Kansas

Guidelines for Hearing Screening

(Birth-21)

Kansas Department of Health &Environment
Kansas State Department of Education

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This publication was jointly developed by the Kansas State Department of Education and Kansas Department of Health and Environment, Kan Be Healthy Early and Periodic Screening, Diagnostic, and Treatment (EPSDT), Parents As Teachers Association, Early Head Start/Head Start - Birth to Five with input from audiologists from the Kansas Speech-Language-Hearing Association.

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Information about future training opportunities for Screening Personnel (birthing facilities) and OAE Screening Technicians (Part C, PAT, EHS, KBH) contact:

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Introduction

In the most general terms, the ultimate goal of any screening program is to change the natural outcome of a condition by creating an opportunity to remediate any negative effects through early identification. According to the World Health Organization (WHO), screening is performed for conditions having serious consequences, with a reliable method for testing, and must offer a scientifically supported, effective treatment when detected early (Wilson & Jugner, 1968). Screening for hearing loss across the age span meets these criteria. Therefore, the Kansas State Department of Education (KSDE) and the Kansas Department of Health and Environment (KDHE) collaborated to develop hearing screening procedures for children aged birth through 21. The purpose of this collaboration is to provide a statewide standard for hearing screening, as part of legislated child find activities, across State-level entities where children receive medical and educational services and supports. Based on the needs of diverse communities across Kansas, a goal of statewide standards is to provide multiple layers of support across our medical and educational providers to capture as many children with hearing loss as possible. Multiple layers of support for child find activities begin with Universal Newborn Hearing Screening (UNHS) and Early Hearing Detection and Intervention (EHDI) programs which overlap with the Early Intervention (birth to three services) or Part C services of the Individuals with Disabilities Education act (IDEA) 2004 and continue through school-aged (3 through 21 years of age) or Part B services covering preschool, elementary, and secondary educational programs. **Accounting for the needs and resources of diverse communities across Kansas and the multiple layers of support for hearing screening, these Guidelines for Hearing Screening (Birth – 21) are designed to be specific enough to clearly state the requirements across the age span while general enough to offer the flexibility for application across diverse settings.**

Continued hearing screening across the age span is essential in successful child find programs that seek to remediate or remove significant barriers to child development and student learning. We know that hearing loss is the most prevalent developmental disorder present at birth (White, 1997) AND early identification and intervention works (Yoshinaga-Itano, 1999; Yoshinaga-Itano, C., Coulter, D., & Thompson, V, 2001). We also know, due to injury, illness, or genetics, children who pass hearing screening at birth may be at risk for hearing loss that is progressive, transient, or acquired after newborn hearing screening occurs. It is estimated that by school age, the incidence of permanent sensorineural hearing loss more than doubles from the newborn period to approximately 9 to 10 per 1,000 (Bamford et.al., 2007, White, 2010) in the school-aged population. In addition, transient hearing loss as a result of ear infection affect up to 90% of children prior to entering school and continue to present educationally significant transient hearing loss for approximately 25% of school aged children (Tos, 1984; Lous and Fiellau-Nikolajsen, 1981). Finally, unsafe listening practices during recreational activities, including use of personal audio devices, place our adolescent population increasingly at risk for noise induced hearing loss (NAHIC, 2014). All told, unidentified and late-identified educationally significant hearing loss results in increased education costs to our system (CDC, 2004-2006) as well as increased lifelong medical costs, lower wages, and negative psychosocial effects for individuals with hearing loss (Holden-Pitt & Diaz, 1998; Ruben, 2000).

Hearing may be screened at various screening sites, such as:

- Birthing Facilities
- Schools
- Local Health Departments
- Community Sites
- Medical Facilities
- Clinically Certified Audiologists

Many Kansas early childhood programs routinely screen hearing, including:

- tiny-k Services [Part C of the Individuals with Disabilities Education Improvement Act (IDEA)]
- Head Start Programs
- Parents as Teachers
- Child Health Assessments/Kan Be Healthy
- Community Child Find Strategies
- Special Education
- General Education

Kansas Hearing Screening Goals

The goals of a hearing screening program are:

- Early detection and identification of hearing loss in children.
- Access to professional care for all children suspected of having a hearing loss, regardless of financial limitations.
- Education for children and their parents/caregivers about the sources and consequences of dangerous sounds, as well as how to protect themselves from dangerous sounds. The activities of a school hearing screening program that are necessary to accomplish the goals as listed above are:
    - Perform hearing screenings according to state guidelines.
    - Notify parent/caregiver prior to child's hearing screening.
    - Notify parent/caregiver of the child's hearing screening results and the need for further medical/ audiological examination; if necessary.
    - Provide referral assistance to hearing professionals.
    - Follow-up with parent/caregiver to make sure the child has received medical/audiological examination.
    - Inform educational staff of the student's hearing status following a comprehensive examination.

State and Federal Laws Pertaining to Hearing Screening

KSA 65-1,157a, every child born in the state of Kansas, within five days of birth, unless a different time period is medically indicated, shall be given a screening examination for detection of hearing loss. The screening shall be conducted in accordance with accepted medical practices and in the manner prescribed by the secretary of health and environment.

K.S.A. 72-6228-6231, every pupil enrolled in a school district or an accredited nonpublic school shall be provided basic hearing screening without charge during the first year of admission and not less than once every three years thereafter. In addition, [K.S.A. 72-6229(d)] makes clear all tests shall be performed by a person competent in the use of a calibrated audiometer and who has been designated by the board of education which provides the basic hearing screening. [K.A.R. 91-40-7 (b)(1) and K.A.R. 91-40-7(b)(2)]] are the state regulations that relate to child find activities, which include hearing and vision screenings conducted in schools. This applies to students from birth through age 21.

Head Start Program Performance Standards Child Health Status and Care, 45 CFR § 1302.42, within 45 days after the child first attends the program or, for the home-based program option, receives a home visit, a program must either obtain or perform evidence-based hearing screenings.

Individuals with Disabilities Education Act (IDEA) 2004, 20 U.S.C. §1412(a)(3), 34 CFR § 300.301(a), 20 U.S.C. §1435 (a)(5) require school districts to identify, locate, and evaluate all children with disabilities and states that "each public agency must conduct a full and individual initial evaluation" to identify a disability and subsequent eligibility for special education services. In addition, IDEA 2004, requires states to have a comprehensive child find system that ensures rigorous standards for appropriately identifying infants and toddlers with disabilities that will reduce the need for future services.

Recommended Hearing Screening Procedures

Screening Methods

Visual Ear Inspection

The purpose is to check for signs of ear disease or abnormal development. An inspection examines the external canal, surrounding tissue, ear canal, and tympanic membrane.

Equipment
Internal inspection: Otoscope*

Procedure
External: Inspect the pinna and the area around it for any abnormalities such as preauricular sinuses, skin tags, or atresia; check for position (set or tilt) of the ears, tenderness, redness or edema, signs of drainage, foul odor, wax build-up in the outer ear canal, or dermatitis.

Internal: With the otoscope, inspect the ear canal and tympanic membrane for signs of drainage, wax buildup, foreign bodies, redness of the ear canal, and other abnormalities; note presence or absence of normal tympanic membrane landmarks.

Referral Criteria:
PASS
Children with normal appearance of all structures and no complaints of pain in the pinna or the tissue around the ear do not require referral.

REFER
Refer children with any abnormality to a medical provider. Do not proceed with audiometer screening if tenderness, signs of drainage, or foul odor is present; this should be an automatic referral.

*If the screener has training and experience in using an otoscope. If the screener lacks training and experience in using an otoscope, the visual inspection should be limited to the external aspect of the ears.

The screener shall note on the hearing screening form any reported symptoms such as:

- Not hearing well.
- Better hearing in one ear.
- Ear pain or tenderness.

Direct observation of the following:

- Discharge from a child’s ear canal.
- Complaining of ear pain/discomfort.
- Soreness or tenderness in or about the ears.
- Foul odor from ear.

Paper Screening

Providers may use a paper hearing screening to identify children who may need further hearing testing. These forms identify a child's risk factors for hearing loss, monitor speech and auditory developmental milestones, and help discover caregiver concerns. Paper screening forms are found in the Appendices.

