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# Audiologists Providing Clinical Services via Telepractice: Technical Report

*Working Group on Telepractice*

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**About This Document**

This technical report was developed by the Telepractice Working Group, which was appointed as part of the 2001–2003 Focused Initiative on Technology. Members of the committee include: Amy C. Georgeadis, Gregg Givens, Mark Krumm (chair), Pauline A. Mashima, John M. Torrens, and Janet Brown (ASHA staff liaison). Pam Mason served as the ASHA audiology staff consultant. Celia Hooper, vice president for professional practices in speech-language pathology, 2003–2005, served as monitoring vice president.

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**Introduction**

Telepractice is the application of telecommunications technology to deliver professional services at a distance. The use of telepractice does not remove any existing responsibilities in delivering services, including adherence to the Code of Ethics (ASHA, 2003), Scope of Practice (ASHA, 2004), state and federal laws (e.g., licensure, HIPAA, etc.), and ASHA policy documents on professional practices. Therefore, services delivered via telepractice must adhere to the same level of quality as services delivered face-to-face. According to the Code of Ethics, clinical services provided solely by correspondence should not be considered acceptable applications of telepractice. Any clinical service must be appropriate based on the unique needs of the client. Telepractice is not appropriate in all circumstances, and a variety of factors need to be considered.

Since 1998, ASHA has studied the potential impact of telepractice on audiologists and the individuals they serve. This technical report summarizes evidence to date about the use of telepractice in audiology, and discusses future directions and research needs.

**Definition of the Topic**

According to the Agency for Healthcare Research and Quality (AHRQ, 2001), telemedicine is "...the use of telecommunications technology for medical diagnostic, monitoring, and therapeutic purposes when distance separates the users." In the past, telemedicine dealt exclusively with medical applications by physicians using advanced technology. In the 1997 Comprehensive Telehealth Act, the broader term of "telehealth" was used to refer to services delivered by non-physician as well as physician providers. Telehealth is the expansion of telemedicine, to include applications across the full spectrum of the health sciences including but not limited to nursing, occupational therapy, physical therapy, speech-language pathology, and audiology, pharmacy, physical education and health promotion, dentistry and dental hygiene, as well as medicine (Bashshur, Reardon, & Shannon, 2000; Books, Sun, Boal, Poropatich, & Abbot, 2002; Burgess et al., 1999; Eikelboom, Atlas, Mba, & Gallop, 2002; Hassol et al., 1996; Mun & Turner, 1999). The term "telepractice" was adopted by ASHA in 2001 to encompass a range of services provided through telecommunications technology that are not exclusively health related, including clinical services for communication enhancement, and education and supervision. This technical report will address telepractice services as they relate to clinical service delivery.

**Benefits of Telepractice**

One of the most commonly recognized benefits of telepractice is the opportunity for clients to have improved access to services (Buckwalter, Davis, Wakefield, Kienzle, & Murray, 2002; Farmer & Muhlenbruck, 2001; Ricketts, 2000). This includes the opportunity to receive services that previously were not available due

## Limitations of Telepractice

to: distance from health care facilities; lack of clinicians or specialized clinicians in a geographic area; and lack of transportation. When extensive travel is required to access services, factors such as fatigue and reduced mobility also affect clients' desire to seek services or capability to benefit from services (Karp et al., 2000). Clients may also limit or decline services due to an unwillingness to disrupt their work schedules or the schedules of working family members to commute or provide transportation to distant health care facilities. Other benefits of telepractice include the opportunity for clients to receive services in their natural environment (in the case of home telepractice); thus, treatment can take a more functional focus by including family/caregivers members and the client's real life situations (Whitten, Doolittle, Mackert, & Rush, 2003). If the client needs to consult multiple providers for complex health or rehabilitation needs, continuity of care may be facilitated through the use of telepractice (Marcin et al., 2004). By eliminating distance considerations, telepractice offers the potential to make services available globally (Bashshur, Readon & Shannon, 2000; Karp et al., 2000; Marcin et al., 2004; Ricketts, 2000).

