

Early Hearing Detection and Intervention (EHDI): The Role of the Medical Home

A PRESENTATION FROM THE AMERICAN ACADEMY OF PEDIATRICS



Hearing Facts

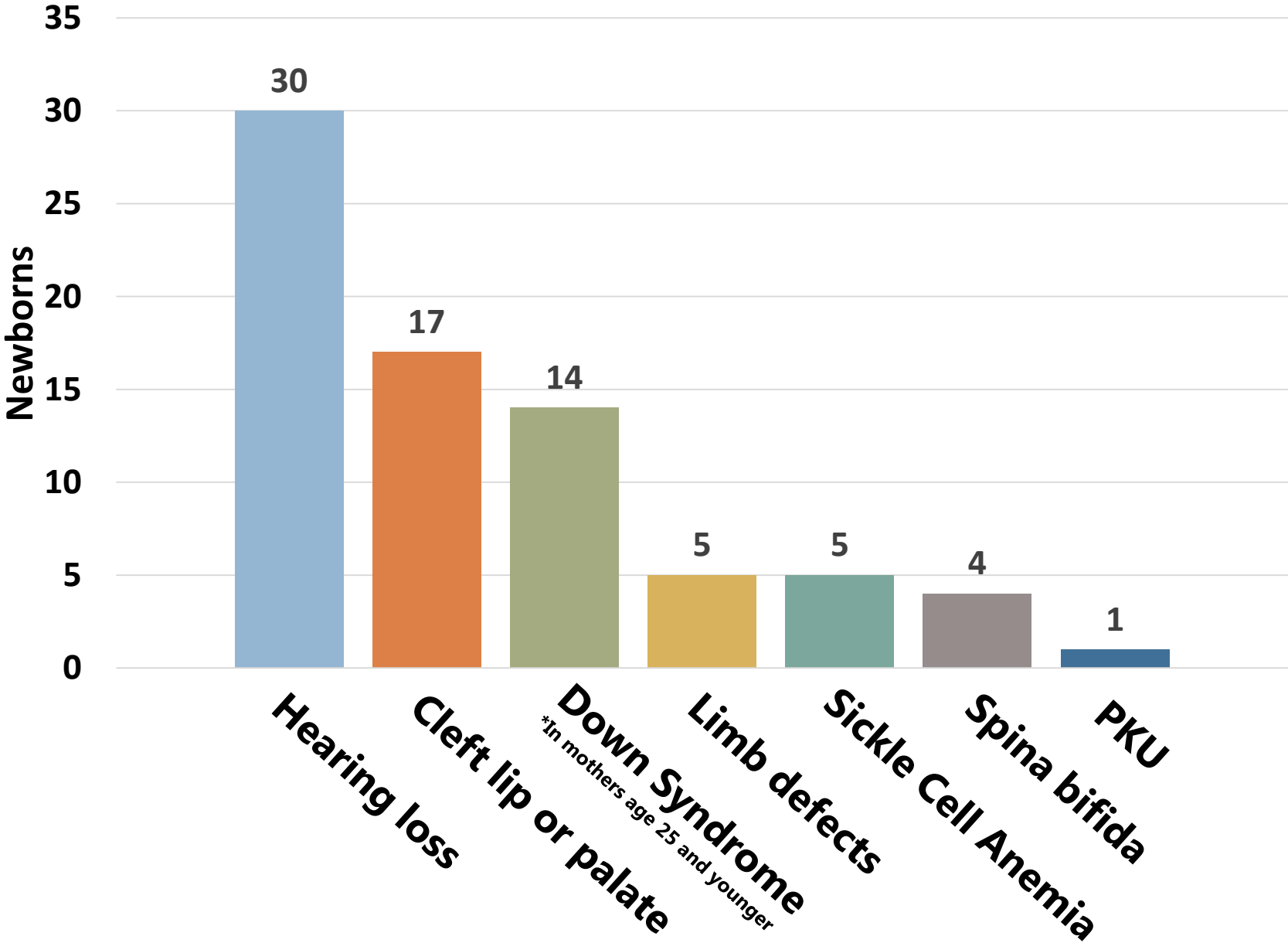


Early identification and intervention for a child who is Deaf or Hard of Hearing (D/HH) will support the development of good communication, language, and social skills.

Delayed identification and intervention can be associated with speech, language, and communication delays that impede the ability for a child to reach his/her full potential.

