

## Telepractice in Audiology and Speech-Language Pathology: Opportunities and Challenges

**Deborah Hayes, Ph.D.**  
Children's Hospital Colorado  
University of Colorado, School of Medicine  
  
Arizona Speech-Language-Hearing Association  
April 12, 2014

---

---

---

---

---

---

---

---

## Purpose of this Presentation

- Discuss the opportunities for telepractice in audiology and speech-language pathology
- Describe the process of developing and implementing an effective telepractice service
  - Explain the technical, logistical, and regulatory considerations for telepractice services
  - Identify the technology needed for internet-based audiology and speech-language pathology services
  - Review advantages, disadvantages, and outcomes of telepractice in audiology and speech-language pathology
- Summarize our experience in providing infant diagnostic audiological evaluations and speech-language therapy services over the internet

---

---

---

---

---

---

---

---

## What is "Telepractice?"

"Telepractice is the application of telecommunications technology to deliver professional services at a distance by linking clinician to client, or clinician to clinician for assessment, intervention, and/or consultation."

American Speech-Language-Hearing Association. (2005). *Audiologists providing clinical services via telepractice: position statement* [Position Statement]. Available from [www.asha.org/policy](http://www.asha.org/policy)

---

---

---

---

---

---

---

---



## Opportunities for Telepractice in Audiology and Speech-Language Pathology

- Consultation
  - Screening programs
  - Educational services
- Clinical care
  - Infant hearing screening and diagnostic audiological evaluations
  - Hearing aid programming and cochlear implant mapping
  - Family-centered early intervention
  - Speech-language therapy
  - Language-based literacy support
- Client/Family counseling and support

---

---

---

---

---

---

---

---



## Developing a Telepractice Service

- Identify the purpose of the service
  - Educational/consulting/parent support
  - Direct patient care
- Identify the geographic area to be served
  - In state
  - Across state borders
  - International
- Secure support from host/guest institutions

---

---

---

---

---

---

---

---



## Implementing a Telepractice Service

- Define technology needs for the intended practice
- Develop practices consistent with regulatory requirements
  - Licensing
  - HIPAA or FERPA
  - State/Federal statutes
- Identify outcome measures to evaluate practice

---

---

---

---

---

---

---

---

## Considerations for Technology

- Technology for real-time delivery of service
  - Videoconferencing capability
  - Remote control operation
  - Connectivity
    - Adequate bandwidth
    - High-speed connection for real-time data transmission
  - Alternative communication mode for technology breakdowns
    - Telephone, cell phone, instant messaging, e-mail
  - Encryption or otherwise private and secure data transmission

---

---

---

---

---

---

---

---

## Considerations in Regulations

- Professional licensing
  - Must hold professional license in jurisdiction of patient
- Privacy and confidentiality
  - All data transmission must be secure and private; audio, video, and data should be encrypted. Patient unique identifiers may be removed for further privacy. Skype?
  - Institution's IT support should evaluate and approve software
- Liability and malpractice
  - Auds/SLPs should be covered by their institution's insurance policy or personal malpractice policy
  - Informed consent must be obtained from clients prior to testing; alternatives to telepractice should be provided

---

---

---

---

---

---

---

---

## Considerations in Clinical Practice

- Quality of services
  - Equivalent to services provided face-to-face
  - Within the scope of competence of the professional (education, training, experience)
  - Evaluated for clinical effectiveness, client, parent or family, and provider satisfaction
- Clinical practice
  - Candidacy for telepractice service
  - Trained, dedicated on-site assistant to prepare client and assist in service delivery for some applications

---

---

---

---

---

---

---

---

## Considerations in Clinical Practice

- Clinical protocols
  - Identical to protocols used for face-to-face service (limited research evidence supports equivalency of telepractice and face-to-face services)
  - Effective family counseling
  - Report with recommendations following evaluation
- Environment
  - Comfortable, private, well-equipped site for client and family
  - Private workspace for aud/SLP
- Test assistant (if needed)

