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Optimizing Listening & Spoken Language Outcomes: What Audiologists (and Families) Should Expect from Early Interventionists

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> *Because the outcomes of AVT depend on high-quality auditory access, the audiologist plays a starring role in AVT by ensuring that babies and children with hearing loss have excellent auditory access to all sounds of speech so they can hear, process, and learn spoken language effectively through listening. Simply put, the achievement of desired outcomes in listening and spoken language intervention Auditory-Verbal Therapy depends heavily on an effective and collaborative relationship among the parent, audiologist, and AV practitioner.*
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> *(Lim and MacIver-Lux, 2022)*

Note to Reader: Following the 2019 position statement of the Joint Committee on Infant Hearing (JCIH), the author uses the term “children who are deaf or hard of hearing” to encompass those with congenital or acquired hearing loss, whether unilateral or bilateral, and ranging from mild to profound, including conductive, sensorineural, auditory neuropathy spectrum disorder, and mixed losses, regardless of whether they are permanent, transient, or intermittent.

In Canada, the prevalence of hearing loss in newborns and infants ranges from 1 to 3-4 per 1,000 births when accounting for all degrees of hearing loss, whether unilateral or bilateral (Hyde, 2005). In neonatal care units, hearing loss can be as high as 10 per 1,000 live births (JCIH, 2007; Vohr et al., 2001). Moreover, an additional 16–18% of children may acquire late-onset hearing loss (Wang et al., 2019).



Parents are the first and most enduring teachers and agents of change in a child's development in audition, speech, language, cognition, communication, literacy, life and social-emotional wellness (MacIver-Lux, Estabrooks, & Smith, 2020). Photo used with permission by parents and MacIver-Lux.

Research on neuroplasticity suggests that early, consistent, high-quality, and meaningful auditory stimulation is necessary for optimal development of a child's auditory potential (Gordon and Harrison, 2005; Sharma, Dorman, and Spahr, 2002). Hearing loss, whether permanent or temporary, restricts the flow and quality of auditory information that travels from the peripheral auditory system (outer ear, middle ear, cochlea, auditory nerve) to the auditory centers of the brain, hampering the development of important neural connections (auditory deprivation) (Flexer and Wolfe, 2020). Consequently, a child's ability to develop essential listening skills, which promote the acquisition of spoken language, literacy, and learning skills, is negatively impacted (Kral, Kronenberger, Pisoni, and O'Donoghue, 2016; Kral and Lenarz, 2015). Thus, deficits in speech, language, cognitive function, academic performance, and social/emotional development are universally recognized as expected outcomes of untreated hearing loss.

The good news is that infants and families who have access to a universal newborn hearing screening program—with hearing loss detection through screening by 1 month of age, confirmation of hearing loss by 3 months, and initiation of early intervention by 6 months (JCIH, 2019)—demonstrate better functional auditory skills, as well as improved understanding and production of spoken language (Percy Smith et al., 2018; Cowan, Edwards, and Ching, 2018), social-emotional wellness (Wischmann et al., 2024; Warner-Cyz, Loy, Pourchot, White, and Cokely, 2018), and literacy and educational outcomes (Geers et al., 2017) compared to those identified later. Notably, children identified with hearing loss by 3 months of age and enrolled in family-centred intervention programs by 6 months can achieve language development trajectories close to those of children with typical hearing (Ching et al., 2017; Fulcher, Purcell, Baker, and Munro, 2012; Tomblin et al., 2015). In its 2019 Position Statement, the JCIH urges Early Hearing Detection and Intervention (EHDI) programs to strive for a 1-2-3 month (identification-diagnosis/fitting of hearing technology-intervention) benchmark if the current 1-3-6 month

benchmark is being met (JCIH, 2019).

Since 2002, the Canadian Infant Hearing Task Force (CIHTF), Speech and Audiology Canada (SAC), and the Canadian Academy of Audiology (CAA) have advocated for the establishment and management of an integrated, consistent, and culturally sensitive EHDI program across all provinces and territories in Canada, to ensure that all children who are deaf or hard of hearing are identified and provided with comprehensive, family-centred early intervention. The CIHTF recommends that EHDI programs implement five key components: universal hearing screening of all newborns, identifying babies with permanent hearing loss, providing support services for technology and language development, offering family support, and ensuring consistent monitoring and evaluation of the program. As of 2024, 5 out of 13 Canadian provinces and territories successfully provide all components of the EHDI program; however, hearing health inequities continue to affect more than one-third of Canadian infants, impacting their communication development and education (CIHTF, 2024).

Just as audiologists who conduct diagnostic evaluations and fit hearing technology for infants and children should possess knowledge, skills, and expertise in pediatric audiology (Bagatto et al., 2016), early interventionists must have a solid understanding of family-centred listening and spoken language intervention principles for infants and toddlers who are deaf or hard of hearing and their families (JCIH, 2019; JCIH, 2013). In the United States (JCIH, 2013), it is recognized that early interventionists come from diverse professional backgrounds, including audiology, early childhood special education, teaching students with hearing loss, and speech-language pathology. The professional titles of early interventionists offering listening spoken language intervention in Canada’s Early Detection and Intervention (EDHI) program vary by province.

