Tele-Intervention: The Wave of the Future Fits Families' Lives Today

By Diane D. Behl, K. Todd Houston, W. Spencer Guthrie, and Nancy K. Guthrie

As a parent, imagine finding yourself—at one moment—enjoying the birth of your infant son. He seems perfect in every way with beautiful blond hair and piercing blue eyes. Then, suddenly, you face some unexpected information—he has failed his newborn hearing screening. While concerned, you assure yourself that it must be a mistake or perhaps there's fluid in his ears. It can't be the alternative. Subsequent testing with a pediatric audiologist confirms the worst—bilateral severe to profound deafness. Suddenly, your world is spinning in a direction that no one predicted or anticipated. A million questions rush through your mind. How will your new son communicate? Where will he go to school? Can he still play baseball? Will he go to college? Will he be happy?

The Guthries

For Spencer and Nancy Guthrie, this is exactly what happened when their son, Alex, was born just over two years ago. Prior to leaving the hospital, Alex had failed his newborn hearing screening, which led the Guthries to seek further testing by a pediatric audiologist. Receiving confirmation of Alex's hearing loss was the beginning of their journey into the world of childhood deafness. Because Alex is the youngest of five children, they knew immediately that acquiring spoken language was going to be a top priority for them and for Alex. Their home is one filled with laughter, conversations, music and singing, and the occasional disagreements that are common among siblings. For them and their family, including Alex in all of these verbal experiences was critical.

Within days of his diagnosis, Alex was fit with very powerful digital hearing aids in both ears. Hearing aids provided Alex with greater access to sounds within his environment, including improvements in his ability to hear the voices of his parents and his brothers and sisters. Unfortunately, however, when the Guthries sought intensive intervention to facilitate listening and spoken language for Alex, they soon realized that their city had limited resources available to them. While some services were initiated to assist Alex, they knew additional intervention was warranted if Alex was going to achieve the spoken language outcomes they so desperately desired.

The Guthries wanted intensive Auditory-

continued on page 24

Tele-Intervention

continued from page 23

Verbal Therapy delivered by specially trained speech-language pathologists (SLPs) to foster his listening and spoken language. Unfortunately, providers trained in the delivery of these specialized services were not widely available locally—a reality for most families with children with significant hearing loss. For the Guthries, receiving these services meant arranging weekly services from a provider that was based about 120 miles away from their home. They quickly realized that the high costs of traveling to therapy appointments, considering the price of gasoline and child care for their other children, as well as taking time off from work, required a different solution.

Thus, when the Guthries were approached by the Sound Beginnings Program at Utah State University to participate in a new method of providing services to children and their families referred to as "tele-intervention," they enthusiastically agreed to participate. Tele-intervention—providing early intervention services virtually using distance communication technologies—allowed the Guthries to receive the specialized services Alex needed on a weekly basis, at a convenient time, and in his own home.

After these services were initiated, Alex began to consistently respond to sounds, and, in turn, his speech production soon followed. He began to babble and started to form first words by the time he was nine months old. However, the Guthries knew that while his hearing aids had enhanced his auditory awareness, Alex would need more powerful hearing technology due to the severity of his hearing loss. The family decided to pursue bilateral cochlear implantation, which resulted in Alex receiving cochlear implants—his right ear at 12 months of age and his left ear at 14 months. The cochlear implant is a device that is surgically implanted and allows Alex to "hear" through direct electrical stimulation of the auditory nerve.

Current Outcomes for Children with Hearing Loss

The Guthries faced some of the same dilemmas as other parents in their quest to access specialized intervention services, recognizing the importance of starting as early as possible to help their children develop language. Permanent hearing loss is the most frequent birth defect in the United States. Most children who are identified early as being deaf or hard of hearing (DHH) and provided with appropriate early intervention are able to progress at age-appropriate rates (Kennedy, McCann, & Campbell, 2006; Moeller, 2000; Yoshinaga-Itano, Sedey, Coulter, & Mehl, 1998).

However, when not detected and treated early, children who are DHH typically do not develop speech and language normally, which then contributes to serious problems with cognitive, language, and social development (White, 2004). Due to early identification of hearing loss through universal newborn hearing screening programs in most hospitals and birthing centers in the United States, recent advances in diagnostic equipment, advancements in hearing technology (e.g., hearing aids and/or cochlear implants), and receipt of specialized early intervention services, most children with hearing loss can achieve language outcomes that are comparable to their hearing peers (McCann et al., 2008).