---

---

---

---

---

---

---

---

## Miscellaneous Considerations

- Scheduling
  - Time zone differences can impact optimum scheduling
- Support
  - Organizational support from both the host and guest institutions is a significant component in success
- Reimbursement
  - Modifier code to common procedural code billing practice identifies practice as "tele-medicine"; CMS does not recognize auds/SLPs as "tele-medicine" providers
  - Auds/SLPs may be unable to bill state Medicaid ~ state-by-state review required

---

---

---

---

---

---

---

---

## Technology for Videoconferencing

- Multiple high-quality, secure videoconferencing software systems are available
  - Nefsis® <http://www.nefsis.com>
  - Tandberg [www.tandberg-conferencing.com](http://www.tandberg-conferencing.com)
  - Polycom <http://www.polycom.com/>
  - What about Skype? Face Time? Adobe Connect?
    - Investigate any system you are thinking of using with IT security expert to confirm the system's compliance with the HIPAA Security Rule

<http://www.hhs.gov/ocr/privacy/hipaa/administrative/securityrule/securityrulepdf.pdf>

---

---

---

---

---

---

---

---

## Technology for Remote Control Operation

- Remote control software allows user to “take over” another’s computer; used in IT departments to restore function to a user’s system
- For audiology telepractice and some applications in speech-language pathology, remote control software allows distance operation of any PC-based system
  - NetOp [www.netop.com/remote-control](http://www.netop.com/remote-control)

---

---

---

---

---

---

---

---

## Advantages of Telepractice

- Reach clients in remote or rural areas
  - Partner with colleagues in public schools, clinics, hospitals, other settings
  - Provide services in-home to homebound clients
- Expand clinical practice area in own state or nationally/internationally
- Convenience and expense reduction for client, families, clinicians

---

---

---

---

---

---

---

---

## Challenges of Telepractice

- Reliance on technology over which you have no control (e.g., internet)
- Expense to client or family
- Expense to clinic for extra time in preparing for and/or troubleshooting the session
- Scheduling conflicts over time zones
- Licensure, regulatory, and reimbursement issues
- Need for trained test assistants at site of client for some applications

---

---

---

---

---

---

---

---

## Telepractice at Children's Hospital Colorado

- Audiological services
  - Diagnostic audiological evaluations for infants who referred on newborn hearing screening
  - Consultation with families of children with cochlear implants
- Speech-language and learning therapy
  - Early intervention for toddlers with speech - language delay
  - Direct intervention for children with a variety of speech and/or language needs
 

Cleft palate	Cochlear implant
AAC	Voice dysfunction
Developmental delay	
  - Reading intervention for children with dyslexia

---

---

---

---

---

---

---

---

## Infant Diagnostic Audiological Evaluations by Telepractice

A Partnership between  
 Children's Hospital Colorado and  
 the University of Guam CEDDERS

---

---

---

---

---

---

---

---

## HABA ADAI! GUAM: A FEW FACTS

- U.S. Territory acquired in 1898 following the Spanish-American War
- Native people are Chamorro from Asian Pacific region
- Japanese occupation during World War II; re-captured by the U.S. in 1944
- U.S. military presence with Naval and Air Force Bases
- Semi-tropical island about 30 miles x 8 miles in size
- Civilian population of 170,000
- Birthrate for 3,300 infants/year



**"Fiber Optic Flower" on a Beachfront Tree**

---

---

---

---

---

---

---

---



## Infant DAE by Telepractice

Infant DAE is a battery of **non-behavioral** tests of auditory function for infants who cannot provide reliable behavioral responses to sound (very young babies, developmentally delayed children).

- Not strictly "hearing tests"; rather tests of function of specific component of the infant's auditory system
  - Middle ear ~ otoscopy, tympanometry, middle ear muscle reflexes
  - Inner ear ~ otoacoustic emissions
  - Auditory neural pathways ~ auditory evoked potentials, such as auditory brainstem response
- Typically conducted while infant is asleep
- Results in predictions of degree, frequency-by-frequency pattern, and type of hearing loss in each ear
- Permits referral for medical/surgical evaluation, early fitting of hearing aids and enrollment in early intervention

