

Hearing Screening in Early Childhood: What, Why, How

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Information covered in this presentation

- Why is screening for hearing loss in early childhood important?
- What are methods of hearing loss identification for ages 6 months to 5 years?
- Pros and cons of different methods

This presentation was developed in 2011 primarily for Coordinators of Early Childhood Education programs in Minnesota. The information has been prepared by Dr. Karen Anderson who is an experienced educational audiologist and has also served in the state Early Hearing Detection and Intervention programs in Florida and Minnesota. She was the Chair of the American Academy of Audiology committee that prepared guidelines for Childhood Hearing Screening.

Requirements to perform hearing screening

Part C of the Individuals with Disabilities Education Act

- Part C (2004) provides for early intervention services for infants and toddlers under the age of 3. As part of the early intervention services, each state is required to have a **child find system to identify, locate and evaluate all children with disabilities**.
- The Part C regulations at 34 CFR §303.322(c) require that the evaluation and assessment of an infant or toddler be based on informed clinical opinion, and include the following:
 - (ii) An evaluation of the child's level of functioning in each of the following developmental areas:
 - (B) Physical development, including vision and **hearing**.
- In addition, for a child who has been evaluated for the first time and determined eligible under Part C, an individualized family service plan (IFSP) must include "a statement of the child's present level of physical development (including vision, **hearing**, and health status), cognitive development, communication development, social or emotional development, and adaptive development. ... **This statement must be based on professionally acceptable objective criteria.**" 34 CFR §303.344(a).
- The Office of Special Education Programs (OSEP) provided clarification on the necessity of providing audiological evaluations to infants or toddlers with suspected communication delays. Nov. 6, 2003
 - "...under Part C, an infant or toddler suspected of a communication delay, whose hearing has not been tested and for whom an audiology evaluation is determined needed, must receive an audiology evaluation as part of the evaluation required to be conducted under 34 CFR §303.322(c)(ii)(B). This evaluation is needed in order to reflect the child's present level of functioning on the IFSP."
- **Part C summary:** If the agency acts consistently with: "*the very fact that they have a speech delay means that further audiological testing is warranted to rule out any late-onset hearing loss*" then audiological evaluations should be provided for these children. Even if the agency does not enact this belief, it is still required to use *objective criteria* to assess functional hearing to fulfill the present level of performance statement on the IFSP.
- **Further Part C Considerations:** It is typical for approximately half of children served by state Part C programs to be eligible primarily due to concerns about communication delay. From a risk standpoint, if the agency truly wanted to identify children with previously unidentified hearing loss it would make sense to obtain a hearing evaluation on every child found to have a communication delay in the absence of other disability conditions. Since doing so is NOT required by Part C, many agencies instead opt to identify hearing loss by some type of **systematic screening** of each child undergoing eligibility evaluation or IFSP assessment. This screening must utilize objective criteria per 34 CFR §303.344(a).

Head Start

- In the Head Start standards for training, qualifications and conduct of home visits, **offering annual hearing screening** for children from birth to entry into kindergarten, *when needed* is required. (Public Law No: 110-134).
- Head Start Performance Standards require that an **auditory screening** be conducted within the first 45 days of enrollment (1304.20 Child health and developmental services).
- Grantee and delegate agencies must obtain direct guidance from a mental health or child development professional on how to use the findings to address identified needs.
 - (iii) Obtain or arrange further diagnostic testing, examination, and treatment by an appropriate licensed or certified professional for each child with an observable, known or suspected health or developmental problem; and (iv) Develop and implement a follow-up plan for any condition identified in 45 CFR 1304.20(a)(1)(ii) and (iii) so that any needed treatment has begun.

