

D. The Relationship of Hearing Loss to Listening and Learning Needs

16-25 dB HEARING LOSS		
Possible Impact on the Understanding of Language and Speech	Possible Social Impact	Potential Educational Accommodations and Services
<ul style="list-style-type: none"> • Impact of a hearing loss that is approximately 20 dB can be compared to ability to hear when index fingers are placed in your ears. • Child may have difficulty hearing faint or distant speech. At 16 dB student can miss up to 10% of speech signal when teacher is at a distance greater than 3 feet. • A 20 dB or greater hearing loss in the better ear can result in absent, inconsistent or distorted parts of speech, especially word endings (s, ed) and unemphasized sounds. • Percent of speech signal missed will be greater whenever there is background noise in the classroom, especially in the elementary grades when instruction is primarily verbal and younger children have greater difficulty listening in noise. • Young children have the tendency to watch and copy the movements of other students rather than attending to auditorily fragmented teacher directions. 	<ul style="list-style-type: none"> • May be unaware of subtle conversational cues which could cause child to be viewed as inappropriate or awkward. • May miss portions of fast-paced peer interactions that could begin to have an impact on socialization and self concept. • Behavior may be confused for immaturity or inattention. • May be more fatigued due to extra effort needed for understanding speech. 	<ul style="list-style-type: none"> • Noise in typical classroom environments impede child from having full access to teacher instruction. Will benefit from improved acoustic treatment of classroom and sound-field amplification. • Favorable seating necessary. • May often have difficulty with sound/letter associations and subtle auditory discrimination skills necessary for reading. • May need attention to vocabulary or speech, especially when there has been a long history of middle ear fluid. • Depending on loss configuration, may benefit from low power hearing aid with personal FM system. • Appropriate medical management necessary for conductive losses. • Inservice on impact of “minimal” 16 – 25 dB hearing loss on language development, listening in noise and learning, required for teacher.

26-40 dB HEARING LOSS		
Possible Impact on the Understanding of Language and Speech	Possible Social Impact	Potential Educational Accommodations and Services
<ul style="list-style-type: none"> • Effect of a hearing loss of approximately 20 dB can be compared to ability to hear when index fingers are placed in ears. • A 26 – 40 dB hearing loss causes greater listening difficulties than a "plugged ear" loss. • Child can "hear" but misses fragments of speech leading to misunderstanding. • Degree of difficulty experienced in school will depend upon noise level in the classroom, distance from the teacher, and configuration of the hearing loss, even with hearing aids. • At 30 dB can miss 25-40% of the speech signal. • At 40 dB may miss 50% of class discussions, especially when voices are faint or speaker is not in line of vision. • Will miss unemphasized words and consonants, especially when a high frequency hearing loss is present. • Often experiences difficulty learning early reading skills such as letter/sound associations. • Child's ability to understand and succeed in the classroom will be substantially diminished by speaker distance and background noise, especially in the elementary grades. 	<ul style="list-style-type: none"> • Barriers begin to build with negative impact on self-esteem as child is accused of "hearing when he/she wants to," "daydreaming," or "not paying attention." • May believe he/she is less capable due to difficulties understanding in class. • Child begins to lose ability for selective listening, and has increasing difficulty suppressing background noise causing the learning environment to be more stressful. • Child is more fatigued due to effort needed to listen. 	<ul style="list-style-type: none"> • Noise in typical class will impede child from full access to teacher instruction. • Will benefit from hearing aid(s) and use of a desk top or ear level FM system in the classroom. • Needs favorable acoustics, seating and lighting. • May need attention to auditory skills, speech, language development, speechreading and/or support in reading and self-esteem. • Amount of attention needed typically related to the degree of success of intervention prior to 6 months of age to prevent language and early learning delays. • Teacher inservice on impact of a 26 – 40 dB hearing loss on listening and learning to convey that it is often greater than expected.