In some circumstances, outcomes may be enhanced through telepractice. For culturally and linguistically diverse clients, telepractice affords a greater opportunity for bilingual clinicians or providers with interpreters to reach non-English speaking clients or geographically isolated populations (e.g., Native American reservations). Providing services in the client's natural environment rather than bringing the client to a health care facility affords the clinician a greater understanding of the client's functional needs, and may enhance the support, involvement, and training of other individuals in the environment.

Other reported benefits of telepractice in both schools and health care environments include increased motivation and responsiveness of the client due to the technologic aspects of the treatment (Brennan, Georgeadis, Baron, & Barker, in press). The versatility and increased capacity of the technology provide access to larger repertoire of services and technical capability that can enhance interest and successful outcomes (Farmer & Muhlenbruck, 2001; Hassol et al., 1996; Karp et al., 2000; Marcin et al., 2004).

From an economic perspective, receiving services via telepractice eliminates the direct cost of transportation and indirect costs of lost work productivity associated with travel time for the client and accompanying family members. Telepractice can increase work efficiency by eliminating the need to travel great distances for home health care or to satellite clinics. Telepractice can also eliminate the need to cancel sessions due to poor weather conditions.

The inability to have direct physical contact with the client is a primary difference between telepractice and traditional face-to-face service delivery. Physical contact with a client is used by clinicians for tactile manipulation and stimulation (e.g., probe placement for tympanometry), cuing, and reinforcement. In the telepractice environment, this must be provided in alternative ways, such as training a family/caregiver or paraprofessional at the remote site, or by using visual/verbal means. Sustaining eye contact between client and clinician can also be more challenging, depending on the location of the Web or videocamera, because the clinician must look at the camera rather than at the screen image of the client in order to make eye contact. Another challenge is that telepractice interventions take place in a

## ASHA's Involvement in Telepractice

static location because of equipment and connectivity requirements. This makes it difficult to change the environment during a session such as addressing aural rehabilitation in a community context.

Since the late 1990s, ASHA has examined the feasibility and success of telemedicine technology to the delivery of audiology services. In 1998, ASHA's *Telehealth Issues Brief*, described activities that had taken place to date in the area of telepractice. Subsequently, one of the goals of ASHA's 2001–2003 Focused Initiative on Technology was to increase members' knowledge and access to ASHA products, information, and activities related to the use of telepractice in the delivery of clinical services in audiology and speech-language pathology. A staff team developed the 2001 *Telepractices and ASHA: Report of the Telepractices Team* that presented an updated overview of telepractice and future activities and needs (ASHA, 2001).

In 2002, ASHA fielded a survey of 1,667 ASHA members to determine their awareness and experience with respect to telepractice (ASHA, 2002). Overall, 11% of the respondents (12% of audiologists and 9% of SLPs) indicated that they had provided services via telepractice (the definition of telepractice at the time was broad enough to include services that were conducted exclusively by telephone). Survey results indicated that a smaller percentage reported using web-based or videoconferencing technology to provide telepractice. For audiologists using telepractice, direct patient care was the most common service (50%), followed by professional consultation (35%), education (5%), and supervision (5%). The most common patient services provided were for counseling (83%), follow-up (68%), equipment check (47%), and treatment (14%).

Between 2001 and 2003, ASHA collaborated with the National Rehabilitation Hospital's Rehabilitation Engineering Research Center to develop professional education presentations that were provided to ASHA members as workshop or convention sessions and as a telephone seminar, and in other multidisciplinary forums.

In 2003, ASHA awarded \$4,000 grants to three telepractice programs to develop materials that would inform ASHA members about telepractice activities. Nineteen programs submitted grant proposals, encompassing audiology and speech-language pathology telepractice services provided from university, health care, and school settings. The diversity of proposals reflected the range of practice models currently in use by audiologists and speech-language pathologists.

## Early Applications of Telemedicine

Telemedicine applications have been reported since 1910 (Stanberry, 2000). Medical and related disciplines utilizing this service delivery model include but are not limited to: radiology, dermatology, oncology, cardiology, surgery, psychiatry, psychology, otolaryngology, ophthalmology, pulmonology, and rehabilitation. Telemedicine has typically been hospital-based, with health care providers delivering services to remote locations such as satellite clinics, community centers, prisons, Native American reservations, and to individuals at home (Bashshur, Reardon, & Shannon, 2000; Stanberry, 2000). Medical services have also been delivered internationally utilizing telemedicine technology.

