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Colorado Infant Hearing Advisory Committee: Guidelines for Infant Hearing Screening, Audiologic Assessment, and Early Intervention

Submitted to the Colorado Board of Health
By the Division of Prevention and Intervention Services for Children and Youth
Colorado Department of Public Health and Environment
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INTRODUCTION

The following guidelines are presented by the Colorado Infant Hearing Advisory Committee for the purpose of advancing the development of a comprehensive and effective statewide system to screen and diagnose newborns for hearing acuity, and to provide prompt and effective early interventions for those infants who are hard of hearing or deaf.

These guidelines are informational only, and are not intended or designed to substitute for the reasonable exercise of independent clinical judgment by physicians and medical providers in any particular set of circumstances for each patient encounter. The guidelines are flexible and are intended to be used as a resource for integration with a sound exercise of clinical judgment. They can be used to create an approach to care that is unique to the need of each individual patient.

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I. An Overview Of The Colorado Infant Hearing Program

The purpose of the Colorado Infant Hearing Program is to support early identification and timely and appropriate intervention for hearing loss. The Maternal and Child Health Bureau[1], the Joint Committee on Infant Hearing[2], the American Academy of Pediatrics[3], and the Centers for Disease Control and Prevention have provided recommendations for state Early Hearing Detection and Intervention (EHDI) programs. These recommendations are designed to assure that infants who are screened receive appropriate and timely follow-up. Infants should be screened, diagnosed, and entered into intervention as early as possible. Research by Yoshinaga, et al.[4] indicates that infants should be screened no later than one month of age, diagnosed by three months, and enrolled into early intervention by six months. Research conducted at the University of Colorado has demonstrated that infants who are identified with a hearing loss and begin early intervention by six months of age can reach language milestones that are within normal limits.

House Bill 97-1095 requires the Colorado Infant Hearing Advisory Committee to develop guidelines for reporting and for assuring that identified children receive referral for appropriate follow-up. The committee has recommended that all hospitals involve an audiologist in the implementation of the screening program, to assure appropriate follow-up for those infants who do not pass a hospital screen. If a staff audiologist is not available, a local audiologist or the Audiology Regional Coordinator should be involved (see Appendix 3). Hospitals are encouraged to work with their community resources including the Audiology Regional Coordinator, Colorado Hearing Resource (CO-Hear) Coordinator, Part C Coordinator, physicians, and public health nurses to identify a formal follow-up protocol in the community.

The Colorado Department of Public Health and Environment's Health Care Program for Children with Special Needs (HCP), in collaboration with the department's Vital Records Program, has utilized the electronic birth certificate to collect newborn hearing screening results. A data management program has been developed that will allow state and local health departments to track infants from screening through early intervention.

The Colorado Infant Hearing Advisory Committee has adopted benchmarks to monitor hospital newborn hearing screening programs and to offer assistance when programs fall below the recommended benchmarks. The Joint Committee on Infant Hearing, which is comprised of the American Academy of Audiology, the American Academy of Pediatrics, the American Speech-

Language-Hearing Association, the Council on Education of the Deaf, and the Directors of Speech and Hearing Programs in State Health and Welfare Agencies, has also recommended benchmarks for hospital-based newborn hearing screening programs to achieve similar screening and follow-up goals. Hospitals should strive to achieve the following goals:

- Ninety-five percent of all births should be screened prior to hospital discharge.

- Hospitals should refer less than 4 percent of newborns at discharge for further evaluation (See Guideline II: Recommendations For Technologies To Be Used For Newborn Hearing Screening Programs). However, due to the risk of a false negative (passing a baby with a hearing loss) no more than three rescreens should take place, prior to a comprehensive audiology evaluation.

- Hospitals should offer an outpatient rescreen if an infant is missed or refers (that is, does not pass the screening test) on one or both ears. This should only occur one time. If an infant still does not pass, the family should be referred to a pediatric audiologist for a diagnostic evaluation.

- Physicians should be notified of all screening results, including those of infants who were missed or whose parents waived the screening.

- Hospitals should document follow-up efforts on all newborns that fail the newborn hearing screen at discharge or were not screened.

- Newborn hearing screening should be offered to infants born at home or born out-of-state as soon as possible and always by one month of age.

Physicians and hospitals are responsible for making the referral to a diagnostic audiologist. Protocols for a comprehensive audiology evaluation can be found in Guideline IV: Recommended Protocol for Infant Audiologic Assessment. A list of audiologists who have appropriate equipment for the assessment of infants below six months of age can be found in Appendix 1. It is important to obtain an appropriate diagnostic evaluation **prior to three months of age** in order to decrease the need for sedation of the infant, decrease parental anxiety, and identify the hearing loss within the recommended time frame.

Following confirmation of hearing loss the audiologist should notify the Regional Colorado Hearing Resource (CO-Hear) Coordinator (a list of CO-Hears can be found in Appendix 4). The CO-Hear Coordinator will provide support and care coordination services to assure the family receives early intervention services as early as possible and **always before six months of age**.

NOTES

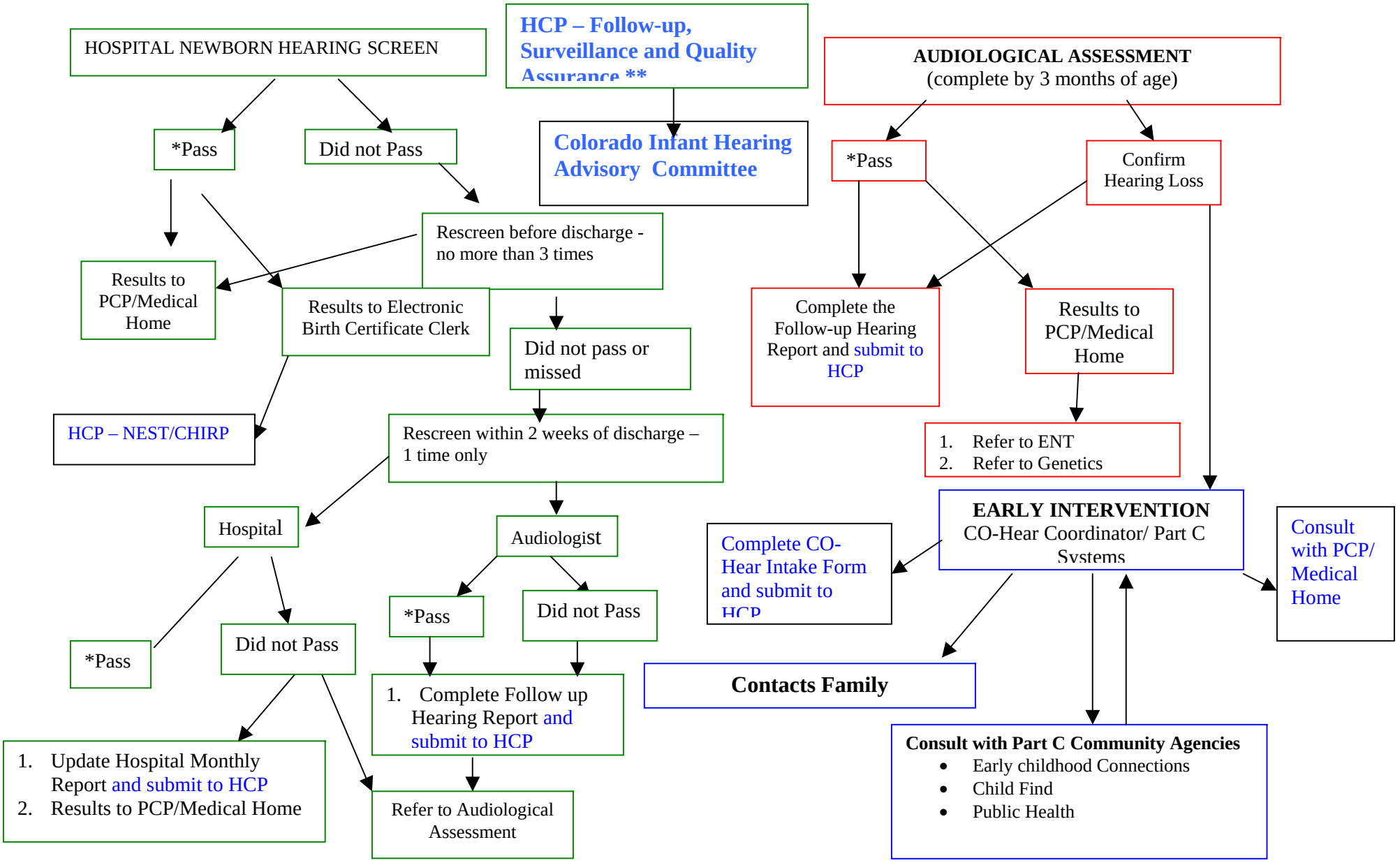
[1]Maternal and Child Health Bureau, U.S. Department of Health and Human Services (2000) Healthy People 2010: National Health Promotion and Disease Prevention Objectives. Washington, D.C.: Public Health Service Objective 28.11.

[2]Joint Committee on Infant Hearing: Year 2000 Position Statement: Principles and Guidelines for Early Hearing Detection and Intervention, *American Journal of Audiology*, Vol. 9, 9-29, June 2000.

[3]American Academy of Pediatrics Policy Statement: Newborn and Infant Hearing Loss: Detection and Intervention (RE9846), *Pediatrics*, 103 (2), 527-530.