Comparison of Select Congenital Conditions

Incidence per 10,000 of Congenital Conditions



Early Hearing Detection & Intervention (EHDI) Program

1-3-6

National EHDI Goals

- ❑ All infants will receive a hearing screening before **1** month of age
- ❑ Infants not passing the screening will receive appropriate audiologic and medical evaluation before **3** months of age
- ❑ All infants identified as D/HH will begin receiving early intervention services before **6** months of age

Three Key Components of Early Hearing Detection & Intervention Programs



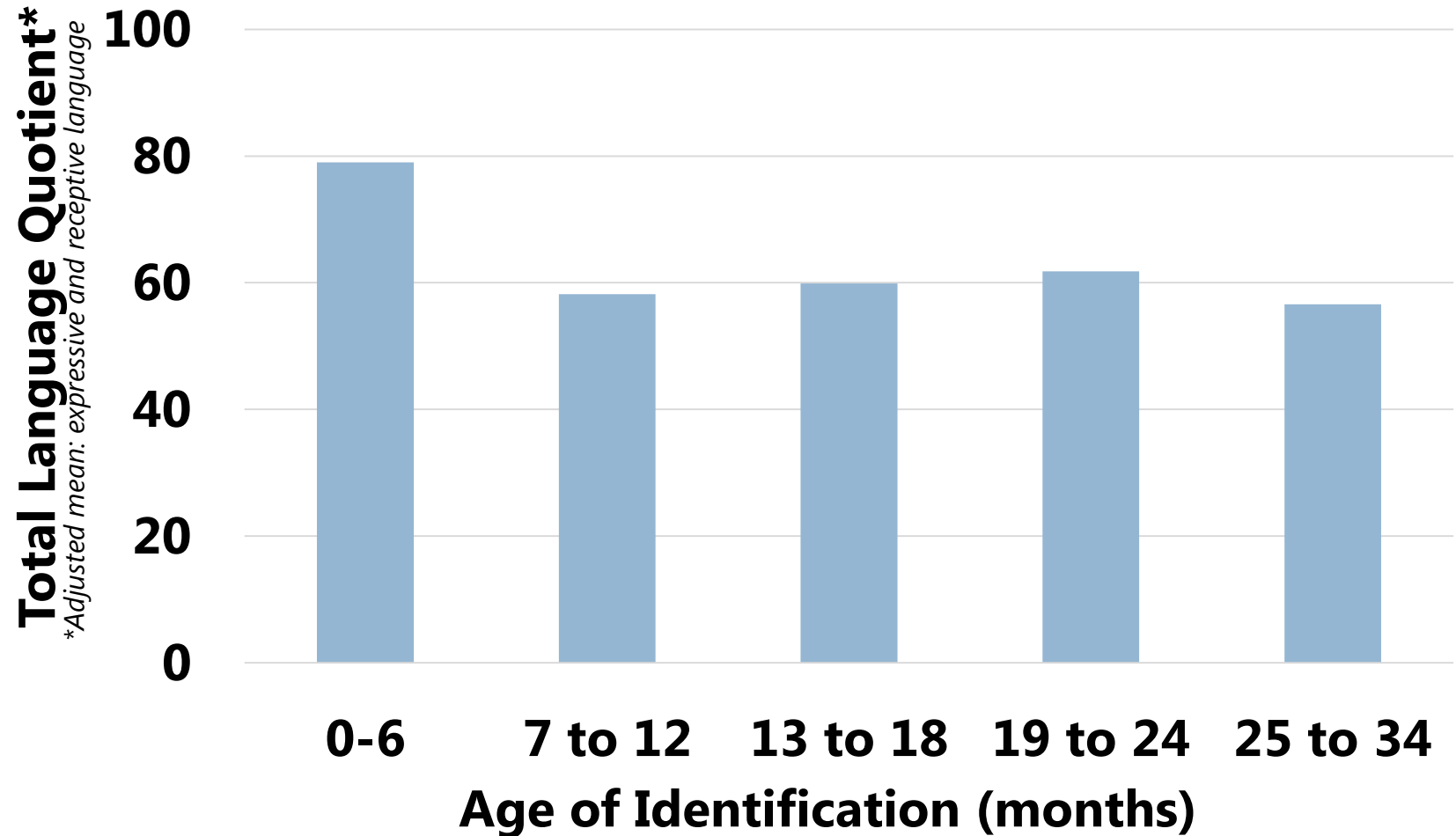
Developmental Emergency

An infant who does not pass his/her newborn hearing screening has a potential developmental emergency.

However...

Early identification of impact to hearing can result in positive language outcomes for children who are D/HH.