Referral Criteria:

PASS

Children for whom no risk factors for hearing loss are identified do not require referral.

REFER

Children who pass their newborn hearing screen but have a risk factor for hearing loss should be referred to an audiologist (ideally one specializing in pediatrics) for at least one diagnostic audiology assessment by age 24 to 30 months or as soon as a concern is identified. Infants and children with specific risk factors, such as those who received ECMO therapy and those with CMV infection, have a higher risk of delayed onset or progressive hearing loss and require ongoing monitoring by an audiologist as soon as a concern is identified.

Automated Auditory Brainstem Response

Ages: Infant

Overview: Automated 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. It is recommended that the screening level be 35 dB nHL or softer.

Automated ABR (AABR) 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.

Equipment: AABR hearing screener; approximate cost $20,000; requires annual calibration.

Procedure: Place electrodes on patient's head and place headphones on patient's ears as instructed in equipment manual. Check impedance levels and begin testing.

Referral criteria:
PASS
Equipment reads "PASS" for both ears.

REFER
Refer if either ear displays a "REFER" result; refer if unable to screen due to excessive noise, movement or inability to complete testing.

Helpful tips:

- Conduct the AABR in a quiet environment.
- Infant should be sleeping or very calm. Immediately after feeding is a good time to test.
- Swaddle the infant to minimize startling movements.
- Minimize electrical interference by unplugging other devices nearby.
- Use a pacifier to calm the infant if necessary, but the sucking motion can also cause myogenic interference, so use pacifiers sparingly.

Otoacoustic Emissions (OAE)

Ages: 0 to 5; appropriate for older students unable to perform pure tone screening

Overview: Otoacoustic emission screening (OAEs) are performed on newborns and children who cannot be conditioned for pure tone testing. OAEs are low-intensity sounds produced by normal, healthy ears. These sounds are produced either spontaneously or in response to an acoustic signal. The OAE originates in the inner ear (cochlea) from the outer hair cells in the cochlea. The response also requires normal or near-normal middle ear functioning. A small probe (foam or rubber) is placed in the child's ear. A soft sound is presented, and the ear produces an emission or echo response. This response is measured with a small microphone that is in the probe.

Otoacoustic emissions (OAE) hearing screening has been approved as an alternative test for students who are unable to complete a pure-tone screening either due to young age or physical or developmental challenges. OAE testing is not a substitute for pure-tone screening for other students. It is important to document why the child was not tested with pure-tone screening. OAEs are approved as an optional test procedure. They are not required. Some school districts with large preschool and/or special education populations may want to consider utilizing OAE testing.

Equipment: Automated DPOAE or TEOAE screening device; approximate cost $3400-4000; requires disposable probe tips; requires annual calibration.

Procedure:

1. Select the appropriate environment.
    a. Choose a time and setting comfortable to the child and where movement by the child will be minimal. If doing other health screenings, conduct OAE screening first.
    b. Reduce noise from external (loud talking, toys, fans, etc.) and internal (sounds from child being screened such as talking, laughing, etc.) sources as much as possible for faster and easier screening.
2. Visually inspect the outer ear to make sure there are no obvious signs of infection, blockage or physical anomaly.
3. After noting the size of the ear canal opening, select a probe tip that will fit snugly in the child's ear.
4. Place probe in the child's ear canal. The probe delivers a low-volume sound into the ear. In approximately 30 seconds, the result is displayed on the computer screen.
5. Read the results on the screen (Pass or Refer).

Referral Criteria: Pass/Refer criteria on OAE screening differs among manufacturers based on test protocol and normative data. Use the manufacturer's default pass/refer criteria specific to the equipment used.

PASS
Equipment reads "PASS" for both ears.

REFER
Refer if either ear displays a "REFER" result; refer if unable to screen due to excessive noise, movement or inability to place probe.

Helpful Tips:

- Check the equipment, including all cords, at the beginning of each screening day either by screening your own ear or using the equipment's probe calibration check procedure. Discontinue if any problems are found.
- Engage the child in a quiet distraction such as a visually interesting toy or elicit help from another adult to keep the child still, quiet, and hands away from their ears. Try to create a fun feeling if possible.
- If the child is afraid or unsure of the probe, familiarize by gently touching it to the child's arm, hand or cheek to point out how soft it is. Have the child "help" screen a doll or stuffed animal.
- Do not hold the probe in the ear canal for an extended period of time as that increases the potential for high noise level or movement.
- Screener may screen a sleeping child during nap time.

Pure Tone Screening

Ages: 5+; appropriate for younger students who can be reliably conditioned to respond

Overview: Pure tone signals are presented across different frequencies, and responses to the signals typically include a hand raise or a conditioned response such as dropping a block in a bucket.

Equipment: Pure tone audiometer; approximate cost: $1000; requires annual calibration; cleaning cloths for headphones are recommended.

Procedure:

1. Select an appropriate environment.
    a. Choose a quiet setting; evaluate your test environment during normal hours so concerns can be identified; test away from halls, windows, cafeterias, gyms, HVAC equipment, bathrooms, and play areas; limit visual distractions.
    b. Consider checking noise level with a sound level meter (SLM) or SLM smartphone app.
    c. DO NOT PROCEED with screening if noise levels are too loud (greater than 50dBA).
2. Visually inspect the outer ear; remove glasses or headbands; tuck hair or headscarf behind ears.
3. Instruct or condition the child.
4. Place headphones; red headphone on right ear, blue headphone on left ear.
5. Perform age-appropriate pure tone sweep at 20 decibels (dB) at the recommended frequencies. (Speech stimuli are not recommended for use.)
6. Present a tone (approximately 3 seconds long) more than once but no more than 4 times.
7. Lack of responses at any frequency in either ear constitutes a failure.

Helpful Tips:

- Perform a daily listening and visual check of the audiometer; inspect the headphones, cords and buttons; listen for noise while pressing buttons; ensure screening tones can be heard; if any problem is found, discontinue screening.
- Use conditioned play techniques with younger children who need more concrete response options (drop a block in the bucket or put a peg in the pegboard when sound is heard).
- Use of warble tone stimulus (instead of steady pure tone stimulus) is acceptable and may be helpful in certain situations.
- Repositioning the headphones may be necessary in some individuals.

Referral Criteria:

PASS

The child responds at each frequency at the screening level.

REFER

Refer if the child fails to respond to one or more tones presented.

Tympanometry

Ages: Any age, but particularly useful in early childhood (not appropriate for infants under 6 months)

Overview: Not a test of hearing. Used to screen outer and middle ear functions (ear canal, eardrum, bones of middle ear and Eustachian tube) and helps delineate referral for a medical evaluation versus an audiology evaluation. Should be used after OAE or pure tone referral as an optional second-stage screening.

Equipment: Automated tympanometer; approximate cost $4000; requires disposable probe tips; requires annual calibration; some combined into device with audiometer.

Procedure:

1. Conduct a visual inspection.
2. Select the appropriate size probe tip.
3. Place against the ear canal and hold steady to maintain seal.
4. Review and interpret results based on type of equipment.
    a. Automated equipment will report “pass” or “refer”
    b. Non-automated equipment refer criteria: >250 daPa tympanometric width for children 3–12 years of age and >275 da Pa tympanometric width for children below age 3. If the use of tympanometric width is not possible, <0.2 mmhos static compliance is recommended (AAA, 2011).

Helpful Tips:

- Check calibration of machine daily, inspect all cords, and discontinue if problems are found.
- Use tympanometry as an immediate “next step” screening following failure of pure tone or OAE screening to help clarify the nature of the failure and most efficient referral protocol.
- Repeat the screening if a flat tympanogram (no observable peak on graph) is obtained.
- A flat tympanogram in conjunction with ear canal volume greater than 1.0 cm3 can indicate patent pressure equalizer (PE) tubes or perforated eardrum.
- A flat tympanogram with a small ear canal volume (less than 0.4 cm3) may indicate occlusion of the ear canal, possibly due to cerumen (earwax) build-up.
- An airtight seal may not be obtained in the presence of PE tubes or a perforated eardrum; do not keep trying to obtain the seal.
- Tympanometry screening may be most appropriately performed by audiologist during rescreening, especially for public school screening programs.
- Referrals should not be made on failed tympanometry screening alone.