---

---

---

---

---

---

---

---

---

---

## How can Infant DAEs be Conducted by Telepractice?

- Equipment used for infant DAEs is PC-based; allows **remote control operation** by an audiologist off-site
- Infant and family needs preparation for testing ~ trained, dedicated, on-site assistant
  - Parent/caregiver comfortably holding baby for one hour or more
  - Baby calm and asleep; usually accomplished after feeding
  - Electrodes attached to baby's head
  - Sound-delivering components (earphones, ear inserts, bone vibrator) appropriate placed
  - All components correctly connected to sound delivery and response recording system
- **Videoconferencing** with assistant and family

---

---

---

---

---

---

---

---

---

---

## Steps in the Telepractice Project

- **Developing of a Memorandum of Understanding** outlining each party's responsibilities
- Visiting site of telepractice in Guam by Children's Hospital Colorado staff
- Acquiring Guam audiology licensure
- Identifying HIPAA-compliant software for remote control of Guam diagnostic audiometric equipment and videoconferencing
- Testing/retesting software solutions
- Ensuring a successful first telepractice test
  - Scheduling a Children's Colorado audiologist on Guam for "Go Live"

---

---

---

---

---

---

---

---

---

---



## Memorandum of Understanding

- MOU for Guam CEDDERS and Children’s Hospital Colorado to collaborate on a pilot project of Telepractice to provide infant DAEs for infants in Guam who refer on newborn hearing screening. Expected outcomes:
  - Infants and families will have timely access to DAE services,
  - Guam CEDDERS and Children’s Colorado will develop a model of telepractice services with sufficient detail on costs, benefits, and challenges to enable implementation of future models of telepractice services.

---

---

---

---

---

---

---

---

---

---

## Memorandum of Understanding

- Guam CEDDERS responsibilities:
  - Equipment and supplies
    - Telehealth/telemedicine technology sufficient to support Telepractice, including transmission through secure server; software licenses
    - Infant DAE equipment
    - Disposable supplies needed for infant DAEs
  - Personnel
    - Technical support
    - Test assistant trained for equipment, infant and family support
    - Support personnel for scheduling, supplies and records maintenance
  - Space
    - Private, environmentally appropriate, and secure room with storage for infant and family, test assistant, and others

---

---

---

---

---

---

---

---

---

---

## Memorandum of Understanding

- Children’s Colorado responsibilities:
  - Equipment
    - Laptop computer for videoconferencing
    - Laptop or desktop computer for remote control operation of Guam CEDDERS diagnostic audiological equipment
    - Software licenses
  - Personnel
    - Technical support
    - Guam-licensed pediatric audiologist with extensive infant DAE experience
    - Support personnel for scheduling, maintaining records and statistics

---

---

---

---

---

---

---

---

---

---

## Steps in the Telepractice Project

- Developing of a Memorandum of Understanding outlining each party's responsibilities
- Visiting site of telepractice in Guam by Children's Hospital Colorado staff
  - Evaluate test environment and equipment
  - Train Guam-based technicians (DOE audiometrists)
  - Develop procedures jointly
- Acquiring Guam audiology licensure
- Identifying HIPAA-compliant software for remote control of Guam diagnostic audiometric equipment and videoconferencing
- Testing/retesting software solutions
- Ensuring a successful first telepractice test
  - Scheduling a Children's Colorado audiologist on Guam for "Go Live"

---

---

---

---

---

---

---

---



**Designated 'Tele-Audiology' House in Guam**

---

---

---

---

---

---

---

---

## Personnel for Telepractice

- In Colorado
  - Two licensed (Colorado and Guam) audiologists from Children's Hospital Colorado
  - Project leadership
  - Technical support
- In Guam
  - Trained technicians (Guam DOE-Part B audiometrists)
  - Project leadership from Guam EHDI
  - Technical support
  - Guam Family Supporters from Guam Early Intervention Services (GEIS)

---

---

---

---

---

---

---

---

## Technology for Telepractice

- In Guam:
  - Bio-logic® Navigator® PRO (NavPRO) for auditory brainstem response, otoacoustic emissions, auditory steady state response
  - GSI TympanStar and Interacoustics Titan for tympanometry and middle ear muscle reflexes
  - Laptop for videoconferencing
- In Colorado:
  - Desktop PC for remote control operation of NavPRO
  - Laptop for videoconferencing

