

Sound **Beginnings**

KANSAS

NEWBORN HEARING

SCREENING GUIDELINES

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ACKNOWLEDGMENTS

Sound Beginnings Newborn Hearing Screening Guidelines is the result of the efforts of people who have been unceasingly dedicated to the **early** identification of children with hearing loss. Expertise and time have been generously shared to develop these guidelines. Members of the **Sound Beginnings** Newborn Hearing Screening Task Force unanimously agreed on the purpose of the guidelines: to provide rationale and process for screening the hearing of **newborns** in Kansas. As we proceeded through the multitude of drafts of the guidelines, it was noteworthy that “the mountain changed as we climbed it.” Varying perspectives unfolded; content originally having “favored status” was deleted; content was included to address additional issues; topics were expanded based on the ideas of the reviewers. The final product provides purpose and direction for the many individuals and groups who value and are involved in newborn hearing screening.

A special note of appreciation is given to **Teresa Kennalley, MA**, chair of the Newborn Hearing Screening Task Force, who guided the development of this document. We thank the many people statewide, including members of the **Sound Beginnings** Advisory Committee and the Assessment and Amplification and Early Intervention Task Forces, who reviewed numerous drafts of the guidelines and provided thoughtful input. Finally, we thank the many other states that shared their resources.

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Guidelines will be reviewed every two years and updated as needed.

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I. INTRODUCTION

Infant hearing screening has undergone major changes over the past thirty years. Because of advancements in hearing screening technology, universal newborn hearing screening (UNHS), which means screening the hearing of *all* newborns, now has the support of many groups including parents, pediatricians, family practice physicians, otolaryngologists, neonatologists, audiologists, nurses, persons who are deaf/hard of hearing, and specialists in early intervention for children with hearing loss such as speech-language pathologists and teachers of the deaf/hard of hearing.

Thirty years ago, audiologists identified hearing loss in infants and toddlers by careful observation of their behavioral responses to sound. This method was neither scientific nor reliable in identifying mild to moderate degrees of hearing loss. Even with normal hearing, infants and toddlers have variable responses to sound.

Later, auditory brainstem response (ABR) became the preferred method to assess the auditory system. Although reliable, it required considerable time and expertise, limiting its use to only those infants who were considered at high risk for hearing loss. More recently it became possible to test for ear “echoes” (called otoacoustic emissions, or OAE). Currently, ABR and OAE testing have been automated with computer technology and can be used in combination or alone to screen hearing.

Newborn hearing screening makes a difference for all children and their families, and information about hearing and typical hearing milestones is valuable for all parents in the care of their child. Newborn hearing screening allows us to successfully screen for potential hearing loss in infants within the first 24 hours of life. Each screening method (automated ABR or screening OAE) takes about five minutes per ear and is done while the infant sleeps. When the infant does not pass hearing screening, follow-up takes place after discharge from the birthing facility¹ and includes testing to confirm hearing loss, determine the degree of hearing loss, and complete other audiologic procedures. Healthy People 2010 (Health and Human Services) includes the following goal for infants: *to confirm hearing loss by three months of age with appropriate intervention no later than six months of age*. With existing technology and expertise, this goal can be met routinely.

¹ Although the term “hospital” will generally be used in this document, the term includes all licensed birth facilities, not only hospitals.

The process of parent education and the initiation of intervention can occur soon after the infant's birth. A family whose child has a significant permanent hearing loss at birth can be proactive in making decisions about intervention strategies for their child. For example, parents and children adapt more readily to hearing aid use when early identification occurs. Hearing loss, when undetected, impedes the child's speech, language, and cognitive development. Early Hearing Detection and Intervention programs (also referred to as "EHDI") can significantly reduce the need, over time, for special services for the child with hearing loss, and increase the likelihood of attaining age appropriate communication, cognitive, social and emotional development.