41-55 dB HEARING LOSS

Possible Impact on the Understanding of Language and Speech	Possible Social Impact	Potential Educational Accommodations and Services
<ul style="list-style-type: none"> • Consistent use of amplification and language intervention prior to age 6 months increases the probability that the child's speech, language and learning will develop at a normal rate. • Without amplification, child may understand conversation at a distance of 3-5 feet, if sentence structure and vocabulary are known. • The amount of speech signal missed can be 50% or more with 40 dB loss and 80% or more with 50 dB loss. • Without early amplification the child is likely to have delayed or disordered syntax, limited vocabulary, imperfect speech production and flat voice quality. • Addition of a visual communication system to supplement audition may be indicated, especially if language delays and/or additional disabilities are present. • Even with hearing aids, child can "hear" but may miss much of what is said if classroom is noisy or reverberant. • With personal hearing aids alone, ability to perceive speech and learn effectively in the classroom is at high risk. • A personal FM system to overcome classroom noise and distance is typically necessary. 	<ul style="list-style-type: none"> • Barriers build with negative impact on self-esteem as child is accused of "hearing when he/she wants to," "daydreaming," or "not paying attention." • Communication will be significantly compromised with this degree of hearing loss, if hearing aids are not worn. • Socialization with peers can be difficult, especially in noisy settings such as cooperative learning situations, lunch or recess. • May be more fatigued than classmates due to effort needed to listen. 	<ul style="list-style-type: none"> • Consistent use of amplification (hearing aids + FM) is essential. • Needs favorable classroom acoustics, seating and lighting. • Consultation/program supervision by a specialist in childhood hearing impairment to coordinate services is important. • Depending on early intervention success in preventing language delays, special academic support will be necessary if language and educational delays are present. • Attention to growth of oral communication, reading, written language skills, auditory skill development, speech therapy, self-esteem likely. • Teacher inservice required with attention to communication access and peer acceptance.

56-70 dB HEARING LOSS

Possible Impact on the Understanding of Language and Speech	Possible Social Impact	Potential Educational Accommodations and Services
<ul style="list-style-type: none"> • Even with hearing aids, child will typically be aware of people talking around him/her, but will miss parts of words said resulting in difficulty in situations requiring verbal communication (both one-to-one and in groups). • Without amplification, conversation must be very loud to be understood; a 55 dB loss can cause a child to miss up to 100% of speech information without functioning amplification. • If hearing loss is not identified before age one year and appropriately managed, delayed spoken language, syntax, reduced speech intelligibility and flat voice quality is likely. • Age when first amplified, consistency of hearing aid use and early language intervention strongly tied to success of speech, language and learning development. • Addition of visual communication system often indicated if language delays and/or additional disabilities are present. • Use of a personal FM system will reduce the effects of noise and distance and allow increased auditory access to verbal instruction. • With hearing aids alone, ability to understand in the classroom is greatly reduced by distance and noise. 	<ul style="list-style-type: none"> • If hearing loss was late-identified and language delay was not prevented, communication interaction with peers will be significantly affected. • Children will have greater difficulty socializing, especially in noisy settings such as lunch, cooperative learning situations, or recess. • Tendency for poorer self-concept and social immaturity may contribute to a sense of rejection; peer inservice helpful. 	<ul style="list-style-type: none"> • Full time, consistent use of amplification (hearing aids + FM system) is essential. • May benefit from frequency transposition (frequency compression) hearing aids depending upon loss configuration. • May require intense support in development of auditory, language, speech, reading and writing skills. • Consultation/supervision by a specialist in childhood hearing impairment to coordinate services is important. • Use of sign language or a visual communication system by children with substantial language delays or additional learning needs, may be useful to access linguistically complex instruction. • Note-taking, captioned films, etc. often are needed accommodations. • Teacher inservice required.

