cause DOF process must be sufficiently flexible to address the range of diagnoses and interventions that might be called for. They also must emphasize the importance of scheduling the consultation with an expert practitioner as soon as practicable.

3.2 The Health-Care Provision Process

3.2.1 Stages

The provision of medical and mental health care by a health-care practitioner is a complex, multi-phase process. The major phases in the health-care provision process include (Falvey 2001; Schwitzer and Rubin 2011; US DHHS 1997) the following:

- screening
- assessment and diagnosis
- case conceptualization and treatment plan development
- treatment and treatment management
- monitoring, and
- follow-up.

This report focuses on the assessment and diagnosis phase of the health-care process, which corresponds closely with the medical and mental health aspects of the determination of fitness process. Research on health care tends to focus on either particular medical or mental health disciplines or diseases or on particular features of the medical or mental health process (e.g., communication and rapport). Consequently, information is not consistently available about the use and effectiveness of electronic communication in the assessment and diagnosis phase of the health care process for all types of health care problems.

3.2.2 Roles and Responsibilities of Participants in the Health-Care Process

The participants in a medical and mental health assessment and diagnosis of primary interest to this discussion are the patient and the practitioner, but may also include nurses and other health-care assistants collecting physical information (i.e., blood pressure or body temperature) as well as other specialists (e.g., x-ray technicians) consulted on specific medical or mental conditions.

During the assessment and diagnosis phase of the medical and mental health process, the practitioner's role is to elicit a medical history, a description of current status and symptoms, and concerns expressed by the patient. The practitioner obtains verbal and nonverbal information from the patient through questions, examination (e.g., touching, listening, and smelling), and observation. The practitioner may then gain additional information by ordering and evaluating the results of laboratory tests (e.g., serum and urinalysis and imaging). The patient's role is to respond to the practitioner's questions (if conscious and coherent), to cooperate with the physical examination, and to participate in the medical tests, as necessary. Depending upon the condition being assessed, the practitioner with whom the patient is consulting may determine that he or she would benefit from the knowledge of a particular type of expert practitioner to assist with the diagnosis. The role of the expert practitioner would be to review information (i.e., medical notes, records, and images) provided by the practitioner and provide professional advice, diagnoses, or further referrals. Typically, the expert practitioner schedules an appointment with the patient subsequent to the patient's consultation with the original practitioner. However, electronic communication increasingly provides the potential for the original practitioner to consult with an expert synchronously. This raises the following question: Would an assessment conducted by a host practitioner who lacks the appropriate specialized expertise and experience required by § 26.189(a) but who is in face-to-face, in-person contact with the patient meet the requirements of § 26.189 if that "host" practitioner conducts the assessment in consultation with an appropriately qualified expert practitioner linked in via synchronous videoconference? Or, does the prohibition against electronic means of communication preclude this alternative?

3.2.3 Observation and Communication in Health-Care Assessment and Diagnosis

Much research has focused on evaluating how the use of electronic communication affects the practitioner's ability to make accurate and thorough observation of the patient as well as how it affects the nature and outcome of practitioner-patient and practitioner-expert practitioner communications. The primary goal of practitioner-patient and practitioner-expert practitioner communication and the acquisition and exchange of information about the patient is to improve a patient's medical care and health. To attain that objective, practitioner-patient and practitioner-expert practitioner communication needs to accomplish three related goals: (1) create a good interpersonal relationship, (2) facilitate the accurate exchange of information, and (3) explain informed diagnostic- and treatment-related decisions and elicit patient participation in the decision-making process (Ha et al. 2010; Ong et al. 1995). Achieving these goals leads to more successful diagnosis and treatment (Ha et al. 2010; Breen et al. 2009).

The creation of a good interpersonal relationship lays the groundwork for successful communication and information exchange between the patient and the practitioner, which informs and supplements the information the practitioner is gathering through observation, physical examination, and medical tests. Once an assessment and diagnosis is made, the practitioner is in a position to develop a treatment plan. To be effective, the treatment plan requires communication with the patient, who must understand, agree with, and follow the plan. Research has shown that patient understanding and follow-through are more likely to be successful if rapport and trust have been established in the previous phases of the process (Ha et al. 2010; Breen et al. 2009). Consequently, researchers have considered it very important to determine whether the use of electronic means of communication adversely affects the quality and outcomes of interpersonal communications in health care settings (Collie 2003). Similarly, researchers have considered it important to determine whether the use of electronic means adversely affects the ability of the practitioner to make the accurate observations needed for assessment and diagnosis. Particular attention has been focused on audio- and videoconferencing.

4.0 Advances in Electronic Communication Technology

Much has changed in the capability, availability, and use of electronic communication technologies over the past decade. Advances in technology have enabled the creation, storage, exchange, and presentation of images, sound, and text with a speed, fidelity, and ease not possible a decade ago. Widespread installation of high-speed telecommunication systems (i.e., cellular networks and the internet) and easy to use, affordable devices (e.g., cell phones, tablets, computers, digital cameras, flat-screen monitors) have made the use of various forms of electronic communication technology ubiquitous, and has changed expectations and habits regarding the communication process (Ito et al. 2008). In addition, the growing availability of digital sensors, which can often be incorporated into these devices and can collect and send information over the telecommunication networks has changed when and where information of various types can be collected and shared (Castellano et al. 2015). The equipment and transmission systems necessary to conduct moderately high-fidelity audio and video communications and to create, send, receive, and view data and images are now standard equipment in most offices and medical facilities, as well as in many homes (Machi 2010). In addition, telecommunications and information technology developments have increased data storage by orders of magnitude on both devices and in the “cloud,” allowing ready exchange of data that was previously prohibitively time consuming or expensive. These changes have extended to and affected medical practice, with implications for the use of electronic communication in medical assessments and diagnoses (Martinez-Akala et al. 2013).