According to JCIH (2013), the early interventionist who offers early and family-centred listening and spoken language intervention for children who are deaf and hard of hearing should demonstrate knowledge, expertise, and skills in the following core competencies:

- Socially, culturally, and linguistically responsive practices tailored to individual families and the Deaf/Deaf-Hard-of-Hearing cultures and communities.
- Understanding of language acquisition and communication development for children with typical hearing and the impact of hearing loss on accessing and developing communication skills.
- Awareness of all communication approaches available to children with hearing loss.
- Knowledge of and ability to implement positive conditions influencing infant and toddler development.
- Understanding of hearing science, pediatric audiology practices, and the interpretation of hearing screening and audiologist diagnostic information.
- Proficiency in formal standardized assessments and informal assessment procedures used to monitor audition, speech, language, cognition, communication, literacy, social skills, and social-emotional wellness progress.
- Familiarity with hearing technology and other assistive devices that enhance access to auditory, visual, or tactile information to support communication.

All core competencies and skills mentioned above are expected to be demonstrated by early interventionists who provide Listening and Spoken Language Auditory-Verbal Practice (LSLS AVT/AVED). In Ontario, speech-language pathologists within the Early Hearing Detection and Intervention (EHDI) program also provide early intervention to a large pediatric caseload with typical hearing who have diverse needs and diagnoses. Many of these speech-language pathologists have received (or require) introductory training in Listening and Spoken Language Auditory-Verbal Practice to serve parent(s) who have chosen listening and spoken language as the desired outcome for their children who are deaf and hard of hearing. A few speech-language pathologists have pursued further education, training, and mentorship (at their own cost and time) for 3 to 5 years to obtain LSLS Certification in Auditory Verbal Therapy and/or Auditory-Verbal Education.



During intervention sessions, parents learn to see evidence of their babies/toddlers responding to sounds and spoken language during playful interactions and realize the benefit of consistent hearing technology use. Photo used with permission by parents and MacIver-Lux.

Listening and Spoken Language Auditory-Verbal Practice

Early interventionists/practitioners who engage in Auditory-Verbal Therapy/Education are guided by ten principles of practice of the Listening and Spoken Language Certified Auditory-Verbal Therapist/Education (AG Bell, 2022). These guiding principles are not meant to be divisive and exclusionary; rather, they exist to guide the practitioner (and parent(s)) in the use of evidence-based/informed conditions that optimize outcomes in multiple developmental domains: listening, spoken language, literacy, cognition, and communication in both academic and social settings (Estabrooks, Morrison and MacIver-Lux, 2020). Out of the ten principles that guide the LSLS Cert. AVT/Ed, six begins with “guide and coach parent(s) to,” highlighting the importance of parent guidance and coaching practices in auditory-verbal intervention. Auditory-verbal practitioners (those who have pursued training in or who have obtained certification in LSLS Cert. AVT/AVED) are obliged to apply comprehensive knowledge and skills in nine defined domains of LSLS knowledge and to use evidence-based/informed strategies and conditions that scaffold

learning in developmental domains such as audition, speech, language, cognition, social communication, and literacy (Eriks-Brophy et al., 2016), and to rely on collaborative partnerships with parent(s), audiologists, educators of the deaf, physicians (and other developmental specialists whenever necessary) to help children who are deaf and hard of hearing reach their highest listening, spoken language, literacy and life potential.

How the Nine Domains of Knowledge for LSL Certification and Practice Assist the Early Interventionist/Auditory-Verbal Practitioner in Optimizing Listening and Spoken Language Outcomes

1. Auditory Functioning

Development of the full range of auditory processing skills necessary for spoken communication and learning requires 15 years of consistent and clear auditory access to all sounds of the world's soundscape (Bellis, 2011). All auditory processes contribute to a child's overall auditory functioning, and to develop and strengthen auditory processes, consistent and clear auditory access to all sounds of speech is imperative.

Thus, during a one-hour therapy session, early interventionists/auditory-verbal practitioners should be able to gather frequency-specific information about the child's auditory access to all speech sounds in their native language with and without hearing technology. When working with children who are deaf and hard of hearing, it's essential to have a strong foundation of knowledge of speech acoustics and the environmental conditions that affect them so that the early interventionist/auditory-verbal practitioner can:

- alert the audiologist when there is a change in auditory status as quickly as possible.
- create appropriate and SMART goals in intervention (e.g., development of /f/ in the final position of words is addressed first (rather than in the initial position of words) because /f/ is easier to hear in the final position of words, thus easier for the child to learn and produce).
- observe and gain diagnostic information within naturally occurring sound and spoken communication-rich listening opportunities (e.g., turning on the water tap while the child is looking away before teeth brushing routines, etc.) and report these observations and diagnostic information to the audiologist for verification purposes.
- guide and coach the parent(s) in ways to make spoken language easier for children to hear, learn, speak, read and write.

Early interventionists and auditory-verbal practitioners need to understand how auditory access and auditory processing skills (e.g., auditory memory, localization, dichotic listening, etc.) affect functioning and progress in various developmental domains such as:

- Speech: Children typically speak as they hear spoken language (Ling, 2002). For instance, a child saying "oo" instead of "mm" may suggest insufficient access to nasal sounds. Similarly, a child

saying “birfday” instead of “birthday” may be developmentally appropriate for a 4-year-old with a hearing age of 3 years.

- Receptive and Expressive Language: Misunderstanding phrases such as “how old are you” as “how are you” could result from limited auditory access or immature auditory processing due to a young hearing age.