Although the benefits of early intervention for children who are DHH have been demonstrated, many of these children are still not receiving appropriate services (CDC, 2008). Experts (Sass-Lehrer & Bedner-Johnson, 2003; White, 2007) agree that the primary reasons for such inadequate services are severe shortages of early childhood professionals who are trained and knowledgeable about current methods for effectively identifying and educating children who are DHH and the lack of a "critical mass" of children who are DHH in a given geographic area. As a result, finding appropriately-trained people for early intervention and educational programs is difficult in many parts of the country. For families like the Guthries, tele-intervention can be part of the solution to accessing needed services.

Videoconferencing Technology & The Typical Tele-Intervention Session

The Sound Beginnings Program purchased "high-end" videoconferencing equipment and placed it in the Guthries' home. The units are relatively small and contain a video camera. A 24-inch monitor is attached to the videoconferencing console so that the parents can clearly see and hear the sessions provided by the SLP. On campus, the SLP uses the same equipment, providing quality video and audio to observe and coach the parents through each session's activities. From the home, the video-

conferencing equipment must be connected to a broadband internet connection, and Sound Beginnings uses its high-speed internet capacity, commonly referred to as T1 and T2 lines.

The tele-intervention sessions typically occur weekly, lasting about 60-75 minutes per session. Each session begins with a discussion of the speech, language, and listening goals demonstrated during the previous session. During the first few minutes, the SLP seeks to determine how communication strategies have been integrated into the child's daily routines. Likewise, the SLP obtains a report from the parent about new behaviors, speech sounds, or language targets that may have emerged over the past week.

Once these updates have occurred, the SLP introduces the goals for that day's session, explaining the desired speech, language, listening, and interactive behaviors. Both the family and the SLP use similar toys and everyday materials to work on these goals. After agreeing on which materials and activities will most engage the child, the SLP demonstrates the activity before asking the parent to engage the child and repeat the activity while the SLP observes. At this point in the session, the SLP's role shifts to one of a coach. The SLP provides positive reinforcement and constructive feedback to the parent based on how the activity is being implemented and how communication strategies that promote listening and spoken language are being applied.

This same scenario is repeated as one activity ends and a new activity is initiated. Throughout the session, the parent and the SLP closely monitor the child's attention level. If the child begins to lose interest, the parent may say, "Let's do it one more time, and then we'll get something else to play with!" By maintaining control of who (i.e., the parent) ends each activity, the parent can progress through several activities that reinforce listening and spoken language without losing the child's interest or seeing the session deteriorate into a power struggle.

As a "coach," the SLP works to increase the

continued on page 26

continued from page 25

parent's confidence and skill level in terms of reinforcing appropriate listening and spoken language targets during play activities and in the child's typical routines. For example, the parent may learn how to appropriately model and expand language during a sandwich-making activity. By reinforcing listening and language targets during these regularly occurring activities within the home, the parent's skills become second nature and can easily transfer to other daily activities, such as bath time, getting dressed, or setting the table for dinner. This coaching approach requires a partnership that emphasizes the role of the parent as the one who best knows his or her child's interests and temperament (Peterson et al., 2007; Rush, Sheldon, & Hanft, 2003; , Hanft, Rush, & Sheldon, 2004).

As the session comes to a close, the SLP summarizes the goals and facilitation strategies that were modeled and practiced that day. Then, based on the child's performance and developmental level, new or additional communication goals are discussed that will be targeted in the home the following week. Before the session comes to a close, the parent is given ample opportunity to discuss any concerns about the child's progress, to ask questions about short- or long-term communication goals, or to seek input about troubleshooting the child's hearing technology (e.g., digital hearing aids and/or cochlear implants).

Supporting Family-Centered Practices

Although the Sound Beginnings tele-intervention program is still in an early phase of development, there are definite advantages and very few disadvantages—according to the participating families. Even families who may live in a place where specialists are a short distance away find that receiving services via tele-intervention can be very beneficial. The Jensens[1], for example, live only five miles from the Sound Beginnings program. However, packing up four small children, including a 2-year-old with hearing loss, to travel to the center is no small undertaking. Tele-intervention allows the family to stay at home with less disruption to the family routine.

Both the Guthrie and Jensen families were interviewed by someone independent of the Sound Beginnings Program to obtain their opinion about this new approach to receiving services. They revealed some very interesting and positive aspects of tele-intervention. In both cases, the interview results clearly indicated that tele-intervention allowed the families to receive services from providers who were experts in providing the kind of Auditory-Verbal Therapy their child needs to be competent communicators and users of spoken language.