Referral Criteria:

A refer on OAE or pure tone screening PLUS a referral on tympanometry screening warrants medical referral and/or rescreening in 6-8 weeks (depending upon specific program referral protocol).

State Hearing Screening Programs

Universal Newborn Hearing Screening

Overview: Early Hearing Detection and Intervention (EHDI) refers to the practice of screening every newborn for hearing loss prior to hospital discharge. Infants not passing the screening receive diagnostic evaluation before three months of age and, upon diagnosis, are enrolled in early intervention programs by six months of age.

Trained personnel at each medical care facility shall provide an initial hearing screening using ABR, AABR, and OAE, in combination or alone. Infants with a well-nursery status born in a birthing facility shall be screened for hearing prior to hospital discharge. Infants in the Neonatal Intensive Care Unit shall be screened when medically able, prior to hospital discharge. Infants born outside of a hospital setting or by a birthing attendant shall be screened for hearing loss within one month of age.

Universal 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 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 hospital and includes testing to confirm hearing loss, determine the degree of hearing loss, and complete other audiologic procedures (JCIH, 2019; AAP, 2007).

I. ESSENTIAL REQUIREMENTS

All newborns in Kansas shall have their hearing screened before one month of age, preferably prior to discharge from the birthing facility. The birthing facility is the most efficient and cost-effective environment for newborn hearing screening. Audiologists can train and direct other health care personnel in the implementation of a newborn hearing screening program.

II. TRAINING AND CERTIFICATION

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.

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.

III. SCREENING METHODS AND FOLLOW UP

A. Automated ABR (AABR) - REQUIRED FOR INFANTS IN NICU (JCIH, 2019; KSA 65-1,157a)

B. Auditory Brainstem Response (ABR)

C. Otoacoustic Emissions (OAE)

IV. 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.

A. 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. KSA 65-1,157a 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 and sent to the KDHE-EHDI.

B. Initial Hearing Screening (Prior to Hospital Discharge) Stage One

i. Screen all infants if medically able.
ii. 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.
iii. Give all parents information about their child's hearing screening results and the role of hearing in the infant's development.
iv. 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.
v. Report all initial hearing screening results to KDHE-EHDI program via electronic birth certificate.

NICU/Medically Fragile Infants

Infants who are transferred immediately after birth to the NICU at another hospital generally will not have completed hearing screening 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 has been completed and that the results are reported to KDHE. Specific NICU hearing screening protocols should be developed outlining use of AABR at each facility. 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.

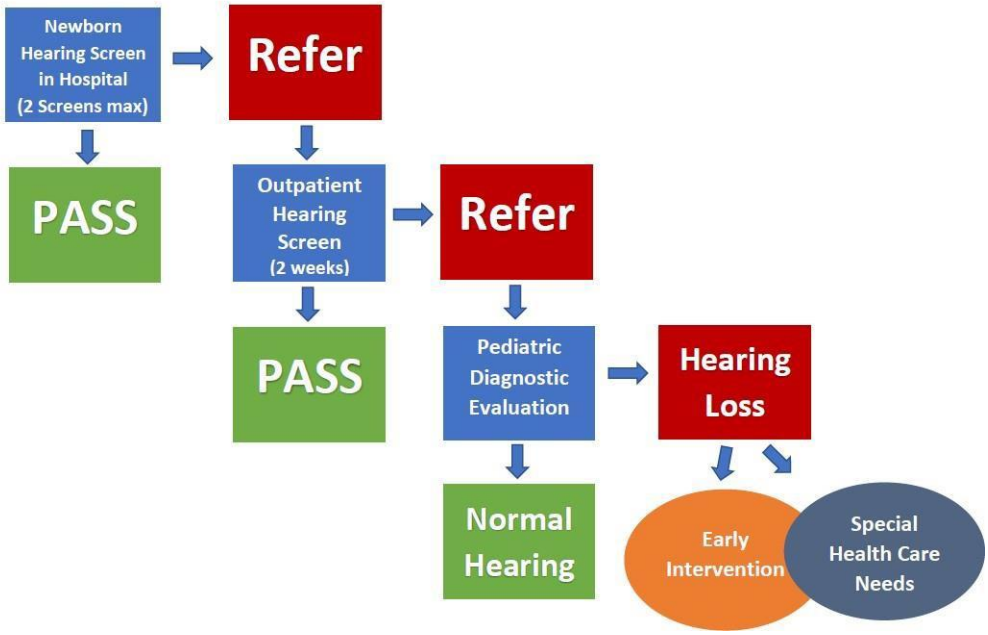
C. Outpatient Screening Stage Two

i. The outpatient screening should be completed no later than one month of age.
ii. Outpatient screening may take place at the birthing facility, an outpatient clinic/physician's office, or community organizations serving the birth to three population.
iii. Notify the infant's primary care physician of the infant's hearing screening results (pass, did not pass/refer or missed appointment).
iv. Give parents information about their infant's hearing screening results and the role of hearing in infant development.
v. Outpatient hearing screening results must be reported to KDHE-EHDI within seven days according to Kansas Administrative Regulation 28-4-605-611.
vi. If the infant does not pass the outpatient screening:
    - the outpatient facility shall give parents a list of professionals who identify themselves as capable of providing diagnostic audiologic testing.
    - the outpatient facility and/or primary care physician may assist the parents in obtaining referral for diagnostic audiologic testing; and the outpatient facility and/or primary care physician may assist families by identifying state or community resources available for assistance in the evaluation process.

Missed Appointments

All families who do not return for a follow-up appointment must be contacted and at least two attempts at contacting the family to reschedule the appointment should be documented (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 reschedule the missed appointment.

Newborn Hearing Screening Process



V. BIRTHING FACILITY AND MANAGER/COORDINATOR RESPONSIBILITIES IN NHS PROGRAMS

Each birthing facility should designate an on-site Manager/Coordinator of the Newborn Hearing Screening program. The on-site Manager/Coordinator of the Newborn Hearing Screening program should be responsible for the following: budgeting, ordering, and maintaining necessary equipment and supplies; coordinating/supervising personnel providing screening including ongoing monitoring of competency; training all screening personnel; assessing the performance of the program on a regular basis; and overseeing data management and transfer as required.

Birthing Facility Newborn Hearing Screening Program Goals:

1. One hundred percent of infants with parental consent receive a hearing screening.
2. Using AABR, the percent of well-baby infants referred for further testing should be less than 4%.
3. Using OAE, the percent of well-baby infants referred for further testing should be less than 8-10%.
4. Document 100% of attempted contacts with families of infants needing follow-up.

VI. NOTIFICATION OF RESULTS

The hearing screening results and audiological evaluations must be communicated effectively. Following the hearing screening, there are four primary settings where communication is significant.

A. **Newborn's Primary Care Physician** There should be a letter or copy of the hospital documentation record of the hearing screening sent to the infant's primary care physician. Physicians should also be notified if the infant's hearing was not screened, and when appointments for outpatient hearing screening were missed. Facilities may choose to provide monthly lists of infants screened and results.

B. **Birthing Facility to Family Communication** In communicating screening results to parents, it is important that they know if the child passed or was referred for additional testing. It is just as important that parents know what the screening results mean and what they need to do next. The best time to communicate the screening results is immediately following the screening so questions can be answered immediately. Communication to the family should include information in as many different forms as possible. Possible forms of communication include: brochures or pamphlets that have a space to record screening results and provide information about speech-language and auditory developmental milestones, cards or forms to schedule follow-up appointments, and letters sent to parents who missed the rescreening appointment.

C. **Birthing Facility Documentation** It is important to make sure that the screening results are documented in the permanent hospital medical record.