Language of Early- and Late-Identified Children With Hearing Loss

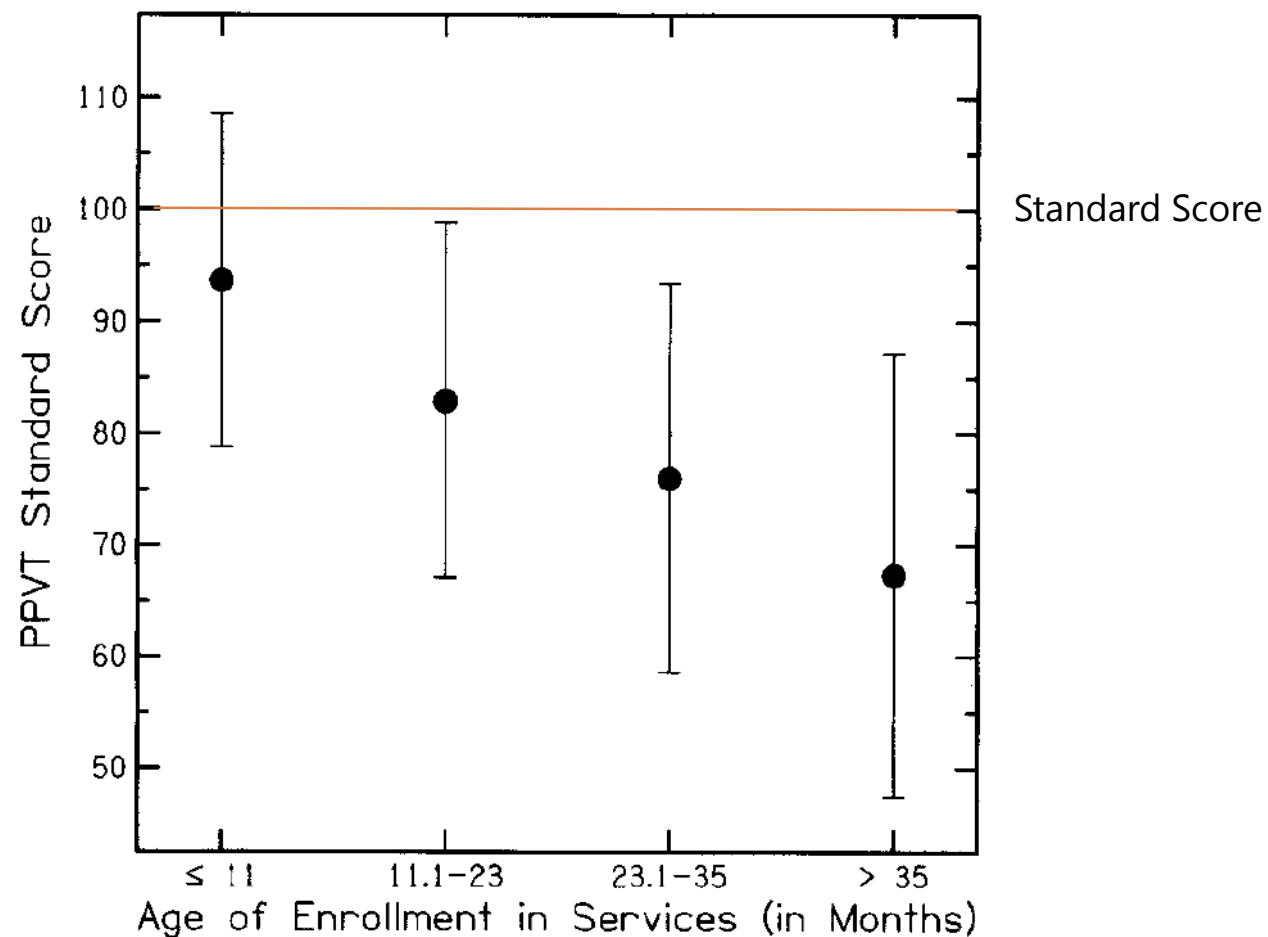


Source: Yoshinaga-Itano, C, Sedey, AL, Coulter, DK, Mehl, AL. (1998). Language of Early- and Late-identified Children With Hearing Loss, *Pediatrics* 1998;103,1161.