---

---

---

---

---

---

---

---

## Software for Telepractice

- Netop Remote Control software for audiologist in Colorado to "take control" of Guam NavPRO
  - Colorado is "guest" and logs into Guam NavPRO through public IP address
  - Guam is "host" and allows Colorado to take control of NavPRO
  - No infant identifying information is transmitted during testing
- Nefsis videoconferencing software
  - Guam holds Nefsis videoconferencing license
  - Colorado connects to videoconference established by Guam via secure website

---

---

---

---

---


---

---

---

## First "Go Live" in Guam

A mother holds her infant during telepractice testing to determine whether or not her infant has a hearing loss. An audiologist at Children's Hospital-Colorado operates the diagnostic audiological equipment remotely after on-site test assist (left) and on-site audiologist (center), prepared the parent and infant for testing on Guam. (Photo credit: University of Guam)



Mother and Baby DeShawn

---

---

---

---

---

---

---

---

## Telepractice Results

- 25 test sessions completed by project completion(July 2013)
  - 24/25 infants received complete diagnostic assessment; 1 infant received partial ABR but did not sleep for remaining tests
    - Otoscopy (by Guam audiometrist)
    - Tympanometry
    - Otoacoustic emissions
    - Auditory brainstem response (air and bone conduction as needed)
    - Auditory steady state response (air and bone conduction as needed)
  - 7 infants identified with permanent hearing loss; 1 infant identified with mild-moderate conductive hearing loss who cannot receive surgery until other medical issues resolve; 3 infants identified with mild conductive hearing loss
  - Audiological diagnosis facilitated referral for medical services for three infants and enrollment in early intervention for children 8 children

---

---

---

---

---

---

---

---

---

---

## Challenges to Telepractice

- Identifying an appropriate test environment
- Identifying and training support personnel
- Scheduling appointments across time zones (16 hour difference between Colorado and Guam)
- Interruption of internet services during testing
- Measuring effectiveness of family counseling delivered by videoconferencing
- Integrating infant DAE services into full EHHI program to attain quality outcomes
- Sustaining services beyond pilot phase

---

---

---

---

---

---

---

---

---

---

## Parent Survey (N = 18)

- 14 (77.8%) indicated that they received a brochure and that it was helpful
- 17 (94.4%) indicated that staff were supportive after informed of the results of testing
- Scattered results: Many parents did not know who provided the testing
- 17 (94.4%) indicated that they would recommend Telepractice to other parents

---

---

---

---

---


---

---

---

---

---



## Preparing Families

- In June 2012, to improve family preparedness for Telepractice, Children's Colorado staff prepared a 5-minute DVD introducing the audiologists and demonstrating the steps in Telepractice with a mom and her baby.

<http://infanthearing.org/flashplayer/index.htm?file=http://www.infanthearing.org/flashvideos/teleaudiology/guam-video.mp4>

---

---

---


---

---

---

---

---



## What We have Learned

- Infant diagnostic audiological evaluations can be effectively provided over the internet
- Site visit(s) is/are critical to success of telepractice
- Software solutions must meet contemporary standards for infant and family privacy and confidentiality
- Telepractice is optimally delivered within the context of comprehensive services for the infant or patient and family
- Telepractice can be a successful approach for providing services in rural and remote communities

---

---

---


---

---

---

---

---



## Impact for Infants in Guam

- Babies who fail outpatient rescreen are tested prior to 2 months of age.
- Early Intervention Providers were trained and training is ongoing on how to prepare babies for the DAE.
- Strong collaboration with Part C Early intervention.
- Connection with the infants medical home
- Enrollment into early intervention

Slide courtesy of Elaine Eclavea University of Guam CEDDERS

---

---

---

---

---

---

---

---

### Impact for Audiologists in Colorado

- Development of technical "know-how" and expertise to expand services to families in remote or rural communities
- Recognition of audiology service as leaders in non-physician telehealth activity within the hospital
- Expansion of Telepractice initiatives to other components of service delivery
  - Hearing aid programming; cochlear implant mapping
  - Aural (re)habilitation/parent coaching and support