D. **Kansas Department of Health - Early Hearing Detection and Intervention Program (KDHE-EHDI)** Screening results shall be reported on the birth certificate, either electronically (Electronic Birth Certificate System or "EBC") or to the state by fax or email. For those infants in newborn intensive care units (NICU), the Newborn Hearing Screening Report form will be used. Data can be transmitted via secure internet or by fax.

   Outpatient screening results and audiological diagnostic evaluation reports must be reported to the KDHE-EHDI program **within 7 days** of the evaluation as mandated in K.A.R 28-4-605-611.

tiny-k Services (Part C)

Overview: tiny-k Services are a statewide system of coordinated, comprehensive, multidisciplinary early intervention services under IDEA Part C. Their services support infants and toddlers with developmental delays and disabilities (birth to three) and their families. Infants and toddlers may also be screened through child find activities. Infants and toddlers who have a confirmed hearing loss are considered 'established risk' and may qualify for services. For children who qualify, these services are free to families.

I. ESSENTIAL REQUIREMENTS

Infants and toddlers are screened upon initial evaluation processes and, if receiving services, at least annually. All children who receive an initial Part C evaluation who have not had hearing screening within the last six months should be screened for hearing loss using OAE technology with or without integrated tympanometry.

Children enrolled in tiny-k Services shall be screened at least **each year** he/she is enrolled in the program because there is a possibility of progressive, late–onset, and newly acquired hearing losses in children.

II. TRAINING AND CERTIFICATION REQUIREMENTS

Any person who is conducting tiny-k hearing screenings should be certified as a hearing screening technician.

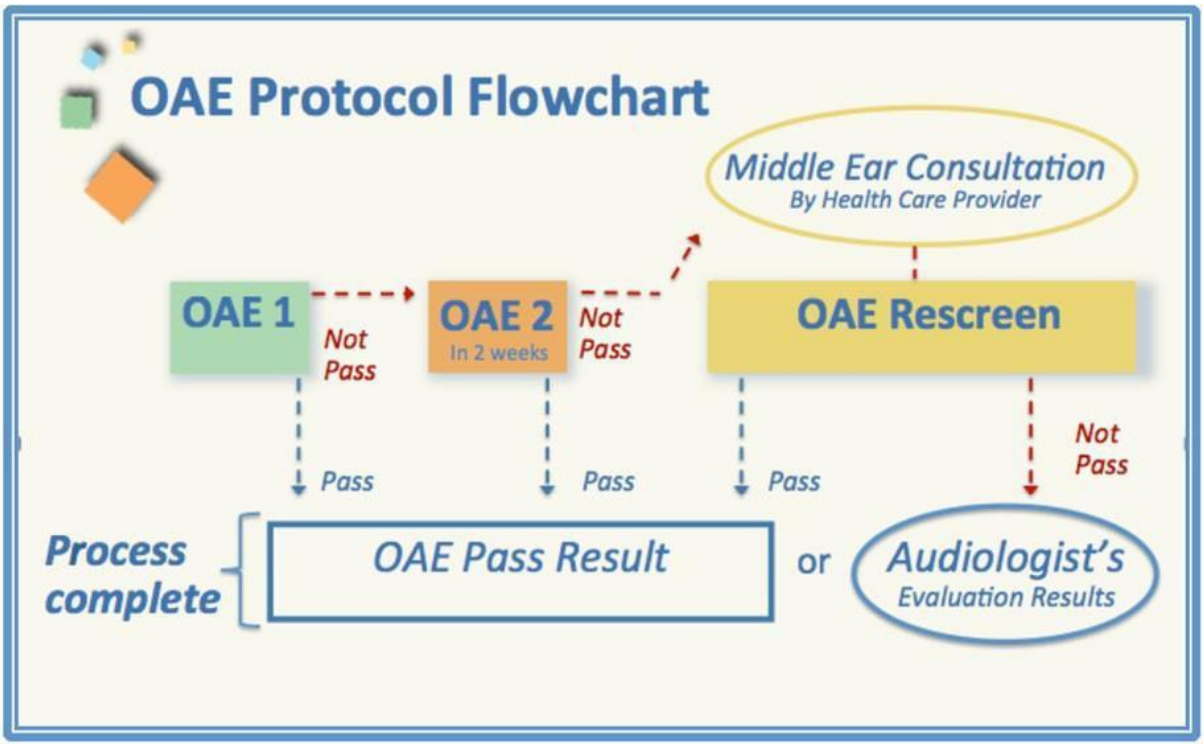
A. **tiny-k Screening Technician** is defined as any *tiny-k Services* employee trained by a licensed audiologist with pediatric experience to perform OAE hearing screenings. The certified technician administers hearing screens and an initial screening of the health and function of the ear. The training designates the level of competency. Any person assigned to do hearing screening is required to hold the appropriate certification.

B. **Training:** Any person who is assigned to do hearing screening is required to hold the appropriate level of certification. *tiny-k* Screening Technician certification should be conducted by a licensed audiologist with pediatric experience. Questions regarding training and educational materials can be directed to the Kansas Department of Health and Environment Part C Coordinator.

C. **Recertification:** Participants shall repeat certification training if they have not been actively performing hearing screening in the past twelve months.

III. SCREENING METHODS AND FOLLOW-UP

A. tiny-k Services Paper Hearing Screening -REQUIRED
B. Otoacoustic Emissions Screening - REQUIRED
C. Visual Ear Inspection - RECOMMENDED
D. Tympanometry - RECOMMENDED



IV. NOTIFICATION OF RESULTS

A. The hearing screening results and audiological evaluations must be communicated effectively to the following entities.

1. **Program to Family Communication** In communicating screening results to parents, it is important that they know if the child passed or was referred for additional testing. It is just as important that parents know what the screening results mean and what they need to do next. The best time to communicate the screening results is immediately following the screening so questions can be answered immediately. Communication to the family should include information in as many different forms as possible. Acceptable forms of communication include: brochures or pamphlets that have a space to record screening results and provide information about speech-language and auditory developmental milestones, cards or forms to schedule follow-up appointments, and letters sent to parents who missed the rescreening appointment. Parents are encouraged to share hearing screening results with the child's primary care provider.

2. **Program Documentation** It is important to make sure that the screening results are documented in the early intervention record.

V. RECORDKEEPING, DATA COLLECTION, AND QUALITY IMPROVEMENT

Kan Be Healthy

Overview: Kan Be Healthy Early and Periodic Screening, Diagnostic, and Treatment (EPSDT) is a state and federally funded insurance plan that provides comprehensive and preventive health care services for Kansas children who are enrolled in Medicaid. Title XIX EPSDT provides services to children under age 21, Title XXI serves children under age 19 who are enrolled in the Children's Health Insurance Plan (CHIP). In Kansas, the EPSDT program is called Kan Be Healthy (KBH). KBH members are typically enrolled in one of three Managed Care Organizations (MCOs) that provide all state Medicaid services. There is a small percentage of members that will be fee-for-service (FFS) for short periods of time, which requires providers to follow the FFS billing guidelines and processes.

I. ESSENTIAL REQUIREMENTS

Kan Be Healthy hearing screenings include identification of diagnosis, referral and treatment for defects in hearing, including hearing aids and are a required component of each Kan Be Healthy (KBH)/Early and Periodic Screening, Diagnostic, and Treatment program visit based on the American Academy of Pediatrics (AAP) Periodicity Schedule. Kansas follows the Bright Futures periodicity schedule from the AAP, which is a CMS-approved schedule of pediatric preventive services. The hearing screening schedule is located on the Bright Futures website.

Providers who may screen KBH members include:

- Physicians
- Advanced Practice Registered Nurses
- Physician Assistants
- Registered Nurses (supervised by physicians or mid-level practitioners)

II. TRAINING AND CERTIFICATION REQUIREMENTS

Any person who is conducting KBH hearing screenings should be trained as a hearing screener appropriate for their work setting and population served.

A. **OAE Screening Technicians** - OAE Screening Technician certification should be conducted by an approved licensed audiologist. KU AHEC includes this in Level 1 training. Questions regarding training and educational materials can be directed to the Kansas Department of Health and Environment.