Early Hearing Detection & Intervention

Why early diagnosis and intervention matters

Effects of Age of Identification on Language Development



State EHDI Programs



State EHDI Goals

- ❑ Every state and territory in the United States has now established an Early Hearing Detection and Intervention (EHDI) program
- ❑ All 50 states and the District of Columbia have a law, regulation, or documented legislative intent about hearing screening and/or hearing screening guidelines
- ❑ EHDI program staff are responsible for creating, operating, and continuously improving a system of services which assures that the national EHDI goals are met
- ❑ State EHDI Laws and Regulations
http://www.aap.org/en-us/Documents/pehdic_ehdi_%20state_requirements.pdf
- ❑ NCHAM State Resource Page
http://www.infanthearing.org/states_home/

EHDI Program Components

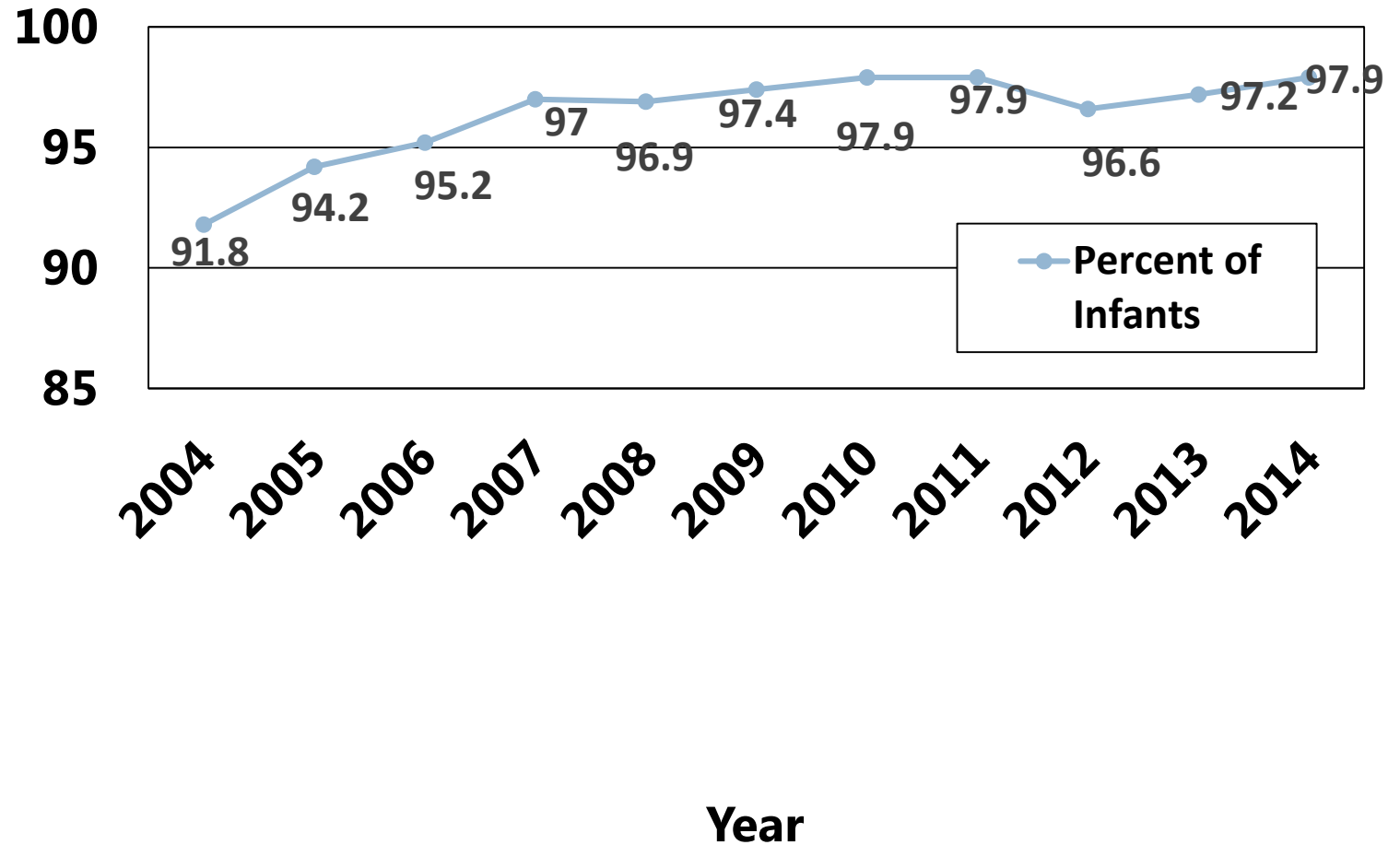
- Universal Newborn Hearing Screening
- Medical Home
- Diagnostic Audiology
- Specialty Referrals
- Early Intervention
- Family Support
- Tracking and Data Management