## Audiology Applications of Telepractice

Computer-based clinical applications are common in audiology today. For example, audiometers, auditory brainstem response (ABR), otoacoustic emissions (OAEs), immittance and hearing aid systems are frequently computer peripherals, which can be interfaced to existing telepractice networks. Manufacturers are now promoting equipment with synchronous or store-and-forward capabilities. Advances in technology have led to the following applications of telepractice in audiology.

In the mid-1990s, Mayo Clinic audiologists provided hearing aid adjustments to consumers located in distant communities through telepractice technology (Fabry, personal communication, 2004). Specifically, audiologists utilized remote control software, a T-1 network connection, a phone line, and hearing aid programming software interfaced to a PC to adjust digital hearing aids. This form of synchronous telepractice permitted the clinician to control computers at a remote site without the need to be physically present with the client. This project demonstrated good clinical utility for serving the amplification needs of clients in rural areas.

In California, audiologists used a T-1 network and high quality interactive video to supervise a licensed hearing aid dispenser and an audiology technician providing hearing health services in rural communities. In addition, the audiologist (using interactive video) provided clients in distant sites with counseling and audiologic rehabilitation services (Office for the Advancement of Telemedicine, 2004).

Also, video-otoscopy has been used for visual assessment of the ear through telepractice systems with varying degrees of success (Burgess et al., 1999; Heneghan, Sclafani, Stern, & Ginsburg, 1999; Sullivan, 1997). However, recent research indicates that video-otoscopy can be provided accurately through a telepractice medium when used with high quality video resolution (Eikelboom, Atlas, Mbaou, & Gallop, 2002).

## Telepractice Delivery Models and Current Trends

The range of possible models does not limit any setting from being a potential location for the delivery of services via telepractice, including hospitals, satellite clinics, other residential and non-residential health care facilities, schools, and the client's home. Possible connections may include:

- Hospital to hospital
- Hospital to health care facility or clinician's office
- Health care facility to client's home
- Health care facility to school
- School to client's home
- Clinician's office to client's home

Three distinct telepractice models are generally recognized, as reported by AHRQ (2001). These models include store-and-forward (asynchronous), clinician interactive (synchronous), and self-monitoring/testing.

**Store-and-forward model (asynchronous).** This form of telepractice is the electronic transmission of clinical data from one location to another. This model does not require for the client and clinician to be available at the same time. Common modes for data transmission include the Internet (via e-mail attachments or in other file formats), a telephone modem, and, in some cases, a fax machine.

Store-and-forward is the most common form of telemedicine and is used almost exclusively by certain medical professionals, such as radiologists and dermatologists. Examples of store-and-forward applications in audiology include transmission of audiological data such as auditory brainstem response (ABR) and otoacoustic emissions (OAE) recordings, immittance measurements, and audiograms.

**Clinician interactive (synchronous).** Synchronous communication normally is conducted in real-time for diagnosis and treatment through interactive audio and/or video, which traditionally required face-to-face encounters between the patient and clinician. Another form of synchronous telepractice incorporates remote control computing that enables the clinician to test individuals at distant locations. Remote control software applications permit the clinician to control computers and their peripherals, such as otoacoustic emission systems located at consumer sites. The advantage of remote control computing is that the clinician can test the consumer directly without an intermediate technician. However, a facilitator is needed at the remote site to provide services (such as headphone placement or otoscopic examination). Other examples of synchronous applications include measurements of auditory brainstem response (ABR) and otoacoustic emissions (OAE) recordings, and audiometric data. The synchronous technology can also include adjustment of amplification devices, including hearing aids and cochlear implants.

**Self-monitoring/testing.** In this model, the client provides data to the provider without any on-site facilitator. Data is usually collected in a client's home or residential care facility. This model is primarily used for clients with chronic illnesses who require close monitoring of vital signs such as the measurement of blood sugar levels or cardiac function. However, web-based assessments are becoming more common on the internet. These assessments include tests incorporating speech or pure tone stimuli. No data has been published to support the efficacy of self-administered testing. In addition, numerous audiology sites use self-assessment surveys to help individuals identify limitations in activities and participation resulting from their hearing loss.

