

### Hearing Impairment

In the United States, approximately 17% of adults experience some degree of hearing impairment. Hearing loss is correlated with age; 40-50% of those over 75 report some degree of hearing impairment (National Institute on Deafness and Other Communication Disorders (NIDCD), 2008a). In 2003, 79,522 school-aged children received special education services as a result of hearing impairment. This represented 1.3% of all children with disabilities served during that year (American Speech-Language-Hearing Association (ASHA), 2008a). Of all children born in the United States, 2 to 3 per every 1,000 will be either deaf or hard-of-hearing (NIDCD, 2008a).

Hearing loss is typically defined by the *type*, *degree*, and *configuration* of the loss. There are three types of hearing loss.

#### Types of Hearing Loss

##### Conductive

- sound moves inappropriately from the outer ear to the middle ear
- often possible to medically or surgically correct

##### Sensorineural

- damage prevents the appropriate movement of sound from the inner ear and/or the nerve pathways to the brain
- permanent, uncorrectable condition

##### Mixed

- some combination of conductive and sensorineural loss

(ASHA, 2008d)

#### Degrees of Hearing Loss

Degree of loss	Sounds audible without amplification	Degree of Disability (if not treated in first year of life)
<i>Slight hearing loss</i> (15 - 25db)	Vowel sounds heard clearly; may miss unvoiced consonant sounds	Mild auditory dysfunction in language learning
<i>Mild hearing loss</i> (25 - 40db)	Hears only some louder-voiced speech sounds	Auditory learning dysfunction, mild language retardation, mild speech problems, inattention
<i>Moderate hearing loss</i> (40 - 65db)	Misses most speech sounds at normal conversation levels	Speech problems, language retardation, learning dysfunction, inattention
<i>Severe hearing loss</i> (65 - 95db)	Hears no speech sounds of normal conversation	Severe speech problems, language retardation, learning dysfunction, inattention
<i>Profound hearing loss</i> (95db +)	Hears no speech or other sounds	Severe speech problems, language retardation, learning dysfunction, inattention

(Help Kids Hear.org, n.d.)

The configuration of hearing loss has to do with whether the loss occurs bilaterally (in both ears), unilaterally (in one ear), whether it is symmetrical (equal hearing in both ears), or asymmetrical (varied levels of hearing in both ears), and whether or not the loss is progressive, sudden, fluctuating, or stable (ASHA, 2008d).

Hearing loss occurs due to a variety of conditions and circumstances. Half of the cases of childhood hearing loss are thought to be based on genetic conditions (ASHA, 2008a). It is also estimated that 15% of American adults endure varying degrees of permanent hearing loss due to exposure to high decibels of sound at work or leisure (NIDCD, 2008). Some of the more common medical conditions that result in auditory damage are described below.

- Acoustic neuroma – tumor affecting the internal auditory nerve
  - Ototoxicity- drug induced hearing loss
  - Meniere’s Disease- affects the inner ear
  - Otitis Media- infection of the middle ear
  - Otosclerosis – abnormal bone growth that invades the inner ear
  - Presbycusis- loss of hearing due to aging
  - Tinnitus – ringing, roaring, or hissing in the ears
- (ASHA, 2008b)

### **Communication Disorders**

Difficulties with communication occur not only in those with hearing impairment, but also occur due to speech, voice, and/or language disorders. These disorders vary from mild sound substitutions to the complete inability to utilize or understand language. A variety of sources lead to communication disorders, including hearing loss, neurological disorders, traumatic brain injuries, intellectual disabilities, physical impairments (such as cleft lip or palate), drug abuse, and improper vocal use (National Dissemination Center for Children with Disabilities (NICHD), 2004). In 2003, more than 1 million children in the United States received services under the Individuals with Disabilities Education Act (IDEA) for speech and language disorders. This represented 24.1% of total services provided by IDEA (ASHA, 2008a). The different ways to classify communication disorders, including speech, voice, and language, are described in greater detail below.