[4]Yoshinaga-Itano, C., Sedey, A., Couldter, D. K., Mehl, A. L. (1998). Language of early- and later-identified children with hearing loss. *Pediatrics*, 102, 1161-1171.

Colorado Infant Hearing Program



* Infants who are high risk for late onset or progressive hearing loss should receive audiologic evaluations every six months

** Infants who are born at home or out of state will be notified by HCP. Parents and medical homes/PCP will be notified when an infant does not pass and has not returned for follow-up.

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II. Recommendations for Technologies To Be Used For Newborn Hearing Screening Programs

Currently there are two technologies that are used to objectively screen hearing in newborns: Auditory Brainstem Response and Otoacoustic Emissions. Behavioral testing is not appropriate in infant screening below six months of age. The Joint Committee on Infant Hearing recommends that screening programs should achieve a refer rate of less than 4 percent. The Colorado Infant Hearing Advisory Committee supports the goal of a refer rate of 4 percent or less at discharge in order to reduce parental stress and to minimize the need to return for further testing.

Auditory Brainstem Response (ABR)

Conventional Auditory Brainstem Response (ABR) is an electrophysiological measure of the auditory system's response to sound. A soft click is presented to the ear via earphones or a probe and electrodes record the response as the sound travels from the ear through the auditory nervous system to the brain. Conventional ABR requires a trained technician or audiologist to perform the evaluation and an audiologist to interpret the screening results. It is recommended that the screening level be no greater than 35dBHL.

Automated ABR (AABR) uses technology similar to conventional ABR. However, the equipment is fully automated and elicits a pass/refer response. There is no interpretation required. Consequently the AABR allows for a variety of trained hospital personnel to perform the screen such as nurses, technicians, support staff, or volunteers.

Automated ABR may miss a small percentage of hearing losses, such as a high frequency loss greater than 4000Hz. The refer rates at discharge for newborns screened with ABR are typically less than 4 percent.

Otoacoustic Emissions (OAE)

Otoacoustic emissions (OAE) measure the integrity of the outer hair cells in the cochlea (inner ear). A soft click is presented and a small microphone, placed in the baby's ear canal, measures the echo that is returned from the baby's ear. The echo is analyzed to determine how well the inner ear is working. Trained hospital personnel such as audiologists, nurses, or technicians can

perform this procedure. Automated OAE units are available and preferable in screening programs. If non-automated equipment is used, an audiologist is required for interpretation of results.

There are two types of OAE technologies: Transient Evoked Otoacoustic Emissions (abbreviated TEOAE) and Distortion Product Otoacoustic Emissions (abbreviated DPOAE). TEOAE are more commonly used for infant hearing screening at this time. Automated OAE technology is now available for both TEOAE and DPOAE. The refer rates at hospital discharge for OAE are typically between 5 and 10 percent

Screening using OAE does not identify a disorder called auditory neuropathy. Although this condition is rare, auditory neuropathy has been diagnosed more frequently in the NICU population.

Although both ABR and OAE screening tests have a high sensitivity and specificity, both tests can miss some mild hearing losses or unusual configurations. It is important to remember that all infants with high risk factors, recessive genetic factors, or asymptomatic CMV (cytomegalovirus) are at risk for late onset hearing loss. Parental concern about speech and language delays, at any time in a child's life, should elicit an immediate referral to an audiologist. Children who have a family history of childhood hearing loss should be monitored **twice a year** until they reach school age.

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III. Recommended Guidelines for the Medical Practitioner for Newborn Hearing Screening

When there is a NORMAL SCREEN

Infants who pass the newborn hearing screen or subsequent screenings can be assumed to have normal hearing. However all infants should be monitored for late onset or progressive hearing loss. Parental concern about speech and language delays, at any time in a child's life, should receive prompt referral for an audiological evaluation. Hearing testing can be performed at any age.

The Joint Committee for Infant Hearing's *Year 2000 Position Statement: Principles and Guidelines for Early Hearing Detection and Intervention Programs* has recommended that the following indicators be used for neonates or infants under two years. These indicators place an infant at risk for progressive or delayed-onset sensorineural hearing loss and/or conductive hearing loss. Any infant with these risk indicators for progressive or delayed-onset hearing loss that has passed the birth screen should, nonetheless, receive audiologic monitoring every six months until age three years. These indicators are:

- Parental or caregiver concern regarding hearing, speech, language, and/or developmental delay.
- Family history of permanent childhood hearing loss.
- Stigmata or other findings associated with a syndrome known to include a sensorineural or conductive hearing loss or eustachian tube dysfunction.
- Postnatal infections associated with sensorineural hearing loss including bacterial meningitis.
- In-utero infections such as cytomegalovirus, herpes, rubella, syphilis, and toxoplasmosis.
- Neonatal indicators including: hyperbilirubinemia at a serum level requiring exchange transfusion; persistent pulmonary hypertension of the newborn associated with mechanical ventilation; conditions requiring the use of extracorporeal membrane

oxygenation. Low levels of hyperbilirubinemia have been associated with auditory neuropathy/ auditory dys-synchrony.

- Syndromes associated with progressive hearing loss such as neurofibromatosis, osteopetrosis, and Usher's syndrome.

- Neurodegenerative disorders, such as Hunter syndrome, or sensory motor neuropathies, such as Friedreich's ataxia and Charcot-Marie-Tooth syndrome.

- Head trauma.

- Recurrent or persistent otitis media with effusion that lasts for at least three months.

Because some important indicators, such as family history of hearing loss, may not be determined during the course of Universal Newborn Hearing Screening programs, the presence of any late-onset risk indicators should be determined in the medical home during early well-baby visits. Those infants with significant late-onset risk factors should be carefully monitored for normal communication developmental milestones during routine medical care.

When there is a MISSED SCREEN

- There is an estimated 1 in 1000 risk of undetected bilateral hearing loss.

- Typically the hospital determines who will retain initial responsibility for recall and screening. It is the responsibility of the primary care physician to know the hospital policies and procedures for recalling and rescreening infants who miss a screen.

- Screening is best performed within the first month of life, later ages require more time due to the infant's increased alertness and may even require sedation in infants older than four months of age.

- Parents who refuse should be counseled on the importance of early identification and encouraged to obtain a screen. Refusals should be documented in the medical record.

When there is an ABNORMAL SCREEN, either Unilateral or Bilateral

- All newborns with abnormal screens **must** be rescreened or referred for an audiological evaluation.

- The abnormal result of the screen is shared with the family before hospital discharge, and a rescreen appointment is scheduled.

- Determine the person or department responsible for the following:

    - Scheduling appointment for recheck.
    - Recalling no-shows; physician involvement may be required.

- Completing all rescreening within four weeks.
- Written notification to primary care physician and Colorado Department of Public Health and Environment.
- Continue recall attempt.
- Record on problem list of outpatient medical record.
- The critical window to confirm diagnosis and begin amplification is two to six months of age.

When the child is subsequently confirmed to be DEAF OR HARD OF HEARING

If the hearing loss is **Unilateral**:

- Unilateral hearing loss is a significant risk factor for later acquired hearing loss in the previously normal ear. Audiologic monitoring is recommended **every three months**, during the first three years of life, due to possible progression to bilateral hearing loss.
- Amplification may have a role in facilitating language development.
- Use of amplification and role of intervention should be explored with audiologist and Regional CO-Hear Coordinator.
- Approach to follow-up may be individualized.
- Record on problem list if rescreening or further testing is delayed.

If the hearing loss is **Bilateral**:

- Early and consistent intervention (typically including amplification) is the key to achieving normal language development. The audiologist and Regional CO-Hear Coordinator can work with the family to assess needs.
- Colorado statistics indicate that 10 percent of these children are profoundly deaf. Children with profound hearing loss have less predictable benefit from traditional amplification; consider opportunities for early intervention programs, early sign language use and nontraditional amplification techniques (e.g., cochlear implants).
- Primary care physician support is necessary:
    - Encourage timely follow-up with audiologist, CO-Hear Coordinator, and other consultants.
    - Monitor continuous use of amplification device.

    - Evaluate ongoing development of communication and language.

- Evaluations recommended in addition to audiology follow-up:

    - Comprehensive multi-disciplinary evaluation (speech, language, functional auditory skills, communication, cognition, motor skills, personal-social skills).

    - Otolaryngology or otology evaluation; required for medical clearance of amplification in children.

    - Genetics evaluation.

    - Ophthalmology exam and follow-up.

    - For more information about these recommendations, refer to Guideline VIII: Recommended Medical Evaluation for Newborns with Confirmed Hearing Loss.

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IV. Recommended Protocol for Infant Audiologic Assessment

The following protocol was developed to facilitate the diagnosis of hearing loss, medical clearance for amplification, and use of amplification for infants with hearing loss by three months of age. An audiologist should have the necessary equipment (ABR with bone conduction and tone bursts, OAE, high frequency tympanometry) and be experienced in the assessment of infants. Infants should obtain a diagnostic assessment after a failed/referred (that is, an abnormal) newborn hearing screen. A hearing screen is considered failed when one or both ears do not pass the hospital screen or outpatient re-screen.

Within the first two months of life, the procedures outlined below in Step I and Step II, should be completed on all infants referred from the screening process. Use the Newborn Audiological Assessment Checklist found in Appendix 1 to assure that all recommended follow-up activities have been completed. The activities outlined in Step III, for children with confirmed hearing loss, should occur by three months of age.