The Sound Beginnings providers were not only specialists in working with children—they were experts in coaching families, emphasizing the role of family members as the primary facilitators of language for their children. Because tele-intervention connects the family to the provider only through a video screen, the interaction dynamic is different than that of traditional home visits. As one parent explained, "I've had early intervention providers do home visits in the past, and they tended to do a lot of demonstration and then say, "That's how you can do it, too." The result is that the parent can often feel that he or she is a passive participant in the session. Tele-intervention forces the family to be in the driver's seat in terms of being the primary teacher for the child. That is, the provider is not in the room, so the parent must do the activities. As a result of the high level of active engagement during tele-intervention sessions, the parents said that integrating therapy strategies into everyday life was easier. As a result, they found that their children were more responsive, followed their directions better, and generally improved their interactions. One parent summarized, "I've learned a lot through tele-intervention. I have more confidence, and my son listens to me better."

Given the importance of intensive early intervention, families see tele-intervention as a way to ensure more consistent, regular sessions. With traditional home visits, a family may need to cancel a session if their child or someone else in the family has even a minor illness; with tele-intervention, families report a lower cancellation rate. Even though someone may have a case of the sniffles, it cannot be passed on to the interventionist when communicating online. The security of not passing along illnesses is especially important for children who are medically vulnerable and need to be protected from germs as much as possible. As a result of fewer interruptions in their intervention services, children are more likely to reach their listening and spoken language goals.

The Jensens said that they prefer tele-intervention over traditional home visits because the former fits in better with their family routine. From the perspective of a stay-at-home mom with four small children, having a provider come into your home seems to require more preparation and organization. Although it's not expected by the providers, families often feel that the entire house needs to be clean and tidy. Tele-intervention is less demanding—you just need one room set aside for the session. Additionally, tele-intervention sessions are more likely to start and end on time, because uncertainties in travel time due to inclement weather, traffic delays, or other reasons do not impact tele-intervention services. As a result, an hour-long tele-intervention session is more predictable, less disruptive, and lets the family get on with the many other activities of the day.

In both the Guthrie and Jensen families, the mother is the one routinely participating in the tele-intervention sessions that are held during regular daytime working hours. In such situations, the dads can easily feel left out of this important part of their children's learning experience. However, because Sound Beginnings makes video recordings of all the sessions and then posts them securely online, dads and others can personally observe the therapy and more fully participate in implementing the recommendations. One mom shared, "Instead of just saying, 'I wish you could've heard Matthew[2] use his words today,' my husband can see first-hand the amazing progress Matt is making and how much better he responds when given certain prompts." Not only are the videos instructional, they serve as an addition to the family home video collection to share with other friends and family. "These videos show how our son's sound production has improved over time, and how his ability to follow directions has improved."

Provider's Perspective on Tele-Intervention

Logistically, once the equipment is in place and functioning, the sessions focus less and less on operation of the technology and more

on the spoken language outcomes that are most wanted for the child. Thus far, parents have mastered the set up of the video-conferencing equipment and learned to troubleshoot connectivity issues in a relatively short period of time. Fortunately, the equipment has been highly reliable, and problems seldom occur.

However, the potential for such problems do exist. For example, if the parents live in a rural area, access to a high-speed internet connection may not be available. Likewise, some parents may not enjoy tele-intervention and decide that they prefer a more traditional, in-home service delivery model. In a similar fashion, some professionals may be "techno-phobes" and may feel intimidated by the technology. They, too, may prefer delivering services directly in the home.

Planning the individual sessions may actually take more time, especially when the SLP or provider is learning how to deliver services through tele-intervention. For example, activities, toys, and objects that are demonstrated "on camera" have to be a certain size so that they can be clearly seen on the monitor in the home. Special equipment such as a document camera that provides an enlarged view of smaller items may be used by the therapist, but alternating between the document and main cameras takes practice in order to maintain continuity and flow within the session.

Usually, more activities are planned for each session than are used. So that the family and the SLP or provider can work with the same materials, a packet of materials is sent to the family one to two weeks before they are used in a session. This allows the parents to become familiar with the materials prior to the session. More importantly, the SLP can demonstrate activities or facilitation strategies using the same materials that the parents have in front of them.

Because of the coaching relationship that is immediately established through tele-intervention, rapport is easy built between the parent and SLP. By "tuning in" each week to the home environment, the experience is like a "home visit" without being there physically. Some providers, however, may feel uncomfortable with this coaching paradigm based on their training, experience, or background. In these cases, they may not be well-suited to take on this kind of professional role.

Tele-intervention Challenges

Although tele-intervention offers numerous benefits to families, implementation of this service in specific situations can be challenging. The high-quality internet connection needed for reliable video communication between the provider and the family is often lacking in the communities where children and families need it most. Even in places where high-speed internet is available, the monthly charges are often too costly for families on a tight budget. In addition to internet fees, costs for a computer, camera, and microphone must be covered. While some programs

continued on page 28

continued from page 27

will provide the equipment and cover the monthly internet services for families they serve, this approach may or may not be less costly when compared to the costs of travel time. Furthermore, even when all these elements are in place, technology can be fickle, and the needed video or audio can be poor due to the time of day or other outside circumstances. Sound Beginnings has found their system to be reliable about 95% of the time.