- Cognition: A child’s difficulty in understanding the difference between “on” and “in” may stem from not having learned the meanings of these words or from auditory access issues or immature auditory discrimination abilities.

- Communication: If a child struggles to localize speakers during a conversation, this may be due to unilateral use of hearing technology, immature localization skills, or asymmetrical auditory access.

- Literacy: It is important to assess whether a child demonstrates phonemic awareness and blending skills expected for their hearing age, or if auditory processing difficulties coexist with hearing loss.

The early interventionist must make these distinctions quickly, and the diagnostic information must be communicated to parents and audiologists regularly, both verbally and in writing.

Early interventionists and auditory-verbal practitioners must be capable of identifying and describing the child’s auditory functioning for effective program planning (including long-term goals and short-term objectives), and use/adaptation of strategies and conditions to scaffold auditory skill learning throughout daily routines. The goal is for the child to make more than maturational progress in the development of auditory processing skills to close the gap between the child’s hearing age (the time the child has been wearing hearing technology) and chronological age (the auditory functioning expected at the child’s chronological age) as quickly as possible.

2. Spoken Language Communication

In early intervention/auditory-verbal practice, focus lies on a developmental rather than remedial sequence of skill acquisition, and a coaching rather than teaching model to support the parents who facilitate their child’s spoken language development through listening (MacIver-Lux, Smolen, Rosenweig and Estabrooks, 2020). The later the child is identified with hearing loss, the more remedial the intervention becomes (Beebe, Pearson and Koch, 1984) and the longer and more frequent the intervention needs to be (Meinzen-Derr et al., 2022). Thus, the primary goal is to help children achieve age-appropriate skills in listening, speech, receptive and expressive language,

spoken communication, cognition, and literacy, and to encourage social integration with their typically hearing peers as quickly as possible (AG Bell Academy for Listening and Spoken Language, 2022).

To effectively guide parents in helping their children who are deaf or hard of hearing towards achieving competency in listening and spoken language, early interventionists/auditory-verbal practitioners must have a deep knowledge of developmental milestones related to speech and spoken language communication in typically hearing children. They should also understand the characteristics of speech and language disorders or delays unrelated to hearing loss and those that arise from auditory deprivation or inadequate access. This understanding allows early interventionists/auditory-verbal practitioners to engage confidently in the differential diagnostic process.

An early interventionist/auditory-verbal practitioner should be skilled in selecting and administering both formal and informal language assessments, interpreting the results, and measuring progress in listening and spoken communication development. This includes analyzing standardized scores, percentiles, and age-equivalent measures, and comparing them with the child's chronological and hearing ages. These test results are shared with parents, audiologists, and educators to document and monitor progress and to ensure intervention goals are integrated into the child's daily routines and activities.

When later identified children age out of the EDHI program, parents will require assistance in helping their children access specialized remedial intervention services outside of the education system, such as Auditory-Verbal Therapy and/or Auditory Life Skills Training. These intervention services and those provided by the education system will support the child's continued development of listening and spoken communication skills.

3. Strategies (and Conditions) for Listening and Spoken Language Development

All strategies and conditions used in early intervention sessions are rooted in evidence-based/informed research and promote the development of skills in listening, spoken language, literacy, and social communication (Eriks-Brophy, DuBois and Ganek, 2016). During early intervention/auditory-verbal sessions, ample opportunities are provided for the parent(s) to practice using and/or adapting strategies and conditions that scaffold the learning of listening and spoken language skills.

Rosenweig and Smolen (2021) investigated the use of specific strategies used among professionals who were either certified LSLSs or noncertified professionals working with children who are DHH learning to listen and develop spoken language and results of the investigation indicated significant differences in the use of AV strategies between certified LSLSs and noncertified professionals. Use of strategies and conditions in listening and spoken language auditory-verbal intervention requires knowledge of speech acoustics, auditory brain development, hearing technology signal processing, and the child's individual hearing needs. In the beginning stages of early intervention/auditory-verbal intervention, strategies and conditions are used/or adapted so that spoken language is easy to hear, learn, say, read and write.

As the child develops higher-level listening skills, auditory functioning, and stronger bottom-up

and top-bottom processing skills, strategy use fades, and conditions become more challenging listening-wise to mimic daily listening conditions such as listening to conversations or instructions in noisy classrooms or cafes or degraded speech signals such as accents foreign to the child's listening ear. Eventually, all strategies and conditions that enhance speech understanding in daily environments are faded into non-use. The purpose of early intervention/auditory-verbal practice is to prepare the child for the inconsistent listening demands of the child's daily soundscape and to help the parent(s) and children learn how to provide clear feedback to the audiologist in the event there is suspicion of sound distortion or a decline in auditory functioning/access. Such reporting can allow the audiologist to utilize exciting, customized listening programs or enable Bluetooth and AI capabilities that may accelerate listening and spoken language outcomes.



Parents learn to create a rich learning environment, one in which their child who is deaf or hard of hearing can be bathed in sound. Photo used with permission by parents and MacIver-Lux.

4. Hearing and Hearing Technology

One of the most challenging tasks for parents of infants and/or toddlers with newly fitted hearing technology is finding ways to keep the hearing technology secured to their children's ears. Early interventionists/auditory-verbal practitioners guide and coach parent(s) in finding creative solutions to keep hearing technology on during all waking hours (e.g., caps, hair accessories). Early interventionists/auditory-verbal practitioners also ensure that the hearing technology is comfortable to wear and listen with, and if there are any discomfort or avoidance issues, the audiologists are quickly informed. During intervention sessions, parents learn to see evidence of their babies/toddlers responding to sounds and spoken language during playful interactions and to see the value that consistent hearing aid use and well-fit hearing aids make to the learning to listen and listening to learn process (MacIver-Lux, Estabrooks, & Smith, 2020; Walker, McCreery, & Sapp, 2020).