Developments in data compression and greatly increased transmittal speed and capacity have enabled the rapid transmission of very large files, such as images via e-mail, text, or the Internet (Hsu 2015; Hilbert and Lopez 2011). The development of wireless (e.g., WiFi and Bluetooth®), satellite, and networking technologies (e.g., 3G/4G/5G) and peer-to-peer sharing has led to increased use of mobile devices and the ability to access multiple modes of electronic communication at any time and in flexible locations. Consequently, nearly continuous access to e-mail, phone and text messages, and the Internet, as well as to videoconferencing, has become commonplace. These technologies are able to support synchronous, multi-person audioconferencing and videoconferencing (e.g., Skype®, FaceTime®, GoToMeeting®, Periscope® and television-quality audio/visual systems). Software applications allow users to download and store data on mobile devices as well as to transmit high-quality image files in real time. With these devices, electronic communication can be synchronous, with many individuals interacting in real time or asynchronous, with a time delay between communication segments.

Electronic communication has become pervasive because it has become user-friendly, affordable, and accessible. A growing percentage of the population relies on the various forms of electronic communication that are available on electronic devices (Duggan 2013). According to the Miniwatts Marketing Group (2014), since 2008, Internet use in the United States has increased from 72.5 to 87 percent of the population. As of January 2014, 90 percent of the U.S. population owned a cell phone, which increasingly provides the capability of audio- and videoconferencing (Pew Research Center 2014). The daily use of multiple forms of electronic communication has made use of these technologies in patient-practitioner and practitioner-expert practitioner communications seem increasingly ordinary and expected. However, specialty equipment is still needed for communication that requires high-fidelity audio or video transmission.

5.0 Telemedicine

5.1 Scope and History

One of the changes that have occurred since the final rule was issued in 2008 is the increased use of electronic communication, particularly audio- and video-conferencing, in medical and mental health practices. The provision of medicine and mental health care through electronic communication attracted significant attention in the 1990s when it expanded rapidly from its early start in the rural Western United States, Canada, and Europe (Phillips et al. 2002; Comer 2015). This increase in telemedicine has provided an experiential basis for evaluating the effectiveness and acceptability of electronic communication in medical and mental health assessment and diagnosis.

Telemedicine³ is defined as the practice of using telecommunication technology (i.e., electronic communication) to provide medical and mental health care at a distance, in an exchange that

³ Telehealth is a broader term that includes not only the provision of telemedicine, but also the use of electronic communications for education, databases to support clinical decision making, patient records storage, and other administrative support (Moore 2011).

does not involve the typical in-person, face-to-face, practitioner-patient meeting (Moore 1999). It also includes the use of telecommunication technology for practitioner-expert practitioner consultations, which sometimes involve linking an expert practitioner in real time into a consultation with a practitioner and his or her patient (Kamsu-Foguem et al. 2015). The patient may or may not be in the physical presence of the practitioner.

In the 1990s, the term telemedicine typically referred to medical consultative services provided through interactive videoconferencing (Moore 1999). By 2015, the definition of telemedicine had expanded to include other modes of electronic communication in the two primary types of telehealth communication:

1. Direct patient care – use of communication devices to conduct assessment, diagnosis, treatment, or monitoring while the patient and practitioner(s) are geographically apart.
2. Teleconsultation – “communication among doctors or between doctors” or other medical personnel so that “knowledge of experts can be transmitted to non-specialists to support medical care” (Takahasi 2001:132).

An ideally configured system for telemedicine has networks capable of delivering high fidelity voice, video, images, and data quickly. Effective use of telemedicine requires widespread supporting networks to provide access for large numbers of health care participants; reasonable costs for equipment and system use; and system and equipment reliability, with adequate bandwidth and scalability. In addition, the system must be user friendly, with easy installation and interface connections and low maintenance requirements (Martinex-Akala et al. 2013). In general, by 2015, advances in technology and its widespread distribution have met these conditions. Coates et al. (2015: 564) point out that telemedicine’s evolution has been shaped by its coincidence with urbanization and the increasingly widespread distribution of technologies capable of linking individuals almost instantaneously and conveying vast amounts of information across great distances. In addition, they credit the responsibility, and growing ability, of health-care practitioners to reach out to and connect with diverse populations, including underserved populations with diverse needs, as important drivers of telemedicine’s expansion.

Electronic communication has become widely used in the medical and mental health fields by practitioners and patients alike, increasing access to practitioners by patients and access to patients by practitioners (Lopez et al. 2005; World Health Organization 2010; Takahashi 2001). In addition, affordable information technologies have enabled the regular use of store-and-forward communication of health related image files (e.g., ultrasounds and x-rays). This capability has increased access to consultations with specialists who are able to access and analyze image files in near real time. In addition, a medical services industry has developed protocols and administrative guidelines that help health-care providers understand and comply with licensing, legal, and regulatory requirements and provides administrative tools and support that make administration of telemedicine less burdensome. The medical services industry makes available expert technical advice and help with the procurement, setup, and maintenance of electronic communications equipment. This has reduced some of the barriers that had previously kept health-care providers from adopting telemedicine (Novotney 2011; Coates et al. 2015; Villalba-Mora et al. 2015; Reamer 2013; Comer 2015; Weiner 2012).