Another challenge is that some families are not confident in using computers, regardless of the training they may receive, and they may therefore choose not to use tele-intervention services even if they could benefit from them. Even for computer-savvy families, having a technical support staff person may be necessary to ensure continued service when glitches do occur.

Yet another challenge is that some families might not have the ability to create a quiet space in their home for holding tele-intervention sessions. Ideally, that space will be a quiet room with carpet, good lighting, and a door that can be closed.

Finally, some families may simply desire the support that only the physical presence of a provider can give. Therefore, keeping in mind that tele-intervention is one "tool" in a toolbox of providing quality, family-centered services is important.

Provider Perspectives: Tele-Intervention Outcomes

Tele-intervention has proven to be a viable service delivery model for supporting children who are DHH in acquiring spoken language. With consistent services and well-trained SLPs or providers, the children are obtaining language outcomes that are consistent with or exceed developmental norms. Furthermore, the children's parents are becoming more confident in their role as the child's primary facilitator of language, regardless of the method of communication used.

In spite of proven successes, access to tele-intervention remains limited in most areas of the United States. While a limited number of universities, private practitioners, and early intervention systems are beginning to use tele-intervention programs, the need for these services far exceeds current capacity in most states. Some providers, for example, face challenges delivering these services due to inadequate insurance reimbursement or lack of acceptance by public authorities such as state Part C Early Intervention programs. In other cases, practitioners may need to obtain multiple licenses to practice in neighboring states if the family or child resides over state boundary lines.

The Future

In spite of some challenges, tele-intervention is being used successfully in programs to bring needed services to families and their children with hearing loss (McCarthy, Muñoz & White, 2010). Telehealth—providing health-related services to distant communities through technology—is spreading all over the world. Many agencies within the United States are using telehealth practices to conduct hearing evaluations on infants who do not pass their newborn hearing screening test (www.infanthearing.org/telehealth/index.html). Virtual therapies, such as speech and/or language intervention, are also provided to school districts that cannot find SLPs to hire (http://www.asha.org/practice/telepractice/).

However, many policy-makers and early intervention administrators are unsure if tele-intervention fits within the definition of providing services in "natural environments," which is typically interpreted as the provider being physically present in the child's home. As distance communication technologies continue to develop, families will need to speak up about what works best for them—what truly fits within their family lifestyle and strengthens their ability to support their child's ability to development optimally. It just might be through tele-intervention, the wave of the future! •

References

Hill AJ, Theodoros DG, Russell TG, Cahill LM, Ward EC, Clark KM. (2006). An Internet-based telere-habilitation system for the assessment of motor speech disorders: a pilot study. Am J Speech Lang Pathol. 15(1):45–56

Jessiman SM. (2003). Speech and language services using telehealth technology in remote and underserviced areas. J Speech Lang Pathol Audiol. 27(1):45–51

Kennedy CR, McCann DC, Campbell MJ, et al. (2006). Language ability after early detection of permanent childhood hearing impairment. N Engl J Med. 354(20):2131–2141

McCarthy M, Muñoz K, and White K. (2010). Teleintervention for Infants and Young Children Who Are Deaf or Hard-of-Hearing,

Pediatrics. 126; S52–S58.

Moeller MP. (2000). Early intervention and language development in children who are deaf and hard of hearing. Pediatrics. 106(3). Available at: www.pediatrics.org/ cgi/content/full/106/3/e43

Rush, DD, Shelden, ML. (2006). Coaching practices rating scale for assessing adherence to evidence-based early childhood intervention practices. CASEtools, 2(2):1–7.

Sicotte C, Lehoux P, Fortier-Blanc J, Leblanc Y. (2003). Feasibility and outcome evaluation of a telemedicine application in speech-language pathology. J Telemed Telecare. 9(5):253–258

Yoshinaga-Itano C, Sedey AL, Coulter DK, Mehl AL. (1998). Language of early- and later-identified children with hearing loss. Pediatrics. 102(5):1161–1171

1 The family name has been changed to provide confidentiality.

2 The real name was not used to provide confidentiality.

To Learn More

Here are some resources to learn more about tele-intervention and telehealth:

The National Center for Hearing Assessment and Management has a web page dedicated to telehealth/telepractice, with resources and presentations on topics such as building parent-provider partnerships through tele-intervention: http://www.infanthearing.org/telehealth/index.html

The American Speech Language Hearing Association provides information about the use of telepractice to deliver speech/language and audiology services: http://www.asha.org/practice/telepractice

Telehealth Resource Centers (TRCs) assist in implementing telehealth programs. Information about the five TRCs can be found here: http://www.telehealthresourcecenters.org/