Kansas enacted legislation, effective July 1, 1999, to provide for screening for the early detection of hearing loss in newborn infants at the birthing facility or as soon after birth as possible. (Appendix A.) Follow-up referrals for those infants who do not pass the screening enable the infants and their families/caregivers to obtain evaluation, treatment, and intervention services at the earliest opportunity to prevent or mitigate the developmental delays and academic failures associated with late identification of hearing loss. The rationale for hearing screening includes the following points:

- • Hearing loss occurs in newborns more frequently than any other health condition for which newborn screening is currently required (*e.g.*, PKU, galactosemia).
- • Early detection of hearing loss in an infant and early intervention and treatment before six months of age has been demonstrated to be highly effective in facilitating a child's development in a manner consistent with the child's age and cognitive ability.
- • Eighty percent of a child's ability to learn speech, language and related cognitive skills are established by the time the child is 36 months of age, and hearing is vitally important to the development of oral language skills.
- • Children of all ages can receive reliable and valid hearing screening which will reduce public expenditure for health care, special education, and related services.

With the implementation of the *Newborn Infant Hearing Screening Act*, K.S.A. 65-1,157a, all newborns in Kansas will have their hearing screened, preferably prior to discharge from the birthing facility. The birthing facility is the most efficient and cost-effective environment for newborn hearing screening. The infant is readily available and qualified personnel are available to provide screening. Audiologists can train and direct other health care personnel in the implementation of a newborn hearing screening program.

II. TECHNOLOGIES FOR NEWBORN HEARING SCREENING PROGRAMS

Currently, newborn hearing screening programs utilize two technologies, in combination or alone, to objectively assess the physiologic status of the ear to screen hearing: Auditory Brainstem Response (ABR) and Otoacoustic Emissions (OAE). **The type of screening technology, in combination with the screening protocol, can affect the referral rate.**

Prior to the purchase of hearing screening equipment, an audiologist should be consulted to provide guidance on which equipment to purchase and to assist in the development of hearing screening protocols. The screening technology which is best for your facility is based on many factors including:

- Number of deliveries per year
- Length of a hospital stay
- Availability of trained staff
- Ability to get families to return for outpatient screening
- Availability of funding to purchase more than one type of screening equipment

Auditory Brainstem Response (ABR)

ABR is an electrophysiological measure of the auditory system's response to sound. A soft (low level) click is presented to the ear through an earphone. Surface electrodes, placed on the infant's head, record the response as the signal travels from the ear through the auditory nervous system to the brain. Hearing screening, using ABR systems that require interpretation of waveforms, must be performed and interpreted by a licensed audiologist or by qualified physicians. It is recommended that the screening level be 35 dB nHL or softer.

Automated ABR (AABR) uses technology similar to ABR except the equipment is fully automated and elicits a pass/refer result. An audiologist is not required for interpretation of these screening results; trained hospital personnel (*e.g.*, nurses, hospital technicians, support staff) can perform the AABR screening.

Otoacoustic Emissions (OAE)

OAE's reflect the integrity of the sensory cells in the cochlea (inner ear). A soft click is presented through a small probe placed in the infant's ear canal. The probe measures the echo that is returned from the infant's cochlea. The echo is analyzed to determine how well the inner ear is working. There are two types of OAE technologies: Transient Evoked Otoacoustic Emissions (TEOAE), and Distortion Product Otoacoustic Emissions (DPOAE). Screening parameters should be set to screen for a "significant" degree of hearing loss (30 dB HL).

Screening OAE equipment is also available. These types of devices have automated scoring of response, consequently allowing trained hospital personnel (*e.g.*, nurses, hospital technicians) to perform screening. A licensed audiologist must interpret OAE systems that do not yield pass/refer results.