In general, by 2015, telemedicine, including telemental health,⁴ had become institutionalized and accepted as a viable means of providing health care. The number of practitioners delivering telemedicine services, reimbursement by Medicaid and private health insurance (Payne 2015), and the proliferation of guidelines on the practice of telemedicine by major medical associations illustrate that telemedicine has become an established part of health-care provision in the U.S. (Evans et al. 2015). For example, in 2007, 2009, and 2014, the American Telemedicine Association (ATA) issued practice guidelines for teledermatology, telemental health, and primary and urgent care, respectively (ATA 2007, 2009, 2014). In 2013, the American Psychological Association (APA) released practice guidelines on telemental and behavioral health (APA 2013).⁵ In 2014, the American Medical Association (AMA) issued its guidelines for telemedicine. The American College of Radiology released a white paper in 2013 providing guidelines for the best practices of teleradiology (Silva et al. 2013). A special series on “Technology and Telemental Health” in the *Journal of Cognitive and Behavioral Practice* (2015) and a review by Reamer (2013) further illustrate the wide range of electronic communication technologies that are being used to deliver mental health services. They also demonstrate how established telemental health has become as a professionally acceptable and effective way to deliver mental health services.⁶

Telemedicine has been particularly widely adopted in medical specialty areas that rely heavily on visual information and image analysis, such as ophthalmology (Das et al. 2015), ultrasound (Ferreira et al. 2015), radiology (Jacobs et al. 2015), pathology (Pantanowitz et al. 2015), and dermatology (Coates et al. 2015) and in those that rely heavily on verbal exchange, such as mental health. Evaluations of this use of telemedicine emphasize that careful analysis is needed to identify the equipment and skills that maximize the effectiveness of the electronic communication technologies and ensure that they are being used correctly (Phillips et al. 2002; Takahashi et al. 2010).

It is clear that in many areas of medicine and mental health care, the use of electronic communication has become widespread (Lowery et al. 2007; Kamsu-Foguem et al. 2015). The remaining question is under what circumstances and for what types of medical or mental health issues does the use of electronic communication continue to be appropriate and effective for the assessment and diagnosis phase of the health care process. This is discussed in the following section.

⁴ Comer (2015) summarizes the debate about terminology, noting that the use of telemedicine to provide mental health care has been called different names including telepsychology, telepsychiatry, behavioral telehealth, and telemental health.

⁵ The American Psychiatric Association (APsA) has not issued its own telepsychiatry guidelines but refers the professional psychiatrist to the ATA's various guidelines on telemental health.

⁶ These services may include online counseling via chat (Harris and Birnbaum 2015), telephone counseling (Brenes et al. 2011), video counseling (Richardson et al. 2009, Nelson and Duncan (2015), cybertherapy, self-guided web-based interventions, electronic social networks, e-mail, and text messages (Adela and Popa 2014).

5.2 Evaluation of Electronic Communications' Effectiveness

5.2.1 Research on the Effects and Effectiveness of Electronic Communications

The rapid expansion and diversification of electronic communications have raised many questions about how these changes in mode of communication have affected social relationships and the provision and receipt of information. This has led to a rapidly expanding body of research examining how the different modes of electronic communication affect the communication process and outcomes. These studies have often focused on clarifying differences in the experience and effects of communication that occurs via text, audioconferencing, and videoconferencing and how communication conducted via these technologies compares with communication conducted in-person and face-to-face. However, the area is relatively new and there are many dimensions of communication effectiveness and effect to be studied. The available research literature focuses primarily on determining which dimensions of effect and which of the many variables known to affect the communication process are important under which circumstances (Slovak 2007). This research topic is further challenged by the rapid changes that continue to occur in the technologies. Consequently, definitive conclusions have yet to be reached about all of the differential effects and relative effectiveness of the various modes of electronic communication compared to traditional interactions as they are used in medical and mental health assessments.

Research on the relative effectiveness of the different modes of electronic communication in establishing rapport and in conveying body language and other nonverbal cues with fidelity is of particular pertinence to those considering their use in the provision of medical and mental health services. In general, the research indicates that people are quite flexible and adaptable in their communications, such that, although in-person, face-to-face interactions may provide some advantages, audioconferencing and videoconferencing are quite effective in enabling information exchange and the establishment of social relationships and rapport (Price et al. 2012; Shalom et al. 2015; Anastasiades et al. 2010; Bohannon et al. 2013). However, because visual and auditory (including verbal) cues play a particularly important role in the assessment and diagnosis of many medical and mental health conditions, videoconferencing appears to be the most appropriate mode of electronic communication for use by medical and mental health expert practitioners conducting assessments similar to those required for determinations of fitness.

The remainder of this report reviews literature focused on the use of electronic communication in the medical and mental and behavioral health process. It gives special attention to information about the benefits and drawbacks of using electronic communication and focuses on the use of videoconferencing to conduct diagnostic assessments of individuals who are in a different location than the diagnosing practitioner or the consulting expert practitioner. The focus is primarily on videoconferencing because of the unknown and variable conditions that might need to be assessed and diagnosed in determinations of fitness. It examines the procedures, equipment, and onsite support necessary for effective implementation of a

diagnostic consultation via electronic means.⁷ To the extent possible, it also focuses on the use of these electronic means by practitioners making evaluation and/or assessment, diagnosis, and management decisions (rather than providing treatment, monitoring, or follow-up). It is important to note that within the context of a medical encounter, synchronous forms of telemedicine often rely upon a third party (who may be a practitioner) to oversee the patient, set up the equipment at the patient's location, facilitate information exchange, and transmit data, as necessary. This occurs during consultations via videoconferencing, particularly when the source of the problem is unknown and a physical examination, collection of health indicator data, or immediate intervention may be necessary, as it is likely to be in for-cause determinations of fitness. A summary of the benefits and drawbacks of telemedicine is provided in Sections 6.2 and 6.3.