- If a child has been identified as failing Head Start or Early Head Start hearing screening, direct guidance from a child health professional **must** occur to provide guidance on how to address the identified needs. An appropriate child health professional can be a physician or an audiologist in the case of failed hearing screening however only an audiologist can diagnose permanent hearing loss in young children.
- **Head Start requires that EPSDT screening be conducted.** EPSDT (in accordance with section 1905(r) of the Act), must include screening services and a comprehensive health and developmental history -- (including assessment of both physical and mental health development);
- **Hearing** is listed under required screening services. "At a minimum, include diagnosis and treatment for defects in hearing, including hearing aids."
- The periodicity schedule for Periodic Screening, Vision, and Hearing services in Minnesota specify subjective hearing screening measures through age 3 and **objective screening** at age 4, 5, 6, 8, 10, 12, 14, 16, 18 years.

Part B of IDEA 2004

- Provides rules and regulations for special education for children between the ages of 3 and 21 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
- 300.304(b)(3): Use technically sound instruments that may assess the relative contribution of cognitive and behavioral factors, in addition to physical developmental factors.
- 300.304(b)(4): The child is assessed in all areas related to the suspected disability, including, if appropriate, health, vision, hearing, social and emotional status, general intelligence, academic performance, communicative status and motor abilities.
- As eligibility is determined for individual children who are 3-5 years of age, hearing screening must occur only if the evaluation team deems it appropriate. If it is performed, screening via **use of technically sound instruments** must occur. This would infer that a subjective measure would not be a suitable means of hearing assessment when determining eligibility for specialized instruction.

Affects of Hearing Loss on Development

Risk Factors

- Approximately 1/6 of the pediatric hearing loss population has HL as one of a number of symptoms in a syndrome.
- Thus, early hearing detection and intervention (EHDI) screening for hearing loss in newborns has decreased the delay in identifying children with syndromes that are not physically obvious as over 400 syndromes so far include hearing loss.
- Hearing loss is the most common birth disorder.
- More children born prematurely and/or with obvious disabilities are surviving.
- In about half of children with hearing loss the cause is due to genetic abnormality.
- Approximately 30-40% of children with hearing loss will have additional disability conditions.

Brain Development - We hear and see with our brains.

- How a brain develops hinges on a complex **interplay** between the **genes** you are born with and the **experiences** you have. Early **experiences** have a **decisive impact** on the architecture of the brain, and on the nature and extent of adult capacities
- **Early interactions** don't just create a context; they **directly affect** the way the brain is "wired"
- Hearing loss, even minimal or fluctuating, provides a barrier that reduces the amount of language stimulation a child will be exposed to in their environment.
- Reduced stimulus to the brain has the ability to affect the number of neural connections that are developed.
- Unidentified hearing loss will affect the degree to which the child will benefit from the experiences they have.

Brain Development and Urgency to Amplify

- Construction of brain pathways is dependent upon sensory input
- Due to the reliance on hearing as part of foundation building of brain pathways it is critical to fit hearing aids to infants with hearing loss within 1 month of diagnosis, preferably no later than 3 months of age.
- Hearing aids are assistive technology devices and therefore are to be provided by Part C to meet the unique developmental needs of children with hearing loss.
- In an OSEP policy letter (<http://www2.ed.gov/policy/speced/guid/idea/letters/2003-1/goodman032503earlyinter1q2003.pdf>) it was clarified that: Appropriate Part C services must be available to all eligible children and their families, are designed to meet the developmental needs of the individual child. Assistive technology devices are among those included as early intervention services at no cost to families (unless a sliding fee system is in place). Thus, our knowledge of brain development in

combination with evidence based practices supporting amplification as early as possible supports the provision of amplification through Part C to eligible infants and toddlers without undue delay.