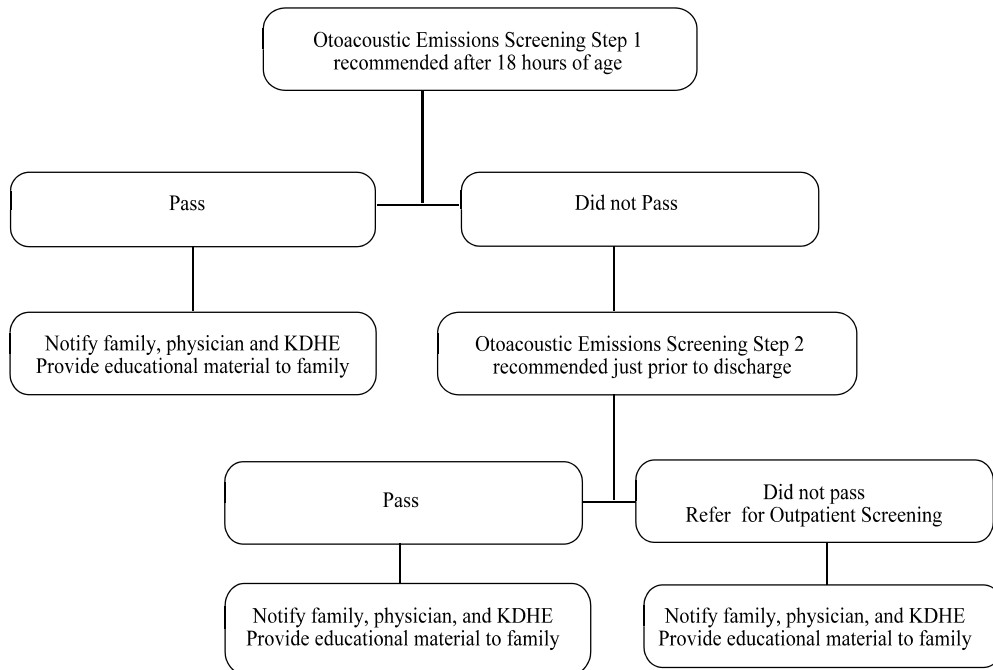
III. SUGGESTED NEWBORN HEARING SCREENING PROTOCOLS

It is essential that there be formal hearing screening protocols that are followed closely. Formal protocols will usually be in policy format for the hospital.

The purpose of any screening program is to identify the population that needs to have more in-depth (diagnostic) testing. The screening protocol(s) that will be used in any given hospital will vary according to the screening equipment and personnel doing the screening. A two-step screening process (a second hearing screening for infants who do not pass the first birth admission screening) prior to hospital discharge is recommended. This two-step process is considered “the initial hearing screening.” The purpose of the second screening prior to hospital discharge is to reduce the overall referral rate for follow-up testing. **Using this two-step “initial hearing screening” process prior to hospital discharge, typical referral rates using AABR are 2-3%, and using OAE are 6-10%.**

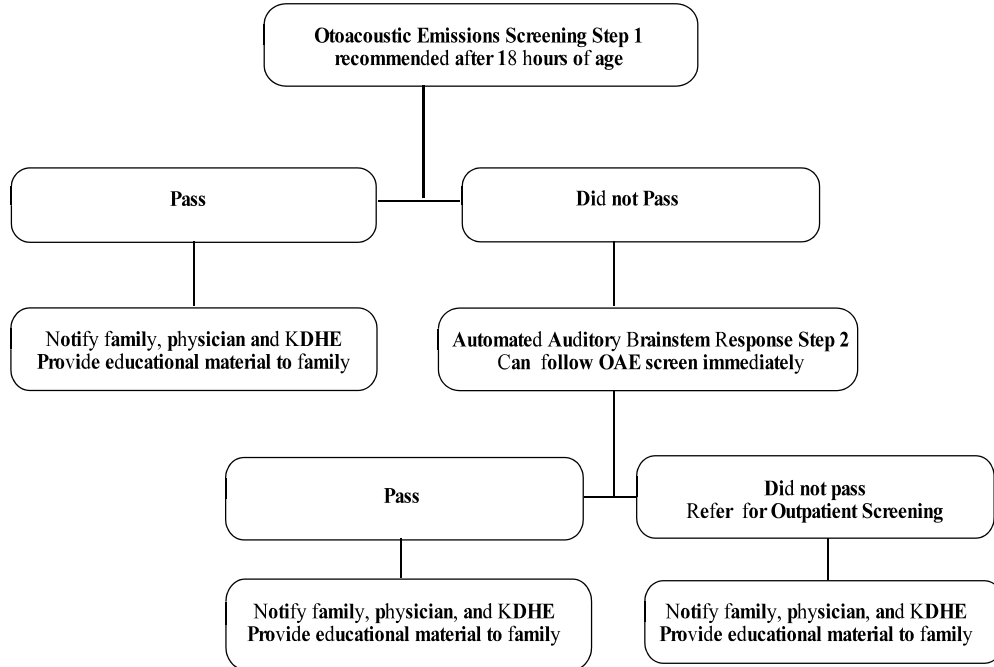
Example #1: an OAE screening (step 1) followed several hours later (before hospital discharge) by a repeat OAE (step 2) for those infants who did not pass the first OAE screening.