5.2.2 Medical Assessments

The qualifier, “in-person,” is an increasingly necessary specification to distinguish face-to-face interactions that occur when people are physically present with one another from those that occur through electronic means as electronic communication has become more common, sophisticated, and diversified within and beyond its use in health care.⁸ Indeed, some forms of electronic exchanges are being considered, and termed, “face-to-face” when the parties involved are interacting directly with one another in real time, with the ability to see one another's faces (i.e., their bodies and immediately surrounding environment) as the exchange is occurring. In telemedicine this terminology has been clearly defined and incorporated into the legal and accounting infrastructure. In telemedicine, face-to-face electronic interactions are distinguished from interactions that:

1. Pass through a third party, sometimes called “store and forward” (i.e., a nurse or another practitioner interacts with the patient and then transmits the information or a video of the interaction to the practitioner conducting the assessment but the practitioner conducting the assessment does not interact directly with the individual being assessed).
2. Involve the asynchronous sending and receiving of information between the practitioner and the patient (i.e., the provider sends a video to the patient at one point in time that is received, and responded to, by the patient at a subsequent point in time or information monitoring the status of the patient is collected from the patient and forwarded to the practitioner).
3. Do not allow both parties of the exchange to see one another (i.e., the practitioner can see the patient but the patient cannot see the practitioner, even though the exchange is occurring in real time).

⁷ For the purposes of this report, we consider the diagnostic situations addressed by practitioners of telemental health and telemedicine to cover for-cause fitness determinations.

⁸ In 2008, the NRC did not consider it necessary to include the qualifier “in-person” in its requirement for face-to-face fitness determinations in its Part 26 rule or the accompanying SOC, although its prohibition of electronic communication makes it clear that this was the intended meaning.

A robust body of research has been developed on the use and effects of electronic communications in the provision of medical and mental health consultation services.^{9,10} This research indicates that people generally, and practitioners and patients specifically, have become accustomed to and are accepting of the use of electronic communication in medical consultations. The research also indicates that both audioconferencing and videoconferencing are effective in supporting the development of interpersonal relationships, the lack of which had been one of the concerns about this approach (Sprecher 2014; Shalom et al. 2015). However, it is also recognized that telemedicine is inappropriate for some patients and circumstances. ATA (2014) identifies some of these circumstances as follows:

In general, conditions that are not suitable for telemedicine are those for which an in-person visit is required to evaluate the patient due to the severity of presenting symptoms, the necessity of haptic information [i.e. information based on the sense of touch], the need for protocol-driven procedures, or the need for aggressive interventions. Other circumstances that are not suitable for telemedicine include some patients with cognitive disorders, intoxication, language barriers, emergency situations that warrant escalation to an ER [emergency room] visit or 911, or when patients do not have the requisite technology to complete a virtual visit (p. 8).

Research comparing the diagnostic and treatment equivalence between telemedicine and in-person, face-to-face consultations has found that telemedicine is as effective as in-person, face-to-face consultations in many circumstances (Harrell et al. 2014; O'Reilly et al. 2007). The research has also shown that the participants in the medical system have developed a better understanding of the benefits, limitations, requirements, and costs associated with the different modes of electronic communication and feel more confident in their use.

Researchers have not reached conclusive agreement about the relative cost effectiveness, and hence the cost-benefit ratios, of telemedicine compared to traditional face-to-face practitioner-patient consultations (Ekeland et al. 2010). This lack of conclusive agreement is attributed to the broad scope of the question and to questions about the extent and quality of the available evaluative research. The available evidence indicates that telemedicine tends to be most useful and effective in the medical fields in which verbal, visual, and/or monitoring data are important (e.g., radiology, dermatology, surgery, home health care, orthopedics, and cardiology) (LeRouge et al. 2002; Menachemi et al. 2004; Miller 2007; Roine et al. 2001; Augustad and Lindsetmo 2009; Ekeland et al. 2010; Hasselberg et al. 2014; Hersh et al. 2006). Organizations such as the ATA and the AMA have issued guidelines on the implementation of a telemedicine practice. Recent telemedicine guidelines issued by the ATA for the application of telemedicine

⁹ The term telemental health is used in this report to refer to the use of electronic communications in the practice of a variety of mental health disciplines including psychology, psychiatry, substance abuse counseling, and psychotherapy (ATA 2009; APA 2013; APsA 2015). Other terms commonly used in the literature covering mental health arena include telepsychiatry, telepsychology, and distance counseling (Telemental Health Institute 2015).

¹⁰ The AMA acknowledges that the definition of telemedicine is evolving and broadly characterizes telemedicine technologies as store-and-forward (transmittal of medical data), remote-monitoring (blood pressure electrocardiogram), and (real-time) interactive services (real-time audio visual communication) (AMA 2014).

to the practice of primary and urgent care situations (ATA 2014) and the AMA's 2014 telemedicine policy indicate that, for the most part, the use of videoconferencing is widely accepted in the medical arena. In its 2014 policy, the AMA appears to equate videoconferencing with face-to-face interactions by stating the following:

Prior to delivering services via telemedicine, the Council believes a valid patient-physician relationship must be established, through at minimum, a face-to-face examination, if a face-to-face encounter would otherwise be required in the provision of the same service not delivered via telemedicine. The face-to-face encounter could occur in person or virtually through real-time audio and video technology.