National EHDI Data

Universal Newborn Hearing Screening

Percent of Infants Receiving Hearing Screening: 2004-2014

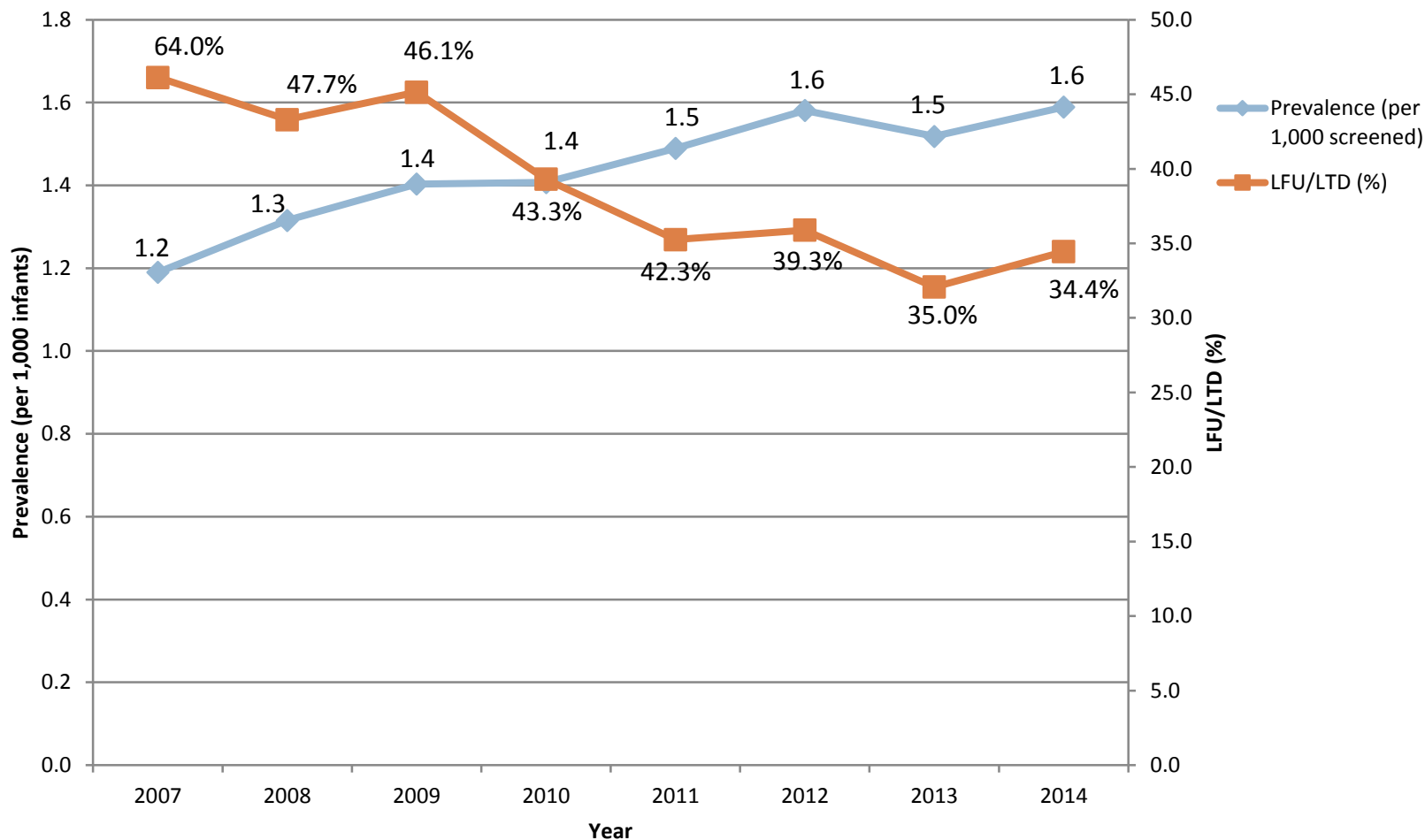
Percent of Infants Screened



National EHDI Data

Incidence of Children who are Deaf or Hard of Hearing (D/HH)

Prevalence of infants identified with hearing loss and loss to follow-up/documentation, United States, 2007-2014



Source: CDC EHDI Hearing Screening and Follow-up Survey (2014)

National EHDI Data

1-3-6 Goals



2014 National CDC EHDI Data

- % Screened: **97.9%** (n=3,877,851)
 - Prevalence of children who are D/HH: **1.6 per 1,000** screened
 - % of those with documented referral for Early Intervention: **87.9%** (n=5,419)
 - % Screened before 1 month of age: **96.1%** (n=3,724,684)
 - % Diagnosed before 3 months of age: **71.3%** (n=26,002)
 - % Receiving Intervention before 6 months of age: **67.9%** (n=2,717)
 - % Loss to Follow-up or Documentation for early intervention: **23.8%** (n=1,467)
- Data Source: 2014 CDC EHDI Hearing Screening & Follow-up Survey (HSFS)

State Specific Statistics

Add state image
here.