B. **Audiometry** – KU AHEC provides this in Level 1 training.

C. **Tympanometry** - KU AHEC provides this in Level 2 training.

III. SCREENING METHODS

A. **Paper Screen**

Providers are free to use whatever documenting forms they prefer as long as all of the elements required by Bright Futures periodicity schedule screenings are met. The State does not dictate which forms providers must use. Suggested forms are available at the KMAP website should providers choose to use them.

For **birth to age 4**, the following checklists may be used:
Kan Be Healthy - Risk Indicators for Hearing Loss Checklist - Birth to Age Four
Kan Be Healthy - Developmental Scales Checklist - Birth to Age 4

For children **age 5 through age 20,** the following form can be used: Kan Be Healthy - Hearing Health History Form - Age 5 and Up. Any "Yes" answers on this form require a referral for further evaluation. Referrals must be documented, and documentation must include the component referred and the provider to whom the child was referred.

The paper hearing screening forms listed above (or documentation listing same criteria) must be maintained in the child's permanent medical record.

In the event the KBH screener determines the child has not passed the paper hearing screen, a referral for further evaluation is required.

While the minimum required for Kan Be Healthy assessments is a paper screen, if a provider has staff trained and certified and calibrated equipment to perform the following, these methods may be used for screening:

B. Visual Ear Inspection
C. Otoacoustic Emissions
D. Pure Tone Screening

The following procedures qualify as allowed KBH hearing screens:

- Play audiometry for age 2-4
- Audiometric sweep screen for age 4 and older
- Screening test, pure tone and air only
- Pure tone audiometry
- Pure tone audiometry – air and bone
- Speech audiometry – threshold only
- Speech audiometry with speech recognition
- Comprehensive audiometry threshold evaluation
- Conditioned play audiometry

Note*:* Documentation must include testing parameters, interpretation and results.

i. Rescreen

A child whose test results indicate "refer" on the rescreen shall be referred for a medical evaluation.

ii. Medical Evaluation

An evaluation by the child's primary care physician to rule out infection, fluid, or blockage is required. The family receives a letter which includes a form for the parents to take to the doctor to fill out and return. It includes any findings the doctor found and whether further treatment is needed. Rescreening after medical clearance is extremely important. If the child "refers" after the medical evaluation, he/she shall be referred for an audiological evaluation with a pediatric audiologist.

E. **Audiological Evaluation**

The pediatric audiologist will conduct further tests to determine if the child has hearing loss and, if so, to what extent.

F. **Ongoing Care**

A program must implement periodic observations or other appropriate strategies for program staff and parents to identify any new or recurring hearing concerns.

G. **Extended Follow-up Care**

A program should provide referral sources to assist with facilitation of: further diagnostic testing, evaluation, and treatment when a child has abnormal hearing screening results. A program should develop a system to track referrals and services provided and monitor the follow-up plan. A program may assist parents, as needed, in obtaining equipment for diagnosed hearing loss, such as hearing aids.

IV. NOTIFICATION OF RESULTS

The hearing screening results, rescreens and audiological evaluations must be communicated effectively. Following the hearing screening, there are three primary settings where communication is significant.

A. **Primary Care Physician** Notify primary care physician of hearing screening results and any follow-up care, including referrals to outside providers, if necessary. If the child does not have a PCP, connect them with available providers in their area.
B. **Program to Family Communication** In communicating screening results to parents, it is important that they know if the child passed or was referred for additional testing. It is just as important that parents know what the screening results mean and what they need to do next. The best time to communicate the screening results is immediately following the screening so questions can be answered immediately. Communication to the family should include information in as many different forms as possible. Possible forms of communication include: brochures or pamphlets that have a space to record screening results and provide information about speech-language and auditory developmental milestones, cards or forms to schedule follow-up appointments, and letters sent to parents who missed the rescreening appointment.
C. **Program Documentation** It is important to make sure that the screening results are documented in the permanent medical record.

V. RECORDKEEPING, DATA COLLECTION, AND QUALITY IMPROVEMENT

Preschool Children

Head Start/Early Head Start

Overview: With over 40,000 Kansas children--our most vulnerable citizens--living in poverty, Kansas Head Start/Early Head Start programs are dedicated to overcoming the risk factors that perpetuate multi-generational poverty. Local programs may be a part of the school district, an Indian tribe, or a local non-profit. Head Start/Early Head Start programs provide comprehensive services for children ages 0-5.

I. ESSENTIAL REQUIREMENTS

Each program must either obtain hearing screening results or perform a hearing screening within the first 45 days of a child's program attendance. Children who continue in Early Head Start are not required to be screened again until they enter Head Start. Screenings may be completed by health assistants, nurses or nursing students.

II. TRAINING REQUIREMENTS

OAE Screeners must complete the online training provided by the Early Childhood Hearing Outreach (ECHO) Initiative through the National Center for Hearing Assessment and Management, provided by Utah State University.
https://www.infanthearing.org/earlychildhood/

III. SCREENING METHODS AND FOLLOW-UP

A. Visual Ear Inspection **- REQUIRED**
B. Otoacoustic Emissions **OR** Pure Tone Screening **- REQUIRED**

IV. NOTIFICATION OF RESULTS

The hearing screening results, rescreens and audiological evaluations must be communicated effectively. Following the hearing screening, there are two primary settings where communication is significant.

A. **Program to Family Communication** In communicating screening results to parents, it is important that they know if the child passed or was referred for additional testing. It is just as important that parents know what the screening results mean and what they need to do next. The best time to communicate the screening results is immediately following the screening so questions can be answered immediately. Communication to the family should include information in as many different forms as possible. Possible forms of communication include: brochures or pamphlets that have a space to record screening results and provide information about speech-language and auditory developmental milestones, cards or forms to schedule follow-up appointments, and letters sent to parents who missed the rescreening appointment

B. **Program Documentation** It is important to make sure that the screening results are documented in the child's permanent record.

V. RECORDKEEPING, DATA COLLECTION, AND QUALITY IMPROVEMENT

Parents as Teachers

Overview: Parents as Teachers (PAT) promotes the optimal early development, learning and health of children by supporting and engaging their parents and caregivers. Parents as Teachers builds strong communities, thriving families and children who are healthy, safe and ready to learn by matching parents and caregivers with trained professionals who make regular personal visits during a child's earliest years in life, from prenatal through kindergarten.

I. ESSENTIAL REQUIREMENTS

Child health review, including hearing screening, is completed within 90 days of family enrollment or child's birth, and at least annually thereafter.

II. TRAINING REQUIREMENTS

Any person who is conducting PAT hearing screenings should be trained as a hearing screener at the level appropriate for their work setting and population served.

A. **Hearing Screening Technician** is defined as any parent educator trained by a licensed audiologist with pediatric experience to perform OAE hearing screenings. The certified technician administers hearing screens and an initial screening of the health and function of the ear. The training designates the level of competency. Any person assigned to do hearing screening is required to hold the appropriate certification.

B. **Training:** Any person who is assigned to do hearing screening is required to hold the appropriate level of certification. Hearing Screening Technician certification should be conducted by a licensed audiologist with pediatric experience. Questions regarding training and educational materials can be directed to the Kansas Department of Health and Environment Part C Coordinator.

C. **Recertification:** Participants shall repeat certification training if they have not been actively screening in the past twelve months.

III. SCREENING METHODS AND FOLLOW-UP

A. Child Health Record (Hearing Review) **- REQUIRED**

B. Otoacoustic Emission **- REQUIRED**

IV. NOTIFICATION OF RESULTS

The hearing screening results, rescreens and audiological evaluations must be communicated effectively. Following the hearing screening, there are two primary settings where communication is significant.

A. **Program to Family Communication** In communicating screening results to parents, it is important that they know if the child passed or was referred for additional testing. It is just as important that parents know what the screening results mean and what they need to do next. The best time to communicate the screening results is immediately following the screening so questions can be answered immediately. Communication to the family should include information

in as many different forms as possible. It is the parent's responsibility to inform the child's primary care provider of the screen results.

Possible forms of communication include:

1. OAE Hearing Screening Form
2. Printed results from OAE screening equipment
3. Brochures/pamphlets with a place to enter results and next steps for follow-up.