### Current Applications and Research

East Carolina University, driven by the needs of an isolated rural population, has developed an Internet-based hearing assessment that accesses an audiometer via an Internet protocol network. (Givens et al., 2003). Studies using this system have demonstrated identical findings between the standard audiometric system and the Internet-based system (Givens & Elangovan, 2003).

At Utah State University, newborn hearing screening is performed using remote control telepractice technology. This technology involves the use of otoacoustic emissions and auditory brainstem response (ABR) measurements. The preliminary results of this project indicate that services using this technology are effective (Krumm, Ribera, & Schmiedge, in press).

In addition, Towers, Pisa, Froelich, & Krumm (in press) reported on the reliability of auditory brainstem response (ABR) testing using telehealth technology via the Internet. Specifically, Towers et al. utilized remote computing software and interactive video to obtain ABR responses on subjects located over 500 miles from

## **Issues in Telepractice**

the audiologist providing these services. Results of the study indicated that there were essentially no differences with ABR recordings obtained face-to-face and those obtained through telepractice.

A study assessing the feasibility of offering the Hearing in Noise Test (HINT) using telepractice technology was described by Ribera (in press). In this study, Ribera reported assessing 30 subjects located 500 miles away with a computerized version of the HINT and telepractice technology over the Internet. Subjects were also tested face-to-face. The results of this study indicated that the HINT data were essentially equal when telepractice HINT scores were compared to face-to-face HINT scores.

### **Personnel**

Given the relatively recent development of telepractice in audiology, there are a number of issues that should be considered prior to delivering services at a distance. Among these are personnel, equipment, ethics, professional licensing, liability and malpractice, privacy, confidentiality, clinical standards, candidacy criteria, client and clinician satisfaction, reimbursement, and research needs.

Although only certified and/or licensed audiologists can provide professional audiology services via telepractice, appropriately trained individuals, (e.g., health professionals, paraprofessionals, trained family members/caregivers) may be present at the site to assist the client. It is the responsibility of the professional to direct the session and to ensure that facilitators (e.g., support personnel and family members/caregivers) are adequately trained to assist in the telepractice session. The type of professional required at the client's site may vary depending on the type of service being provided.

For example, a technician can be trained to assist in teleaudiometry by placing headphones on the client. A client could be trained to connect his/her own hearing aid to a remote communication device for adjustment of the hearing aid or receive aural rehabilitation independently at home.

### **Equipment**

Equipment specifications vary depending upon the telepractice application and the desired outcomes of the intervention. Image and sound quality should be of sufficient quality for the clinical application. Examples of telepractice equipment which are readily available in the public domain include videophones, teleconferencing software/equipment, closed circuit TV, computer with Web cam, and image scanners. Transmission mediums include plain old telephone system (POTS), ISDN (Integrated Services Digital Network), satellite, cable (broadband Internet connection), and DSL (Digital Subscriber Line). Conventional telephone connections provide the narrowest bandwidth, in contrast to high speed ISDN technology (T1–T4 lines) which offers comparatively large bandwidths for data transmission. Broader bandwidth permits greater speed of transmission, resulting in sharper, faster, and larger video images. However, broader bandwidth is associated with higher cost and reduced availability in some areas. Network availability and reliability are also important factors, as are equipment maintenance, training, and upgrades.

**Ethics**

ASHA's Code of Ethics (ASHA, 2003) applies to all certified audiologists. Certified individuals engaged in clinical practice, including telepractice, are bound to honor their responsibility to hold paramount the welfare of persons they serve professionally and provide all services competently (Denton, 2003). According to the Principle of Ethics I, Rule J, clinicians may practice by telecommunication where not prohibited by law. Among other ethical responsibilities of clinicians are expectations that they will:

- Obey laws and regulations of relevant jurisdictions governing professional licensing.
- Be educated and trained in the models of telepractice delivery.
- Inform clients how services via telepractice differ from services delivered face-to-face and disclose potential risks and limitations as well as benefits.
- Evaluate the effectiveness of services rendered via telepractice to ensure that methods, procedures, and techniques are consistent with best available evidence and adhere to standards of best practices.
- Create a safe environment within which to provide services.
- Use transmission and recordkeeping methodologies that protect privacy and ensure confidentiality and security. Transmission and storage of electronic health information must also be consistent with federal and state regulations.