Consider inserting a slide
with information about the
data and laws in your state.

Newborn Hearing Screenings

Otoacoustic Emissions (OAE)

vs

Automated Auditory Brainstem Response (AABR)

	Otoacoustic Emissions (OAE)	Automated Auditory Brainstem Response (AABR)
Technique	Probe with microphone placed in the ear canal. Acoustic stimuli presented.	Earphone placed in the ear canal, electrodes placed on baby's scalp. Acoustic stimuli presented.
Measurement	OAEs are measured in the ear canal. With outer/middle ear and/or cochlear problems, no OAEs are detected.	Neural activity of cochlea, auditory nerve and brainstem is measured. Problems with peripheral auditory and/or auditory nerve and/or brainstem result in abnormal or absent measurements of auditory neural activity.
Advantage	Is easier and quicker.	Can indicate auditory nerve or auditory brainstem pathway dysfunction.
Disadvantage	Will NOT identify auditory nerve or auditory brainstem dysfunction.	May require sedation after 4 months of age.

Common Newborn Hearing Screenings

Automated OAE Screening Video



**Early Hearing
Detection & Intervention**

a program of the American Academy of Pediatrics

Common Newborn Hearing Screenings

Automated Auditory Brainstem Response (AABR) Screening Video



Early Hearing
Detection & Intervention

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Newborn Hearing Screening Methods

OAE versus AABR

- ❑ The two screening methods are reliable and can be used separately or together based on:
 - ❑ Whether the baby needs intensive (AABR) or routine newborn care (OAE and/or AABR)
 - ❑ The hospital's choice
 - ❑ State EHDI guidelines
- ❑ Both OAE and AABR may miss very mild hearing thresholds and frequency-specific hearing thresholds
- ❑ OAE will miss auditory nerve or auditory brainstem pathway dysfunction, such as auditory neuropathy spectrum disorder
- ❑ Babies who do not pass the first OAE screen can be given a second screen using either an OAE or the AABR
- ❑ Babies screened for hearing with an AABR in the hospital and resulted in an identified low threshold should not be rescreened in the office with an OAE they should be referred for diagnostic audiological evaluation.

About the Medical Home



The patient and family are the focal point of the medical home

- Includes partnerships with primary providers, specialists and support from the community

Medical home guidelines:

- Accessible
- Continuous
- Comprehensive
- Coordinated
- Compassionate
- Culturally effective
- Family-centered