Children typically learn to speak as they hear (Ling, 2002). Thus, early interventionists/auditory-verbal practitioners must keep abreast of advances in hearing science and hearing technology and best practices in selecting and fitting hearing technology for infants and toddlers. Additionally,

early interventionists/auditory-verbal practitioners should demonstrate knowledge and skills in operating and troubleshooting hearing technology.

It is also essential that hearing technology provides consistent and clear auditory access to the sounds of the world and spoken language. Today's hearing technology with new signal processing strategies, feedback managers, non-linear frequency compression, and customized listening programs can, from time to time, distort the speech signal heard by the listener when inadequately utilized or programmed. Early interventionists/auditory-verbal practitioners guide and coach parent(s) in connecting hearing technology to mobile devices/televisions, identifying when hearing technology is not working optimally, troubleshooting hearing technology when necessary and providing feedback to the audiologist.

5. Parent Guidance, Education and Support

Parents are the first, most enduring teachers and agents of change in a child's skills development in audition, speech, language, cognition, communication, literacy, life, and social-emotional wellness (MacIver-Lux, Estabrooks and Smith, 2020). Listening and spoken language/auditory-verbal practice specifically requires the parent(s) to be the client as well as the child's primary language model and facilitator of skills development in areas of audition, speech, receptive and expressive language, cognition, communication and literacy (Hlady-MacDonald, 2012; Levasseur, 2001). Early interventionists/auditory-verbal practitioners must respect the family's culture and traditions in all aspects of the early intervention process (Rosenzweig et al., 2022) and are encouraged to seek out parent mentors in parent-to-parent support programs/organizations (JCIH, 2019) such as VOICE FOR CHILDREN WHO ARE DEAF AND HARD OF HEARING and/or HANDS and VOICES. Early interventionists/auditory-verbal practitioners will work with family support workers to manage any emotional, financial and societal barriers to successful outcomes when necessary.

6. Child Development

Early interventionists/auditory-verbal practitioners need to have a good understanding of the overall gross and fine motor skills development of children. Additionally, having a good understanding of sensory-motor and emotional regulation abilities and/or dysregulation in infants and children is beneficial. Early interventionists/practitioners guide and coach parents in creating conditions and strategies to help children learn to cope with the cacophony of sensory input that daily life delivers. Children need support from adults to manage their emotions effectively, express them in a socially appropriate manner, and maintain an optimal regulated emotional and physical state for learning.

Approximately 30–40% of children born with hearing loss also have significant additional disabilities, and 39% of the 31,784 school-aged children who are deaf and hard of hearing surveyed had an educationally relevant additional need(s) (Gallaudet Research Institute, 2008). Research also shows that children with additional disabilities can benefit from hearing aid(s) and cochlear implantation, albeit at a slower pace and/or to a lesser degree than children with no

additional disabilities (Cupples et al., 2014; Waltzman, Scalchunes and Cohen, 2000; Beer, Harris, Konenberger, Holt and Pisoni, 2012). For children with visual or speech output impairments, syndromes and medical disorders, the level of maternal education and degree of hearing loss are significant predictors of children's language outcomes (Cupples et. al., 2014).

Early interventionists/auditory-verbal practitioners must be familiar with the implications of additional developmental and medical issues on the development of listening, spoken communication, literacy and life skills. For children with additional and medical challenges, the management of hearing and implementation of listening and spoken language intervention may be seen as a lower-priority need by both parent(s) and the members of the medical team (Ritter, Hayward, Estabrooks, Kennely and Hogan, 2020). Therefore, audiologists and early interventionist/auditory-verbal practitioners must work collaboratively with the parent(s) and other developmental and medical specialists to help children with hearing loss and additional disabilities reach their highest listening, spoken communication, academic and life potential.



The early interventionist/auditory-verbal practitioner model use of strategies that promote the development of listening and social communication during playful interaction. Photo used with permission by parents and MacIver-Lux.

Domains 7-9: Emergent Literacy, Education, and History, Philosophy and Professional Issues

During the listening and spoken language intervention process, the child's pre-literacy skills (e.g., phonemic awareness, phonemic blending) are developed during play with speech sounds (e.g., Learning to Listen Sounds), speech babble, nursery rhymes, songs, and picture books. In Ontario, children who are deaf and hard of hearing are gradually transitioned into preschool programs and the educational system for continued development of literacy, spoken language, and social communication necessary for academic success. When aware of the history of intervention practices and how it's evolved over the years with the introduction of EDHI programs, early interventionists/auditory-verbal practitioners and audiologists can be inspired by advances in hearing science and technology, infant and child learning practices, and the evolution of the constellation of families' communities.

Questions Audiologists and Parents Should Ask Early Interventionists/Auditory-Verbal Practitioners

Can you provide an update on the child's rate of progress in developing functional auditory skills?

Is the rate of progress aligned with expectations based on the duration the child has been using hearing technology?

I need functional information to help verify hearing aid or cochlear implant programming. Can you tell me if the child detects all sounds within the speech spectrum? If not, which ones? If so, at what distances?

