
Joint Committee on Infant Hearing

1994 Position Statement

This 1994 Position Statement was developed by the Joint Committee on Infant Hearing. Joint committee member organizations that approved this statement and their respective representatives who prepared this statement include the American Speech-Language-Hearing Association (Allan O. Diefendorf, PhD, Chair; Deborah Hayes, PhD; and Evelyn Cherow, MA, ex officio); the American Academy of Otolaryngology-Head and Neck Surgery (Patrick E. Brookhouser, MD, and Stephen Epstein, MD); the American Academy of Audiology (Terese Finitzo, PhD; and Jerry Northern, PhD); the American Academy of Pediatrics (Allen Erenberg, MD, and Nancy Roizen, MD); and the Directors of Speech and Hearing Programs in State Health and Welfare Agencies (Thomas Mahoney, PhD, and Kathie J. Mense, MS).

Position Statement*

The Joint Committee on Infant Hearing endorses the goal of universal detection of infants with hearing loss as early as possible. All infants with hearing loss should be identified before 3 months of age, and receive intervention by 6 months of age.

I. Background

In 1982, the Joint Committee on Infant Hearing recommended identification of infants at risk for hearing loss in terms of specific risk factors and suggested follow-up audiologic evaluation until an accurate assessment of hearing could be made (Joint Committee on Infant Hearing, 1982; American Academy of Pediatrics, 1982). In 1990, the Position Statement was modified to expand the list of

*The recommendations in this statement do not indicate an exclusive course of treatment or serve as a standard of care. Variations taking into account individual circumstances and unique program needs may be appropriate.

risk factors and recommend a specific hearing screening protocol.

In concert with the national initiative *Healthy People 2000* (U.S. Department of Health and Human Services, Public Health Service, 1990), which promotes early identification of children with hearing loss, this 1994 Position Statement addresses the need to identify *all* infants with hearing loss.

The prevalence of newborn and infant hearing loss is estimated to range from 1.5 to 6.0 per 1,000 live births (Watkin, Baldwin, & McEnery, 1991; Parving, 1993; White & Behrens, 1993). Risk factor screening identifies only 50% of infants with significant hearing loss (Pappas, 1983; Elssman, Matkin, & Sabo, 1987; Mauk, White, Mortensen, & Behrens, 1991). Failure to identify the remaining 50% of children with hearing loss results in diagnosis and intervention at an unacceptably late age.

This 1994 Position Statement:

1. endorses the goal of universal detection of infants with hearing loss and encourages continuing research and development to improve techniques for detection of and intervention for hearing loss as early as possible;
2. maintains a role for the high-risk factors (hereafter termed indicators) described in the 1990 Position Statement, and modifies the list of indicators associated with sensorineural and/or conductive hearing loss in newborns and infants;
3. identifies indicators associated with late-onset hearing loss and recommends procedures to monitor infants with these indicators;
4. recognizes the adverse effects of fluctuating conductive hearing loss from persistent or recurrent otitis media with effusion (OME) and recommends monitoring infants with OME for hearing loss;
5. endorses provision of intervention services in accordance with Part H of the Individuals with Disabilities Education Act (IDEA); and

6. identifies additional considerations necessary to enhance early identification of infants with hearing loss.

II. Considerations for Detecting Hearing Loss in Infants

A successful infant hearing program must detect hearing loss that will interfere with normal development of speech and oral language. Because normal hearing is critical for speech and oral language development as early as the first 6 months of life (Kuhl, Williams, Lacerda, Stephens, & Lindbloom, 1992), it is desirable to identify infants with hearing loss before 3 months of age.

Facilities or agencies that implement infant hearing programs must develop protocols to achieve identification of all infants with hearing loss. To gain access to most infants, the Joint Committee on Infant Hearing recommends the option of evaluating infants before discharge from the newborn nursery. For infants discharged early or delivered at an alternative birthing site, it is desirable to have their hearing assessed before 3 months of age.

Concern for hearing should not stop at birth. Some children may develop delayed-onset hearing loss. For infants identified with indicators associated with delayed-onset hearing loss (see Sections III B and III C, below), ongoing monitoring and evaluation will be necessary (ASHA, 1991).

A. Technical Considerations

Hearing loss of 30 dB HL and greater in the frequency region important for speech recognition (approximately 500 through 4000 Hz) will interfere with the normal development of speech and language. Techniques used to assess hearing of infants must be capable of detecting hearing loss of this degree in infants by 3 months and younger. Of the various approaches to newborn hearing assessment currently available, two *physiologic measures* (auditory brainstem response

[ABR] and otoacoustic emissions [OAE]) show good promise for achieving this goal.

ABR has been recommended for newborn hearing assessment for almost 15 years (Schulman-Galambos & Galambos, 1979) and has been successfully implemented in both risk register and universal newborn hearing screening programs (Galambos, Hicks, & Wilson, 1982, 1984; Kileny, 1987; Amochaev, 1987; Hyde, Riko, & Malizia, 1990). Follow-up studies of infants screened by this technique demonstrate acceptable identification of infants with hearing loss (Stein, Ozdamar, Kraus, & Paton, 1983; Kileny & Magathan, 1987).