**Professional  
Licensing**

Each state has the right to create and enforce its own licensure laws for the protection of consumers of professional services. Due to the recent advances in telepractice, the National Council of State Boards of Examiners in Speech-Language Pathology and Audiology has urged state licensing boards to develop statutory language relative to telepractice. The National Council further states that the clinicians should be licensed in the state in which the consumer is receiving the service. Prior to initiating telepractice, clinicians should check with regulating bodies such as state licensure boards.

In 2003, 17 states adopted an Interstate Compact for Licensed Nursing (ACNM, 2003), which allows nurses licensed in their home state to practice in any other party state (i.e., a state that has also adopted the compact). Each party state is able to place restrictions or additional requirements on what they consider advanced practice registered nursing. This compact could serve as a model for other professions.

**Liability and  
Malpractice**

Clinicians are held to the same standard of practice in providing services via telepractice as in conventional face-to-face delivery methods. Although traditional liability theories apply to telepractice, it is likely an emerging body of statutory and common law will further affect the delivery of services by telepractice in the future. Much like professional licensing, malpractice insurance requires a provider to be licensed in each state to which they deliver services.

Adequate facilitator (e.g., support personnel and family members/caregivers) training is necessary to ensure the quality of service delivery. Documentation of this training is encouraged.

To manage risk, clinicians are advised to obtain documentation of informed consent from the client. This may include a description of the equipment and services to be delivered, how services via telepractice may differ from services

## **Privacy and Confidentiality**

delivered face-to-face, and potential confidentiality issues. Documentation may also include the type of equipment used, the identity of every person present, the location of the client and the clinician, and the type and rate of transmission.

Clinicians have an ethical and legal responsibility to protect and preserve the privacy and confidentiality of their clients. This may include using the camera to scan the clinician's environment to assure privacy and providing clients with an opportunity to decide who should be present at their location when receiving telepractice services. Federal regulations (e.g., the Health Insurance Portability and Accountability Act (HIPAA)) requires that providers maintain the privacy and confidentiality of protected health information (PHI). There are various electronic means for achieving confidentiality and privacy consistent with HIPAA regulations, such as data encryption, secure certificates, and virtual private networks. While these are adequate strategies at present, future regulations as well as advances in technology may require higher levels of security.

## **Clinical Standards**

Because telepractice is emerging as a widely used method of service delivery due to advances in technology, health care professions are developing clinical standards to ensure quality of services. The American College of Radiology, the American Psychological Association, the American Nurses Association, the American Association of Respiratory Care, and the American Telemedicine Association are among the first professional associations to develop guidelines or statements about telepractice/telehealth service delivery. These documents essentially affirm that telepractice services must meet all standards required for face-to-face services. The use of telepractice as a delivery model does not negate any ethical responsibility on the part of the provider, who is expected to be competent in the area of service and with the instruments used in a telepractice encounter.

Clinical competencies may include:

Knowledge of:

- The types and use of technology used for delivering telepractice services, and awareness of the remote client's resources and support systems.
- How to address cultural/linguistic differences in client populations using telepractice service delivery (e.g., non-verbal communications, pragmatics).

Ability to:

- Assess the appropriateness of clients as candidates for telepractice.
- Match the appropriate technology to the clinical needs of the client.
- Assure the reliability and validity of diagnoses obtained via telepractice.
- Adapt diagnostic procedures and treatment techniques to the telepractice encounter.
- Assure the effectiveness of the telepractice intervention (outcome measures, consumer satisfaction).
- Document services appropriately.

## **Candidacy Criteria**

As in any clinical practice, the client's candidacy for receiving services via telepractice should be assessed prior to initiation of services.