Hearing and Development

- Vision and hearing are your distance senses, 95% of all learning is through your distance senses
- 90% of learning is incidental - language is learned incidentally. Incidental exposure to language or experiences only occurs if the child is within 'earshot.'
- We hear with our brains – these pathways develop most in the first few months of life
- Children tune into speech about a year before they begin to say actual words
- Hearing loss is a barrier to children being exposed to speech that typically will delay their readiness to begin talking AND their neural pathways will NOT develop optimally unless they are consistently stimulated before 6 months of age!!!!
- Language is CAUGHT not TAUGHT. Babies learn language by associating a word or concept with something they are interested in. The fleeting interest of the baby is what drives language learning. Anything within sight or hearing can catch their interest – if paired with language then new words are learned. If a pairing between interest and language happens repeated during daily activities, the likelihood of the child learning language to describe the thing of interest increases. Early intervention and early childhood education is all about how to make the most of a child's teachable moments!
- The concept of the Listening Bubble was introduced. Out of 'earshot' means language is not caught!
- Hearing Does Not Develop - Children can hear starting in the womb at about 4 months gestation. When born, children hear as well as adults (or better) but need to learn what sounds mean. When children with hearing loss are born they are already behind in sound awareness/identification
- A child with normal hearing will develop auditory skills needed to detect, identify, and comprehend what sounds in their environment mean – all during the first few months of life. Children with hearing loss must be exposed to a specific hierarchy of experiences so that they learn these skills

Experience for Yourself!!

Hearing loss affects how loudly sound is perceived

- **Slight** loss (20 dB) -similar to loss due to ear infection
- **Mild** loss (30 dB) -about ½ who have this much hearing loss do not wear hearing aids

Hearing loss can affect perception of different pitches

- Missing many high pitch sounds (s, f)
- Hearing only the low pitch sounds (oo, aw)

Won't most children with hearing loss be identified by newborn screening?

NO - Even with universal newborn hearing screening not all children with educationally significant hearing loss will be identified:

-Newborn screening is at 35-40 dB; significant hearing loss starts at 16-20 dB. For every 1 child with mild hearing loss identified at birth, **2 will not be identified until speech/language delays are evident.**

-Children with hearing loss right at the cutoff (35dB) will often pass upon retest after newborn screening.

-Some families decline newborn hearing screening or do not obtain follow up evaluation if their newborn failed screening

-Progressive and late onset hearing loss occur after the newborn period

Less than 1% of Minnesota families refuse to have their newborn's hearing screened. In Minnesota that loss to follow up rate is only 2.6%, so most children identified with hearing loss in early childhood will be due to unidentified mild hearing loss, late or progressive hearing loss and not be from missed hearing loss due to lack of follow up of infants who failed newborn hearing screening.

How many children should be identified? Estimates vary

- NIDCD suggests 6-7 per 1000 children have permanent hearing loss in addition to the 3 per 1000 likely to be diagnosed shortly after birth(1)
- The National Health & Nutrition Evaluation Studies (NHANES) for the periods of 1976-80 and 1988-94 screened children from 6-19 years of age indicated that the estimated 3/1000 prevalence of permanent hearing loss in infants can be expected to increase to 9-10/1000 children in the school-age population (2)

What about for Early Childhood?

UNFAIR SPELLING TEST

List 1	List 2
1.	1.
2.	2.
3.	3.
4.	4.
5.	5.
6.	6.
7.	7.
8.	8.
9.	9.
10.	10.

- Data gathered on screening performed on Early Head Start children ages 0-3 and follow-up suggests that approximately 2 of every 1000 children screened in early childhood settings are being identified with a permanent hearing loss.
- So it is conservative to assume that 2-3 additional children with permanent hearing loss will be identified in early childhood and at least another 3 or 4 per 1000 children in elementary school.
- Thus, the anticipated number of children identified with significant hearing loss who pass newborn screening should be 2-3/1000 of the early childhood population screened
- This would therefore be a **doubling** of the number of children found with significant hearing loss shortly after birth.

Types of hearing loss

- Permanent hearing loss is relatively rare. Far greater in number are the children who experience middle ear effusions associated with hearing loss.
- Early Head Start hearing screening for children ages 0-3 identified 18 children per 1,000 to have transient conductive hearing loss secondary to fluid or infection behind the eardrum (3). Due to follow up issues, the 18/1000 finding likely underestimates the actual children with hearing issues due to middle ear effusion.
- About 90% of children under the age of 3 have experienced at least one episode of ear infection or fluid.
- An estimated 35% of pre-school children experiencing intermittent hearing loss secondary to repeated episodes of ear infections with some untreated for extended period of time (4)
- Fluid or infection behind the eardrum, in the middle ear space, can cause significant temporary hearing loss. Young children are more prone to ear problems because the Eustachian tube is much more horizontal and bacterial from the throat can more easily invade the middle ear space. Lower immunity and allergies also contribute.