More recently, OAEs have been introduced for risk register and assessment of newborn hearing (Bonfils, Uziel, & Pujol, 1988; Stevens et al., 1989, 1990; Kennedy et al., 1991; White & Behrens, 1993). Follow-up studies of infants screened by this technique are limited but suggest that OAEs can identify infants with hearing loss of approximately 30 dB HL and greater (Kennedy et al., 1991).

Specific characteristics of test performance for ABR and OAE have not been fully defined in universal infant hearing detection applications. Because direct comparisons of ABR and OAE test performance are not currently available, the Joint Committee on Infant Hearing recommends that each team of health care professionals responsible for the development and implementation of infant hearing programs evaluate and select the technique that is most suitable for their care practices. New technologies or improvements to existing technologies that substantially enhance infant hearing assessment should be incorporated into existing programs as appropriate.

Each of the two physiologic measures has its advantages and disadvantages; both procedures outperform behavioral assessment in newborn hearing detection applications. *Behavioral measures*, including automated behavioral techniques, cannot validly and reliably detect the criterion hearing loss of 30 dB HL in infants less than 6 months of age (Jacobson & Morehouse, 1984; Durieux-Smith, Picton, Edwards, MacMurray, & Goodman, 1987; Hosford-Dunn, Johnson, Simmons, Malachowski, & Low, 1987). However, for infants 6 months developmental age and older, conditioned behavioral techniques provide reliable and valid measures of hearing sensitivity (ASHA, 1991).

B. Personnel

Teams of professionals, including audiologists, physicians (otolaryngologists and pediatricians), and nursing personnel, are often involved in establishing infant hearing programs. Audiologists should supervise infant hearing assessment programs. Personnel appropriate to the

infant hearing program who are trained and supervised by an audiologist may conduct some aspects of the infant hearing program (National Institutes of Health, 1993).

C. Implementation

Conditions that permit implementation and/or conversion to a universal infant hearing program, as well as timelines to initiate such programs, vary by program and location. However, program development and specific timelines should be established by each program to move toward the Joint Committee's goal. Pending development of programs to identify *all* infants with hearing loss, the Joint Committee on Infant Hearing recommends that programs based on indicators and currently in operation continue to provide assessment services to identified infants. The section that follows lists indicators associated with sensorineural and/or conductive hearing loss in neonates (Section III A) and infants (Section III B). On implementation of universal infant hearing programs, these indicators may be used to aid in the etiologic diagnosis of hearing loss as well as to identify those infants who develop health conditions associated with hearing loss and who therefore require ongoing hearing monitoring.

D. Cost/Benefit Analysis

Cost/benefit analysis of infant hearing programs should include consideration of direct cost of identification, assessment, and intervention. In addition, it may be valuable to determine the cost savings that accompany early detection and subsequent management of the child with hearing loss. Each infant hearing program should develop a cost/benefit analysis associated with its specific protocol. The results of cost/benefit analysis vary widely because of differences in protocol, location, geographic and economic considerations, and other factors.

III. Indicators Associated With Sensorineural and/or Conductive Hearing Loss

A. For use with neonates (birth through age 28 days) when universal screening is not available.

1. Family history of hereditary childhood sensorineural hearing loss.
2. In utero infection, such as cytomegalovirus, rubella, syphilis, herpes, and toxoplasmosis.
3. Craniofacial anomalies, including those with morphological abnormalities of the pinna and ear canal.
4. Birth weight less than 1,500 grams (3.3 lbs).
5. Hyperbilirubinemia at a serum level requiring exchange transfusion.

6. Ototoxic medications, including but not limited to the aminoglycosides, used in multiple courses or in combination with loop diuretics.

7. Bacterial meningitis.

8. Apgar scores of 0-4 at 1 minute or 0-6 at 5 minutes.

9. Mechanical ventilation lasting 5 days or longer.

10. Stigmata or other findings associated with a syndrome known to include a sensorineural and/or conductive hearing loss.

B. For use with infants (age 29 days through 2 years) when certain health conditions develop that require rescreening.

1. Parent/caregiver concern regarding hearing, speech, language, and/or developmental delay.

2. Bacterial meningitis and other infections associated with sensorineural hearing loss.

3. Head trauma associated with loss of consciousness or skull fracture.

4. Stigmata or other findings associated with a syndrome known to include a sensorineural and/or conductive hearing loss.

5. Ototoxic medications, including but not limited to chemotherapeutic agents or aminoglycosides, used in multiple courses or in combination with loop diuretics.

6. Recurrent or persistent otitis media with effusion for at least 3 months.

C. For use with infants (age 29 days through 3 years) who require periodic monitoring of hearing.

Some newborns and infants may pass initial hearing screening but require periodic monitoring of hearing to detect delayed-onset sensorineural and/or conductive hearing loss. Infants with these indicators require hearing evaluation at least every 6 months until age 3 years, and at appropriate intervals thereafter.