B. Program Documentation It is important to make sure that the screening results are documented in the child's permanent record.

V. RECORDKEEPING, DATA COLLECTION, AND QUALITY IMPROVEMENT

School-Aged Children (Part B)

Overview: School-age hearing screenings are an integral tool in identifying children with hearing loss who were not identified at birth, lost to follow-up, or who developed hearing loss later in life. Without mandated routine hearing screenings in schools, students with unilateral, less severe or late onset hearing loss may not be identified or will be misdiagnosed and managed. Efforts to provide consistent protocols, screener training and follow-up through school-age help ensure that children with hearing loss are identified and managed in a timely manner, and thereby minimize negative academic consequences.

I. ESSENTIAL REQUIREMENTS

PRESCHOOLERS: Preschoolers attending a school-based program shall be screened each year he/she is enrolled in preschool. Children who cannot be screened using approved and/or optional methods shall be referred for a complete medical/audiological evaluation. Between the ages of 2 ½ and 5 years (not yet in kindergarten), tympanometry is recommended for students who do not pass OAE screening or do not pass pure tone screening at 20 dB at 500 Hz.

KINDERGARTEN - AGE 21: Pure Tone Screening for all enrolled school children during the first year of admission and, not less than, once every 3 years [K.S.A.72-1205(a)]. More frequent screening (e.g. every two years) is recommended, especially through second grade.

In addition, the following school children shall be screened annually or upon occurrence:

- Students new to a school (and not tested within the past 12 months).
- Students returning to school after an extended absence.
- Students who are undergoing initial evaluation for special education services.
- Students referred by a teacher or other school personnel.
- Students who were referred within the past year with no documented follow-up, regardless of grade.
- Students absent during the previous hearing screening.
- Students who request a hearing screening.
- Students whose parent/caregiver requests a hearing screening.

Children who should not be included in school hearing screening programs
Students who wear hearing aids and/or cochlear implants **should not be screened** and should be seen by an audiologist for assessment and ongoing monitoring, preferably annually. It is critical that the school collaborates with the child's parents, the child's clinical audiologist, and/or the school district's educational audiologist/nursing services for any recommendations and modifications.

II. TRAINING

Any person who is conducting school hearing screenings should be competent as a trained hearing screener appropriate for their work setting and population served.

Hearing Screening Technicians are individuals trained to perform Otoscopy, Pure tone Screening, Tympanometry, and Otoacoustic Emission Screenings. Questions regarding the Hearing Screening Technician training and educational materials can be directed to the University of Kansas Area Health Education Center (KU AHEC) Program Manager or a licensed audiologist with pediatric experience. Training may include one or more of the following procedures: Otoscopy, Pure tone Audiometry, Otoacoustic Emission Screenings, and Tympanometry.

The School Hearing Screening Certification Training Manual is under revision.

III. SCREENING METHODS AND FOLLOW UP

Accounting for the needs and resources of diverse programs across Kansas, the test protocol for students may vary. The following different types of hearing screenings are available to identify children who may require further evaluation.

A. Pure-Tone Screening

1. Conduct this type of hearing screening for all enrolled school children during the first year of admission and, not less than, once every 3 years [K.S.A.72-)6229(a)]. More frequent screening (e.g. every two years) is recommended, especially through second grade.

REFERRAL CRITERIA:

PASS

Child responds at 20 dB at all required frequencies.

REFER

Failure to respond at any one frequency in either ear.

B. Tympanometry

1. Preschoolers: If OAE screen or 500 Hz pure tone screen is not passed, tympanometry should be performed.
2. Kindergarten through age eight (or 3rd grade): If 500 Hz pure tone screen is not passed, tympanometry should be performed.

REFERRAL CRITERIA:

PASS

Automated equipment will report “pass.” Non-automated equipment pass criteria: <250 daPa tympanometric width for children 3–12 years of age and <275 da Pa tympanometric width for children below age 3. If the use of tympanometric width is not possible, >0.2 mmhos static compliance is recommended (AAA, 2011).

REFER

Automated equipment will report “refer.” Non-automated equipment refer criteria: >250 daPa tympanometric width for children 3–12 years of age and >275 da Pa tympanometric width for children below age 3. If the use of tympanometric width is not possible, <0.2 mmhos static compliance is recommended (AAA, 2011).

C. Otoacoustic Emissions (OAE) Screening

1. Otoacoustic Emissions (OAE) Screening is:
    a) conducted with an initial OAE on both ears if the child is between the ages of 2 ½ and 5 if pure tone screening is not performed.
    b) conducted with an initial OAE on both ears if a child cannot be conditioned to pure tone screening at any age.

REFERRAL CRITERIA: Pass/Refer criteria on OAE screening differs among manufacturers based on test protocol and normative data. Use the manufacturer's default pass/refer criteria specific to the equipment used.

PASS
Equipment reads "PASS" for both ears.

REFER
Refer if either ear displays a "REFER" result; refer if unable to screen due to excessive noise, movement or inability to place probe.

Age of Child	Decibel Level	Frequencies to Screen using Pure Tone Screening	Alternative test method	Tympanometry
2½ to 5 years (not yet in kindergarten)	20 dB	500, 1000, 2000, 4000 Hz	OAE	Required only for students who do not pass OAEs or pure tone screening at 500 Hz
5-8 years (or 3rd grade)	20 dB	500, 1000, 2000, 4000 Hz	OAE	Required only for students who do not pass pure tone screening at 500 Hz or OAEs
9 years (4th grade) and up	20 dB	1000, 2000, 4000, 6000 Hz	OAE/500 Hz	Not necessary

IV. NOTIFICATION OF RESULTS

A. Program to Family Communication Parents need to be informed of hearing screening results. Kansas schools must follow the state law, "The results of the test and, if necessary, the desirability of examinations by a qualified physician shall be reported to the parents or guardians of such pupils" [K.S.A.72-6229(d)].

B. Program Documentation It is important to make sure that the screening results are documented in the child's permanent educational record.

V. RECORDKEEPING, DATA COLLECTION, AND QUALITY IMPROVEMENT

Referral Protocol and Follow Up

Hearing screening is an effective method of identifying children at risk for hearing loss. Screening programs should stress that screening is not a diagnostic hearing evaluation and will not detect all hearing problems. Parents/caregivers of children screened should be informed of the limitations of the screening.

Routinely, referrals should be made only following a second screening. In general, some children will pass the second screening, reducing the over-referral rate. Use the referral chart to determine the appropriate referral indicated.

Next Steps after Screening:

Otoscopy	Pure Tone Screen or OAE	Tympanometry	Next steps after Initial Screening:	Next steps after Rescreening:
Pass	Pass	Pass	None	N/A
Pass	Pass	Fail/Abnormal	Medical referral	Rescreen after medical clearance
Fail	Pass or fail	Pass or fail	Medical referral	Rescreen after medical clearance
Pass	Fail	Fail	Rescreen in 2-4 weeks	Medical referral
Pass	Fail	Fail	Rescreen in 2-4 weeks	Refer to pediatric audiologist

a. Rescreen

- Students who fail initial pure tone/OAE screening should be rescreened in 2-4 weeks. If students continue to fail pure tone/OAE screening, a referral should be made for medical evaluation or audiological evaluation according to the chart above.
- Students with abnormal otoscopy findings should be referred immediately for medical evaluation. Rescreening occurs after medical intervention.

b. Medical Evaluation

An evaluation by the child's primary care physician to rule out perforation, infection, fluid, or blockage is required. The family receives a letter which includes a form for the parents to take to the doctor to fill out and return. It includes any medical findings and whether further treatment is needed. Rescreening after medical clearance is extremely important. If the child fails pure tone/OAE screening after the medical evaluation, he/she shall be referred for an audiological evaluation with a pediatric audiologist.

c. Audiological Evaluation

Following failed pure tone or OAE screening, the pediatric audiologist will conduct further tests to diagnose hearing loss, if present. In addition, if the screening technician is unable to obtain reliable results, referral to the audiologist is recommended.

d. Extended Follow-Up Care

A program should provide referral sources to assist with facilitation of: further diagnostic testing, evaluation, and treatment when a child has abnormal hearing screening results. A program should develop a system to track referrals and services provided and monitor the follow-up plan. A program may assist parents, as needed, in obtaining equipment for diagnosed hearing loss, such as hearing aids.

