

## Facts on Hearing Loss

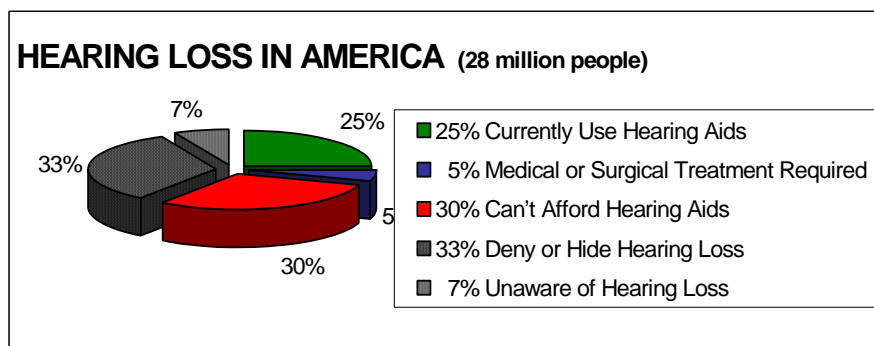
The purpose of this paper is to provide policy makers, government officials, third party payers and consumers facts on hearing loss in the United States.

### Types of Hearing Loss

- Sensorineural hearing loss (or nerve-related deafness) involves damage to the inner ear caused by aging, pre-natal and birth-related problems, viral and bacterial infections, heredity, trauma, and exposure to loud noise, fluid backup, or a benign tumor in the inner ear. Almost all sensorineural hearing loss can be effectively treated with hearing aids.
- Conductive hearing loss involves the outer and middle ear that may be caused by blockage of wax, punctured eardrum, birth defects, ear infection, or heredity, and often can be effectively treated medically or surgically.
- Mixed hearing loss refers to a combination of conductive and sensorineural loss and means that a problem occurs in both the outer or middle and the inner ear.
- Central hearing loss results from damage or impairment to the nerves or nuclei of the central nervous system, either in the pathways to the brain or in the brain itself.

### Facts on Hearing Loss in Adults

- One in every ten (28 million) Americans has hearing loss. As baby boomers reach retirement age starting in 2010, this number is expected to rapidly climb and nearly double by the year 2030.
- The prevalence of hearing loss increases with age, up to 1 in 3 over age 65. Most hearing losses develop over a period of 25 to 30 years.
- Among seniors, hearing loss is the third most prevalent, but treatable disabling condition, behind arthritis and hypertension.
- While the vast majority of Americans (95%) with hearing loss could be successfully treated with hearing aids, only 25 % (6.35 million individuals) currently use them. Only 5% of hearing loss in adults can be improved through medical or surgical treatment.



Graph taken from  
National Center on Hearing Assessment and Management.  
<http://www.infanthearing.org/research/summary/prevalence.html>.

## **Facts on Hearing Loss in Children**

- Everyday in the United States, approximately 1 in 1,000 newborns (or 33 babies every day) is born profoundly deaf with another 2-3 out of 1,000 babies born with partial hearing loss, making hearing loss the number one birth defect in America.<sup>1</sup>
- Newborn hearing loss is 20 times more prevalent than phenylketonuria (PKU), a condition for which all newborns are currently screened.<sup>2</sup>
- Of the 12,000 babies in the United States born annually with some form of hearing loss, only half exhibit a risk factor – meaning that if only high-risk infants are screened, half of the infants with some form of hearing loss will not be tested and identified.<sup>3</sup> In actual implementation, risk-based newborn hearing screening programs identify only 10-20% of infants with hearing loss.<sup>4</sup> When hearing loss is detected beyond the first few months of life, the most critical time for stimulating the auditory pathways to hearing centers of the brain may be lost, significantly delaying speech and language development.
- Only 69% of babies are now screened for hearing loss before 1 month of age (up from only 22% in 1998). Of the babies screened, only 56% who needed diagnostic evaluations actually received them by 3 months of age. Moreover, only 53% of those diagnosed with hearing loss were enrolled in early intervention programs by 6 months of age.<sup>5</sup> As a result, these children tend to later re-emerge in our schools' special education (IDEA, Part B) programs.
- When children are not identified and do not receive early intervention, special education for a child with hearing loss costs schools an additional \$420,000, and has a lifetime cost of approximately \$1 million per individual.<sup>6</sup>

### **Early Hearing Detection & Intervention (EHDI) Recommendations**

- The Joint Committee on Infant Hearing<sup>7</sup> and U.S. Public Health Service's Healthy People 2010 health objectives<sup>8</sup> recommend that all newborns be screened for hearing loss by 1 month of age, have diagnostic follow-up by 3 months, and receive appropriate intervention services by 6 months of age.
- A National Institutes of Health (NIH) Consensus Panel in 1993 recommended hearing screening of all newborns. The consensus report concluded that the best opportunity for achieving this goal is provided by the development of hearing screening programs for newborns in hospital nurseries or in birthing centers, prior to discharge.<sup>9</sup>
- The U.S. Preventive Services Task Force in 2001 concluded that universal newborn hearing screening does lead to earlier identification and treatment. However, there were not enough clinical studies of sufficient size and strength to evaluate long-term outcomes. While the preponderance of anecdotal evidence and clinical research indicates that EHDI provides substantial benefit, additional clinical outcome studies and clinical trials are needed.<sup>10</sup>