STEP I: Initial Audiologic Consultation

- Obtain an Auditory Brainstem Response (ABR):
    - Obtain a 70 or 75 dB nHL response to click stimulus to assess the latency and morphology of waves III, V, I-III, III-V, I-V, and I.
    - Obtain a 30 or 35 dB nHL response to click stimulus to assess latency and morphology of wave V.
- Obtain Evoked Otoacoustic Emissions (OAEs):
    - Transient Evoked Otoacoustic Emissions (TEOAEs) and/or
    - Distortion Product Otoacoustic Emissions (DPOAEs).
- Interpret the results and discuss the results and follow-up recommendations with parents:

- For infants who pass both ABR and OAEs (***robust responses at 3 or more frequencies)***, parents should receive information about hearing, speech, and language milestones and information regarding risk indicators for progressive hearing loss. Parents should be instructed that, if questions about their child's hearing or speech and language development arise at any point, their child should receive an age-appropriate audiologic assessment.

- Infants who pass ABR but who do not pass OAEs may have external and/or middle ear pathology and should be referred to a physician experienced in evaluating external and middle ear function in infants. A repeat audiologic assessment should be completed after this evaluation. The assessment should occur by three months of age and should include repeat OAEs.

- Infants who pass OAEs but who do not pass ABR should continue with the recommended assessments outlined in Step II below.

- Infants who fail both OAEs and ABR in one or both ears should continue with the recommended assessments as outlined in Step II.

STEP II: Audiologic Diagnostic Assessment

A complete assessment should be obtained **bilaterally** even when an infant only fails/refers **unilaterally.**

- Diagnostic ABR assessment:

  - Obtain a threshold search to a click ABR in 10 dB steps; responses should be assessed to 90-95 dB nHL if responses are not observed at softer levels.

  - If a neural response is not identified, compare responses obtained to rarefaction and condensation clicks presented at 80 to 90 dB nHL using a fast click rate (>30 per second). If a response (e.g., cochlear microphonic) is observed, an auditory neuropathy should be suspected.

  - Obtain a threshold response to a tone burst ABR or Auditory Steady State Response (ASSR) for at least 500Hz and 2000 or 3000Hz.

  - Obtain a bone conduction click ABR if conductive hearing loss is suspected.

- Perform an otoscopic evaluation.

- Obtain acoustic immittance measures using a high frequency probe tone stimulus.

- Obtain an evoked otoacoustic emission (TEOAE and/or DPOAE) to further evaluate cochlear function.

- Perform behavioral observation audiometry (BOA) to a speech stimulus and/or a 500 and 2000 Hz tone or noise, by air conduction and bone conduction. Identify any minimal responses and attempt to obtain startle responses.

- Discuss the results and follow-up recommendations with the parents.

- Prepare a written report interpreting test results and describing the diagnostic profile.

- If hearing loss is confirmed, recommend referral to an otolaryngologist for evaluation and clearance for amplification.

- Have the parents complete an informed consent form.

- Disseminate written report and recommendations to the parents, the infant's primary care physician, and other care providers and agencies as requested by the parents.

- Complete the Audiological Assessment reporting form (provided in Appendix 2) as completely and accurately as possible and return to the Colorado Department of Public Health and Environment, Health Care Program for Children with Special Needs (HCP). (HCP's address is provided at the end of this section.) This form should be **resubmitted** whenever a change in demographic or audiologic information is made.

STEP III: The following activities should be completed by three months of age for infants with confirmed hearing loss.

All infants with confirmed hearing loss should be followed audiologically **every three months through age 2** and then **every six months through age 5** or until hearing is stable.

- Review results of the diagnostic audiologic assessment, implications of the audiologic diagnosis, and recommendations for intervention with the parents including:

    - Amplification options including hearing aids, cochlear implants and FM systems.

    - Information regarding the importance of early intervention and communication strategies.

    - Information regarding the need for medical follow-up.

    - The availability and importance of parent-to-parent support (e.g., Colorado Families for Hands & Voices) and deaf/hard of hearing role models.

    - Information and referral for funding assistance, if necessary.

- *The Colorado Resource Guide for Families of Children Who are Deaf/Hard of Hearing* (available from Colorado Families for Hands & Voices, www.handsandvoices.org).

- Initiate the amplification process, if appropriate (given parental choice and medical considerations) after medical clearance for amplification has been obtained. See Guideline V: Recommended Guidelines for Pediatric Amplification.

- Discuss additional specialty evaluations (e.g., genetics, ophthalmology, and child development) with the parents and the infant's primary care physician as appropriate.

- Referral to the Regional Colorado Hearing Resource (CO-Hear) Coordinator for entry into the local Part C system and for specific information regarding intervention options and resources. **Note that Part C requires this referral to occur within 48 hours of the diagnosis!** This referral is for all infants with hearing loss, including those with unilateral hearing loss. For further information, see Guideline VI: Recommended Guidelines for Referral to Early Intervention.

- Complete the Audiological Assessment reporting form (provided in Appendix 2) and send it to the Colorado Department of Public Health and Environment, Health Care Program for Children with Special Needs (HCP):

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V. Recommended Guidelines For Pediatric Amplification

Qualifications for Pediatric Hearing Aid Services

- Audiologists are the professionals singularly qualified to select and fit all forms of amplification for children, including personal hearing aids, FM systems, cochlear implants, and other assistive listening devices. Audiologists have a master's and/or doctoral degree in Audiology from a regionally accredited university and are currently registered by the Department of Regulatory Agencies of the State of Colorado.

- Audiologists fitting hearing aids on infants and young children must have experience with amplification and management of infants and children with hearing loss and have the test equipment necessary to complete all described testing for hearing aid selection and evaluation procedures.

- An audiologist must complete the procedures described in Guideline IV: Recommended Protocol for Infant Audiologic Assessment.

- Medical clearance must be obtained from an otologist, a pediatric otolaryngologist, or a general otolaryngologist prior to hearing aid fitting.

Criteria for Candidacy

- Permanent, bilateral hearing loss exceeding 20 dB HL in a portion of the frequency range critical for speech understanding (approximately 1000-4000 Hz). Degree of hearing loss may be determined by either:

    - Behavioral thresholds obtained by conditioned audiometric techniques appropriate to the child's developmental level (i.e., visual reinforcement audiometry, conditioned play audiometry, or standard behavioral audiometry), or

    - Estimates from electrophysiologic correlates of hearing sensitivity (i.e., click and frequency-specific auditory evoked potentials/OAEs).

- Children with permanent unilateral hearing loss (exceeding 20 dB HL in a portion of the frequency range) with measurable hearing in the affected ear as measured by ABR and behavioral testing may benefit from amplification. Infants should be fit to the "best estimate" audiogram based on the completion of assessment techniques from Guideline IV: Recommended Protocol for Infant Audiologic Assessment.

- Final amplification decisions should be based on audiologic information, performance in home/educational environment (based on parental and interventionist report), existence of other special needs, speech and language development, and the family's preferences.

Pre-selection/Physical Characteristics

- Amplification options:

    - Behind-the-ear (BTE) aids are the hearing aid style appropriate for most children. In-the-ear hearing aids are **not** recommended for use with infants and young children due to the rapid growth of the outer ear. Body aids may be appropriate if the child has physical limitations preventing the use of BTEs.

    - A bone conduction aid may be appropriate if the loss is conductive and BTEs cannot be used due to medical or physical contraindications. A bone-anchored hearing aid is a device that is surgically implanted into the skull behind the ear and may be useful for an individual who must use a bone conduction aid on a permanent basis. The BAHA does not have the approval of the U.S. Food and Drug Administration (FDA) for use in children less than five years old.

    - Currently, the following criteria must be met for a child to receive a cochlear implant: the child is at least 12 months of age, has a bilateral profound sensorineural hearing loss, has used optimally fit appropriate hearing aids consistently for at least six months, has been enrolled in an early intervention program, exhibits minimal benefit from the hearing aids, and meets medical candidacy requirements.

    - Frequency modulation (FM) systems, coupled with personal hearing aids, should be considered when the child becomes mobile and needs to hear a caretaker at a greater distance. FM technology is the system of choice to improve signal-to-noise ratio.

    - Hearing aids with wide dynamic range compression as a signal-processing strategy should be considered for their improved ability to make soft speech audible. Compression should also be considered as an output limiter, providing comfort and good sound quality for the output of intense signals.

    - Hearing aids with processing schemes to reduce background noise or enhance speech perception may be considered, however their benefit to young children has not been established.

    - Hearing aids with multiple channels should be considered when the audiometric configuration requires the shaping of gain or output in specific frequency regions.

    - Hearing aids with multiple memories and remote controls should be considered for ease of adjustment for the caretaker and for flexibility.

    - Directional microphones, or dual microphones, should be considered only for older children to improve signal-noise-ratio when FM technology, the system of choice to improve signal-to-noise ratio, is not being used. Young children need to hear environmental noise and distance speech from all directions to maximize language and speech development and therefore directional microphones are not usually recommended for this population.

- FM compatibility: All hearing aids should be compatible with FM and assistive listening devices such as:

    - Direct audio-input (DAI) capabilities.

    - A telecoil.

    - A microphone-telecoil switching option (M/MT/T switch).

- Safety features:

    - Tamper-resistant battery doors.

    - Volume control covers.

- Binaural: All hearing aid fittings for binaural hearing loss should be binaural unless there is evidence over time of no benefit in one ear.

- Earmolds:

    - Should be made of a soft material for comfort, safety, and retention.

    - Should be replaced whenever feedback is excessive on optimal settings.