As is also true with telemental health, the literature associated with telemedicine has shifted from studies designed to evaluate the effectiveness of medical uses of electronic communication to efforts to provide guidance on issues associated with the practical implementation of telemedicine. These practical considerations include cost effectiveness, communication issues associated with the presence of a third party (i.e., someone managing the technology or other health care support staff), confidentiality, privacy and ethical concerns, licensing, reimbursement, and technical issues associated with telemedicine (Klutke et al. 1999; Stanberry 2001; LeRouge et al. 2002; Menachemi et al. 2004; Miller 2007; Ekeland et al. 2010; Hasselberg et al. 2014; Kramer et al. 2014).

5.2.3 Mental Health and Behavioral Assessments

Mental health and behavioral assessments are discussed here as a subset of medical assessments. Research on the effectiveness of videoconferencing for conducting mental health assessments, diagnosis, and treatment has demonstrated that it generally has similar results to mental health assessments, diagnosis, and treatment conducted in-person and face-to-face (Barretto et al. 2006). Outcome evaluations have found that mental health services provided via videoconferencing and audioconferencing produce successful results across different demographic groups and geographic settings and for a relatively wide variety of mental health and behavioral problems (Monnier et al. 2003; Hilty et al. 2004; Ruskin et al. 2004; Simpson et al. 2005; Myers et al. 2006; Hilty 2006; Neufeld et al. 2007; O'Reilly et al. 2007; Singh et al. 2007; Godleski et al. 2008; Crow et al. 2009; Perle et al. 2011; Hilty et al. 2013; Shore 2013; Reese et al. 2013; Vogel et al. 2014). However, some researchers have questioned the assertion that mental health interactions via audioconferencing and/or videoconferencing are as effective as face-to-face consultations. They cite concerns about the research methodology used in these studies (e.g., small sample sizes, short duration of follow-up, and incomplete scope of the evaluation studies) as the basis for their questions. To address these concerns they have called for more studies and more careful examination of the impact of electronic communications on clinical practices (Hersh et al. 2006; Monnier et al. 2003; Hilty et al. 2004; O'Reilly et al. 2007; Shore et al. 2007; van Wynesberghe and Gastmans 2009; Shore 2013; Davalos et al. 2009). Although most researchers agree that electronic communication provides convenience and improves accessibility, some question whether it improves the quality of care (May et al. 2001; Miller 2003; van Wynesberghe and Gastmans 2009). Hersh et al. (2006), in their review of 597 telemedicine studies (including telemental health), concluded that "the best

evidence for the effectiveness of telemedicine is in medical specialties for which verbal interactions are a key component of the patient assessment, such as psychiatry and neurology.”

Despite these remaining concerns, telemental health has become accepted as a viable, effective modality and researchers have begun to shift their focus onto the clinical, administrative, and ethical issues associated with the provision of health care via electronic communication (Shore et al. 2007; Godleski et al. 2008; Zur 2012; Perle et al. 2011; Shore 2013; APA 2013). This shift has increased efforts to codify requirements and best practices for implementing telemental health services and to establish guidelines for practitioners (Bohannon et al. 2013). Several organizations, including the Telemental Health Institute, offer mental health practitioners training and educational resources in the use of electronic communications.

Consequently, there are indications that medical and mental health practitioners are increasing their use of electronic communication in the provision of health care, including during the assessment and diagnosis phase. However, third parties are not commonly present during psychological/psychiatric assessments and treatment sessions due to privacy and confidentiality concerns, the need to build trust and rapport, and an interest in avoiding distractions. If the presence of a host practitioner were deemed therapeutically inappropriate, this would constitute a significant barrier to the use of telemedicine in for-cause determinations of fitness involving mental health issues because it would preclude the host practitioner-expert practitioner simultaneous assessment arrangement.

6.0 Benefits, Costs, and Other Disadvantages

6.1 Overview

The provision of medical and mental health assessments through telemedicine could potentially yield benefits in terms of cost reductions, increased access to professional experts, and some increased efficiencies. It could improve quality of care. However, these benefits would not be attained without costs and risks. The benefits and costs will vary depending upon a number of factors, including the patient's working and living conditions and location, the medical or mental health issue or problem, and capabilities and location of the practitioner(s). Figure 1 shows the factors Van der Kam et al. (2000) identified as important to effective telemedicine and to practitioners' considerations of its use.

As discussed above and summarized below, much of the research on telemedicine and telemental health has focused on its effect on quality of care, including access to appropriate medical and mental expertise, patient and practitioner acceptance and appreciation, convenience, and, to a limited extent, cost. As discussed above, some researchers do not agree that the research base is sufficient to conclude that mental health interactions via audioconferencing and/or videoconferencing are as effective as face-to-face consultations and call for additional research before this conclusion is accepted (Hersh et al. 2006; Monnier et al. 2003; Hilty et al. 2004; O'Reilly et al. 2007; Shore et al. 2007; van Wynesberghe and Gastmans 2009; Shore 2013; Davalos et al. 2009).