When do you anticipate the child will be ready for conditioned play audiometry tasks?

How does the child indicate detection, discrimination, identification, and comprehension of spoken language?

Does the child require any additional time to process and use spoken language? Which strategy works best with this child?

Is the child able to understand spoken language when it's noisy? If so, in which noise conditions (e.g. signal to noise ratio) is the child able/unable to do so?

What strategy can I use to understand how the child heard a certain spoken message? The answer would be to ask the child, "What did you hear?"

Can you provide insights on whether the child is progressing in receptive and expressive language?

Is the rate of progress what you would expect considering how long the child has been using hearing technology?

What are some examples of questions that the child can consistently answer during your therapy sessions and at home?

What types of instructions can the child follow? Can they point to body parts?

Does the child understand any spondee words? Do you think the child is ready for speech perception testing? This knowledge can help the audiologist choose and/or develop materials for speech perception tests that are hearing age and/or speech-language stage-appropriate.

Common Misconceptions about LSLS Auditory-Verbal Therapy/Education

Auditory-verbal practitioners have been criticized for using the "hand cue" and rightly so. The hand cue distorts the speech sounds of spoken language, making it more difficult for children who are deaf and hard of hearing to hear, understand, and learn spoken language and communication. Thus, using the hand cue within auditory-verbal sessions is no longer considered acceptable practice.

Auditory-verbal practice has been commonly described as an early intervention that prohibits the

use of visual cues and/or lipreading during intervention sessions, and this is also not the case. Doreen Pollack, one of the pioneers of Auditory-Verbal Practice, urged practitioners to coach parents in creating a rich learning environment, one in which their child who is deaf or hard of hearing (fitted with appropriate hearing technology) could be bathed in sound, surrounded by people who believe he/she/they could hear, and expect the child to listen and respond in the relevant and meaningful context of daily experience (Pollack, Goldberg, and Caleffe-Schenck, 1997). Socially appropriate eye-eye and face-facing communication are encouraged, and the child's listening skills are maximized by using strategies that promote listening (e.g., sitting side by side while reading a book, etc.). When misunderstanding occurs, visual cues such as lipreading and/or gestures are provided, and then spoken language is provided again through listening (e.g., commonly referred to as the "auditory-sandwich" strategy). All of these strategies are used in as natural a manner as possible.

Children with all degrees and types of hearing loss, whether unilateral or bilateral, are candidates for Auditory-Verbal Therapy. Research has consistently shown that children with "minimal hearing loss" are at risk for language and listening deficits (Bess, Tharpe, and Gibler, 1986; Bess, Dodd-Murphy, and Parker, 1998; Fitzpatrick et al., 2016), and there is inconsistent evidence of benefit from use of hearing technology and early intervention (Walker, 2020). Nevertheless, the auditory-verbal practitioner can guide and coach parents of children with unilateral or mild hearing loss by providing intervention that meets these children's unique listening and spoken communication development needs.



Collaboration with other members of the intervention team is encouraged. The mother and the teacher of the deaf demonstrate the strategies they have learned that promote the development of age and stage-appropriate listening and spoken language skills. Photo used with permission from the parents, teacher of the deaf, and MacIver-Lux.

Differential Diagnosis: The Collaboration Between the Audiologist and Early Interventionist

First and foremost, regular assessment and careful monitoring of communication progress using listening and spoken language are essential in any early intervention, including LSLS Auditory-Verbal Practice. If an infant or child struggles to meet expected language milestones, it is

important to investigate the reason(s) why so that they have every opportunity to thrive.

Thus, early interventionists/auditory-verbal practitioners and audiologists must identify if there are any:

- speech, language, cognitive, developmental, sensory, and/or medical issues in addition to hearing loss? If so, referrals must be made to the appropriate professional(s) to identify and support those identified needs (e.g., speech-language pathologists (e.g., apraxia of speech), occupational therapists (e.g., vestibular and/or sensory/emotional regulation dysfunction), psychologists (e.g., autism, ADHD, etc.), physicians/specialists (e.g., genetic testing, USHERs, etc.), special education/reading specialists (e.g., dyslexia).
- barriers (e.g., financial, systemic, cultural or informational, etc.) that prevent the families from accessing consistent early intervention services and/or hearing technology? If so, the early interventionist/auditory-verbal practitioner should work together with family support workers and community resource centers to diminish/eradicate these.
- limitations of hearing aid technology in terms of auditory access to all sounds of spoken language? If so, the auditory-verbal interventions/auditory-verbal practitioner must inform the audiologist immediately and investigation for candidacy of alternative hearing technologies [e.g., different hearing aid(s), implantable hearing technologies (e.g., cochlear implant(s), bone anchored hearing implant systems, auditory brainstem implant(s)] and/or assistive hearing technologies should commence as quickly as possible.
- presence of auditory-neuropathy spectrum disorder (ANSD) or auditory-processing disorder (APD) which may interfere with the development of spoken language and/or higher-level listening skills. Have appropriate hearing technologies and/or supplemental interventions been tried for these unique hearing challenges?
- concerns that the early intervention approach does not meet the child's and family's needs? If so, then it is necessary to explore additional or alternative language and communication approaches or technologies such as Auditory-Oral Intervention, Total Communication, and/or American Sign Language.

Comprehensive treatment and hearing technology plans that best meet the unique needs of children who are deaf and hard of hearing and their families should not be considered special treatment but standard practice.