    - May be used with cream (“Otofirm” or “Otoease”) to help reduce feedback.

- Retention devices:

    - Straps or “Huggies.”

    - Toupee or wig tape.

    - Cords or “Critter Clips.”

- Headbands.

- Maintenance kit: All families should be offered a maintenance kit, which includes:
  - Dry aid kit.
  - Battery tester.
  - Stethoscope.
  - Instruction books.
  - Warranty information.
  - Explanation of trial period.

Selection and Verification

- Individual or age-appropriate ear acoustics should be accounted for in the hearing aid selection and fitting process. Aids can be pre-set prior to direct evaluation of the hearing aid on the child using average age-related real-ear to coupler difference (RECD) values. The Desired Sensation Level (DSL) method, calculated either manually or in a computer-assisted format, is the approach of choice for the RECD procedure.

- The preferred verification method is to use probe microphone measurements and the child's ear, ear mold, and personal amplification system. The procedure should be combined with a prescriptive technique that estimates target responses appropriate for the characteristics of the amplification system (linear vs. non-linear, analog vs. digital). The verification should always include direct measurement of the real-ear saturation response (RESR) and target maximum output values.

- Aided soundfield threshold measurements may be useful for the evaluation of audibility of soft sounds, but they are not recommended to verify appropriate electroacoustic requirements.

Validation and Monitoring

- Aided auditory skills should be monitored to ensure optimal electroacoustic settings of the hearing aids. Monitoring should include:
  - Audiologic assessment directly measuring the child's performance, including aided soundfield responses to speech and frequency-specific stimuli.
  - Functional auditory skill assessment obtained by the audiologist and early interventionist.

- Speech, communication, and language skill assessment obtained by the early interventionist.

- Parent and health care provider input.

Informational Counseling and Follow-up

- Information about all amplification options should be provided to parents. Orientation and training should include family members, caregivers, and the child. Orientation and training information should be discussed, demonstrated, and sent home in a written or video format. Orientation and training will include:

    - Care of the hearing aids, including cleaning and moisture concerns.

    - Suggested wearing schedule.

    - Insertion.

    - Removal.

    - Overnight storage (including the mechanism for turning off the hearing aids).

    - Insertion and removal of the batteries.

    - Battery life, storage, disposal, toxicity.

    - Basic troubleshooting (batteries, feedback, plugged earmold and/or receiver).

    - Telephone coupling and use.

    - Assistive device coupling and use.

    - Moisture solutions (e.g., dehumidifying systems and covers).

    - Tools for maintenance and care (e.g., battery tester, listening stethoscope, earmold air blower).

    - Issues of retention/compliance/loss (including spare hearing aids and any available loaner programs).

    - Recommended follow-up appointments to monitor use and effectiveness.

- Minimally, an audiologist should see the child at least every three months during the first two years of amplification and every four to six months after that time. Follow-up appointments should include:

- Behavioral audiometric evaluations.
- Adjustment of the amplification system based on updated audiometric information.
- Assessment of communication abilities, needs, and demands.
- Periodic electroacoustic evaluations.
- Listening checks.
- Check fit of earmold.
- Periodic probe microphone measurements.
- Periodic functional measures to document development of auditory skills.
- Insurance recommendations following warranty period for repairs or loss.

- An early interventionist should provide ongoing rehabilitation including auditory training.

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VI. Recommended Guidelines for Referral to Early Intervention

When a hearing loss is diagnosed, the audiologist makes a referral to the Regional Colorado Hearing Resource (CO-Hear) Coordinator (Appendix 4). According to Part C of the Individuals with Disabilities Education Act, the referral must be made within two working days of the diagnosis [Sec 303.321(d)(2)(ii)]. Physicians, parents, or staff in other agencies may also make this referral.

The CO-Hear Coordinator contacts the local Part C point of entry to refer the newly identified child. A service coordinator will be assigned. These two individuals work in close collaboration to ensure expertise is provided relevant to the child's disability. All local agencies (e.g., Early Childhood Connections, Community-Centered Board, Child Find, public health, physicians) are notified of the service coordination being provided.

The Regional CO-Hear Coordinator, as part of the local Part C system, contacts the family and provides consultation and information about the following:

- Communication options.
- Use and importance of amplification.
- Community, state, and national resources specific to hearing loss.
- Parent-to-parent support, including Colorado Families for Hands & Voices (Families for Hands & Voices has a contract with the state and will guide parents to other parent groups).
- *The Colorado Resource Guide for Families of Children Who are Deaf/Hard of Hearing* (available from Colorado Families for Hands & Voices, www.handsandvoices.org).
- Service and program options, that is, community-based early intervention programs delivering family-centered services specifically for children who are deaf or hard of hearing.
- The importance of a "medical home" and the role of the medical home for the family.

- Consent for information sharing.

- Part C entitlements: service coordination, multi-disciplinary assessment, Individual Family Service Plan (IFSP), procedural safeguards, and the provision of services in natural environments.

- Funding sources: A variety of funding sources exist to pay for direct services. The CO-Hear Coordinator helps families access these funds. The service coordinator, if this is a different person, also assists with this process. There are definitive criteria for financial assistance. Many families access more than one funding source. Some funding sources have financial eligibility criteria associated with them. Some sources are available statewide and others are available through the county in which the family resides. There are prescribed procedures to access funds. Specific criteria and procedures to access funds are listed in Appendix 5.

The CO-Hear Coordinator provides information to the Newborn Hearing Screening Program's Clinical Health Information Records of Patients (CHIRP) database. This database keeps track of the screening referrals, the diagnosis, and the intervention activity for children born in Colorado who are deaf or hard of hearing, for use by the Health Care Program for Children with Special Needs (HCP) of the Colorado Department of Public Health and Environment (CDPHE). The CO-Hear Coordinators maintain their records on this database and receive reports of their caseloads from this application.

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VII. Recommended Guidelines for Early Intervention Services

Competencies and Skills of Early Interventionists

When early intervention is recommended to address needs specific to hearing loss, services must be provided by a qualified interventionist.[1] Early intervention services are to be provided by professionals who have acquired the requisite knowledge and skills[2] and have demonstrated proficiency in providing services, direct or consultative, to children who are deaf and hard of hearing. The professional must be able to communicate directly with the child in a manner consistent with the child's developmental level and communication mode.

- **Rationale**
    - Children who are deaf or hard of hearing and families of these children have unique needs specific to the hearing loss. These unique needs reflect the challenges children with hearing loss encounter related to their lack of full access to communication. In order to meet the needs of these children and their families, interventionists require expertise in specific areas. This training is often acquired through both pre-service and in-service training programs.
- **Characteristics**
    - Colorado's statewide network of Regional Colorado Hearing Resource (CO-Hear) Coordinators are specifically trained to assist families in the aspects of early childhood development that are unique to hearing loss. They participate in service coordination activities.
    - Early intervention services provide parents with training and education that will allow them to provide an enriched communication environment at home.
    - Colorado's standards for early intervention service providers[3] identify the competencies for an early interventionist. These competencies are:
        - Communication and collaborative partnerships.

- Working with families.
- Developmental assessment and interpretation.
- Developing and implementing the Individual Family Service Plan (IFSP) as part of the team.
- Management of the sensory device.
- Maximizing auditory potential.
- Facilitating communication development.
- Facilitating cognitive development.

Appropriate Multidisciplinary Assessment

Language, listening, speech, and all other developmental areas are evaluated by a multidisciplinary team that includes specialists knowledgeable about hearing loss and its implications. Parents are active participants in this multidisciplinary assessment process.

- **Rationale**
  - The presence of hearing loss can alter performance on assessment procedures that are developed for children with normal hearing. Use of assessments developed for hearing children is recommended only when a person familiar with hearing loss can appropriately modify the procedures and interpretation of the assessments based on their knowledge of hearing loss. In order to acquire valid information about a child's skills, information should be acquired from a variety of sources, over time, and include skills demonstrated in the child's customary environment.
- **Characteristics**
  - Assessments are appropriate for infants and toddlers with hearing loss.
  - Specialists conducting the assessments are able to provide the necessary accommodations for the hearing loss.
  - Parent participation includes parent observation, parent interview, and opportunities for parent-child interaction.
  - Assessment results are understood by parents.

Developing the Individual Family Service Plan (IFSP)

A specialist knowledgeable in hearing loss and its implications is a member of the IFSP team. The IFSP team should assure the child's language skills, performance in all developmental areas, all communication features and modes, and all intervention options are discussed without bias with the family.

- **Rationale**
    - Communication modes, which provide access to language learning, need to be selected based on objective information about the child's skills, the parents' preferences, and informed choice.
- **Characteristics**
    - Specialists are able to interpret assessment results relative to the implications of hearing loss on speech, language, and communication.
    - Assessment information is discussed with families in a sensitive manner that reflects the abilities of the child compared to typically developing peers.
    - Assessment information that reflects the abilities of the child compared to other deaf and hard of hearing peers is discussed with families.
    - Information is presented from a variety of perspectives.

Selecting a Communication Mode

The family, with input from the IFSP team, selects the preferred features of communication and a communication mode for use with the child that is based on parent choice and the features of the child's emerging communication.

- **Rationale**
    - Children learn language most efficiently when it is presented in the mode that is being used by that child. In order to learn language, a child must receive consistent exposure to language in that mode. Family commitment to the features/modes is essential to assure consistent exposure and the child's uninterrupted development of communication.
- **Characteristics**
    - Features of communication (e.g., listening, vocalizing, gestures, spoken language, English signs, speechreading, American Sign Language, conceptual signs, fingerspelling, visual phonics/cued speech, augmentative communication, and picture communication) are discussed

- Identify communication features and modes the parents use with their child.