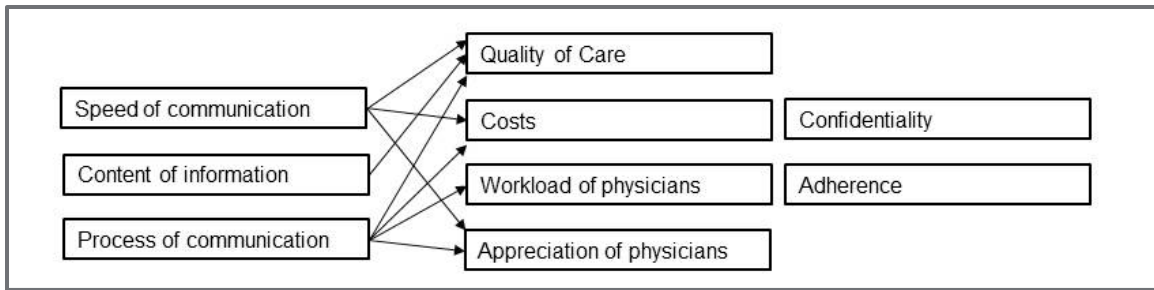


Figure 1. Evaluation Framework

Source: Reprinted from International Journal of Medical Informatics, Vol. 60, Issue 1, van der Kam et al. (2000), Effects of Electronic Communication in General Practice, 59-70, Copyright (2000), with permission from Elsevier.

6.2 Benefits to Patients, Practitioners, and Licensees

The primary benefits attributed to telemedicine are the ability to bring medical expertise to practitioners and patients in remote and rural areas, to expedite treatment, and to increase efficiency and convenience in the delivery of some health care services (LeRouge et.al 2002; LeRouge et al. 2007; Miller 2007; Menachemi et al. 2004; Ekland et al. 2010; Hasselberg et al. 2014; Shealy et al. 2015; Shepherd et al. 2006). For patients living in rural or remote areas, the availability of telemedical services can provide an enhanced sense of security and well-being due to the speed of communication and increased access to medical and mental health care, including specialists (Menachemi et al. 2004).

Debate about the cost effectiveness of providing medical and mental health assessments through telemedicine continues. Researchers have completed few rigorous studies delineating the costs and benefits of the different forms of telemedicine for the different stages of the medical process, and even fewer have taken the next step of comparing them to the costs and benefits of the face-to-face consultations that would otherwise have occurred. In addition, in many of the studies that have been completed, the authors have not clearly defined whose costs and benefits have been taken into account—those of the practitioner, the patient, the insurance provider, or the community (Whited 2010).

From the information available, it appears that cost savings and convenience benefits for patients are greatest when distance is a factor. A number of studies indicate that in certain circumstances, telemedicine may be more cost effective for the patient than an in-person, face-to-face interaction, primarily because of savings in time and travel costs (Menachemi et al. 2004; Ekland et al. 2010). Other studies (Moffatt and Eley 2011) have found that consultations using videoconferencing actually require more time from the health-care practitioner than in-person consultations when the time for setup and coordination with the personnel supporting the patient at the medical office or health-care facility local to the patient are taken into account. The project team found no quantification of the amount of additional time required.

Table 1 characterizes the key benefits associated with the implementation of a videoconferencing system in place of an in-person medical evaluation for licensee personnel

and identifies the primary beneficiaries of these benefits (i.e., licensee, patient, and/or practitioner). It also provides a description of the factors for which these benefits vary.

Table 1. Characterization of Benefits

Benefits	To Whom	Variables
Potentially increases access to qualified experts	<ul style="list-style-type: none"> • Licensee • Patient 	Video conferencing can provide increased access to qualified practitioners for some sites and situations. The degree to which this benefits the patient and licensee depends on the existing access limitations , such as distance to practitioners with appropriate qualifications.
Reduces travel time and expenses for assessments	<ul style="list-style-type: none"> • Potential cost reductions for licensee and patients • Reduces travel time and expenses for practitioner 	The remoteness and distance of the location to which the practitioner and/or patient must travel would largely determine the degree to which eliminating or reducing travel expenses would decrease travel time and the costs associated with it. It should be noted that practitioners often do not travel to meet with patients.
Potential efficiency and productivity gains	<ul style="list-style-type: none"> • Licensee • Practitioner • Patient 	Video conferences could potentially be set up in manner to respond quickly to needs and could save time to setup and carry out evaluations. For cases where videoconferencing does save time and effort, this would potentially free up resources for more productive endeavors. The degree to which efficiency gains could be realized would depend on the specific case and situation .

In general, the primary benefit associated with using electronic means of communication is improved access to and prompt attention from health care providers, particularly to specialists who are unlikely to be present in rural areas, and the avoidance of travel costs, which in rural areas may be high in both money and time. In addition, electronic communication can be a significant benefit to rural health care providers, who can also benefit from improved access to consultation with experts.

6.3 Costs and Potential Disadvantages for Patients, Practitioners, and Licensees

Characterization of the costs and potential disadvantages of telemedicine suffers from the same limitations discussed concerning benefits. As with benefits, the costs and other disadvantages for patients, practitioners, and licensees will vary depending upon a number of factors that have not been thoroughly addressed in the available studies. Preparing to provide telemedicine services involves a variety of start-up and development costs (e.g., acquisition of the appropriate equipment, training, procedure/protocol development, cross-state licensing, and researching legal and insurance requirements) (Stanberry 2001; Menachemi et al. 2004; Miller 2007; Ekland et al. 2010). The hardware, software, and institutional infrastructure needed for telemedicine have continued to mature. This is reducing the costs of establishing and providing these services. For example, one of the important considerations in telemedicine is ensuring

that the system meets security and medical information privacy requirements.¹¹ This served as a barrier to early adoption of telemedicine for many practitioners. However, off-the-shelf software programs¹², devices, and set-ups are increasingly able to meet these requirements in ways that have the additional benefit of integrating well with the provider's and patient's other administrative procedures and communication systems (e.g., e-mail and internet) (Saeed et al. 2012; Cerrato 2013; Zur 2012).