Hospital First Stage Two-Step Initial Screening Protocol
Step 1 - Otoacoustic Emissions Screening (DPOAE or TEOAE)
Step 2 - Otoacoustic Emissions Screening (DPOAE or TEOAE)



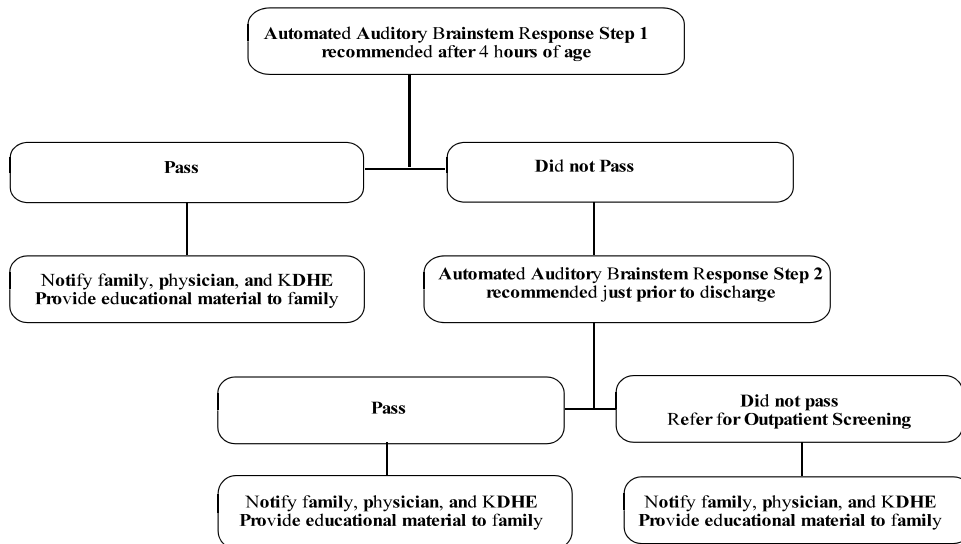
Example #2: an OAE screening (step 1) followed before hospital discharge by AABR (step 2) for those infants who did not pass the OAE screening.

Hospital First Stage Two-Step Initial Screening Protocol
 Step 1 - Otoacoustic Emissions Screening (DPOAE or TEOAE)
 Step 2 - Automated Auditory Brainstem Response (AABR)



Example #3: an AABR screening (step 1) followed before hospital discharge by a repeat AABR (step 2) for those infants who did not pass the first AABR screening.

Hospital First Stage Initial Screening Two-Step Protocol
 Step 1 - Automated Auditory Brainstem Response (AABR)
 Step 2 - Automated Auditory Brainstem Response (AABR)

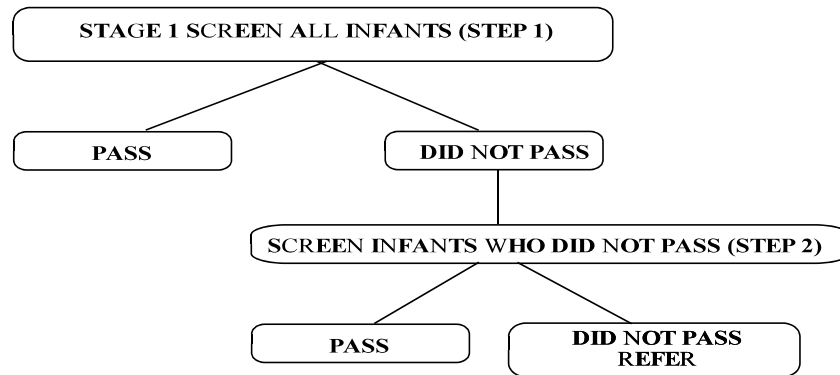


Informed Consent

Most hospitals ask that blanket consent for treatment be signed at admission. This type of consent includes the newborn hearing screening. It is important that parents are given information in advance (*e.g.*, in preadmission packet, at prenatal classes, in admission packet) about the hearing screening process. The law states that if parents object to the screening, their child is exempt from the screening. A birthing facility should have a standardized form available for the parents to sign if consent for hearing screening is not given; the signed form should be retained by the hospital as a medical record for that infant.

Initial Hearing Screening (Prior to Hospital Discharge) Stage One

1.