- Identify and discuss the variety of intervention options in the child's community
- Appropriate technology is available to support the communication mode selected for the child.

Communication with Peers

Opportunities to promote and enhance language and social development through direct communication with peers, including peers who are deaf and hard of hearing, are identified. Opportunities are also identified for the child to socialize with peers who use the language and communication mode chosen by the family based on the needs of their child and upon the families' routines and activities.

- **Rationale**
    - Young children learn social-emotional skills, cognitive skills, and language through communication with their peers. Continuous exposure through a consistent mode provides requisite exposure to language. Children need a first language in order to develop cognitive skills, communication, and literacy.
- **Characteristics**
    - Typical peers communicate with the deaf or hard of hearing child without needing an interpreter.

    - Adults encourage children of all ages to communicate with one another and facilitate child-to-child communication among all children.[4]

Adult Role Models

The need for opportunities for parents to have direct communication with adults who are deaf and hard of hearing is identified. Opportunities to interact with adults who represent the language and communication mode chosen by the family based on the needs of their child are identified.

- **Rationale**

    - The "connection" that happens between an adult role model and a parent or child can be a profound experience for families and children as they learn about and live with hearing loss. By meeting a role model, parents begin to understand that their child can have a positive future. This natural connection between parents and adults who are deaf or hard of hearing provides parents with information that helps them develop reasonable expectations for their child. For the child, a positive, supportive, individualized relationship with adults promotes optimal development.

- **Characteristics**

    - The role model respects and honors the family's values while providing information about his or her own experiences as a person who is deaf or hard of hearing.

    - The role model provides additional resources to families by identifying supports in the community.

    - The role model demonstrates the communication mode that he or she uses.

Natural Environments

Early intervention services support the development of a language-rich environment in all daily routines and activities that support active and consistent communication in the mode used by the child.

- **Rationale**

    - The provision of early intervention in the context of the child and family's everyday routines and activities ensures that early intervention is used to enhance the child's development, support the family's capacity to enhance their child's development, and facilitate the child's participation in home and community settings where children without disabilities participate.[5,6] When there is a determination that services and supports cannot be provided in the child's and family's natural environment, documentation must be provided on the IFSP. When a child with hearing loss cannot access communication, the ability of that child to learn language is compromised. Intentional support and education must be provided to those caregivers who interact with the child in the context of everyday routines and activities.[7,8]

- **Characteristics**

    - Assure equal access to communication through a visual, auditory, and/or combined communication system specific to that child and his or her family.

    - Support families and all consistent caregivers in the child's life in developing meaningful communication utilizing visual, auditory, and/or combined communication mode so that the child may become a full participating member of the family.

    - Minimize a family's isolation by providing and supporting a network with other parents of children who are deaf or hard of hearing.

NOTES

[1] Individuals with Disabilities Education Act (IDEA), Sect. 303.22

[2] Colorado's Standards for Early Intervention Service Providers: Infants/Toddlers who are Deaf/Hard of Hearing and their Families (2003) Early Intervention Task Force, Colorado Infant Hearing Advisory Committee

[3] Ibid

[4]Colorado Quality Standards for Early Childhood Care and Education Services: A Planning Document (November, 1994). Colorado Department of Education.

[5] IDEA, Sect. 303.341

[6] Colorado State Plan under Part C of the Individuals with Disabilities Act (2000)

[7] A Guidebook: Early Intervention Supports and Services in Everyday Routines, Activities and Places in Colorado (1999). Early Childhood Connections for Infants, Toddlers and Families; Colorado Department of Education.

[8] Natural Environments: Considerations for Infants and Toddlers (Birth – 3) Who are Deaf/Hard of Hearing. Western States Early Intervention Administrators Coalition for Young Children with Sensory Disabilities, January 14, 1999.

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Joint Committee on Infant Hearing (2000). Year 2000 position statement: Principles and guidelines for early hearing detection and intervention programs. American Journal of Audiology, 9:9-29.

Standards of Practice for Educational Audiology Services, Colorado Department of Education, www.cde.state.co/cdesped/download/pdf/S4-3-AudoPrac.pdf

Task Force on Pediatric Amplification (draft 3/13/02). Pediatric Amplification Guidelines. American Academy of Audiology: www.audiology.org

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VIII. Recommended Medical Evaluation For Newborns With Confirmed Hearing Loss

Audiologist

Once a newborn has been confirmed by an audiologist to have a hearing loss, the audiologist should notify:

- Parents.
- Primary Care Provider/Medical Home.
- Regional Colorado Hearing Resource (CO-Hear) Coordinator (see Appendix 4).

Primary Care Provider

(See also: Guideline III: Recommended Guidelines for the Medical Practitioner for Newborn Hearing Screening.)

The primary care provider initiates the referral process to otolaryngology/otology and genetics. Elements of the evaluation should include:

- History:
  - Prenatal:
    - Ototoxic medication exposure.
    - Any significant complications during pregnancy.
    - Lack of immunization to rubella or exposure or suspicion of disease.
    - Abnormal syphilis testing.
    - Maternal drug use.
    - Frequent spontaneous abortions.
  - Perinatal:
    - Ashphyxia.

        - Infection.
        - Ototoxic medications.

    - Family:

        - Other family members with hearing loss, with age of onset under 30 years.
        - Desire to have additional children.

- Physical Examination:

    - Three or more minor anomalies: unusual morphologic features occurring in less than 3 to 5 percent of the population with no cosmetic or functional significance, e.g., transverse palmer crease/simian line, clinodactyly, ear tags, other.

    - Major anomalies: those causing cosmetic and/or functional abnormality, e.g., cleft palate; cardiac, limb, or skeletal deformities.

    - Poor growth and/or microcephaly, abnormal neurologic examination.

- Referrals:

    - All infants with confirmed hearing loss should have an otolaryngology evaluation and receive medical clearance for amplification when indicated

    - Referral for genetics evaluation is recommended for all families, in the absence of a clear non-genetic cause for the hearing loss.

    - Yearly ophthalmologic exam is recommended.

ENT/Otology Evaluation

- History:

    - Prenatal.

    - Family.

    - Behavioral.

- Physical:

    - Head and neck examination.

    - Head circumference.

    - Review of prior testing, i.e., Auditory Brainstem Response (ABR) and Otoacoustic Emission (OAE) results.

- Evaluation:
    - Infectious diseases: cytomegalovirus, rubella, syphilis, toxoplasmosis.
    - Urinalysis.
    - Ophthalmologic examination.
    - Computed Tomography (CT) high resolution of temporal bones.
    - Auditory Brainstem Response for threshold (if not previously done).
    - Otoacoustic Emissions (if not previously done).
    - Medical clearance for amplification and referral.
- Referrals:
    - Genetics.
    - Audiology assessment (see Guideline IV: Recommended Protocol for Infant Audiologic Assessment).
    - Regional Colorado Hearing Resource (CO-Hear) Coordinator (Appendix 6).
    - Early intervention, if not currently being provided.

Genetic Evaluation

- History:
    - Pregnancy.
    - Family pedigree.
    - Developmental.
- Physical Examination:
    - General pediatric examination.
    - Careful dysmorphologic examination.

- Neurologic/developmental evaluation.

- Diagnostic Tests:

  - Hearing tests on first-degree relatives (parents and siblings).

  - Ophthalmologic examination by six months of age.

  - Toxoplasmosis, herpes, rubella, or cytomegalovirus specific Immunoglobulin G and Immunoglobulin M if under six months.

  - All other laboratory tests depend upon clinical evaluation and history but may include the following:

    - Chromosomes (if dysmorphic).
    - Electrocardiograph (EKG).
    - Skeletal survey if there is short stature or disproportional growth.
    - Evaluation of other systems: renal, cardiac, skin.
    - CT or MRI of brain, if neurologically abnormal.
    - Specialized genetic studies: molecular, gene testing, etc.

Ophthalmology Evaluation

Following the diagnosis of confirmed congenital hearing loss, evaluation by a pediatric ophthalmologist is indicated. Yearly re-evaluation by the ophthalmologist is also recommended.

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IX. CHECKLIST FOR PARENTS OF NEWBORNS AT RISK FOR HEARING LOSS

The following checklist is for use by parents as they progress through the Colorado Infant Hearing System. This checklist gives parents the ability to understand where they are in the system at any given time and allows them to be proactive in moving from one step to the next. This checklist should be given to parents when a child is referred for a follow-up rescreen (that is, when a child has failed to pass an initial newborn hearing screening test).

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PARENT CHECKLIST

This checklist is designed to assist parents whose children **do not pass** their first newborn hearing screening test.

Initial (First) Newborn Hearing Screening Test

Your baby should get a newborn hearing screen within 48 hours of birth.

One out of every 500 babies born has a hearing loss.

Your baby is born!

- ❑ Your baby is screened in the hospital before discharge (once, or sometimes, twice).
- ❑ Babies born at home can get screened at the local health department, any local birthing hospital or through the local school district.
- ❑ The results of your baby's screening are given to you ___in writing ___verbally.

Your baby **passes** the hearing screening.

- ❑ You are given information on speech and language development in children.
- ❑ You know what to do if you ever have questions or concerns about your baby's hearing or speech.
- ❑ Your baby's screening results are given to your baby's "medical home" (that is, to the physician's office or clinic where you regularly get medical care for your baby).