Although the equipment and communication systems have become more standardized, and hence easier to set up and operate, practitioners whose diagnosis depends upon careful and accurate interpretation of facial expressions, eye movements, or other nonverbal cues may require specially designed setup arrangements¹³ and additional training (LeRouge et al. 2002, 2007). Consequently, the cost of providing a particular telemedicine consultation will depend on the nature of the practitioner's specialty, his or her history and experience with telemedicine, and the number of telemedicine consultations over which the cost of the equipment and administrative infrastructure will be spread.

An important disadvantage of telemedicine is that it is not appropriate for all patients in all circumstances. Being physically distant from a patient limits a practitioner's ability to provide immediate intervention and assistance to the patient. This can be particularly problematic in emergency situations. The use of telemedicine would also be inappropriate for patients who are unstable or intoxicated unless the practitioner has arranged for the patient to access the telemedicine consultation from a location where personnel are prepared to and responsible for providing any necessary intervention (e.g., in a medical office or hospital) or unless the situation involves a practitioner who is present in-person with the patient who is consulting an expert-practitioner via videoconference (Shore 2013; Hersh et al. 2006).¹⁴ Pappas and Seale (2009) note that the involvement of support personnel adds organizational and management costs and may require the patient to interact with additional people in a more complex environment. This can complicate communications and is considered especially problematic for mental health consultations, as discussed above. Consequently, it is generally agreed that the in-person, face-to-face presence of a practitioner is necessary in certain medical situations and that exclusive telemedicine is not a good fit for all medical interactions. This may be the case for at least some of the individuals subject to for-cause determinations of fitness.

¹¹ Requirements include establishing a designated secure network for data storage, using appropriate encryption, and ensuring that the Health Insurance Portability and Accountability Act (HIPAA) requirements for confidentiality and security of video material are met (Shore 2013; Zur 2012).

¹² According to Saeed et al. (2012), software that compresses, decompresses, and synchronizes audio and video signals is increasingly part of personal computers and not a separate device. Saeed et al. (2012) also points out that the use of internet protocol networks commonly used for internet and e-mail have in-house security applications that can be useful for telemedicine.

¹³ Shore (2013) indicated that good room configuration, appropriate gaze angles and camera position (which affect how the individual and professional see one another and where they look on the screen), effective video framing, lighting, and assurance of privacy as set-up conditions have all been shown to be effective.

¹⁴ This is less likely the case when the medical practitioner is using electronic means (e.g., videoconferencing, audioconferencing, texting, data transmission) to follow-up with or monitor a patient.

Physical distance also has the disadvantage of preventing or limiting the ability of the teleconferencing practitioner to detect olfactory and tactile information and other nonverbal/non-visual cues that may be important for the diagnosis (May et al. 2001; Miller 2003; Hilty et al. 2004; van Wynsberghe and Gastmans 2009; Perle et al. 2011). In a for-cause determination that is based on a physical condition or observed behavior, accurate perception and assessment of nonverbal cues (e.g., those provided by body or breath odor, posture, and muscle tone) may be important to the expert practitioner's ability to make an accurate diagnosis (Zeng and Lin 2012). In addition, there remains some concern that the inability to touch a patient (e.g., offering a greeting or provide a consoling gesture) may compromise the establishment of optimal connection, rapport, and trust (May et al. 2001; Miller 2003).

Table 2 characterizes the costs associated with the implementation of a telemedicine system and identifies the bearer of these costs. It also provides a description of the factors for which these costs vary. Overall, the costs associated with implementing a telemedicine system for the provision of medical and mental health assessments include capital costs, start-up and maintenance costs, learning costs, and increased risks associated with potential evaluation limitations and diagnostic challenges that could be introduced with use of telemedicine in place of in-person, face-to-face assessment. These costs would vary based on the existing technological and staffing capabilities of the licensee and practitioners. These costs would also likely vary based on the type of medical and mental health situation that is being assessed and the practitioner's expertise; thus, case-by-case costs would likely be extremely variable. Some costs could conceivably decline over time as experience is gained and technology improves.

7.0 Conclusions

The research reviewed for this report indicates that many medical and mental health professions have accepted that electronic communication is effective and ethical for certain patients and circumstances. For some patients, an in-person, face-to-face consultation is necessary for his or her assessment and treatment. Additionally, the practitioners using electronic communications for assessment and diagnosis may often need the assistance of personnel who are physically present with the individual being assessed.

The uncertain nature and variability of the behavioral, medical, and mental health issue(s) that can lead to both for-cause and other determinations of fitness means that those managing the DOF process need to be prepared to deal with a range of circumstances that vary widely in severity and urgency.