2. Notify the infant's primary care physician of the infant's hearing screening results (both pass and did not pass/refer results) based on facility protocol.
3. Give all parents information about their child's hearing screening results and the role of hearing in the infant's development. (See Initial Hearing Screening, Pass Results)
4. If the infant needs to be referred for further testing, give parents information about the importance of an outpatient hearing screening, and, with permission of the family, the hospital may assist the family and the primary care physician with scheduling the outpatient screening appointment. (See Initial Hearing Screening, Refer Results)
5. Report **all** Initial Hearing Screening results to KDHE.

Pass Results

The parents of infants who pass the hearing screening should receive information about hearing, speech and language developmental milestones, and information regarding risk indicators for progressive and delayed-onset hearing loss (Appendix B). The information should also include that if, at any point in the infant-toddler-child's development, the parents or the primary care physician suspect a hearing loss, the child should be referred for audiologic services even if the newborn passed the initial hearing screening process.

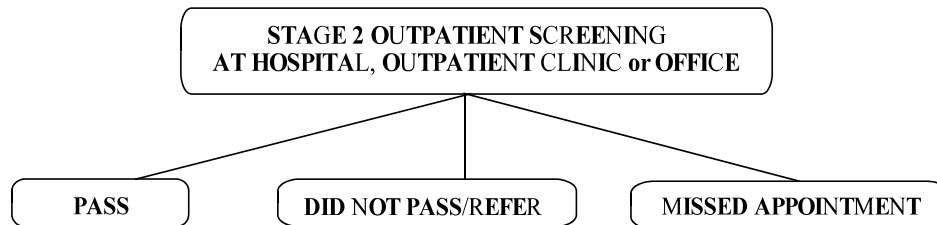
Refer Results

The parents of infants who did not pass the screening test should be given information regarding: a) the hearing screening process; b) the role of hearing in the infant's development; c) factors that may cause a referral for further hearing testing (*e.g.*, debris in the ear canal, fluid in the middle ear) and d) the importance of further testing.

Outpatient Screening Stage Two

In order to achieve the Healthy People 2010 goal of confirmation of hearing loss by three months of age, the outpatient screening should be completed **no later than 30 days of age**.

1.



2. Notify the infant's primary care physician of the infant's hearing screening results (pass, did not pass/refer or missed appointment).
3. Give parents information about their infant's hearing screening results and the role of hearing in infant development.
4. If the infant does not pass the outpatient screening:
 - a) the outpatient facility shall give parents a list of professionals who identify themselves as capable of providing diagnostic audiologic testing;
 - b) the outpatient facility and/or primary care physician may assist the parents in obtaining referral for diagnostic audiologic testing; and
 - c) the outpatient facility and/or primary care physician may assist families by identifying state or community resources available for assistance in the evaluation process.²
5. Report **all** outpatient hearing screening results to KDHE.

²The family's insurance may cover hearing assessment for the infant. Other state resources include Services for Children with Special Health Care Needs; Medicaid for eligible infants; and Infant-Toddler Services (a community-based early identification and intervention program for infants and toddlers [Part C of the Individuals with Disabilities Education Act, IDEA]) which helps families access audiologic diagnostic services, and if a hearing loss is confirmed, multi-disciplinary services (evaluation and intervention) to meet the individualized needs of the child and family. For further information on resources, call the Make a Difference Information Network at 1-800-332-6262 V/TTY, or contact the Kansas Commission for the Deaf and Hard of Hearing at 1-800-432-0698 V/TTY.

Pass Results

The parents of infants who pass the hearing screening at any stage (initial hearing screening or outpatient screening) should receive information about hearing, speech and language developmental milestones, and information regarding risk indicators for progressive and delayed-onset hearing loss (Appendix B). The information should also include that if, at any point in the infant-toddler-child's development, the parents or the primary care physician suspect a hearing loss, the child should be referred for audiologic services even if the newborn passed the hearing screening process.

Refer Results

The parents of infants who did not pass the screening test should be given information regarding: a) the hearing screening process; b) the role of hearing in the infant's development; c) factors that may cause a referral for further hearing testing (*e.g.*, debris in the ear canal, fluid in the middle ear); and d) the importance of further testing.