Conclusion

If listening and spoken language is a desired outcome, parents deserve the opportunity to help their children who are deaf or hard of hearing acquire listening and spoken language communication. The world of science and research and the evolving practice trends in Auditory-Verbal Therapy continue to transform the dreams of parents of children into reality (Estabrooks, Morrison & MacIver-Lux, 2020) and EDHI programs worldwide continue to evolve and grow with the mission of eradicating all barriers to equitable services.

The value of a strong collaborative partnership between early audiologists, early interventionist audiologists, early interventionist auditory-verbal practitioners and the parent(s) is priceless and

enduring and has enriched the lives of so many children who are deaf and hard of hearing, including mine.

References

1. AG Bell Academy for Listening and Spoken Language. (2022). *The AG Bell Academy for Listening and Spoken Language certification handbook.* Retrieved from https://agbellacademy.org/wp-content/uploads/2022/06/LSL-Certification-Handbook_2022_Final.pdf

2. Bagatto, M., Moodie, S., Brown, C., Malandrino, A., Richert, F., Clench, D., & Scollie, S. (2016). Prescribing and verifying hearing aids applying the American Academy of Audiology Pediatric Amplification Guideline: Protocols and outcomes from the Ontario Infant Hearing Program. *Journal of the American Academy of Audiology, 27*(3), 188-203. https://doi.org/10.3766/jaaa.15051

3. Bagatto, M., Scollie, S., Hyde, M., & Seewald, R. (2010). Protocol for the provision of amplification within the Ontario Infant Hearing Program. *International Journal of Audiology, 49*(1), 70-79.

4. Beebe, H. H., Pearson, H. R., & Koch, M. E. (1984). The Helen Beebe Speech and Hearing Center. In D. Ling (Ed.), *Early intervention for hearing impaired children: Oral options* (pp. 15-63). College Press.

5. Beer, J., Harris, M. S., Kronenberger, W. G., Holt, R. F., & Pisoni, D. B. (2012). Auditory skills, language development, and adaptive behaviour of children with cochlear implants and additional disabilities. *International Journal of Audiology, 51*, 491-498. https://doi.org/10.3109/14992027.2012.664291

6. Bess, F. H., Tharpe, A. M., & Gibler, A. M. (1986). Auditory performance of children with unilateral sensorineural hearing loss. *Ear and Hearing, 7*(1), 20-26. https://doi.org/10.1097/00003446-198602000-00005

7. Bess, F. H., Dodd-Murphy, J., & Parker, R. A. (1998). Children with minimal sensorineural hearing loss: Prevalence, educational performance, and functional status. *Ear and Hearing, 19*(5), 339-354. https://doi.org/10.1097/00003446-199810000-00001

8. Bellis, R. J. (2011). *Assessment and management of central auditory processing disorders in the educational setting: From science to practice*. Delmar Learning.

9. Canadian Infant Hearing Task Force. (2020). Status of early hearing detection and intervention programs in Canada: Results from a country-wide survey. *Canadian Journal of Speech-Language Pathology and Audiology, 44*(3), 107-124. Retrieved from https://www.infanthearingcanada.ca/wp-content/uploads/2022/05/Bagatto%20et%20al.%20-%202020%20-%20Status%20of%20Early%20Hearing%20Detection%20and%20Intervention.pdf

10. Canadian Infant Hearing Task Force. (2024, May 28). *2024 Early hearing detection and intervention (EHDI) progress report and position statement* [Press Release]. Retrieved from https://www.infanthearingcanada.ca/wp-content/uploads/2024/05/CIHTF%20Press%20Rel

ease%202024%20EHDI%20Report%20Card_Final_EN.pdf

11. Cupples, L., Ching, T. Y., Crowe, K., Seeto, M., Leigh, G., Street, L., Day, J., Marnane, V., & Thomson, J. (2014). Outcomes of 3-year-old children with hearing loss and different types of additional disabilities. *Journal of Deaf Studies and Deaf Education, 19*(1), 20-39. https://doi.org/10.1093/deafed/ent039

12. Ching, T. Y. C., Dillon, H., Button, L., Seeto, M., Van Buynder, P., Marnane, V., Cupples, L., & Leigh, G. (2017). Age at intervention for permanent hearing loss and 5-year language outcomes. *Pediatrics, 140*(3), e20164274. https://doi.org/10.1542/peds.2016-4274

13. Cowan, R. S. C., Edwards, B., & Ching, T. Y. C. (2018). Longitudinal outcomes of children with hearing impairment (LOCHI): 5-year data. *International Journal of Audiology, 57*(sup2), S1-S2.

14. Dahlby-Skoog, M., Kalandadze, T., Karltorp, E., Lyxell, B., & Löfkvist, U. (2025). Hearing early opens more doors: Long-term effects of age at implantation on metaphor comprehension in adolescents and young adults with cochlear implants. *Journal of Speech, Language, and Hearing Research, 68*(3), 1105-1125. https://doi.org/10.1044/2024_JSLHR-24-00480

15. de Melo, M. E., Soman, U., Voss, J., Valencia, M. F. H., Noll, D., Clark, F., & Löfkvist, U. (2022). Listening and spoken language specialist auditory–verbal certification: Self-perceived benefits and barriers to inform change. *Perspectives of the ASHA Special Interest Groups, 7*(6), 1828-1852.