#### ***Speech***

Speech disorders are diagnosed when a person exhibits abnormal articulation, fluency, or speech sounds. These disorders are typically

distinguished by the type of speech problem exhibited, some of which are described below.

#### ***Articulation***

Articulation disorders, also known as phonological disorders, occur when a person omits, distorts, or substitutes specific speech sounds. These disorders appear in conjunction with physical structural abnormalities (with the tongue or roof of the mouth, for example), neurological problems (often referred to as dysarthria), but also occur due to unknown causes. Approximately 7-8% of children from the age of 3 to 11 are diagnosed with articulation disorders and males are affected two to four times more often than their female peers (Encyclopedia of Mental Disorders, 2007). In 2006, 91% of school speech-language pathologists treated children with articulation disorders (ASHA, 2008a). Three-quarters of children with mild to moderate forms of these disorders recover spontaneously and completely as they mature, often before the age of six (Encyclopedia of Mental Disorders, 2007).

#### ***Fluency***

Fluency disorders are diagnosed when there is an interrupted flow in rate, rhythm, and/or repetition while speaking (ASHA, 2008c). The most common fluency disorder is stuttering, affecting approximately 1% of the population (ASHA, 2008c), though that rate increases to 4-5% in children. In 2006, a survey of speech-language pathologists found that 69% treated children with fluency disorders (ASHA, 2008a).

#### ***Motor***

Motor speech disorders occur because of damage to the central or peripheral nervous system and are most common in the elderly. Three diseases likely to lead to motor speech disorders include Parkinson’s Disease (occurs in 0.3% of the population, but increases to 1% in those over 60 years old), Huntington’s Disease (occurs in 5 out of 100,000 people), and Amyotrophic Lateral Sclerosis (ALS) (occurs in 0.5 to 3 in 100,000 people) (ASHA, 2008c).

#### ***Voice***

Voice disorders occur when people have abnormal vocal quality, pitch, loudness, resonance, and duration compared to what is

considered normal for the person's age and sex (AHSA, 2008c). Approximately 7.5 million Americans experience difficulty using their voices normally. Hoarseness, spasmodic dysphonia (spasms in the larynx or voice box), laryngeal papillomatosis (tumors in the larynx and/or voice box), and cleft palate are examples of vocal disorders or conditions that lead to voice disorders (NIDCD, 2008b). The lifetime prevalence of experiencing a voice disorder is 30% (AHSA, 2008c). In 2006, 29% of speech-language pathologists treated children with voice disorders (ASHA, 2008a).

### **Language**

Language disorders involve an impairment related to the comprehension of spoken, written, and/or symbol systems (ASHA, 2008c).

Approximately 6 to 8 million Americans face some degree of language impairment (NIDCD, 2008b). Aphasia, the partial or complete impairment of language due to brain damage, is one of the most common language disorders. Typically caused by stroke, aphasia affects 80,000 people in the United States each year (AHSA, 2008c). Autism, hearing loss, and other developmental disabilities can also result in language disorders. A Specific Language Impairment (SLI) is diagnosed when a child's language skills are at least 12 months behind their chronological age, which occurs in 7% of children. In 2006, 61% of speech-language pathologists treated children with a SLI (AHSA, 2008a).

### **Texas' Early Hearing Detection Services**

The Texas Early Hearing Detection and Intervention (TEHDI) Program was established as Texas' universal newborn hearing screening, tracking, and intervention program. Supervised by the Texas Department of State Health Services, the House Bill 714 was passed in 1999 and is being implemented in over 196 birth facilities. HB 714 requires that these birth facilities offer newborn hearing screening (NBHS) to all families of newborns during the birth admission (Texas Department of State Health Services [DSHS], 2007). Facilities that are legislatively mandated to offer NBHS are:

- Hospitals licensed under Chapter 241 that offer obstetrical services and are located in

counties with populations greater than 50,000, and

- Birthing Centers licensed under Chapter 244 that are located in counties with populations greater than 50,000 and that have 100 or more births per year.
- Facilities certified by the Department of State Health Services that maintain Health Safety Codes, Texas Administrative Codes, and keep up performance standards for the NBHS programs (DSHS, 2007).
- Rural hospitals operating in counties with a population of 50,000 or less. This is the only exemption to the certification requirements.