---

---

---

---

---

---

---

---

### Challenges to Telepractice

- Identifying an appropriate test environment
- Identifying and training support personnel
- Scheduling appointments across time zones (16 hour difference between Colorado and Guam)
- Interruption of internet services during testing
- Measuring effectiveness of family counseling delivered by videoconferencing
- Integrating infant DAE services into full EHDI program to attain quality outcomes
- Sustaining services beyond pilot phase

---

---

---

---

---

---

---

---



Mother and Toddler  
DeShawn

---

---

---

---

---

---

---

---

## Speech-Language and Learning Therapy Services by Telepractice

A Partnership between  
Children's Hospital Colorado and  
Families and Communities

---

---

---

---

---

---

---

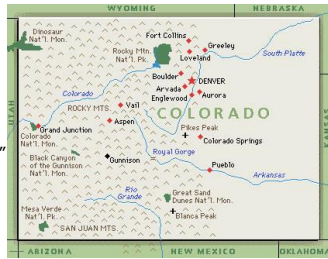
---

## Colorado: A Mountain Community

8th largest state in the nation; 1/3 high plains dry land farming; 2/3 mountainous, ranching

Population ~ 5.3 million  
85% live in "Urban Corridor" from Fort Collins to Pueblo

Population density ~ 48.5/mi<sup>2</sup> vs. 87.4/mi<sup>2</sup> in US



---

---

---

---

---

---

---

---

## Speech-Language Services to Children in Rural Colorado

- Professionals with expertise in evaluation and treatment of children with special health or developmental needs are concentrated in the highly populated "Urban Corridor"
- Families from rural areas are unable to travel weekly for ongoing services and may have limited or no access to speech-language services in their community
- Access to wideband, high speed internet service is available in most areas of Colorado

---

---

---

---

---

---

---

---

## Laying the Groundwork

- Identifying the need
  - Specialty clinics ~ Cleft Palate, Sie Center Down Syndrome, AAC program, CI program
- Selecting videoconferencing software
- Practicing with software
  - Hospital, home, operating systems, PC and Mac
- Developing family materials
- Determining billing procedures
- Selecting patients

---

---

---

---

---

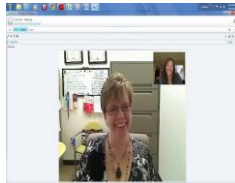
---

---

---

## Videoconferencing Software

- Microsoft Lync
- Approved by hospital IT Dept as HIPAA compliant
  - Free download for families
  - Families receive meeting request by e-mail with "click on" to connect option
  - Adequate quality for most applications
  - White board and file sharing options
  - Newest version compatible with tablets and smart phones




---

---

---

---

---

---

---

---

## Billing Procedures

- Colorado state Medicaid reimburses for speech-language therapy by telepractice; varies by state
  - Therapy CPT code with "GT" modifier to identify "telepractice"
- Colorado statute requires insurance to reimburse for services delivered by telepractice if policy reimburses for equivalent face-to-face services
- Hospital has grant funding from the Scottish Rite Foundation of Colorado to assist families who qualify
  - No insurance or limited benefit
  - Financial need

---

---

---

---

---

---

---

---



## Models of Care

- Consultation
  - SLP in rural Colorado requested consultation for a 10-year old boy who was making slow progress in articulation therapy
- Direct intervention
  - 11 year old boy referred from Cleft Palate Clinic
  - 4-2 year old boy with motor speech and expressive language delay
- Parent coaching
  - 2-8 year old girl with expressive language delay

---

---

---

---

---

---

---

---

## Direct Intervention

- 11 year old boy referred from Cleft Palate Clinic
  - Decreased speech intelligibility
  - Lived in remote Colorado with limited access to SLP with expertise in cleft palate speech
- Therapy location
  - Home with internet and family interruptions
  - Public library (private room) arranged by parent
- Therapy materials
  - Word list on white board; games such as hangman, tic-tac-toe
- Outcome
  - Shortly before discharge, family re-located out-of-state; Mother expressed improved understanding of how to help generalize articulation to conversational speech