71-90 dB & 91+ dB HEARING LOSS

Possible Impact on the Understanding of Language and Speech	Possible Social Impact	Potential Educational Accommodations and Services
<ul style="list-style-type: none"> • The earlier the child wears amplification consistently with concentrated efforts by parents and caregivers to provide rich language opportunities throughout everyday activities and/or provision of intensive language intervention (sign or verbal), the greater the probability that speech, language and learning will develop at a relatively normal rate. • Without amplification, children with 71-90 dB hearing loss may only hear loud noises about one foot from ear. • When amplified optimally, children with hearing ability of 90 dB or better should detect many sounds of speech if presented from close distance or via FM. • Individual ability and intensive intervention prior to 6 months of age will determine the degree that sounds detected will be discriminated and understood by the brain into meaningful input. • Even with hearing aids children with 71-90 dB loss are typically unable to perceive all high pitch speech sounds sufficiently to discriminate them, especially without the use of FM. • The child with hearing loss greater than 70 dB may be a candidate for cochlear implant(s) and the child with hearing loss greater than 90 dB will not be able to perceive most speech sounds with traditional hearing aids. • For full access to language to be available visually through sign language or cued speech, family members must be involved in child's communication mode from a very young age. 	<ul style="list-style-type: none"> • Depending on success of intervention in infancy to address language development, the child's communication may be minimally or significantly affected. • Socialization with hearing peers may be difficult. • Children in general education classrooms may develop greater dependence on adults due to difficulty perceiving or comprehending oral communication. • Children may be more comfortable interacting with deaf or hard of hearing peers due to ease of communication. • Relationships with peers and adults who have hearing loss can make positive contributions toward the development of a healthy self-concept and a sense of cultural identity. 	<ul style="list-style-type: none"> • There is no one communication system that is right for all hard of hearing or deaf children and their families. • Whether a visual communication approach or auditory/oral approach is used, extensive language intervention, full-time consistent amplification use and constant integration of the communication practices into the family by 6 months of age will highly increase the probability that the child will become a successful learner. • Children with late-identified hearing loss (i.e., after 6 months of age) will have delayed language. • This language gap is difficult to overcome and the educational program of a child with hearing loss, especially those with language and learning delays secondary to hearing loss, requires the involvement of a consultant or teacher with expertise in teaching children with hearing loss. • Depending on the configuration of the hearing loss and individual speech perception ability, frequency transposition aids (frequency compression) or cochlear implantation may be options for better access to speech. • If an auditory/oral approach is used, early training is needed on auditory skills, spoken language, concept development and speech. • If culturally deaf emphasis is selected, frequent exposure to Deaf, ASL users is important. • Educational placement with other signing deaf or hard of hearing students (special school or classes) may be a more appropriate option to access a language-rich environment and free-flowing communication. • Support services and continual appraisal of access to communication and verbal instruction is required. • Note-taking, captioning, captioned films and other visual enhancement strategies are necessary; training in pragmatic language use and communication repair strategies helpful. • Inservice of general education teachers is essential.

UNILATERAL HEARING LOSS

Possible Impact on the Understanding of Language and Speech	Possible Social Impact	Potential Educational Accommodations and Services
<ul style="list-style-type: none"> • Child can "hear" but can have difficulty understanding in certain situations, such as hearing faint or distant speech, especially if poor ear is aimed toward the person speaking. • Will typically have difficulty localizing sounds and voices using hearing alone. • The unilateral listener will have greater difficulty understanding speech when environment is noisy and/or reverberant, especially when normal ear is towards the overhead projector or other competing sound source and poor hearing ear is towards the teacher. • Exhibits difficulty detecting or understanding soft speech from the side of the poor hearing ear, especially in a group discussion. 	<ul style="list-style-type: none"> • Child may be accused of selective hearing due to discrepancies in speech understanding in quiet versus noise. • Social problems may arise as child experiences difficulty understanding in noisy cooperative learning, or recess situations. • May misconstrue peer conversations and feel rejected or ridiculed. • Child may be more fatigued in classroom due to greater effort needed to listen, if class is noisy or has poor acoustics. • May appear inattentive, distractible or frustrated, with behavior or social problems sometimes evident. 	<ul style="list-style-type: none"> • Allow child to change seat locations to direct the normal hearing ear toward the primary speaker. • Student is at 10 times the risk for educational difficulties as children with 2 normal hearing ears and 1/3 to 1/2 of students with unilateral hearing loss experience significant learning problems. • Children often have difficulty learning sound/letter associations in typically noisy kindergarten and grade 1 settings. • Educational and audiological monitoring is warranted. • Teacher inservice is beneficial. • Typically will benefit from a personal FM system with low gain/power or a sound-field FM system in the classroom, especially in the lower grades. • Depending on the hearing loss, may benefit from a hearing aid in the impaired ear.

MID-FREQUENCY HEARING LOSS or REVERSE SLOPE HEARING LOSS

MID-FREQUENCY HEARING LOSS or REVERSE SLOPE

Possible Impact on the Understanding of Language and Speech	Possible Social Impact	Potential Educational Accommodations and Services
<ul style="list-style-type: none"> • Child can "hear" whenever speech is present but will have difficulty understanding in certain situations. • May have difficulty understanding faint or distant speech, such as a student with a quiet voice speaking from across the classroom. • The "cookie bite" or reverse slope listener will have greater difficulty understanding speech when environment is noisy and/or reverberant, such as a typical classroom setting. • A 25 – 40 dB degree of loss in the low to mid-frequency range may cause the child to miss approximately 30% of speech information, if unamplified; some consonant and vowel sounds may be heard inconsistently, especially when background noise is present. • Speech production of these sounds may be affected. 	<ul style="list-style-type: none"> • Child may be accused of selective hearing or "hearing when he wants to" due to discrepancies in speech understanding in quiet versus noise. • Social problems may arise as child experiences difficulty understanding in noisy cooperative learning situations, lunch or recess. • May misconstrue peer conversations, believing that other children are talking about him or her. • Child may be more fatigued in classroom setting due to greater effort needed to listen. • May appear inattentive, distractible or frustrated. 	<ul style="list-style-type: none"> • Personal hearing aids important but must be precisely fit to hearing loss. • Child likely to benefit from a sound-field FM system, a personal FM system or assistive listening device in the classroom. • Student is at risk for educational difficulties. • Can experience some difficulty learning sound/letter associations in kindergarten and 1st grade classes. • Depending upon degree and configuration of loss, child may experience delayed language development and articulation problems. • Educational monitoring and teacher inservice warranted. • Annual hearing evaluation to monitor for hearing loss progression is important.

