National Institutes of Health

Fact Sheet *Newborn Hearing Screening*

Two to three of every 1,000 children in the United States are born deaf or hard-of-hearing, and more lose their hearing later during childhood.

NIH-supported research suggests that the most intensive period of speech and language development is during the first three years of life — a period when a child's brain is developing and maturing. If a child is not exposed to language during this period due to hearing loss, he or she will have more difficulty developing spoken or signed language, and reading skills. In addition, during the early stages of life, the brain builds the nerve pathways necessary for understanding auditory information. For these reasons, identifying hearing loss as early as possible, by the time a child reaches three months of age, enables pursuing treatment options early so that a child can learn to communicate comparably with his or her hearing peers.

Fifteen Years Ago

- Generally, only babies born with conditions that put them at high risk for hearing loss, such as low birth weight, were screened. This translated to roughly 50 percent of newborns with hearing loss – or 6000 babies – being sent home each year with undetected hearing loss.
- On average, hearing-impaired children were first identified when they were 2 1/2 to 3 years old. Many were not identified until they reached 5 or 6 years of age, long after the critical period for speech and language development had ended.
- Children with hearing loss often fell behind their peers in language, cognitive, and social skills.
- Hearing loss in infancy or childhood often resulted in difficulties later in life, including problems with listening and speaking skills, literacy skills, academic performance, and long-term job opportunities.
- In 1993, NIH held a Consensus Development Conference that, in a landmark move, endorsed the screening of all newborns for hearing loss before the child leaves the hospital. As a result of this recommendation, an unprecedented state-by-state effort was initiated to promote the mandatory screening of newborns. Bolstering this effort was Congress's passage of the Newborn and Infant Hearing Screening and Intervention Act of 1999, which helps in the coordination and funding of statewide programs.
- In 1997, an NIH-convened expert panel recommended standard screening methods for use in nationwide newborn hearing screening programs – methods routinely used to this day.

Today

- In the year 2000, an NIH-funded study found that children with hearing loss who began receiving treatment at an early age demonstrated language skills that were comparable to their hearing peers, regardless of the degree of hearing loss.
- In a 2001 NIH-funded study, children whose hearing loss was identified by six months of age and who were enrolled in a treatment program scored significantly higher in language skills than children whose hearing loss was identified after six months of age.
- Researchers estimate that children who receive treatment early in life in the form of a cochlear implant can save $30,000 to $200,000 in special education costs by the time they graduate from high school because they are more likely to be placed into mainstream classrooms.
- Thirty-nine states plus the District of Columbia and Puerto Rico have mandated newborn hearing screening programs. An additional 5 states have voluntary programs.

- In 2005, nearly 93 percent of all newborns born in the United States were screened for hearing loss.
- Many hearing-impaired infants are identified at a few weeks of age, when appropriate treatment programs can optimize their long-term speech and language, cognitive, and social skills. In 2004, 65 percent of infants identified with hearing loss in statewide programs were receiving treatment, with 46 percent receiving treatment within six months of age.
- NIH-supported scientists contributed to the mapping and identification of approximately one-third of the genes and genetic loci (a segment of chromosome on which a deafness gene is located but not yet identified) that cause hereditary hearing loss. Some genes result in deafness or hearing loss at birth, while others cause hearing loss or deafness later in life. By studying how these genes function in the normal and hearing-impaired ear, scientists may learn how to prevent or lessen the effects of mutations in these genes.
- NIH-supported scientists identified a genetic mutation that causes Usher syndrome in Ashkenazi Jewish children. Babies with Usher syndrome are born deaf and gradually lose their vision. Scientists can now identify which deaf children possess this mutation so that those who have it can learn alternative ways to communicate before they lose their vision.
- As much as 20 to 30 percent of childhood hearing loss is caused by cytomegalovirus (CMV) infection, a common virus that is passed from a mother to her unborn child. Ninety percent of CMV-infected children show no symptoms at birth. In a large-scale clinical study, NIH-supported scientists are combining screening newborns for CMV infection with newborn hearing screening to improve our ability to detect and predict hearing loss in children.

Tomorrow

The NIH is positioned to continue making major discoveries in the *prediction* of hearing loss, thus furthering efforts to *personalize* individual treatments and *preempt* hearing loss when possible.

- *Predicting hearing loss.* Scientists will be able to identify certain children who are likely to develop hearing loss later in life, whether due to infection or heredity.
- *Personalized treatments.* Genetic profiling will enable scientists to tailor treatment approaches for hearing loss based on their knowledge of inherited mutations.
- *Preemptive approaches.* Scientists will be able to use their knowledge to prevent some types of hearing loss before it occurs. When hearing impairment is diagnosed, appropriate intervention strategies can be initiated to minimize the impact of hearing impairment on communication skills.