Who *SHOULD* we identify?

- Our primary target is young children with permanent hearing loss in one or both ears.
- A long history of fluctuating hearing loss secondary to chronic, recurrent middle ear effusion has been correlated with delays in speech/language development and affects on the ability to listen in noise.
- A single screening will not differentiate children with chronic ear problems from those with the occasional ear problem due to a cold.
- The most effective screening protocols will strive to differentiate between potential permanent and temporary hearing loss.

A word about unilateral hearing loss

- About 20-25% of newborns identified with permanent hearing loss after hearing screening have unilateral hearing loss.
- It is a common misperception that hearing loss in one ear will not cause any developmental concerns
- 1/3 develop expressive language delays - 1/5 develop behavior/social concerns - 1/4 develop hearing loss in their better ear
- These children are at 10 times the risk for school failure or special education than normal hearing peers
- Any transient hearing loss due to ear infection will increase the risk of delay

Methods of screening for hearing loss in young children 6 months to 5 years

- ✓ Informal observation and parent interview
- ✓ Checklists
- ✓ Traditional pure tone hearing screening
- ✓ Otoacoustic emissions
- ✓ Tympanometry

Informal observation and parent interview

- Asking if family members have any hearing concerns has long been considered sufficient to identify hearing problems in most early intervention programs, even when there are primarily communication development concerns.
- Some early intervention programs have included informal observation of the young child when a bell or other noisemaker is used as a measure of functional hearing ability.
- Checklists - At least one checklist is available that lists 'red flag' questions for hearing loss and auditory milestones by age to allow identification of possible delays that could indicate a hearing loss (Florida).
- As part of the health history it is common for early intervention programs to ask questions about the result of newborn hearing screening.
- Questions may also be asked about a child's history of ear infections or permanent hearing loss in the family.

Traditional pure tone hearing screening

- This hearing screening method requires a response from the child; typically dropping a block into a bucket when they hear a beep through earphones.

- Pure tone hearing screening methods are usually successful with typically developing 3 year olds. Success is possible with some children as young as 24-30 months.

Otoacoustic emissions (OAE)

- A small tip into the ear as the child listens to a soft clicking. A healthy cochlea will send back a very soft echo that is measured by a microphone.
- This screening provides information about Pass/Fail for the child's hearing, but **not** the amount or type of hearing loss.

Tympanometry

- Tympanometry checks how well the eardrum moves and how well the eardrum and middle ear system send sound to the inner part of the ear.
- Tympanometry does **not** tell if a child is hearing or not. It indicates if there is fluid in the middle ear which can cause temporary hearing loss.
- It can also tell the size of the child's ear canal. If the child has tubes, the test shows that the tubes are working right.

PROS and CONS of Different Screening Methods

Informal observation and parent interview PROS & CONS

- PRO – minimal training, no equipment cost
- PRO - family centered; assumes parents are aware if a hearing problem is present
- CON - Hearing reduces the size of a child's listening bubble. For all but the children with severe to profound degrees of deafness, there will be conditions under which they are observed to respond to sound.
- CON - The younger or less developmentally mature the child, the easier it is to mistakenly assume that hearing is normal.
- CON – Does not meet the requirement for professionally objective assessment criteria.

Each of the hearing losses simulated toward the beginning of this presentation will NOT be identified via informal observation and are unlikely to be identified via parent interview or checklists. All unilateral hearing loss will remain unidentified by these methods. Even children with moderate and severe degrees of hearing loss will respond to sound if it occurs close to the ears and loudly enough. Children that primarily have communication concerns are at risk for permanent hearing loss as are those with syndromes and cranio-facial deformities (i.e., 50-90% of children with Down syndrome have co-existing significant hearing loss).