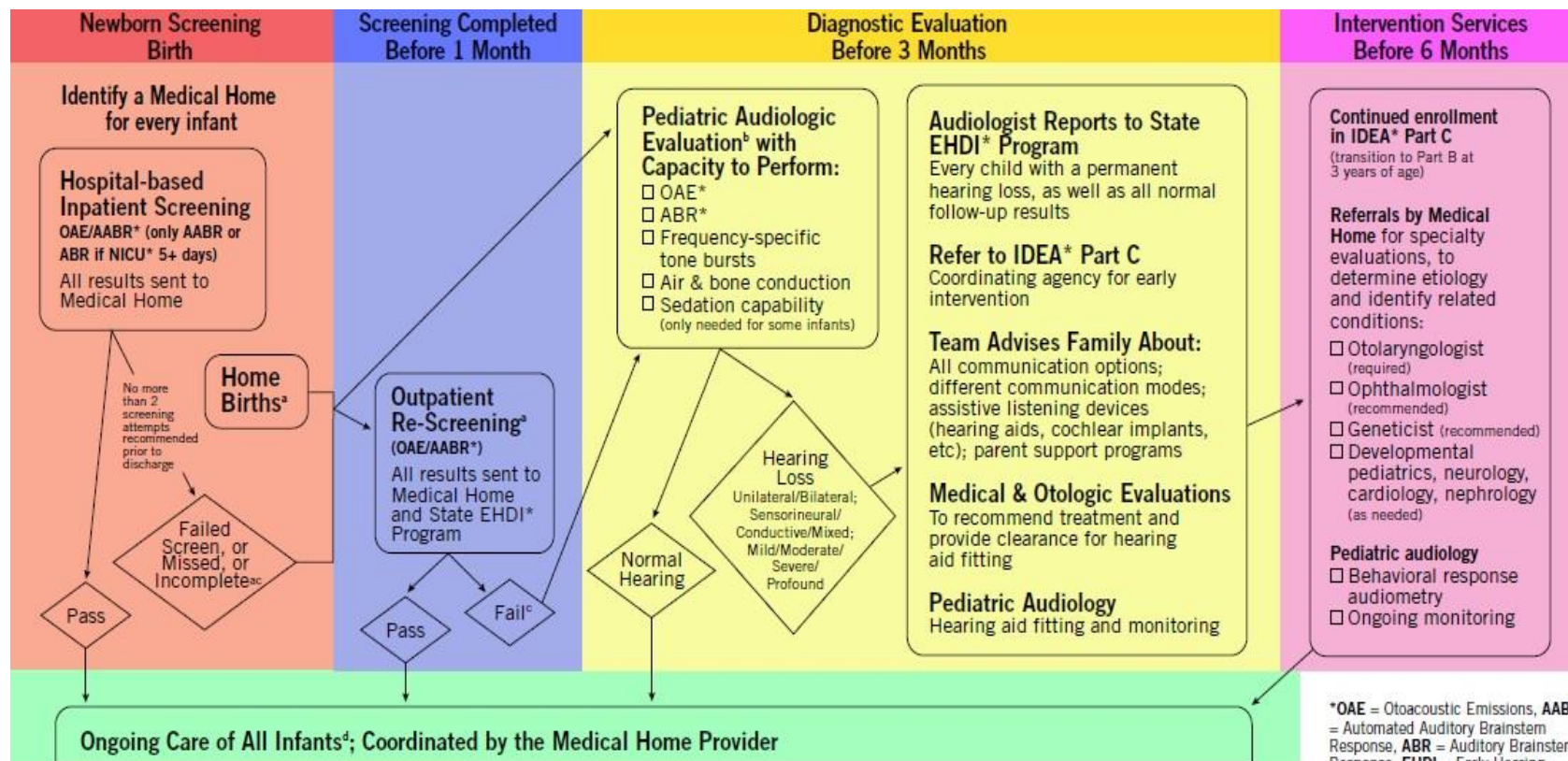
The Role of the Medical Home

Early Hearing Detection and Intervention

- ❑ The medical home plays a key role in the success of EHDI programs
- ❑ A medical home can help families understand the EHDI process
- ❑ The medical home ensures that appropriate and timely steps are taken to identify children who are D/HH and ensure they are connected with an early intervention program
- ❑ The medical home serves as the primary coordinating entity which can help significantly reduce loss to follow-up/documentation

EHDI 1-3-6 Guidelines

Early Hearing Detection and Intervention (EHDI) Guidelines for Pediatric Medical Home Providers



Guidelines and Referral checklist for providers available at

<http://www.aap.org/en-us/advocacy-and-policy/aap-health-initiatives/PEHDIC/Pages/Early-Hearing-Detection-and-Intervention.aspx>

The Role of the Medical Home



If there is any suspicion that an infant is Deaf or Hard of Hearing (D/HH)...

- ❑ **Do listen to parents concerns and refer immediately for full audiology evaluation for any parental worries about hearing or language development.**
- ❑ Encourage prompt follow-up with rescreens and diagnostic evaluations
- ❑ Make sure diagnostic evaluations are done by an audiologist who has experience with infants
- ❑ Set up electronic medical record (EMR) system to include results of auditory screening
- ❑ Flag all patient charts for children that require follow-up for hearing screens
- ❑ Flag all patient charts for children that are at risk for late onset hearing loss

The Role of the Medical Home



Infants identified as D/HH

- ❑ Address the family's concerns
- ❑ Ensure the family is seeing an experienced pediatric audiologist
- ❑ Refer the family to appropriate specialists
- ❑ Otolaryngology, Genetics, Ophthalmology
- ❑ Help the family obtain early intervention services
- ❑ Monitor developmental milestones and ear infections

AAP Resources for Medical Home Providers

Reducing Loss to Follow-up/Documentation (LTF/D)

- ❑ LTF/D rates following diagnosis: 34.4% (CDC, 2014)
- ❑ Medical home providers play a key role in helping reduce the rate of LTF/D
- ❑ LTF/D resources available under the Loss to Follow-up heading at the AAP EHDI web page

<http://www.aap.org/en-us/advocacy-and-policy/aap-health-initiatives/PEHDIC/Pages/Early-Hearing-Detection-and-Intervention.aspx>

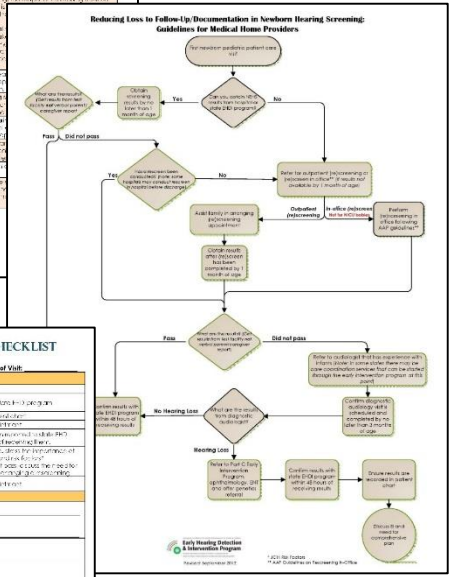
Reducing Loss to Follow-up/Documentation (LTF/D) Resources