## **Methods and Costs for Newborn Hearing Screening**

- Advances in technology for newborn hearing screening at most birthing hospitals have allowed for cost containment, with current charges ranging from \$25 to \$60. The cost of identifying a newborn with hearing loss is less than one-tenth the cost of identifying newborns with PKU, hypothyroidism, or sickle cell anemia, which are screened for in nearly every state.<sup>11</sup>
- Currently, two types of electrophysiologic procedures are used to screen newborns singly or in combination:

**Auditory brainstem responses (ABR)** are measured by placing sensors on the baby's head. Sound is then introduced to the baby's ears through tiny earphones while the child sleeps. A computer allows brainwave activity to be recorded to indicate whether the ear and auditory brainstem pathway are responding to sound. This test is painless and takes only about 5 minutes.

**Otoacoustic emissions (OAE)** are faint sounds produced by most normal inner ears. The sounds cannot be heard by people, but can be detected by very sensitive microphones that are placed in the ear canal. During testing, a tiny flexible plug is inserted into the baby's ear and sound is then projected into the ear through the plug. A microphone inside the plug records the otoacoustic emissions that the normal ear produces in response to the incoming sound. Testing is also painless, takes about 5 minutes to complete, and can be done while the baby sleeps.

These measures are changing and advancing with new technologies.

## **Benefits of Early Hearing Detection and Intervention (EHDI)**

- Infants identified with hearing loss can be fit with amplification by as young as 4 weeks of age. With appropriate early intervention, children with hearing loss can be mainstreamed in regular elementary and secondary education classrooms.<sup>12</sup> Recent research has concluded that children born with a hearing loss who are identified and given appropriate intervention before 6 months of age demonstrated significantly better speech and reading comprehension than children identified after 6 months of age.<sup>13 14</sup>
- Even mild hearing loss can significantly interfere with the reception of spoken language and education performance. Research indicates that children with unilateral hearing loss (in one ear) are ten times as likely to be held back at least one grade compared to children with normal hearing.<sup>15 16 17</sup> Similar academic achievement lags have been reported for children with even slight hearing loss.<sup>18</sup> Children with mild hearing loss miss 25-50% of speech in the classroom and may be inappropriately labeled as having a behavior problem.<sup>19</sup>
- Recent clinical studies indicate that early detection of hearing loss followed with appropriate intervention minimizes the need for extensive habilitation during the school years and therefore reduces the burden on the IDEA Part B program.<sup>20 21</sup> In contrast, a 30-year Gallaudet study revealed that half of the children with hearing loss graduate from high school with a 4<sup>th</sup> grade reading level or less.<sup>22</sup>

## Facts on Hearing Aids

- The hearing aid fitting process typically consists of six stages: assessment, treatment planning, selection, verification, orientation, and validation. The widespread use of computers has made the process of fitting hearing aids more accurate and efficient.
- Over 60% of individuals with hearing loss are fit with two hearing aids (binaural). The benefits of wearing two hearing aids are enhanced ability to (a) hear better in the presence of background noise, (b) determine where sound is coming from, and (c) hear soft sounds at lower levels.
- One state-commissioned study published in 2000 has put the average cost for requiring hearing aid coverage by all insurers, non-profit health plans and health maintenance organizations (HMOs) every 3 years at \$16. This is based on a \$1,400 contribution per hearing aid (beneficiaries wanting more expensive hearing aids would pay the difference), excluding the cost of batteries and maintenance that is estimated at about \$300 per year.<sup>23</sup>
- Hearing aids differ in design, type of circuitry, size, and amount of amplification, but they do have similar components that include a microphone, amplifier circuitry (to make the sound louder), a receiver (to deliver the amplified sound into the ear); and batteries to power the electronic parts.
- Approximately 30% of hearing aids in use today are equipped with a telecoil. This is an optional feature that couples directly with hearing aid compatible telephones and assistive listening devices, improving intelligibility in noisy situations, poor acoustical environments, and at long distances from the speaker.
- There are over 1,000 types and models of hearing aids to satisfy an individual's hearing loss needs.

Models of hearing aids include:

- Completely-in-the canal (CIC) – the smallest model for mild to moderate hearing loss.
- In-the-canal (ITC) – not as small as CIC, but slightly better power.
- In-the-ear (ITE) – larger than ITC, enough power to benefit a wide range of hearing losses and enough room for some special circuitry.
- Behind-the-ear (BTE) – offers special programming, special coupling ability to other devices, special circuitry, and power.
- Body – housed in a special case that can be carried in a pocket providing the most power for the most severe hearing losses.

Hearing aids vary in terms of the technology that is enclosed in the casing (described above). Types of hearing aids include: conventional analog hearing aids, analog programmable hearing aids, and digital processing hearing aids. Lower end technology allows limited flexibility in programming the hearing aid for the individual's hearing loss characteristics and environmental characteristics. Mid level technology allows greater flexibility in meeting individual needs and can produce a hearing aid that is fully automatic. This level of technology may include noise reduction which may make listeners more comfortable in noisy backgrounds. The highest level of technology can be completely automatic or user controlled. This level of technology provides the greatest flexibility and many custom features are available to meet the individual listener's needs.