Checklist PROS & CONS

- PRO – inexpensive, requiring only copying costs
- PRO – minimal training needed
- PRO – provides a systematic means for the IFSP team to consider functional hearing ability that can be applied across early intervention programs
- CON - Using parent questionnaires found that this method of identification misses at least 80% of mild hearing loss or does not differentiate between those with and without hearing loss.
- CON – Does not meet the requirement for professionally objective assessment criteria.

In 40-60% of cases of otitis media with effusion neither children nor their parents report significant complaints relative to the disease. Parent report is highly inaccurate in identifying children experiencing non-acute otitis media with effusion, with or without substantial hearing loss (Burkey et al., 1994; Olusanya, 2001; Lo et al. 2006; Gomes and Lichtig 2005).

Traditional pure tone hearing screening PROS & CONS

- PRO – many schools and Health Departments already have access to this equipment due to school hearing screening
- PRO – considered the optimal choice for identifying hearing loss in preschool and school age because it can identify even mild loss
- CON – Many three year olds are challenging to screen and populations younger than three are too difficult to test effectively in mass screening
- CON - Even more challenging to successfully screen developmentally delayed populations

Pure tone hearing screening remains the gold standard for hearing loss identification because even mild hearing loss can be identified. Hearing screening of preschool and school-age children age 3 years and above should be first attempted with pure tone techniques. Young children should be screened using conditioned play audiometry (drop the block in the bucket). It is not an objective measure but it has been found to be reliable in identifying hearing loss in typical preschool and school age children.

OAE – Otoacoustic Emissions

- PRO – meets the requirement for professionally objective assessment criteria.
- PRO – quick and painless, often successfully completed by trained personnel using distraction techniques (viewing video)
- PRO - Equipment applies pass/fail criteria preventing screening personnel from making this judgment

- CON – requires purchase of OAE equipment, tips, cleaner.
- CON – requires significant training of personnel otherwise can-not-test rate can be as much as 50%
- CON – requires the child to be still and quiet
- CON – OAE screening equipment is typically set to identify hearing losses greater than 35-40 dB, so many mild hearing losses are missed
- CON – the presence of middle ear fluid or pressure will also cause a screening failure

The development of OAE screening techniques has made quick and objective identification of hearing loss in very young and developmentally delayed children possible. Screening challenges can occur frequently for insufficiently trained personnel. Although operation of the equipment is simple, obtaining a valid screening result on active infants or defiant toddlers requires a variety of strategies that are best learned through supervised practice.

Tympanometry PROS & CONS

- PRO – use of tympanometry in conjunction with OAE screening will differentiate children who are likely failing from middle ear effusion from those who are likely to have permanent hearing loss
- PRO – quick, painless and is not as sensitive to movement or background noise as OAE
- CON – NOT a hearing test
- CON – requires purchase of equipment, tips, cleaner
- CON - requires training on how to use equipment
- CON – should be done in conjunction with otoscopy to identify possible draining ears or those with holes in the eardrum

Tympanometry has been used in some school hearing screening programs for 30 or more years. With the advent of OAE screening in young child populations it is advantageous to include tympanometry screening so that children who fail OAE screening and pass tympanometry screening can be prioritized as most likely to have permanent hearing loss.

Implementation Costs & Issues 0-5

Checklist/Parent Interview/Observation method

- Cost
 - Minimal cost for materials and training
 - Possible litigation for missed hearing loss
- Issues
 - Does not meet requirement for objective assessment criteria
 - Miss/hit rate approximately 80/20 (permanent loss)
 - Individual cost to children in terms of limitations on potential progress due to hearing loss, despite provision of quality early intervention services
 - Implementation Costs & Issues 0-3

Although it would be convenient and low cost to implement a checklist or observation method to identify hearing loss in young children, this method fails to identify over ¾ of individuals who have hearing loss. It does not meet the 34 CFR 303.344(a) criteria required for objective assessment.