Your baby does **not** pass the hearing screening. Your baby needs additional testing.

- ❑ You receive this checklist to assist you in understanding what testing your baby needs.
- ❑ An appointment is made to re-check your baby's hearing. You have an appointment ___back at the birth hospital ___to see an audiologist (hearing specialist).

Rescreening – A Second Newborn Hearing Screening Test

If your baby did not pass the first newborn hearing screen in the hospital, and needs another screen, your baby should get that second screen within two weeks after leaving the hospital.

Your baby **passes** the re-screen (or has testing by an audiologist that shows your baby has normal hearing).

- The results of your baby's screening are given to you ___in writing ___verbally.
- You are given information on speech and language development in children.
- You know what to do if you ever have questions or concerns about your baby's hearing or speech.

Your baby does **not** pass the re-screen. Your baby needs to see an audiologist (hearing specialist).

- The audiologist you choose for your baby is on the list of ''pediatric audiologists." This means the audiologist has the right equipment for testing infants. (You may request this list of pediatric audiologists from the birth hospital or the audiologist.)
- Check insurance coverage.

Getting Your Baby's Hearing Checked by an Audiologist (Hearing Specialist)

If your baby does not pass a first newborn hearing screening test, and does not pass a re-screen (second screen), your baby should be seen by an audiologist before three months of age.

Four out of every ten babies who do not pass their first and second newborn hearing screening tests will have a hearing loss, so it is **very important** for babies who do not pass two screens to see the audiologist without delay!

- At your appointment with the audiologist, you are given choices for sedating your baby (to make your baby sleepy and quiet for the test). If your baby is less than four months old, the audiologist should be able to test your baby without sedation.
- The audiologist does a diagnostic assessment of your baby's hearing. ("ABR" and "OAE" tests are done.)

Your baby **passes** the diagnostic evaluation.

- The results of your baby's testing are given to you ___in writing ___verbally.
- You are given information on speech and language development in children.
- You know what to do if you ever have questions or concerns about your baby's hearing or speech.
- Your baby's screening results are given to your baby's "medical home" (that is, the physician's office or clinic where you regularly get medical care for your baby).

Your baby does **not** pass the diagnostic evaluation.

- Your baby has a hearing loss. Your baby is diagnosed as "deaf," "hard of hearing," or "hearing impaired" (based on your baby's degree of hearing loss).
- Your baby is referred to an otolaryngologist (ear, nose, and throat doctor) for otologic diagnosis (to determine the medical reason for your baby's hearing loss) and for amplification clearance (a medical exam that is required before your baby can be fitted for hearing aids or other types of amplification).
- You are given information on amplification (hearing aids, etc.) options.
- You are given information about amplification loaner banks (places where you can borrow temporary hearing aids for your baby while his/her own aids are fitted).
- Your baby begins the process of getting amplification (hearing aids, etc.), if appropriate
- The audiologist will contact the Regional Colorado Hearing Resource (CO-Hear) Coordinator in your community within 48 hours of making a diagnosis of hearing loss. The CO-Hear Coordinator is an expert on community resources for the deaf and hard of hearing and can help you in many ways immediately following your baby's diagnosis.
- You are given information regarding the importance of early intervention (that is, professionals and families beginning right away to work together on your child's communication skills).
- You receive a copy of *The Colorado Resource Guide for Families of Children Who are Deaf/Hard of Hearing* (available from Colorado Families for Hands & Voices, www.handsandvoices.org).
- You are given information about parent-to-parent support groups and activities.
- You receive information about available funding and funding assistance.
- You receive information about specialty evaluations you may wish to get for your child, including: genetics, ophthalmology (eyes), and child development.

Qualifications of an Audiologist

from: *Colorado Infant Hearing Advisory Committee Guidelines for Infant Hearing Screening, Audiological Assessment, and Intervention*

- An audiologist is the professional singularly qualified to select and fit all forms of amplification for children, including personal hearing aids, FM systems, cochlear implants and other assistive listening devices.

- Audiologists working with young children must have experience with amplification and management of infants and children with hearing loss and have the test equipment necessary to complete all described testing for hearing aid selection and evaluation procedures.

Entry into Early Intervention

- You choose your managing (primary) audiologist.

- You receive a visit from your Regional Colorado Hearing Resource (CO-Hear) Coordinator
- You obtain needed information from *The Colorado Resource Guide for Families of Children Who are Deaf/Hard of Hearing* (available from Colorado Families for Hands & Voices, www.handsandvoices.org).

    - You begin to receive information from a variety of sources about:

        - Choices in communication.
        - Choices in programming (types of early intervention).
        - Information on grief.
        - Connections to other parents.
        - Connections to deaf and hard of hearing adults.
        - Information on your child's rights under the law (that is, Part C of the Individuals with Disabilities Education Act).

    - After receiving information about all program options, your family chooses and begins early intervention.

Qualifications of Early Interventionists [providers of services for children who are deaf or hard of hearing]:
from: ***Colorado Infant Hearing Advisory Committee Guidelines for Infant Hearing Screening, Audiological Assessment, and Intervention***

Children who are deaf or hard of hearing and families of these children have unique needs specific to the hearing loss. These unique needs reflect the challenges children with hearing loss encounter related to their lack of full access to auditory communication. In order to meet the needs of these children and their families, interventionists require expertise in specific areas. This training is often acquired through both pre-service and in-service training programs. *Ask your CO-Hear for more information about the qualifications of service providers for deaf and hard of hearing children.*

For more information, or questions concerning:

SCREENING
Contact:
Vickie Thomson
303-692-2458
Vickie.Thomson@state.co.us

ENTRY INTO EARLY INTERVENTION
Contact:
Arlene Stredler Brown
303-492-3037
Arlene.brown@colorado.edu

ASSESSMENT/DIAGNOSIS
Contact:
Sandra Gabbard
720-848-2819
Sandra.Gabbard@uch.edu

PARENT-TO-PARENT SUPPORT
Contact:
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X. Recommended Guidelines for Parent Leadership in Early Hearing Detection and Intervention (EHDI) Systems

The following protocol was developed to facilitate the use of parent leadership in the Colorado Infant Hearing Program. Effective parent/professional collaboration in the development of systems is an essential component of creating a successful program. “Parents have been under-represented at the level where decisions are being made about programs and services for their children. But parents remain the consistent, long term case manager for their child; overseeing the programming and ‘watchdogging’ its quality.” (Wright, 2001)

These guidelines are useful for medical, government, private, and educational institutions.

Purpose of Parent Leadership in Systems Development

- Parent leadership provides:
    - Perspective of “one who has been there.”
    - Motivated and personal commitment to improvement of the system.
    - Systems that are appropriate for and acceptable to families.

- Effective parent involvement results in:
    - Parent leaders advocating at a systems level on behalf of all children and families in a community, region, or state.
    - Parent leaders making significant changes in the delivery of the system to families. Changes in how information is delivered to families, increased physician awareness of the parent experience, and legislative advocacy are examples of the parent presence in an EHDI system.
    - Parent leaders advocating for their own child and family.
    - Parent leaders understand the system in order to provide support to other parents and families.

Implementation of Parent Leadership

- Develop a plan for identifying a diverse, representative group of parent leaders to participate.

- Identify parent leadership roles in RFPs (requests for proposals), grants, and policy.

- Identify what roles parent leaders will play in each of the three components of the system: Screening, Assessment/Diagnosis, and Early Intervention.

- Include both volunteer and paid staff opportunities for parent leadership.

- Collaborate with statewide and regional parent organizations for implementation of parent leadership (e.g., Colorado Families for Hands & Voices, El Grupo Vida, Parent to Parent of Colorado, Family Voices, A.G. Bell, American Society of Deaf Children).

- Ensure that parent perspectives are not considered a separate component of the policymaking process, but instead are infused throughout.

- Be ready to hear what families have to say:

    - Always consider an individual parent's story to be valid.
    - Respect the passion parent leaders have for change.

- Invite parent leaders to professional training opportunities.

- Be particularly careful to include members of traditionally underserved groups (e.g., Spanish-speaking families).

General Qualifications of Parent Leadership

- Parent leaders are appropriately trained through leadership training opportunities, on such topics as advocacy, systems building, parent/professional partnerships, and parent-to-parent support.

- Parent leaders possess the elements of collaboration, that is, mutual respect for skills and knowledge, honest and clear communication, understanding and empathy, mutually agreed-upon goals, shared planning and decision making, open and two-way sharing of information, accessibility and responsiveness, and joint evaluation of progress.

- Parent leaders have the capacity to look beyond their own personal experiences/beliefs to represent a broad community of parents.

Recommended Duties/Activities for Parent Leaders

These duties may include, but are not limited to:

- Representation on statewide advisory boards, forums, task forces, etc. and collaboration with medical, educational, and government institutions. To facilitate parent participation, these institutions should be willing to:
    - Provide convenient meeting times and locations for parent participation.
    - Compensate families for their time, expertise, and expenses.
    - Provide informational support for parents, so that parent participants have the opportunity to participate as equal partners on a "level playing field" with their professional counterparts.
    - Consider shared leadership – parent and professional co-chairs or teaming.
    - Provide clear information about the goals of the board, task force, or committee and the role of individual members and the roles of parent leaders.
- Participation in quality improvement initiatives (e.g., increased participation of the home birthing population, increased percentage of follow-up participation in screening, deaf education reform).
- Training by parent leaders to teacher/professional pre-service and in-service courses, workshops, and conferences.
- Directing parent-to-parent activities, e.g., workshops for families; picnics for families with newly identified children; development and ongoing maintenance of resource guide, website, and newsletter/newspaper for parents and professionals.
- Participation in legislative advocacy.