Missed Appointments

The hearing screening program Manager/Coordinator or designee should contact all families who do not return for a follow-up appointment, carefully documenting at least two contacts to schedule the hearing screening appointment (*e.g.*, by phone and by mail). The infant's primary care physician should be notified after the second missed appointment, or after two unsuccessful contacts to schedule the second appointment.

NICU / Medically Fragile Infants

Infants who are transferred immediately after birth to the NICU at another hospital generally will not have had their hearing screened prior to hospital transfer. It is the responsibility of the facility that releases the infant **to the home** to ensure that the initial and/or outpatient hearing screening have been completed and that the results are reported to KDHE.

Specific NICU hearing screening protocols should be developed at facilities that serve this population. Infants who are transferred from one facility to another may have more than one hearing screening due to the changing health status of the infant.

When Hearing Loss Is Confirmed

The primary care physician works with parents and other healthcare professionals in the coordination of care for infant's identified with hearing loss. Once the diagnosis has been confirmed, the primary care physician should be directly involved in assisting families in identifying state and community resources available for assistance in preparing treatment plans needed to meet the individualized needs of the infant and family.

IV. HOSPITAL AND MANAGER/COORDINATOR RESPONSIBILITIES IN NHS PROGRAMS

Each hospital should designate a physician to oversee the medical aspects of the program.

In addition, an on-site Manager/Coordinator of the Newborn Hearing Screening program, at **all** birthing facilities, regardless of whether screening or not screening, should be responsible for the following:

1. Provide information regarding the Newborn Hearing Screening Program to hospital administration, KDHE, insurance companies, physicians, parents, outside agencies, etc., and
2. Write and implement a hospital policy for the Newborn Hearing Screening program in consultation with the hospital's medical director, consulting audiologist, OB Nurse manager, and others.

The on-site Manager/Coordinator of the Newborn Hearing Screening program at birthing facilities **where newborn hearing screening is provided** should be responsible for the following:

1. Budget for necessary equipment and supplies;
2. Coordinate/supervise personnel providing screening including ongoing monitoring of competency;
3. Provide for training of all screening personnel (see Chapter VII);
4. Provide for care and accurate operation of equipment, and ordering of supplies;
5. Assess the performance of the program on a regular basis; and
6. Oversee data management and transfer of data as required.

V. AUDIOLOGIST RESPONSIBILITIES IN NHS PROGRAMS

The audiologist associated with the Newborn Hearing Screening program may be on staff at the hospital or a consultant for the program. The supervising/consulting audiologist must be licensed by the State of Kansas (KDHE; Health Occupations Credentialing Program), should have professional experience in performing hearing screening on newborn infants, and be experienced in both the development and maintenance of a newborn hearing screening program including an understanding of technology options. It is essential that support personnel receive competency-based training and that their performance in the areas specific to their defined job be reviewed. Routine supervision and continuing education activities should be regularly scheduled and documented.

The responsibilities of the audiologist include the following:

1. Work with the program Manager/Coordinator to ensure the success of the newborn hearing screening program;
2. Recommend screening equipment to the program Manager/Coordinator based on current equipment availability and performance information;
3. Work with the program Manager/Coordinator to develop program implementation policy and procedures including:
 - a) performing the newborn hearing screening;
 - b) ordering appropriate supplies necessary for accurate screening;
 - c) documenting results;
 - d) making referrals;
 - e) providing information to parent/caregiver;
 - f) communicating screening results to parent/caregiver and primary care physician; and
 - g) developing a back-up hearing screening plan to ensure continuation of newborn hearing screening services when screening equipment malfunctions;
4. Outline a process for periodic review of the competency of screeners;
5. Review data to monitor the performance of the screening program including referral rates and competency of screening personnel; and
6. Provide information, training and technical assistance as needed.

VI. PRIMARY CARE PHYSICIAN RESPONSIBILITIES IN NHS PROGRAMS

The infant's primary care physician (PCP), or the primary health care provider such as the local health department, plays an integral role in the newborn hearing screening program. The PCP should receive the results from all hearing screenings. If the family had not selected a PCP at the time the infant was discharged from the hospital, then at the time of the infant's regular well baby checkup, the PCP should contact the birthing facility to obtain hearing screening results for review.