OAE screening method

- Cost
 - Approximately \$4500 per OAE screener
 - Ongoing costs for tips and tip cleaning time
 - Suggest ½ day or more training of screening personnel. Training should include oversight by an experienced and highly trained person during initial use of OAE
 - Time needed for repeated follow up screening to see if hearing problem resolves over time as a means of reducing over referral rate due to OAE inability to differentiate transient from permanent hearing loss
- Issues
 - Miss/hit rate 20/80 depending
 - Rigorous protocol needed for screening/rescreening to manage loss to follow up rate and identify referrals
 - Implementation Costs & Issues 0-3

OAE screening does meet the criteria required by 34 CFR §303.344(a) for objective assessment. OAE does not identify all children with mild hearing loss - there is NO practical-to-use technology that can be used with this age group as a screening method that WILL identify all mild hearing loss cases.

The Eiserman Early Head Start study conducted initial OAE screening and two additional screenings within a 6 week period for the children who failed the initial screening and those who failed the initial and second screening. With every rescreening there was additional loss to follow up by families who refused or did not follow through on obtaining the rescreening. (Eiserman, W.D., Hartel, D.M., Shisler, L., Buhrmann, J., White, K.R. & Foust, T. (2008). International Journal of Pediatric Otorhinolaryngology. 72, 475-482.) Because of the high prevalence of middle ear effusion and the low prevalence of permanent hearing loss it is likely that a physician will assume that a transient middle ear problem was the cause of the OAE failure. If the family follows through with the medical appointment and if there is middle ear effusion present (1) the medical community's first management technique for ear problems is 'wait and see' and (2) the American Academy of Pediatrics recommends observation management until it is demonstrated that middle ear effusion continues unabated for at least 3 months and (3) 85% of young children's ear problems will resolve within 3 months. Due to the cost of medical care and the fact that most parents work, many do not complete the course of the 3 months of observation management.

Therefore, referral of every child failing OAE screening to their primary medical care provider will likely result in a delay of referral for a hearing evaluation until after 3 months - if the receiving ear, nose, throat physician chooses to obtain a hearing assessment. This assumes that the family has followed through with the medical appointments during the observation management period. If the child presents with clear ears on the first medical appointment the physician may just question the parent about hearing and speech development concerns and choose to conclude that the OAE failure was due to transient middle ear effusion rather than referring the child for an audiological evaluation. However, if the family can report that the child failed three OAE screenings over the course of 1-2 months the primary care physician may be more likely to refer the child for an audiological assessment if the ear are clear on the day of the medical appointment. If the family does not state concerns about hearing or speech development the physician may choose again to conclude that the OAE failures were due to transient hearing loss that resolved.

Tympanometry & OAE Screening

- Cost
 - Approximately \$4500 for OAE, \$3500 for tympanometer or \$7000 for a combined tympanometer/OAE unit
 - Ongoing costs for tips (<\$50/yr) and tip cleaning time
 - Same training needed as OAE screening only
- Issues
 - Miss/hit rate of 6/94
 - Agency must decide on referral practices and follow up for children with apparent middle ear effusion (fail OAE/tympanometry)

If possible, children with failed OAE and pass tympanometry results should be referred to an audiologist for hearing evaluation. Unless the agency provides hearing evaluation at no cost to families, most medical plans require that a physician make a referral to an audiologist. Due to the tendency of the medical community to assume that hearing loss is transient, rather than permanent, the agency or program needs to remain involved and support the family in pursuing a hearing evaluation for children who have been identified by objective means to have hearing concerns. Medical clearance from the physician that there is no middle ear effusion present does not fulfill the need to obtain an appropriate hearing evaluation to address the hearing concern.

For children who have fail results both with OAE and with tympanometry there remains the chance that both a transient and a permanent hearing loss co-exist. If the primary concern is communication delay then the agency or program needs to remain involved and support the family in pursuing appropriate follow up. Medical clearance from the physician that there is no middle ear effusion present does not fulfill the need to obtain an appropriate hearing evaluation to address the hearing concern. The agency or program may choose to repeat the OAE/tympanometry screening following receipt of information from the physician that the ears are clear. If abnormal screening findings continue, it is strongly suggested that the agency or program assist the family in obtaining a hearing evaluation.