The following factors while not exclusionary, may impact the success of the telepractice assessment/intervention:

- Attention (e.g., ability to sit in front of a monitor)
- Auditory comprehension (ability to follow directions to operate equipment)
- Literacy
- Cognitive ability
- Hearing ability
- Visual ability (e.g., ability to see material on a computer monitor)
- Speech intelligibility
- Behavior (e.g., ability to sit in front of a camera and minimize extraneous movements to avoid compromising the image resolution)
- Physical endurance (e.g., sitting tolerance)
- Motor ability (e.g., ability to operate a keyboard if needed)
- Comfort level with technology
- Willingness of the client and family/caregiver to participate in telepractice
- Cultural/linguistic considerations (e.g., availability of interpreter)
- Access to and availability of resources (e.g., telecommunications network, facilitator)

## Client Satisfaction

As with other clinical services, it is important to measure client satisfaction. The clinical literature from other professions (e.g., psychology, psychiatry, physical therapy, etc.) report positive outcomes in client satisfaction (Hilty, Luo, Morache, Marcelo, & Nesbitt, 2002; Leyden & Phillips, 1999; Mashima et al., 2003). However, satisfaction may be affected by factors including client selection, service delivery methodology, transmission quality, and clinician and facilitator competence.

Few studies in audiology have documented client satisfaction with the use of telepractice technology in audiology. Preliminary findings by the Utah State University newborn hearing screening project indicate that clients and clinicians (e.g., parents and providers) are generally satisfied with telepractice services (Krumm, Ribera, & Scmiedge, in press).

## Clinician Satisfaction

Another important consideration is clinician satisfaction. Clinician and administrative support and acceptance of telepractice are essential to the development of successful programs. Less information is available regarding provider satisfaction and telepractice. Generally, providers have found telepractice acceptable for service provision. However, research suggests that providers are more likely to find telepractice effective if they serve rural centers and have prior experience with telepractice technology (Hilty, Luo, Morache, Marcelo, & Nesbitt, 2002; Karp et al., 2000; Hilty, Marks, Urness, Yellowlees, & Nesbitt, 2004; Marcini et al., 2004; Whited, 2001).

## Reimbursement

Without a reasonable expectation of payment for a service, it will be difficult for providers or institutions to plan and implement a telepractice program. ASHA's 2002 member survey on telepractice indicated that 71% of telepractice services were not reimbursed. Historically, telepractice services have been funded by grants, rather than traditional sources such as Medicare, Medicaid, or third-party insurance. Federal telehealth legislation has become more favorable for payment of telepractice services, but reimbursement is contingent on specific telepractice

procedure codes being developed. Some states reimburse for SLP telepractice through Medicaid. Third-party insurance typically follows Medicare's lead on reimbursement for new procedures (Nickelson, 1998). Although private insurance carriers reimburse some medical practitioners, SLPs are not yet widely covered for providing services via telepractice. However, precedents are being set for coverage by private insurers such as Blue Cross/Blue Shield of North Dakota for speech-language pathology services (ASHA, 2003, November 18). Ultimately, services that would normally be reimbursed in a face-to-face encounter should be reimbursed in a telepractice encounter; the lack of reimbursement could potentially be a barrier to the expansion of telepractice.

## Research Needs

Evidence from clinical research is needed to:

- Determine appropriate applications of telepractice in audiology.
- Develop and validate telepractice clinical protocols.
- Develop appropriate reliability and validation techniques (e.g., cross checks) for telepractice procedures to ensure quality of service.
- Support advocacy for reimbursement.
- Investigate the efficacy and effectiveness of clinical outcomes, client and clinician satisfaction, quality of care, cost, and cost-effectiveness of telepractice applications.
- Set minimal acceptable technical specifications (compression, depth, resolution, transmission quality) to support clinical procedures and the application of service delivery models.

(AHRQ, 2001; Hill & Theodoros, 2002)

## Future Directions

The use of technology to deliver services remotely will continue to expand to meet currently unmet needs. However, the speed of expansion in audiology will depend on four critical factors: 1) the acceptance of state, federal, and private insurance programs to pay for eligible services delivered by telepractice; 2) the continued development of research on telepractice technology and applications; 3) statewide acceptance of telepractice through licensure; and 4) institutional and administrative support. Interstate compacts, such as the one initiated by the Interstate College of Nursing, or reciprocity agreements, represent one future direction for addressing the new challenges created by telepractice for all professions.

As telepractice applications continue to grow and expand, additional policies and guidelines will emerge regarding professional education to provide the services, particularly in pre-service training, and its appropriate use for clinical supervision.

## Summary

Telepractice is the judicious application of technology to services already practiced by audiologists. Research and reports to date confirm its significant advantages to overcome barriers of access to services caused by distance, unavailability of specialists and/or sub specialists, and/or impaired mobility.

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