HIGH FREQUENCY HEARING LOSS

Possible Impact on the Understanding of Language and Speech	Possible Social Impact	Potential Educational Accommodations and Services
<ul style="list-style-type: none"> • Child can "hear" but can miss important fragments of speech. • Even a 26 – 40 dB loss in high frequency hearing may cause the child to miss 20%-30% of vital speech information if unamplified. • Consonant sounds t, s, f, th, k, sh, ch likely heard inconsistently, especially in the presence of noise. • May have difficulty understanding faint or distant speech, such as a student with a quiet voice speaking from across the classroom and will have much greater difficulty understanding speech when in low background noise and/or reverberation is present. • Many of the critical sounds for understanding speech are high pitched, quiet sounds, making them difficult to perceive; the words: cat, cap, calf, cast could be perceived as "ca," word endings, possessives, plurals and unstressed brief words are difficult to perceive and understand. • Speech production may be affected. • Use of amplification often indicated to learn language at a typical rate and ease learning. 	<ul style="list-style-type: none"> • May be accused of selective hearing due to discrepancies in speech understanding in quiet versus noise. • Social problems may arise as child experiences difficulty understanding in noisy cooperative learning situations, lunch or recess. • May misinterpret peer conversations. • Child may be fatigued in classroom due to greater listening effort. • May appear inattentive, distractible or frustrated. • Could affect self concept. 	<ul style="list-style-type: none"> • Student is at risk for educational difficulties. • Depending upon onset, degree and configuration of loss, child may experience delayed language and syntax development and articulation problems. • Possible difficulty learning some sound/letter associations in kindergarten and 1st grade classes. • Early evaluation of speech and language skills is suggested. • Educational monitoring and teacher inservice is warranted. • Will typically benefit from personal hearing aids and use of a sound-field or a personal FM system in the classroom. • Use of ear protection in noisy situations is imperative to prevent damage to inner ear structures and resulting progression of the hearing loss.

FLUCTUATING HEARING LOSS

Possible Impact on the Understanding of Language and Speech	Possible Social Impact	Potential Educational Accommodations and Services
<ul style="list-style-type: none"> • Of greatest concern are children who have experienced hearing fluctuations over many months in early childhood (multiple episodes with fluid lasting three months or longer). • Listening with a hearing loss that is approximately 20 dB can be compared to hearing when index fingers are placed in ears. • This loss or worse is typical of listening with fluid or infection behind the eardrums. • Child can "hear" but misses fragments of what is said. Degree of difficulty experienced in school will depend upon the classroom noise level, the distance from the teacher and the current degree of hearing loss. • At 30 dB can miss 25-40% of the speech signal. • A child with a 40 dB loss associated with "glue ear" may miss 50% of class discussions, especially when voices are faint or speaker is not in line of vision. • Child with this degree of hearing loss will frequently miss unstressed words, consonants and word endings. 	<ul style="list-style-type: none"> • Barriers begin to build with negative impact on self esteem as the child is accused of "hearing when he/she wants to," "daydreaming," or "not paying attention." • Child may believe he/she is less capable due to understanding difficulties in class. • Typically poor at identifying changes in own hearing ability. With inconsistent hearing, the child learns to "tune out" the speech signal. • Children are judged to have greater attention problems, insecurity, distractibility and lack self esteem. • Tend to be non-participative and distract themselves from classroom tasks; often socially immature. 	<ul style="list-style-type: none"> • Impact is primarily on acquisition of early reading skills and attention in class. • Screening for language delays is suggested from a young age. • Ongoing monitoring for hearing loss in school, communication between parent and teacher about listening difficulties and aggressive medical management is needed. • Will benefit from sound-field FM or an assistive listening device in class. • May need attention to development of speech, reading, self esteem, or listening skills. • Teacher inservice is beneficial.