Screening Program Management

Screener Qualifications and Training

Any person who is assigned to conduct hearing screening is required to hold the appropriate level of certification. This includes nurses, audiology assistants, technicians, health care assistants, other allied health personnel, and other persons specifically trained to screen children for hearing loss.

Personnel with the appropriate training who may conduct the hearing screening:

- Physicians (Audiometry, Tympanometry, OAE)
- Audiologists
- Speech-language pathologists (Audiometry, Tympanometry, OAE)
- RNs and LPNs (Audiometry, Tympanometry, OAE)
- Support Personnel (OAE, AABR)
- Hearing Screening Technician (Audiometry, Tympanometry, OAE)
- OAE Screening Technician (OAE and Tympanometry)

Support personnel are individuals who are selected and trained to operate devices used to screen the hearing of newborns. Training is performed by the birthing facilities under the direction of the Kansas Department of Health, Early Hearing Detection and Intervention Program.

OAE Screening Technicians are individuals trained to perform Otoacoustic Emissions screening. Questions regarding the OAE Screening Technician training and educational materials can be directed to the Kansas Department of Health, Early Hearing Detection and Intervention Program or a licensed audiologist with pediatric experience.

tiny-k Part C Screening Technicians are individuals trained to perform Tympanometry and Otoacoustic Emissions screening. Questions regarding the OAE Screening Technician training and educational materials can be directed to the Kansas Department of Health, Early Hearing Detection and Intervention Program or a licensed audiologist with pediatric experience.

Hearing Screening Technicians are individuals trained to perform Pure tone Audiometry, Tympanometry, and Otoacoustic Emissions Screenings. This includes RNs, LPNs, Speech-Language Pathologists, Physicians, and other individuals who have completed Hearing Screening Technician training. Questions regarding the Hearing Screening Technician training and educational materials can be directed to the Area Health Education Center Program Manager or a licensed audiologist with pediatric experience.

When participants have completed training and demonstrated competencies, they are ready to conduct hearing screenings, according to state law [K.S.A. 72-1205(d)].

Hearing Screening Training

tiny-k Part C Screening Technicians and OAE Screening Technicians – OAE screening renewal training should be attended only if the technician has not been actively screening for over 12 months.

Hearing Screening Technicians - When participants have completed training and demonstrated competencies, they are ready to conduct hearing screenings, according to state law [K.S.A. 72-1205(d)].

Equipment Selection and Calibration

Annual calibration of hearing screening equipment is recommended by the U.S. Occupational Health and Safety Administration (OSHA), the National Institutes of Health (NIH) and the Kansas Department of Health. Different factors such as age of the machine, frequency of use, exposure to extreme temperatures, and handling and storage of the machine can cause the instruments to become non-compliant to specifications set forth by the American National Standard Specification for Audiometers (ANSI). Annual calibration, regardless of frequency of use of the equipment, ensures the accuracy of the machine's readings. A signed and dated sticker should be affixed somewhere on the hearing screening equipment to indicate the date of the last calibration. Regardless of how often equipment is serviced, it is recommended to perform daily listening checks prior to conducting hearing screening.

Inaccurate results can result in a missed diagnosis, treatment that is unnecessary, and the possibility of causing further damage to your patients' hearing. Equipment problems that are detected and resolved before testing begins will avoid the consequences of having to follow-up on inaccurate results and bringing patients back in for retesting. As a hearing healthcare practitioner, you must be confident in the results of the tests you administer. Important hearing healthcare decisions are made based on those results.

Screening Environment

Finding an appropriate hearing screening environment can be challenging as noise levels in childhood and school settings are often less than ideal. The importance of this task, however, cannot be stressed enough and every effort should be made to select and confirm an appropriate screening environment. Test settings should meet the specifications detailed in national standards (ANSI, 2008), which specify the maximum permissible ambient noise levels allowed in a test room. Based on these standards, it is recommended that the background noise during pure tone screening be no greater than 50dBSPL as measured by a calibrated sound level meter or an app-based sound level meter on your mobile device. There are currently no standards regarding the OAE screening environment.

Infection Control/Universal Precautions

The following universal precautions must be used to control contaminants in the hearing screening environment.

Universal Precautions Best Practices

The following recommended procedures are considered universal precautions to avoid cross contamination that may occur between children. These recommendations include:

- Screener should wash his/her hands with medical-grade antibacterial soap and water or use an antibacterial hand sanitizing gel before screening each child.
- Remove rings to eliminate contamination by microorganisms,
- Surfaces such as headphones and conditioned play toys used during screening should be cleaned and disinfected with a wipe before each use.
- Other surfaces such as tabletops, chairs, other toys, and any equipment that may have come in contact with microorganisms should be disinfected with a wipe as needed throughout the day and at minimum once a day.

Contaminant Exposure

Exposure to contaminants may occur when:

- performing a visual inspection
- handling hearing aids and ear molds
- placing earphones on ears
- handling and placing tympanometer probe tips in ears
- testing children with suspected head lice or scalp infections
- handling toys used for play audiometry
- touching work surfaces

Disinfect the OAE, Tympanometer Probe Tips and Non-Disposable Otoscope Specula

The following recommendations need to be considered when disinfecting the tympanometer probe tips and a non-disposable otoscope specula:

- use disinfectant wipes (one wipe per use),
- soak the probe tips and an otoscope specula in disinfecting solution, or
- use an ultrasonic cleaner with disinfectant solution.

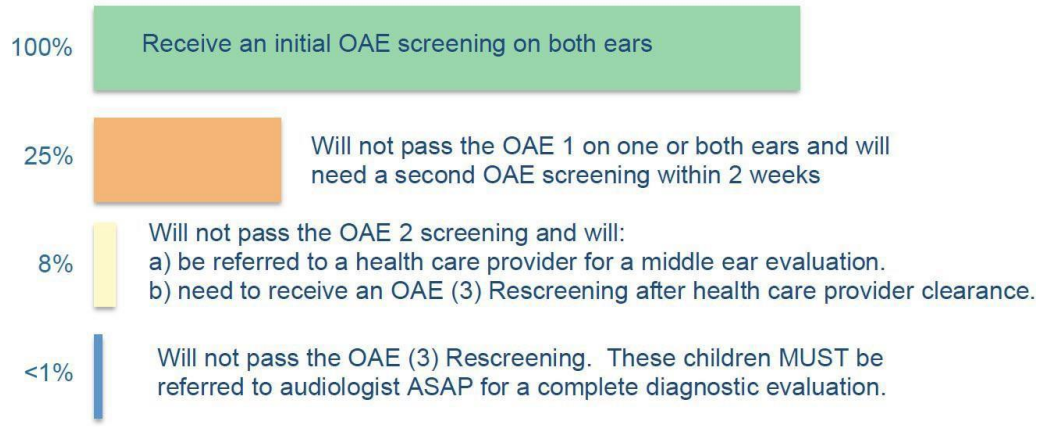
Recordkeeping, Data Collection, and Quality Improvement

Data should be collected in order to evaluate the effectiveness of the hearing screening. The following are recommended data points and should be used in on-going monitoring of program performance:

- Total number of children screened
- Number and/or percentage of children who did not pass the initial screening and/or rescreening
- Number and/or percentage of children who missed the initial screening and/or rescreening
- Number and/or percentage of children referred for follow up (audiological, medical, educational)
- Number and/or percentage of children diagnosed with hearing problems
- Data validating appropriate equipment calibration and performance

The Early Childhood Hearing Outreach Initiative (ECHO) has developed this Hearing Screening & Diagnostic Log, which may be helpful for tracking and data management purposes.

The approximate percentages of children in the early education setting who are likely to need subsequent steps in hearing screening protocol are as follows:



In elementary schools, especially the lower grades, the referral rate ranges from 15-25%, largely due to the increased incidence of otitis media in this population.