16. Donaldson, A. I., Heavner, K. S., & Zwolan, T. A. (2004). Measuring progress in children with Autism Spectrum Disorder who have cochlear implants. *Archives of Otolaryngology—Head and Neck Surgery, 130*, 666-671. https://doi.org/10.1001/archotol.130.5.666

17. Eriks-Brophy, A., Ganek, H., & DuBois, G. (2016). Evaluating the research examining outcomes of auditory–verbal therapy: Moving from evidence-based to evidence-informed practice. In W. Estabrooks, H. M. C. Morrison, & K. MacIver-Lux (Eds.), *Auditory–verbal therapy: Science, research, and practice* (pp. 59-144). Plural Publishing.

18. Estabrooks, W., Morrison, H. M., & MacIver-Lux, K. (Eds.). (2020). *Auditory-verbal therapy: Science, research, and practice.* Plural Publishing.

19. Flexer, C., & Wolfe, J. (2020). Auditory brain development and auditory-verbal therapy. In W. Estabrooks, H. Morrison, & K. MacIver-Lux (Eds.), *Auditory-verbal therapy: Science, research, and practice.* Plural Publishing.

20. Fitzpatrick, E., Grandpierre, V., Durieux-Smith, A., Gaboury, I., Coyle, D., Na, E., & Sallam, N. (2016). Children with mild bilateral and unilateral hearing loss: Parents' reflections on experiences and outcomes. *Journal of Deaf Studies and Deaf Education, 21*(1), 34-43. https://doi.org/10.1093/deafed/env047

21. Fulcher, A. N., Purcell, A., Baker, E., & Munro, N. (2015). Factors influencing speech and language outcomes of children with early identified severe/profound hearing loss: Clinician-identified facilitators and barriers. *International Journal of Speech-Language Pathology and Audiology, 17*(3), 325-333.

22. Fulcher, A., Purcell, A., Baker, E., & Munro, N. (2012). Listen up: Children with early identified hearing loss achieve age-appropriate speech/language outcomes by 3 years-of-age. *International Journal of Pediatric Otorhinolaryngology, 76*(12), 1785–1794.

23. Gallaudet Research Institute. (2008). *Regional and national summary report from the 2009-2010 annual survey of deaf and hard of hearing children and youth*. Washington, DC: Gallaudet University.

24. Geers, A. E., Mitchell, C. M., Warner-Czyz, A., Wang, N. Y., & Eisenberg, L. S. (2017). Early sign language exposure and cochlear implantation benefits. *Pediatrics, 140*(1), e20163489. https://doi.org/10.1542/peds.2016-3489

25. Gordon, K. A., & Harrison, R. V. (2005). Hearing research forum: Changes in human central auditory development caused by deafness in early childhood. *Hearsay, 17*, 28-34.

26. Hlady-MacDonald, V. (2012). What does a listening and spoken language professional do that is different from a speech-language pathologist? In W. Estabrooks (Ed.), *101 FAQs about auditory–verbal practice*. Alexander Graham Bell Association for the Deaf and Hard of Hearing.

27. Holt, R., & Kirk, K. (2005). Speech and language development in cognitively delayed children with cochlear implants. *Ear and Hearing, 26*(2), 132–148. https://doi.org/10.1097/00003446-200504000-00003

28. Hyde, M. L. (2005). Newborn hearing screening programs: Overview. *Journal of Otolaryngology, 34*, S70-S78.

29. Joint Committee on Infant Hearing. (2000). Year 2000 position statement: Principles and guidelines for early hearing detection and intervention programs. *Pediatrics, 106*(4), 798–817.

30. Joint Committee on Infant Hearing. (2007). Year 2007 position statement: Principles and guidelines for early hearing detection and intervention programs. *Pediatrics, 120*(4), 898-921.

31. Joint Committee on Infant Hearing. (2013). Supplement to the JCIH 2007 position statement: Principles and guidelines for early intervention after confirmation that a child is deaf or hard of hearing. *Pediatrics, 131*(4), e1324. https://doi.org/10.1542/peds.2013-0008

32. Joint Committee on Infant Hearing. (2019). Year 2019 position statement: Principles and guidelines for early hearing detection and intervention programs. *The Journal of Early Hearing Detection and Intervention, 4*(2), 1–44.

33. Kral, A., Kronenberger, W. G., Pisoni, D. B., & O'Donoghue, G. M. (2016). Neurocognitive factors in sensory restoration of early deafness: A connectome model. *The Lancet Neurology, 15*(6), 610-621. https://doi.org/10.1016/S1474-4422(16)00034-X

34. Kral, A., & Lenarz, T. (2015). How the brain learns to listen: Deafness and the bionic ear. *e-Neuroforum, 21*(1), 21-28. https://doi.org/10.1515/s13295-015-0004-0

35. Levasseur, J. (2001). What does an auditory–verbal therapist do that is different from what a speech-language pathologist does? In W. Estabrooks (Ed.), *Fifty FAQs about auditory–verbal therapy*. Learning to Listen Foundation.

36. Lim, S. R., & MacIver-Lux, K. (2022). The audiologist's starring role in auditory-verbal therapy. *Audiology Today, 34*(1). https://www.audiology.org/news-and-publications/audiology-today/articles/the-audiologists-starring-role-in-auditory-verbal-therapy/

37. Ling, D. (2002). *Speech and the hearing-impaired child: Theory and practice*. Alexander Graham Bell Association for the Deaf and Hard of Hearing.