---

---

---

---

---

---

---

---

## Direct Intervention

- 4 year old boy with poor speech intelligibility
  - Lives in rural Colorado
  - Received therapy at preschool in group 1 session/week
  - Therapy initiated with face-to-face clinic session
  - Standardized assessment (HCAPP)
    - Initial (10/24/12) 85 (moderate range)
    - Interim (7/23/13) 46 (mild range)
    - Recent (2/18/14) 30 (mild range)
  - Materials: cut and paste activities; games in conjunction with articulation cards, PowerPoint flash cards

---

---

---


---

---

---

---

---



Insert Larry video here

---

---

---


---

---

---

---

---



Parent Coaching

- 2-8 year old girl with expressive language delay in the presence of average receptive language skills
  - Lives in rural Colorado
  - Receives early intervention in home on a sporadic basis
  - Therapy initiated with face-to-face clinic session
  - Materials: favorite toys in the home (baby doll, truck, blocks), simple picture cards, cut/paste activities, printable books
  - Outcome: discharged in March 2013; did not qualify for school-based services ~ scores fell within normal range

---

---

---


---

---

---

---

---



Insert Filomena video here

---

---

---

---

---

---

---

---

## Speech-Language Telepractice Challenges

- Technology
  - Software installation
  - Internet connectivity
  - Operating systems other than Microsoft
  - Fixed camera
- Environmental distractions
- Therapy preparation
  - Family environment
  - Materials prepared ahead of time to meet individual needs
- Outcome data ~ family surveys; face-to-face evaluations

---

---

---

---

---

---

---

---

## Speech-Language Telepractice Benefits

- Access, convenience, and cost
  - Access to Children's Hospital Colorado specialists
  - Families able to work into their schedules resulting in less cancellations due to travel, sibling illness, weather
  - Lower/no travel cost to families
- Better carry-over and family participation
  - Parents more involved in sessions
  - Child engaged more with parents
  - Use of family materials
- Clinic reach
  - Expansion of services to outlying communities
  - Use of lower cost space for therapy

---

---

---

---

---

---

---

---

## 2013 Children's Hospital Update

- Number of Children Served: 10 (136 visits)
- Ages of Children: 2 years – 14 years
  - Speech therapy provided for children with:
    - Cleft lip and palate
    - Voice Dysfunction
    - Cochlear implant
    - Augmentative/Alternative Communication
    - Learning Disabilities
    - Developmental Language Delay
- MOU with Family Resource Center in Cortez Colorado to provide telepractice for families without home-based internet access

---

---

---

---

---

---

---

---

## Resources

- National Center for Hearing Assessment and Management ~ Utah State University
  - Practical guides for "teleaudiology" and "teleintervention"
- American Speech-Language-Hearing Association
  - Practice guidance, special interest group, frequently asked questions, resources, technical assistance, webinars
- American Academy of Audiology
  - White Paper on Teleaudiology (due 2014)
- American Telemedicine Association
- Government agencies ~ Maternal and Child Health, Centers for Disease Control and Prevention

---

---

---

---

---

---

---

---

## Acknowledgements

- |  |  |
|--|--|
| <p><u>Children's Hospital Colorado</u></p> <ul style="list-style-type: none"> <li>· Sue Dreith</li> <li>· Ericka Schicke</li> <li>· Jackie Rowley</li> <li>· Kathy Boada</li> <li>· Stephanie Coe</li> <li>· Kim Lich</li> <li>· Jennifer Maybee</li> <li>· Bereket Habte</li> </ul> | <p><u>University of Guam</u></p> <ul style="list-style-type: none"> <li>· Elaine Eclavea</li> <li>· Sean Lizama</li> <li>· Bobbie Maguadog</li> <li>· JJ Mendiola</li> <li>· Ron Nochefranca</li> <li>· Vickie Ritter</li> <li>· Laurie Soto</li> <li>· David Zeiber</li> </ul> <p><u>The Piñon Project – Cortez</u></p> <ul style="list-style-type: none"> <li>· Kellie Willis</li> <li>· Lara Blair</li> </ul> |
|--|--|

---

---

---

---

---

---

---

---



Blossoms on the "Flame Tree" in Guam

---

---

---

---

---

---

---

---