Funding Issues and Sources to Pay Parent Leaders

- Develop provisions that ensure that parents are present to participate in leadership activities, which may include direct staff support, stipends, travel expenses, and childcare.
- Determine capacity of volunteer parent leaders vs. paid positions.
- Identify sources within the state that could provide monies for parent participation (e.g., Consumer Involvement Fund; Department of Education, Part C and B; Department of Health; institutions of higher education; school for the deaf).

- Identify paid parent leadership positions in RFPs (requests for proposals), grants, and institution budgets.
- Utilize paid staff and volunteers from statewide or regional parent organizations.
- Consider writing private and corporate grant proposals to pay for parent involvement.
- Provide letters of support for parent and advocacy organizations as they seek funding.

NEWBORN Audiological Assessment Checklist[1]

[To be completed for all infants/toddlers, birth to age 6 months]

Name:_____ Date:_____

	Date Done	Deferred	Initials
Step 1. Initial Audiologic Rescreen & Consultation (by 2 months of age) (this step may be completed by local hospital)			
A. ABR Rescreen @ 30-35 dBN			
B. OAE Screen			
(1) TEOAE or DPOAE			
C. Discuss follow-up recommendations with parents			
Step 2. Audiologic Diagnostic Assessment (ideally by 2 months of age)			
A. Diagnostic ABR			
(1) Air Conduction Click Threshold			
(2) Click Polarity to verify Cochlear Microphonic (CM)			
(3) Air Conduction low Hz tone pip			
(4) Air Conduction high Hz tone pip			
(5) Bone Conduction click threshold			
B. Otoscopic			
C. High Frequency Acoustic Immittance (optional)			
D. Diagnostic OAE (both TEOAE *and* DPOAE)			
(1) TEOAE			
(2) DPOAE			
E. Behavioral Audiometry (age appropriate)			
(1) Speech and Tone Air Conduction			
(2) Speech and Tone Bone Conduction			
F. Discuss follow-up recommendations with parents			
G. Disseminate written report to primary care physician & other agencies			
H. Otolaryngology referral for confirmed hearing loss			
(1) Obtain Medical Clearance for Amplification			
Step 3. Confirmed Hearing Loss Follow-up (ideally by 3 months of age)			
A. Review diagnostic audiological assessment, implications of diagnosis, & recommendations for intervention with parents including:			
(1) Amplification options			
(2) Importance of early intervention			
(3) Importance of medical follow-up			
(4) Importance of parent-to-parent support			
(5) Funding assistance and options			
(6) Provide family copy of *RESOURCE GUIDE*			
B. Discuss need for special assessments (genetics, vision, etc.)			
C. Refer to CO-Hear Regional Coordinator			
D. Complete *Confirmed Hearing Loss Report*			

[1] Checklist accompanies the *Colorado Department of Health Guidelines for Infant Hearing Screening, Audiologic Assessment, and Intervention.*(1999). Available from Vicki Thomson @ HCP (303) 692-2397

COLORADO HEARING PROGRAM - AUDIOLOGICAL ASSESSMENT

FORM MUST BE COMPLETED FOR ANY CHILD FROM BIRTH TO 7 YEARS OF AGE

(Please print legibly with dark pencil or pen)

Name of person completing form _____ Date _____/_____/_____
Signature _____ Phone (_____) _____
Audiology clinic: Name of clinic _____
Address: Street _____
City _____ State ____ ZIP _____ County _____
E-mail address _____

PATIENT INFORMATION

Patient name: Last _____ First_____ Middle _____Suffix (Jr., etc) _____
Any other name this patient has been known as: Last _____First_____ Middle _____
Gender ☐ M ☐ F State where born _____ Birth Date _____/_____/_____
Multi birth?: ☐ Twin ☐ Triplet ☐ > 3 Birth order: A B C D E F
Birth hospital _____
Mother's maiden name: Last _____
Mother's name: Last _____First _____Middle _____
Father's name: Last _____First _____Middle _____
Guardian's name (if not parent):Last _____First _____Middle _____
Primary language spoken in the home _____ English spoken in the home? ☐ Y ☐ N
Address: Street_____ City _____ State ____ ZIP _____
County _____ Phone_____(_____) _____
Identification numbers: Medicaid: _____ Other (specify): _____
Name of primary care provider/medical home provider: _____

Prenatal and Postnatal High Risk Factors:

_____ Admitted to the NICU for 48 hours or longer
_____ Stigmata or other findings associated with sensorineural hearing loss
please specify: _____
_____ Family history of permanent childhood sensorineural hearing loss
_____ Craniofacial anomalies, including morphological abnormalities of the pinna and ear canal
_____ In-utero infection such as Cytomegalovirus, Herpes, Toxoplasmosis, or Rubella (please circle)
_____ Connexin 26
_____ Meningitis
_____ Unilateral hearing loss progressed to bilateral

Newborn Hearing Screening Results (if known):

☐ Yes ☐ No Date: ___ / ____ / ____ **RESULTS: RIGHT** ☐ Pass ☐ Refer **LEFT** ☐ Pass ☐ Refer

Hearing Test Results:

Test date ___/___ /___ Check the procedures used: ☐ OAE ☐ Click ABR ☐ Tone Pip ABR ☐ Immittance ☐ BOA ☐ ASSER

RESULTS: **RIGHT** ☐ Pass ☐ Refer **LEFT** ☐ Pass ☐ Refer

Confirmed Hearing Loss

☐ **RIGHT** __S/N __Conductive __Mixed __ AN **Degree:** __ Mild 21–40dB __Moderate 41-70 __Severe 71-90 __Profound >90

☐ **LEFT** __S/N __Conductive __Mixed __ AN **Degree:** __ Mild 21–40dB __Moderate 41-70 __Severe 71-90 __Profound >90

Amplification

Date of fitting: __ / __ / __ Type of amplification: ☐ Digital ☐ Programmable ☐ Analog ☐ Cochlear Implant ☐ Bone Conduction ☐ FM

Has guardian signed consent form to share information with other state health agencies? ☐ Yes ☐ Not Yet ☐ Declined
☐ CO-Hear contacted: Name: _____Date: _____ / _____ / _____

For Use By Data Entry
Date received: _____/_____/_____ Date entered: _____/_____/_____ By whom: _____

MAIL OR FAX REPORT TO: Newborn Hearing Screening Follow-up Coordinator, Colorado Department of Public Health and Environment,, 4300 Cherry Creek Drive South, PSD-HCP-A4, Denver, CO 80246-1530**; FAX: (303) 753-9249**

Health Care Program for Children with Special Needs (HCP)
AUDIOLOGY REGIONAL COORDINATORS

Regional Office	*Discipline Contact and Address*	*Contact Information*	*County(ies)*
Boulder	Sally Specht 421 Mariana Point Court Loveland, CO 80537	Phone: 970-622-0391 Fax: 303-441-1452 Email: dspecht@prodigy.net	Boulder
Denver	Trudy Frederics 9189 Seven Arrows Trail Lone Tree, CO 80124	Phone: 303-788-8351 Fax: 303-649-1875 Email: trudyfrederics@yahoo.com	Denver
El Paso	Kathy Sera Budney 175 S Union Blvd Suite 330 Colorado Springs, CO 80910	Phone: 719-442-6984 Alt. Phone: 719-495-3617 Fax: 719-442-6985 Email: kbudney@divide.net	El Paso, Teller
Jefferson	Trudy Frederics 9189 Seven Arrows Trail Lone Tree, CO 80126	Phone: 303-788-8351 Alt. Phone: 303-649-1873 Fax: 303-649-1875 Email: trudyfrederics@yahoo.com	Broomfield, Clear Creek, Gilpin, Jefferson, Park
Larimer	Beverly J. Griffin 2722 Westridge Court Ft. Collins, CO 80526	Phone: 970-223-7798 Fax: 970-282-9521 Email: gscott@frii.com	Larimer
Northeast	Linda Jelden 315 South Reynolds Drive Holyoke, CO 80734	Phone: 970-854-2593 Fax: 970-522-1412 Email: ljelden@pctc.net	Logan, Morgan, Phillips, Sedgwick, Washington, Yuma
Northwest	John Burke P. O. Box 770042 Steamboat Springs, CO 80477	Phone: 970-879-7286 Fax: 970-870-1326 Email: jonburke@sailors.steamboat.k12.co.us	Grand, Jackson, Moffat, Rio Blanco, Routt
Pueblo	Kathy Sera Budney 175 S Union Blvd Suite 330 Colorado Springs, CO 80910	Phone: 719-442-6984 Alt. Phone: 719-495-3617 Fax: 719-442-6985 Email: kbudney@divide.net	Pueblo
Pueblo	Anna Soennecken Penrose Hospital 2215 N Cascade Ave P.O. Box 7021 Colorado Springs, CO 80933	Phone: 719-776-5207 Fax: 719-776-5392 Email: annasoennecken@centura.org	Pueblo