If a hospital does not offer the TEHDI program, it is required to refer the parents to another facility that does offer the program. In 2004, 41 rural birth facilities still did not offer the TEHDI program. Infants that do not pass the initial screening are referred to out-patient follow-up facilities, yet Texas still has no law to enforce reporting from the follow-up screenings. DSHS faces the challenge of not receiving data for the infants that needed follow-up exams. In 2005, DSHS lacked outpatient information on 46% of babies (DSHS, 2007).

### **Helping those with hearing impairment and communication disorders**

There are a variety of resources for those in Texas who are dealing with hearing loss, deafness, and communication disorders. The state agency serving those who are deaf or hard of hearing is the Texas Department of Assistive and Rehabilitative Services (DARS) Office for Deaf and Hard of Hearing Services (DHHS) (Texas Connect, n.d.).

Three schools in Texas provide an education for young people with hearing impairment:

1. The *Texas School for the Deaf*, a public day and residential school for students in preschool through 12<sup>th</sup> grade, is located in Austin. This school offers a free education that boasts small class sizes, American Sign Language and spoken language options, as well as visual access to all class materials. Its curriculum includes all academic subjects in addition to physical education, health,

technology, career development, and work-based learning courses (Texas School for the Deaf, n.d.).

2. The *Jean Massieu Academy* in Arlington serves children in preschool through 12<sup>th</sup> grade with hearing loss and deafness as well as their non-deaf siblings. This school functions as a charter school and does not charge tuition. All instruction at this school is provided using American Sign Language (Jean Massieu Academy, 2006).
3. The *Sunshine Cottage School for Deaf Children* in San Antonio offers early childhood and elementary level programs, as well as a parent-infant program. It charges tuition, but also provides scholarships and tuition assistance. This program teaches natural communication and speech techniques and does not include sign language in its curriculum. Sunshine Cottage also provides a full range of services, some of which are available to the general public, including Audiology, Speech Pathology, and Counseling. The Newborn Hearing and Evaluation Center provides diagnostic testing for newborns (Sunshine Cottage School for Deaf Children, n.d.).

There are also several non-profit agencies throughout the state that deal specifically with hearing impairment and/or communication disorders. The Callier Center, a non-profit agency based in Dallas, provides “clinical services to the community; educational programs to children with hearing impairments; basic and applied research in communication disorders; and university training for undergraduate, master’s level, and doctoral students” (The University of Texas at Dallas Callier Center, n.d.). Other non-profit agencies in Texas that serve those with hearing impairment or communication disorders include the HEAR ME Foundation, the Texas Association of the Deaf, the Texas Chapter of the Alexander Graham Bell Association, Texas Hands & Voices, and Texas Parent to Parent (Texas Connect, n.d.).

There are several camps that provide programs for children who are deaf or hard of hearing:

- *Camp SIGN*, located near Houston, offers a week long outdoor program for children between 8 and 17 with hearing impairments.
- *Camp Summit* near Dallas offers ten week-long outdoor programs for people ranging from 6 years old to adults with a variety of disabilities, including hearing impairment.
- *The Texas Lions Camp* in Kerrville offers similar one-week programs for children with various disabilities, cancer, and diabetes.
- Sponsored by the Callier Center in Dallas, a *cochlear implant summer listening camp* is held for a week each summer for children from 3-11.
- *The HEAR ME foundation*, based in Kingwood, provides weekend retreats for children with hearing related disabilities along with their families.
- *The Texas School for the Deaf* offers a wide variety of summer programs, some of which include sign language courses, family retreats, and driver’s education courses (Texas Connect, n.d.).

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