The agency or program must decide how to handle the children who fail OAE and tympanometry but do not have communication development concerns. The following is offered for consideration:

1. Recommend that a child be seen by a physician soon if it is close to the time for a well-child check anyway.
2. Rescreen with OAE/tympanometry after 6 months (or sooner at family request) with no referral for pass/pass, referral to a physician for fail/fail and referral to an audiologist for fail/pass. Check communication development progress to determine if typical rate of development has occurred over the 6 months.

Infant/Toddler Screening Summary: Time, Money, & Effectiveness

- Although the checklist/observation method of hearing loss identification is most simple, it is not effective nor does it fulfill the requirement for objective assessment criteria.
- OAE screening fulfills the objective assessment criteria at the cost of the equipment, training, and serial rescreening time until a referral can appropriately be made.
- Serial rescreening often competes with high caseload demands and intervention needs resulting in lack of completion in a timely manner.
- The time taken for rescreening is ultimately time lost to appropriate intervention if a permanent hearing loss is truly present.
- OAE/tympanometry screening is at high initial cost for equipment and training, but results are more accurate with less staff time to rescreen children with common ear problems.

Preschool Hearing Screening

- Conditioned play audiometry is still the 'gold standard' for ages 3 and 4
- If child cannot be conditioned then OAE could be used.
- Tympanometry will help to differentiate between probable middle ear effusion and possible permanent hearing loss
- Monitoring of preschoolers with recurrent chronic middle ear effusion can be an important related service for those in Special Education preschool settings with language delays.
- Children who are Down syndrome and those with cleft palate issues are also at high risk for continual hearing problems and merit hearing monitoring.

Many children outgrow middle ear problems around the age of 3 years although approximately 10% continue to experience middle ear problems and fluctuating hearing loss into elementary and high school. If you plug your ears with your fingers the degree of hearing loss you experience can be compared to transitory hearing problems that accompany occasional fluid or infection behind the eardrum. Pain is only a symptom in a little over half the cases of ear infection. Children who have had many recurrent ear problems can experience up to 50 dB of hearing loss (average conversational speech is at a loudness of 45 dB HL). If a child with communication delay continues to have chronic middle ear problems it is important to consider the affect of hearing loss on learning in the educational planning process.

Summary

- It is hoped that this presentation
 - Raised your awareness of the legal requirements for hearing loss identification
 - Raised your awareness of issues related to hearing loss in young children
 - Raised your awareness of the complexities of screening for hearing loss in young children
 - And provided you with the information needed for your agency or program to determine next steps for implementing or improving a hearing screening initiative.

Resources

- OSEP 11/6/2003 audiology evaluations (<http://www2.ed.gov/policy/speced/guid/idea/letters/revpolicy/tpeval.html>)
- Head Start standard for health and developmental services
<http://eclkc.ohs.acf.hhs.gov/hslc/standards/Head%20Start%20Requirements/1304/1304.20%20Child%20health%20and%20developmental%20services..htm>
- Minnesota EPSDT periodicity schedule <http://www.health.state.mn.us/divs/fh/mch/ctc/>
- The Harvard Center on the Developing Child InBrief: The Science of Early Childhood Development.
http://developingchild.harvard.edu/search/?cx=001599101917928556767%3Aczjkqwnv8&cof=FORID%3A9&ie=UTF-8&q=early+brain+development&siteurl=developingchild.harvard.edu%2Findex.php%2Fresources%2Fmultimedia%2Fvideos%2Finbrief_series%2F&ref=
- OSEP 3/25/03 assistive technology letter of clarification <http://www2.ed.gov/policy/speced/guid/idea/letters/2003-1/goodman032503earlyinter1q2003.pdf>
- Ear Infections and Language Development. e-brochure by US Department of Education and ASHA:
<http://www2.ed.gov/offices/OERI/ECI/earinfections.pdf>
- Parent Interview Protocol for Child Hearing & Vision Skills - example of a checklist screening format http://www.cms-kids.com/home/resources/es_policy_0710/Attachments/3_SHINE_Parent_Interview_Protocol.pdf