Appendices

Appendix A: Glossary

Acuity – Sharpness or clarity of hearing ability in humans that is measured and recorded on an audiogram in decibels (sound level) and hertz (sound pitch or frequency).
Ambient noise – Surrounding noise from all directions encompassing a combination of sources (e.g., lighting, heating, air conditioning systems, people moving about, or use of equipment/facilities).
ANSI S3.6-2010 – The American National Standards Institute's specification which defines the technical characteristics of audiometers and calibration procedures.
ANSI, 2008 – The American National Standards Institute's specification which defines the allowable ambient noise levels for hearing test environments.
Appropriate environment – An acceptable hearing screening setting that is free from excess noise and visual distractions; when noise levels exceed 50dB, the hearing screening environment is deemed inappropriate and should not occur.
Audiology – The study of hearing disorders, including evaluation of hearing function and rehabilitation of individuals with hearing loss
Audiologist – The professional who provides care in the prevention, identification, diagnosis, and evidence-based treatment of hearing, balance, and other auditory disorders for people of all ages. An educational audiologist refers to audiologists practicing in the school setting; pediatric audiologists are audiologists specializing in services to children.
Audiogram – a graphic record of hearing ability for various sound frequencies; used in diagnostic audiology evaluations.
Audiometer – An instrument for gauging and recording acuity of hearing.
Calibration – The electroacoustic (physical measurement) or psychoacoustic (listening check) determination that an audiometer is performing properly in terms of its acoustic output, attenuation linearity, frequency accuracy, or harmonic distortion.
Cerumen (also called Earwax) – The yellow, waxy matter secreted in the outer portion of the ear canal that keeps out foreign objects, and keeps skin in the canal and tympanic membrane moist.
Cochlea – The spiral-shaped cavity of the inner ear and the main organ of hearing. The cochlea contains the nerve endings that transmit sound vibrations from the middle ear to the auditory nerve and are responsible for producing otoacoustic emissions.
Conditioned play audiometry (also called play audiometry) – A hearing test technique that uses behavioral conditioning to teach children to respond to sound; it makes a game of the hearing test by using activity-related toys such as blocks or pegs.
Conductive hearing loss – hearing loss produced by pathologies of the external and/or the middle ear.
Decibel (dB) – A unit used to measure the relative loudness or intensity of sounds; 0.0 dB (HL) is considered to be the faintest sound that can be heard by a normal hearing person; 140 dB (sound pressure level), a pressure 10 million times as great, is considered to be the pain threshold of the normal ear.

Diagnostic audiometry – Performed by an audiologist to determine precise hearing abilities and includes hearing thresholds for both tonal stimuli and speech stimuli.
Early childhood – Stage in human development that generally includes the toddler (ages 1-3) and preschooler (ages 3-5).
Ear canal (also called external auditory canal) – The narrow, tube-like passage through which sound enters the ear.
Eardrum – The thin, semitransparent, oval-shaped membrane that separates the middle ear from the external ear. Also called tympanic membrane.
Educationally significant hearing loss (ESHL) – A typically permanent hearing loss diagnosed by an audiologist and potentially determined to have a negative impact on listening and learning in the educational setting. In Kansas, ESHL can be bilateral (both ears), unilateral (one ear), high frequency (bilateral, occurring in high-frequency range of hearing), or transient (ESHL that is present for more than 3 months due to a treatable condition such as OME).
Eustachian tube – A slender tube that connects the tympanic cavity with the nasal part of the pharynx and serves to equalize air pressure on either side of the ear drum.
Frequency – The rate of repetition of the cycles of a sound wave. The unit is called Hertz (Hz) or cycles per second (cps). The frequency of a tone largely determines pitch.
Hearing loss – General term for the partial or total inability to hear, also called hearing impairment. Hearing loss has many different causes, degrees, and types.
Hertz (Hz) – The standard unit of frequency (i.e., cycles per second) in the International System of Units, equal to one cycle per second.
Inner ear – The portion of the ear within the temporal bone that is involved in hearing and balance and includes the semicircular canals, vestibule, and cochlea. Also called internal ear, labyrinth.
Mass-population screening – examination of a large group or population to determine the presence of disorder or disease.
Middle ear – An air-filled cavity bordered by and including the tympanic membrane, ossicles, and Eustachian tube and ending at the cochlea.
Middle ear condition (or pathology) – Disorder of the middle ear space that can cause hearing loss or abnormal function of the structures of the middle ear; may include but is not limited to Eustachian tube dysfunction, ear infections, perforated eardrum, and impacted earwax.
Normal hearing – The ability to perceive sound within the normal range; typically defined as hearing levels between 0 to 20dB.
Occlusion – A closing or shutting off of the external ear canal. May occur due to a blockage of cerumen or be caused in some individuals by tight fitting headphones.
Otitis media – a general term indicating inflammation of the middle ear.
Otitis media with effusion (OME) – Inflammation of the middle ear accompanied by an accumulation of fluid (liquid).
Otoacoustic emissions (OAE) – Sounds given off by the inner ear when the cochlea is stimulated by sound, and which can be measured with a small probe inserted into the ear canal. People with normal hearing produce emissions. Those with hearing loss greater than 25-30 decibels (dB) do not produce these very soft sounds. The recommended type of OAE to be used in childhood screening programs is distortion product otoacoustic emissions (DPOAE), which refers to sounds measured in response to 2

simultaneous tones of different frequencies.

Outer ear (also called external ear) – the outer portion of the ear including the auricle (pinna) and the passage leading to the eardrum (ear canal).

PE tubes (pressure equalization tubes) – ear tubes inserted into the eardrum to keep the pressure equal across the eardrum thereby preventing a vacuum forming in the ear which contributes to infection; also called ventilation, tympanostomy, myringotomy tubes.

Perforated eardrum – A hole or rupture in the eardrum.

Probe tip – Refers to the slender instrument inserted into the ear canal opening to perform an OAE or tympanogram test; most often has disposable cover to use, disinfect, and replace between tests to prevent spread of microorganisms which can cause infection.

Pure tone – A sound wave of a single frequency whose sound sensation is characterized by its singleness of pitch.

Pure tone audiometry – The key hearing test used to identify hearing threshold levels of an individual, enabling determination of the degree, type and configuration of a hearing loss. Thus, providing the basis for diagnosis and management.

Pure tone sweep – An audiometric technique to identify those individuals whose thresholds do not fall within the normal limits of hearing from those individuals whose thresholds fall at or within the limits of normal hearing, using pure-tone as stimuli.

Referral – Notification of parent/guardian/caregiver regarding results of hearing screening and the recommendations for follow up.

Risk factors – Attribute or exposure of an individual that increases the likelihood of causing or developing hearing loss.

Sensorineural hearing loss (SNHL) – Hearing loss resulting from a pathological condition in the inner ear or along the nerve pathway from the inner ear to the brain stem.

Stimulus button (also called interrupter) – The control on an audiometer that when pressed presents the signal to the listener; can be turned “continuously on” using a separate control also on the audiometer.

Threshold – The sound level below which an individual is unable to detect sound; also the lowest point at which a person can hear; hearing thresholds are also referred to as hearing levels are stated in decibels (dB) at various frequencies.

Tympanogram – A graphic representation of a pressure compliance function of the middle ear.

Warble tone – A stimulus tone available on many audiometers whose frequency varies periodically several times per second over a small range and can be slightly easier to hear in certain environments; may be reliably alternated with pure tone stimulus.

Appendix B: tiny-k Services Paper Hearing Screening

Appendix C: tiny-k/Parents as Teachers OAE Screening Form

Appendix D: Kan Be Healthy - Risk Indicators for Hearing Loss Checklist - Birth to Age Four

Appendix E: Kan Be Healthy - Developmental Scales Checklist - Birth to Age 4

Appendix F: Kan Be Healthy - Hearing Health History Form - Age 5 and Up

Appendix G: Kan Be Healthy - Early and Periodic Screening, Form

Appendix H: Hearing Screening Report for Schools

Appendix I: School Hearing Screening Certification Training Manual - *under revision*

Appendix J: SoundBeginnings Newborn Hearing Screening Form

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