Table 2. Characterization of Costs

Costs	To Whom	Variables
Acquisition, maintenance, and training in the use of appropriate electronic communications equipment and	<ul style="list-style-type: none"> • Licensee • Practitioner 	In addition to acquiring high-quality videoconferencing equipment, the use of such equipment would require continued maintenance and training to run the equipment for both the licensee and the practitioner. The cost would depend on the existing technical capabilities and expertise related to this technology. If there is much

Costs	To Whom	Variables
connectivity (at both locations)		variation in practitioners , this would require additional training and setup for each case.
Administrative, logistical and confidentiality challenges	<ul style="list-style-type: none"> • Licensee • Practitioner 	In addition to dealing with the technological costs of video conferencing, there would be associated administrative and logistical challenges to ensure that the staffing, sequencing of steps, and all matters related to confidentiality, privacy, and personnel safety are dealt with adequately. This cost would be imposed in all situations where videoconferencing was implemented, but would presumably diminish over time as licensees and practitioners gain experience with the new system.
Lack of familiarity and cost of change challenges	<ul style="list-style-type: none"> • Licensee • Practitioner 	Any significant change in practice will impose learning and adaptation costs. In addition, although the change may be technologically feasible, some practitioners may be reluctant to change simply because they are much more comfortable and confident in their evaluations and prognoses derived from face-to-face meetings. While some people may seamlessly adapt to change, others may not; thus, this cost would vary on a case-by-case and practitioner basis .
Demonstrating and defending the validity of the evaluation process and diagnosis challenges	<ul style="list-style-type: none"> • Practitioner • Licensee • Patient 	Changes in procedure and the introduction of new technologies can lead to uncertainty and an increase in challenges to the validity of the process and resulting diagnoses. Challenges have costs to all parties, both those initiating and those responding to/addressing a challenge. The costs associated with challenges to the process or resulting diagnoses would vary on a case-by-case basis .
Third-party logistical and confidentiality challenges	<ul style="list-style-type: none"> • Licensee • Practitioner 	Some videoconferencing sessions may necessitate additional third-party practitioner support on the patient side of the camera. This will impose additional administrative and management costs including scheduling and finding available staff to perform these functions, clarifying the roles and responsibilities of the expert professionals, providing personnel support to the third party, and dealing with the issues of confidentiality, privacy, personnel safety and employee trust. These costs would always be present when third-party support is deemed necessary .
Diagnostic accuracy and efforts to subvert challenges	<ul style="list-style-type: none"> • Licensee • Practitioner 	Conducting assessments solely via electronic communication may limit the ability of practitioners to accurately diagnosis certain conditions and increase the ability of the individual being assessed to subvert the process. This would impose additional costs on the licensee in terms of dealing with impaired workers and designing and implementing corrective actions and on the practitioner in terms of reputation and professional satisfaction.

With regard to for-cause determinations of fitness, where there is a significant degree of urgency, it is possible that a qualified expert will not be available within a reasonable commuting distance or in time to observe a behavior or physical condition, which may be transitory. In such circumstances, it may be beneficial to allow an appropriate expert practitioner to conduct the for-cause DOF using electronic communications as a consultant to a local “host” practitioner who is

physically present with the patient. However, there are no established guidelines for determining whether an assessment conducted through electronic communications would be appropriate for a particular individual subject to a for-cause DOF or for the qualifications a host practitioner would need to support this consultative process. In circumstances where the assessment might need to draw upon physical information (i.e., odor, pupil size, or overall appearance) the host practitioner would need to be qualified to obtain and communicate this information. In addition, in a host practitioner-expert practitioner consultative relationship, clarification would be needed on whether the physically present host practitioner (i.e., who does not meet the Part 26 qualification requirements) or the electronically consulted expert practitioner would be the provider of record from the perspective of the determination of fitness requirements.

Given the prohibition of electronic means of communication in for-cause determinations of fitness, it is not clear whether such an electronically mediated host practitioner-expert practitioner DOF would be permissible under the existing Part 26 requirements. However, the growing acceptance of teleconferencing in medicine and mental health, indicates that enabling the use of teleconferencing within an appropriate regulatory framework and associated guidance may be beneficial for at least some for-cause determinations of fitness. If a decision were made to allow this alternative, § 26.189 would need to be revised and licensees would need to update their policies and procedures (Godleski et al. 2008; Zur 2012; Shore 2013) and the roles and responsibilities of all parties (e.g., licensees, host practitioner, expert practitioner, IT services, etc.) involved in the arrangement would need to be established.

Because Part 26 is currently internally consistent in requiring non-electronic face-to-face interaction in all for-cause testing and assessments, changes to § 26.189 would need to be reviewed for impact on these other for-cause assessments, especially fatigue assessments.

Part 26 does not provide limitations on the use of electronic communication in the conduct of other determinations of fitness, for example, those conducted:

1. to review with the specimen donor potential explanations for a positive, adulterated, substituted, or invalid test result and ensure that those reasons have not left the individual impaired and unfit for duty;
2. before making return-to-duty recommendations after an individual's authorization has been terminated unfavorably or denied under a licensee's or other entity's FFD policy;
3. before an individual is granted authorization when potentially disqualifying FFD information is identified that has not previously been evaluated by another licensee or entity who is subject to and the FFD requirements;
4. when potentially disqualifying FFD information is otherwise identified and the licensee's or other entity's reviewing official concludes that a determination of fitness is warranted under § 26.69.

In many of these determinations of fitness, direct interaction with and evaluation of the individual being assessed provides only a part of the information needed for the determination, with documents, information from test results, information provided by other individuals through interviews or written reports providing much of the basis for the determination. Because Part 26

is silent on the methods to be used in these non-for-cause determinations of fitness, licensees have flexibility in how they are conducted, consistent with the licensees' written policies and procedures. Rapid advances in technology and the incorporation of electronic communications as a standard means of conducting business make it likely that these methods can be effective and efficient and will be increasingly used in the conduct of the various information gathering and exchange activities that provide the basis for non-for-cause determinations of fitness.

8.0 References

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