If the newborn infant did not pass the hearing screening, the PCP should:

1. Work with the family to ensure that the infant has timely audiologic follow-up;
2. Be knowledgeable about community resources that can help the family obtain the outpatient screening or the audiologic assessment;
3. Issue a referral for an audiologic assessment and, depending on the outcome, a referral for an ENT assessment;
4. Expect the referral agent(s) to share the results of the assessments;
5. Be aware that the PCP of record will receive notice from KDHE regarding hearing screening results, and data will be housed at KDHE;
6. Be aware that the goal of the Newborn Hearing Screening program is that of Healthy People 2010, the Maternal and Child Health Bureau, and the Centers for Disease Control and Prevention: all newborn infants are screened for hearing loss prior to hospital discharge or at least by one month of age, those referred have audiologic evaluation by age three months, and, if a hearing loss is confirmed, are enrolled in appropriate intervention services by age six months.

Regardless of whether the infant passed or did not pass the hearing screening, the PCP should be aware of the risk indicators for hearing loss (Appendix B), and monitor for delayed-onset, progressive and acquired hearing loss during routine medical care.

VII. SUPPORT PERSONNEL IN NHS PROGRAMS

This section is intended specifically for support personnel in *newborn hearing screening*. The information does not replace requirements for Audiology Assistants as set forth in regulation by the Kansas Department of Health and Environment (KDHE), nor does it replace the Hearing Screening Guidelines developed by the Kansas State Department of Education (KSDE) and KDHE.

Support personnel are individuals who are selected and trained to operate devices used to screen the hearing of newborns. Support personnel may include nurses, audiology assistants, technicians, health care assistants, other allied health personnel, and other persons specifically trained to screen newborns for hearing loss. The roles of the support personnel should be clearly defined.

Minimum Qualifications of Support Personnel

- Eighteen years of age or older
- High school diploma or equivalent
- Works independently to complete specified procedures consistently
- Demonstrates competency-based skills necessary to perform the specific tasks assigned
- Communicates and interacts with hospital staff, medical staff, and parents reliably and maturely
- Meets the physical demands of the screening process
- Follows a precise sequence of instructions for the screening protocol
- Handles and operates electrical equipment safely
- Applies small objects safely to infant ears and head
- Free of communicable diseases; immunizations current
- Follows hospital policies, regulations and procedures

Training of Support Personnel

A formal training program for support personnel should be in place under the direction of the supervising/consulting audiologist or qualified physician. The content of the training program should exceed basic instruction in the operation of the screening equipment and should address all aspects of screening responsibilities. Specific competency-based training through formal instruction and supervised practice should be included. Individual observation/assessment to determine the ability of the support person to perform duties associated with newborn hearing screening safely and competently should be completed with documentation. Personnel should have ongoing assessment of proficiency and retraining as needed.

Areas of training should include, but are not limited to:

- Basic anatomy and physiology of the ear
- Nature of the responses being measured
- Patient and non-patient factors that influence responses
- Understanding and completing screening procedures, including documentation of screening
- Understanding and use of specific equipment including screening instruments and computers
- Patient Bill of Rights
- Confidentiality requirements
- Effective communication skills to provide accurate and appropriate information
- Safety and infection control procedures, including universal precautions for blood-borne pathogens and tuberculosis according to guidelines of the Occupational Safety and Health Association (OSHA)
- Hospital and nursery emergency procedures
- Risk management and incident reporting procedures

Duties and Responsibilities of Support Personnel

Duties and responsibilities of support personnel may vary according to the facility. Suggested duties and responsibilities **may** include the following items:

- Reporting to the nursery at scheduled time to perform screenings
- Selecting and preparing infants for screening based upon program policies and nursery requirements
- Operating a screening device according to manufacturer's instructions and instructions received in the training program
- Recording results of screening and disseminating information to appropriate personnel
- Performing daily equipment checks and maintaining equipment in good condition
- Notifying program supervisor of low supplies and equipment problems
- Maintaining strict patient confidentiality
- Wearing hospital identification at all times
- Following strict guidelines for patient/parent identification
- Completing records and logs as required
- Interacting appropriately with infants, parents, and other caregivers
- Cleaning and disposing of supplies for screening, observing infection control procedures

Support personnel **may not** engage independently in the following activities:

- Interpreting screening results or clinical data
- Referring a patient's family to other professionals or agencies without a clear protocol established by the program Manager/Coordinator and physician