## **Facts on Cochlear Implants**

- Approximately 70,000 people worldwide have cochlear implants.<sup>24</sup>
- Approximately 25,000 people in the United States have cochlear implants.<sup>25</sup>
- Nearly half of all cochlear implant recipients are children.<sup>26</sup>
- Cochlear implants can help an estimated 200,000 children in the United States who do not benefit from hearing aids.<sup>27</sup>
- The demand for cochlear implants is increasing annually by 20%.<sup>28</sup>
- Approximately 250 hospitals across the country perform cochlear implant procedures.<sup>29</sup>
- A recent study on cochlear implants demonstrated that special education in elementary school is less necessary when children have had "greater than two years of implant experience" before starting school. These children are mainstreamed at twice the rate or more of age-matched children with profound hearing loss who do not have implants.<sup>30</sup>
- The benefits of a cochlear implant to society amount to a lifetime savings of \$53,198 per child.<sup>31</sup>
- By the time a child with hearing loss graduates from high school, as much as \$420,000 can be saved in special education costs if the child is identified and given appropriate early intervention.<sup>32</sup>

## **Facts on Assistive Listening Devices (ALDs)**

- ALDs are "binoculars for the ears" and may benefit many people with residual hearing. They are intended to augment standard public address and audio systems by providing signals that can be received directly by persons with special receivers or their own hearing aids.
- A minority of hearing aid owners concurrently use ALDs. About 1 in 4 consumers use a phone amplifier, while less than 10% of hearing instrument owners are users of ALD devices for enhancing their hearing with TV, at movies, in places of worship, or in conferring.<sup>33</sup>
- ALDs "stretch" the performance of a hearing aid by increasing the signal to noise ratio (SNR). This is significant as SNR has to be higher for many people with hearing loss for them to hear speech over background noise
- ALDs reduce the effect of distance between the person with hearing loss and the sound source; override poor acoustics; and minimize background noise.
- There are hard-wired ALDs and three types of wireless ALDs (audioloop, FM, and Infrared). All three types can be used with or without hearing aids, and can be used with an array of receiver attachments for consumers with varying needs and preferences. This includes neck loops, silhouette inductors, headphones, direct audio input and other linkages. Hard-wired ALDs include hand-held amplifiers with microphones, direct audio input microphones, and hard-wired systems.

- Another category of assistive listening devices are the self-contained beam-forming microphone arrays. Some may connect with hearing devices via the telecoil or direct audio input.
- Each type of ALD has advantages and disadvantages. The type of ALD appropriate for a particular application depends on the characteristics of the setting, the nature of the program, and the intended audience.
- ALDs may be installed in large areas, portable for personal use, or in the case of FM systems, built into a hearing aid.
- ALDs are an example of auxiliary aids and services and reasonable accommodations required by the Americans with Disabilities act (ADA ) to be provided by public facilities, state and local governments, and employers, to enable people with hearing loss to participate in their programs and services.
- ALDs typically have not been covered by any public or private health insurance plans, and are not available in mainstream retail outlets. Most ALDs must be purchased through catalogs of ALD distributors or from some hearing health professionals. Access, availability and therefore awareness of ALDs by consumers is a limiting factor to their acceptance and use.
- Other assistive technology that can benefit people with hearing loss include alerting devices, such as special smoke detectors, doorbells, telephone ring signalers, telephones, and alarm clocks. These may produce loud signals, visual signals, or tactile signals. Captioning and CART (Computer Assisted Realtime Transcription) also provide great benefit.

**For More Information Contact:**

Alexander Graham Bell  
Association for the Deaf and Hard of Hearing  
Contact Person: Michele Duchin  
Tel: 202-337-5220  
Web Site: [www.agbell.org](http://www.agbell.org)

American Academy of Audiology  
Contact Person: Jodi Chappell, Director of Health Care Policy  
Tel: 703-790-8466  
Web Site: [www.audiology.org](http://www.audiology.org)

American Speech Language Hearing Association  
Contact Person: Jim Potter, Director of Government Relations and Public Policy  
Tel: 301-897-5700  
Web Site: [www.asha.org](http://www.asha.org)

Deafness Research Foundation  
Contact Person: Susan Greco, Executive Director  
Tel: 202-289-5850  
Web Site: [www.hearinghealth.net](http://www.hearinghealth.net) and [www.hearinghealthmagazine.com](http://www.hearinghealthmagazine.com)

Hearing Industries Association  
Contact Person: Carole Rogin, Executive Director  
Tel: 703-684-5744  
Web Site: [www.hearing.org](http://www.hearing.org)

Self Help for Hard of Hearing People  
Contact Person: Brenda Battat, Director of Public Policy and State Development  
Tel: 301-657-2248 (V) 2249 (TTY)  
Web Site: [www.hearingloss.org](http://www.hearingloss.org)

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