Indicators associated with delayed onset sensorineural hearing loss include:

1. Family history of hereditary childhood hearing loss.

2. In utero infection, such as cytomegalovirus, rubella, syphilis, herpes, or toxoplasmosis.

3. Neurofibromatosis Type II and neurodegenerative disorders.

Indicators associated with conductive hearing loss include:

1. Recurrent or persistent otitis media with effusion.

2. Anatomic deformities and other disorders that affect eustachian tube function.

3. Neurodegenerative disorders.

IV. Early Intervention

When hearing loss is identified, evaluation and early intervention services should be

provided in accordance with the Individuals with Disabilities Education Act (IDEA), Part H Public Law 102-119 (formerly PL 99-457). A multidisciplinary evaluation will be completed to determine eligibility and to assist in developing an individualized family service plan (IFSP) to describe the early intervention program. Because specific services and service eligibility are not uniform from state to state, potential service users and service providers should contact their state Resource Access Projects (RAP) coordinators for information.

The full evaluation process should be completed within 45 days of referral. However, intervention services may commence before the completion of the evaluation if parental/caregiver consent is obtained and an interim IFSP is developed. Specifically, early intervention services that might be offered before completing the full evaluation of all developmental areas include provision of amplification, support, and information to parents regarding hearing loss and the range of intervention alternatives available.

The interim IFSP should include the name of the service coordinator who will be responsible for both implementation of the interim IFSP and coordination of activities among other agencies and persons.

The multidisciplinary evaluation and assessment of an infant identified with hearing loss should be performed by a team of professionals working in conjunction with the parent/caregiver. The professionals may include, depending on the needs of the individual:

1. A physician with expertise in the management of early childhood otologic disorders.
2. An audiologist with expertise in the assessment of infants and young children to determine type, degree, symmetry, stability, and configuration of hearing loss, and to recommend amplification devices appropriate to the child's needs (e.g., hearing aids, personal FM systems, vibrotactile aids, and/or cochlear implants).
3. A speech-language pathologist, audiologist, sign language specialist, and/or teacher of children who are deaf or hard-of-hearing with expertise in the assessment and intervention of communication skills.
4. Other professionals as appropriate for the individual needs of the child and family.

This team will develop a program of early intervention services (an IFSP) based on the child's unique strengths and needs and consistent with the family's resources, priorities, and concerns related to enhancing the child's development. This multidisciplinary team must include the parent/caregiver. Team planning should be cognizant of and sensitive to the range of available communication and educational choices, and parents should be given sufficient information regarding all options to enable them to

exercise informed consent when selecting their child's program. Components of an early intervention program for children with hearing loss and their families should include:

1. Family support and information regarding hearing loss and the range of available communication and educational intervention options. Such information must be provided in an objective, nonbiased way to support family choice. It is recommended to use consumer organizations and persons who are deaf or hard-of-hearing to provide such information. Professional, consumer, state, and community-based organizations should be accessed to provide ongoing information regarding legal rights, educational materials, support groups and/or networks, and other relevant resources for children and families.
2. Implementation of learning environments and services designed with attention to the family's preferences. Such services should be family-centered and should be consistent with the needs of the child, the family, and their culture.
3. Early intervention activities that promote the child's development in all areas, with particular attention to language acquisition and communication skills.
4. Early intervention services that provide ongoing monitoring of the child's medical and hearing status, amplification needs, and development of communication skills.
5. Curriculum planning that integrates and coordinates multidisciplinary personnel and resources so that intended outcomes of the IFSP are achieved.

V. Additional Considerations

Successful programs for identifying infants with hearing loss are characterized by commitment and support from health care administrators, physicians, audiologists, families and caregivers, and a community educated about the importance of hearing and infant development. Because of the dynamic changes in technology and in education and health care policy, the Joint Committee on Infant Hearing recommends consideration of the following factors to facilitate the establishment and maintenance of infant hearing programs:

1. Development of a uniform state and national database incorporating standardized technique, methodology, reporting, and system evaluation. This database will enhance patient outcomes, program evaluation (including efficacy and cost/benefit analysis), continuous quality improvement, and public policy development.
2. Development of a tracking system to ensure that newborns and infants identified with or at risk for hearing loss have access to evaluation, follow-up, and intervention services.
3. Systematic evaluation of techniques for identification and assessment, and

intervention for hearing loss in infants. Replication and ongoing assessment of current programs will assist in evaluating the efficacy of infant hearing programs and widespread acceptance of the benefits of early identification of infants with hearing loss.

4. Ongoing refinement of current indicators associated with sensorineural and/or conductive hearing loss.
5. Outcome studies to investigate the impact of early identification on the degree of literacy and communication competence achieved and to establish factors that contribute to outcome.
6. Continued research into the prevention of hearing loss in newborns and infants.

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Suggested Readings

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