38. MacIver-Lux, K., Smolen, E. A., Rosenzweig, E. R., & Estabrooks, W. (2020). Strategies for developing listening, talking, and thinking in auditory-verbal therapy. In W. Estabrooks, H. Morrison, & K. MacIver-Lux (Eds.), *Auditory-Verbal Therapy: Science, Research, and Practice*. Plural Publishing.

39. Meinzen-Derr, J., Tabangin, M. E., Altaye, M., Ehrhardt, J., & Wiley, S. (2022). Factors associated with early intervention intensity for children who are deaf or hard of hearing. *Children, 9*(2), 224. https://doi.org/10.3390/children9020224

40. Percy-Smith, L., Tønning, T. L., Josvassen, J. L., Mikkelsen, J. H., Nissen, L., Dieleman, E., Hallstrøm, M., & Cayé-Thomasen, P. (2018). Auditory verbal habilitation is associated with improved outcomes for children with cochlear implants. *Cochlear Implants International, 19*(1), 38–45.

41. Picard, M. (2004). Children with permanent hearing loss and associated disabilities: Revisiting current epidemiological data and causes of deafness. *The Volta Review, 104*(3), 221–236.

42. Pollack, D., Goldberg, D. M., & Caleffe-Schenck, N. (1997). *Educational audiology for the limited-hearing infant and preschooler*. C.C. Thomas.

43. Pyman, B., Blamey, P., Lacy, P., Clark, G., & Dowell, R. (2000). The development of speech perception in children using cochlear implants: Effects of etiologic factors and delayed milestones. *The American Journal of Otology, 21*, 57–61.

44. Sharma, A., Gilley, P. M., Dorman, M. F., & Baldwin, R. (2007). Deprivation-induced cortical reorganization in children with cochlear implants. *International Journal of Audiology, 46*(9), 494-499. https://doi.org/10.1080/14992020701524836

45. Tomblin, J. B., Walker, E. A., McCreery, R. W., Arenas, R. M., Harrison, M., & Moeller, M. P. (2015). Outcomes of children with hearing loss: Data collection and methods. *Ear and Hearing, 36*(Suppl 1), 14S-23S. https://doi.org/10.1097/AUD.0000000000000212

46. Tomblin, J. B., Harrison, M., Ambrose, S. E., Walker, E. A., Oleson, J. J., & Moeller, M. P. (2015). Language outcomes in young children with mild to severe hearing loss. *Ear and Hearing, 36*(Suppl 1), 76S-91S. https://doi.org/10.1097/AUD.0000000000000219

47. Tomblin, J. B., Walker, E. A., McCreery, R. W., Arenas, R. M., Harrison, M., & Moeller, M. P. (2015). Outcomes of children with hearing loss: Data collection and methods. *Ear and Hearing, 36*(Suppl 1), 14S-23S. https://doi.org/10.1097/AUD.0000000000000212

48. Walker, E. A. (2020). Evidence-based practices and outcomes for children with mild and unilateral hearing loss. *Language, Speech, and Hearing Services in Schools, 51*(1), 1-4. https://doi.org/10.1044/2019_LSHSS-19-00073

49. Waltzman, S. B., Scalchunes, V., & Cohen, N. L. (2000). Performance of multiply handicapped children using cochlear implants. *The American Journal of Otology, 21*, 329–335.

50. Wang, J., Sung, V., Carew, P., et al. (2019). Prevalence of childhood hearing loss and secular trends: A systematic review and meta-analysis. *Academic Pediatrics, 19*(5), 504-514.

51. Warner-Czyz, A. D., Loy, G., Pourchot, H., White, T., & Cokely, E. (2018). Effect of hearing loss on peer victimization in school-age children. *Exceptional Children, 84*(3), 280-297. https://doi.org/10.1177/0014402918754881

52. Wass, M., Anmyr, L., Lyxell, B., Karltorp, E., Ostlund, E., & Löfkvist, U. (2025). Longitudinal predictors of reading ability in children with cochlear implants learning to read in Sweden. *Journal of Communication Disorders, 114*.

53. Wiley, S., Gustafson, S., & Rozniak, J. (2014). Needs of parents of children who are deaf/hard of hearing with autism spectrum disorder. *The Journal of Deaf Studies and Deaf Education, 19*(1), 40–49. https://doi.org/10.1093/deafed/ent040

54. Wischmann, S., Samar, C. F., Hestbæk, M. K., Serafin, S., Cayé-Thomasen, P., & Percy-Smith, L. (2025). Quality assurance of a hospital-based auditory verbal intervention for children with hearing loss. *Journal of Clinical Medicine, 14*(4), 1098. https://doi.org/10.3390/jcm14041098

55. Vohr, B. R., Oh, W., Stewart, E. J., Bentkover, J. D., Babbard, S., Lemons, J., et al. (2001). Comparison of costs and referral rates of three universal newborn hearing screening protocols. *The Journal of Pediatrics, 139*(2), 238-244. https://doi.org/10.1067/mpd.2001.116698

56. Yang, H. M., Lin, C. Y., Chen, Y. J., & Wu, J. L. (2004). The auditory performance in children using cochlear implants: Effects of mental function. *International Journal of Pediatric Otorhinolaryngology, 68*, 1185–1188. https://doi.org/10.1016/j.ijporl.2004.03.015