Regional Office	Discipline Contact and Address	Contact Information	County(ies)
South Central	Lara Ciasulli San Luis Valley BOCS PO BOX 1198 Alamosa, CO 81101	Phone: 719-589-5851 Fax: 719-589-5007 Email: lciasulli@slvbocs.org	Alamosa, Chaffee, Conejos, Costillas, Custer, Fremont, Lake, Las Animas, Huerfano, Mineral,
Southeast	POSITION VACANT	Phone: 719-383-3040 Fax: 719-383-3060 Email:	Baca, Bent, Cheyenne, Crowley, Kiowa, Kit Carson, Lincoln, Otero,
Southwest	Eileen Goebel 484 Turner Dr. E. 102 Durango, CO 81303	Phone: 970-375-2369 Fax: 970-375-9054 Email: avahear@frontier.net	Archuleta, Dolores, La Plata, Montezuma, San Juan
Tri-County Health Department - HCP	Nancy Cyphers 7037 West 83rd Way Arvada, CO 80030	Phone: 720-972-5696 Alt. Phone: 303-421-1889 Fax: 720-972-5699 Email: nancy.cyphers@adams12.org	Adams, Arapahoe, Douglas, Elbert,
Weld	Deanna Meinke University of Northern Colorado Gunter Hall Office 1500 Campus Box 140 Greeley, CO 80634	Phone: 970-351-1600 Fax: 970-351-2974 Email: deanna.meinke@unco.edu	Weld
Western Slope	Daria Stakiw Mid Valley Hearing & Balance Clinic 100 Elk Run Suite 101 Basalt, CO 81601	Phone: 970-927-9992 Fax: 970-927-9989 Email: dariastakiw@yahoo.com	Delta, Eagle, Garfield, Gunnison, Hinsdale, Mesa, Montrose, Ouray,
Western Slope	Richard Hartman 2136 Mesa Avenue Grand Junction, CO 81501	Phone: 970-245-1740 Fax: 970-245-1740 Email: dhartma@bresnan.net	Delta, Eagle, Garfield, Gunnison, Hinsdale, Mesa, Montrose, Ouray,

State HCP Discipline

Vickie Thomson, MA, Audiology Consultant
Colorado Department of Public Health and Environment
Health Care Program for Children with Special Needs, PSD-HCP-A4
4300 Cherry Creek Drive South
Denver, CO 80246-1530

Phone: 303-692-2458
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Health Care Program for Children with Special Needs (HCP)
CO-HEAR REGIONAL COORDINATORS
April 19, 2004

Regional Office	*Discipline Contact and Address*	*Contact Information*	*County(ies)*
Boulder	Dee Shuler-Woodard 615 Mount Evans St. Longmont, CO 80501	Phone: 303-678-0818 Fax: 303-678-0818 Email: deebillw@ecentral.com	Boulder
Denver	Dinah Beams 2535 Routt Street Lakewood, CO 80215	Phone: 303-735-5405 Alt. Phone: 303-237-3152 Fax: 303-492-3274 Email: dinah.beams@juno.com	Denver
El Paso	Denise Davis-Pedrie 1260 Big Valley Drive Colorado Springs, CO 80919	Phone: 719-578-2186 Alt. Phone: 719-593-1301 Fax: 719-578-2239 Email: ddped@msn.com	El Paso, Teller, Elbert, Lincoln
Jefferson	Dinah Beams 2535 Routt Street Lakewood, CO 80215	Phone: 303-735-5405 Alt. Phone: 303-237-3152 Fax: 303-492-3274 Email: dinah.beams@juno.com	Broomfield, Jefferson, Clear Creek, Park, Gilpin
Larimer	Annette Landes 7888 Kremers Lane LaPorte, CO 80531	Phone: 970-223-0137 Alt. Phone: 970-494-4520 Fax: 970-223-0306 Email: alandes@psd.k12.co.us	Larimer
Northeast	Wendy Dudley 15364 Crestview Lane Sterling, CO 80751	Phone: 970-522-8865 Fax: 970-522-1412 Email: dwdudley@sterlingcomputer.net	Logan, Morgan, Phillips, Sedgwick, Washington, Yuma
Northwest	Heather Abraham 621 S. 2nd Street, Apt. D Carbondale, CO 81623-2176	Phone: 970-309-3521 Alt. Phone: 970-704-0217 Fax: 970-704-0217 Email: hechabraham@aol.com	Grand, Jackson, Moffat, Rio Blanco, Routt
Pueblo	Denise Davis-Pedrie 1260 Big Valley Drive Colorado Springs, CO 80919	Phone: 719-578-2186 Alt. Phone: 719-593-1301 Fax: 719-578-2239 Email: ddped@msn.com	Pueblo
South Central	Mary Lambourne 510 N Oliver Drive Aztec, NM 87410	Phone: 970-247-5702 Alt. Phone: 505-334-8665 Fax: 719-589-2073 Email: mlambourne@cyberport.com	Alamosa, Chaffee, Conejos, Costilla, Mineral, Rio Grande Saguache

Regional Office	Discipline Contact and Address	Contact Information	County(ies)
South Central	Denise Davis-Pedrie 1260 Big Valley Drive Colorado Springs, CO 80919	Phone: 719-578-2186 Fax: 719-578-2239 Email: ddped@msn.com	Custer, Fremont, Huerfano, Las Animas
South Central	Heather Abraham 621 S. 2nd Street, Apt. D Carbondale, CO 81623-2176	Phone: 970-384-5477 Alt. Phone: 970-704-0217 Fax: 970-945-8984 Email: hechabraham@aol.com	Lake
Southeast	Sue Bemiss 27203 County Rd. 809 LaJunta, CO 81050	Phone: 719-383-2623 Alt. Phone: 719-384-5862 Fax: 719-383-2627 Email: sue.bemiss@sftboces.k12.co.us	Baca, Bent, Cheyenne, Crowley Kiowa, Kit Carson, Otero, Prowers
Southwest	Mary Lambourne 510 N Oliver Drive Aztec, NM 87410	Phone: 970-247-5702 Alt. Phone: 505-334-8665 Fax: 505-334-8665 Email: mlambourne@cyberport.com	Archuleta, Dolores, La Plata, Montezuma, San Juan
Tri-County Health Department - HCP	Lynn Wismann-Horther 7065 South Elm Court Centennial, CO 80122	Phone: 303-220-9200 Fax: 720-489-6062 Email: lynnw_h@yahoo.com	Adams, Arapahoe, Douglas, Elbert
Tri-County Health Department - HCP	Annette Landes 7888 Kremers Lane LaPorte, CO 80535	Phone: 970-223-0137 Alt. Phone: 970-494-4520 Fax: 303-220-9208 Email: alandes@psd.k12.co.us	Adams, Arapahoe, Douglas, Elbert
Weld	Sandy Bowen UNC-Special Education 501 20th Street, Campus Box 141 Greeley, CO 80639	Phone: 970-351-2102 Alt. Phone: 970-339-4030 Fax: 970-351-1061 Email: sandy.bowen@unco.edu	Weld
Western Slope	Heather Abraham 621 S. 2nd Street, Apt. D Carbondale, CO 81623-2176	Phone: 970-309-3521 Alt. Phone: 970-704-0217 Fax: 970-704-0217 Email: hechabraham@aol.com	Delta, Eagle, Garfield, Gunnison, Hinsdale, Mesa Montrose, Ouray, Pitkin, San Miguel, Summit

Funding sources for early intervention for hearing loss

Agency	SERVICES	SERVICE DELIVERY	REGION SERVED	ACCESS	CONTACT
Private Insurance	(Possible) funding for intervention by specialist in hearing loss (Possible) funding for intervention by other specialist (Possible) funding for amplification (Limited) funding for assistive technology	Home-based or clinic-based	Individual policy dictates	Health Insurance Carrier	Health Insurance Carrier
Medicaid	Funding for intervention by specialist in hearing loss Funding for intervention by other specialist Funding for amplification	Home-based or clinic-based	Statewide	County Social Services Office	Colorado Hearing Resource (CO-Hear) Coordinator
Local Community Centered Boards (CCB)	(Possible) funding for intervention by specialist in hearing loss (Possible) funding for sign language instruction Funding for intervention by other specialist (Supplemental) funding for assistive technology Parent support (non-categorical)	Home-based or clinic-based	County	County Community Centered Board (CCB)	Colorado Hearing Resource (CO-Hear) Coordinator
County Part C	(Possible) funding for intervention by specialist in hearing loss (Possible) funding for sign language instruction (Possible) funding for intervention by other specialist (Possible & partial) funding for amplification (Possible & partial) funding for assistive technology	Home-based / natural environment	County	Part C Service Coordinator	Colorado Hearing Resource (CO-Hear) Coordinator
Colorado School for the Deaf and Blind (CSDB)	Funding for intervention by specialist in hearing loss Funding for sign language instruction	Home-based	Statewide	Colorado Hearing Resource (CO-Hear) Coordinator	Colorado Hearing Resource (CO-Hear) Coordinator
Service Organizations	(Possible) funding for intervention by specialist in hearing loss (Possible) funding for sign language instruction (Possible) funding for intervention by other specialist (Possible) funding for amplification (Possible) funding for assistive technology	Home-based or clinic-based	Community	Individual service organizations	Colorado Hearing Resource (CO-Hear) Coordinator
Child Health Plan Plus (CHP+)	Funding for intervention by specialist in hearing loss Funding for intervention by other specialist Funding for amplification (Possible) funding for assistive technology	Home-based or clinic-based	Statewide	Local Satellite Eligibility Determination (SED) site or county Social Services Office	Colorado Hearing Resource (CO-Hear) Coordinator