AAP Resources for Medical Home Providers

- ❑ Glossary of EHDI Terms
- ❑ Guidelines for Medical Home Providers
- ❑ Reducing LTF/D Provider Checklist

GLOSSARY OF TERMS FOR NEWBORN HEARING SCREENING

TERM	DEFINITION
Newborn hearing screening (NHS)	Screening that is part of the routine care of newborns. It is a quick and simple test that can be done in the hospital or in the community. It is designed to identify infants who may have hearing loss so that they can receive early intervention services.
Otoacoustic Emissions (OAE)	Electrical signals that are produced by the cochlea in response to sound. They are used in hearing screening to identify infants who may have hearing loss.
Automated Auditory Brainstem Response (AABR)	A hearing screening method that uses a computerized system to deliver and analyze the hearing screening test. It is designed to identify infants who may have hearing loss.
Unaided hearing	Hearing without the use of hearing aids or other assistive devices.
Lead to follow-up	When a newborn does not pass the hearing screening, the provider should schedule a follow-up hearing screening within 30 days of the initial screening.
Lead to documentation	When a newborn does not pass the hearing screening, the provider should document the results of the screening and the follow-up screening in the medical record.
Lead to treatment	When a newborn does not pass the hearing screening, the provider should refer the infant to a hearing specialist for further evaluation and treatment.
Medical home	A primary care provider who is responsible for the overall care of the patient, including the coordination of care with other healthcare providers.
Late arrival hearing loss	Hearing loss that is detected after the age of 3 months.
Auditory Neuropathy	A hearing disorder in which the ear can hear sounds but cannot process them properly.



1-3-6 NEWBORN HEARING SCREENING CHECKLIST

Patient Name	Patient DOB	Date of Visit
1. INITIAL SCREENING (See also newborn hearing screening checklist for details.)		
Has the child been screened for hearing loss?	Yes/No	Screened in the office
Was the screening done by a qualified provider?	Yes/No	Documentation in medical record
Was the screening done in the hospital or in the community?	Yes/No	Documentation in medical record
Was the screening done in the hospital or in the community?	Yes/No	Documentation in medical record
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Was the screening done in the hospital or in the community?	Yes/No	Documentation in medical record
2. FOLLOW-UP (See also newborn hearing screening checklist for details.)		
Was the child rescreened within 30 days of the initial screening?	Yes/No	Documentation in medical record
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Was the child rescreened within 30 days of the initial screening?	Yes/No	Documentation in medical record
3. DIAGNOSTIC EVALUATION (See also newborn hearing screening checklist for details.)		
Was the child referred for a diagnostic hearing evaluation?	Yes/No	Documentation in medical record
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Was the child referred for a diagnostic hearing evaluation?	Yes/No	Documentation in medical record
4. EARLY INTERVENTION (See also newborn hearing screening checklist for details.)		
Was the child referred for early intervention services?	Yes/No	Documentation in medical record
Was the child referred for early intervention services?	Yes/No	Documentation in medical record
Was the child referred for early intervention services?	Yes/No	Documentation in medical record
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ONGOING SURVEILLANCE AND SCREENING		
Was the child screened for hearing loss at subsequent visits?	Yes/No	Documentation in medical record
Was the child screened for hearing loss at subsequent visits?	Yes/No	Documentation in medical record
Was the child screened for hearing loss at subsequent visits?	Yes/No	Documentation in medical record

Conducting an In-Office Hearing Screening or Re-screening



Key Highlights

- ❑ In general, medical homes should NOT conduct the initial newborn hearing screening and re-screening should be limited to OAE screening
- ❑ It is very important that the medical home know what screening equipment is used at local birth facilities
- ❑ If you are conducting a re-screening, you are obligated to report the results to the state EHDI program
- ❑ Additional guidelines available at:

<http://www.aap.org/en-us/advocacy-and-policy/aap-health-initiatives/PEHDIC/Documents/NBHSRescreening1%200414.pdf>

Diagnostic Audiology

- ❑ Timely and appropriate diagnostic and intervention services are associated with communication/language development that matches typically developing/hearing peers
- ❑ If diagnostic audiologic assessment is indicated, complete before 3 months of age
- ❑ The diagnostic audiologic evaluation should be performed by a pediatric audiologist
- ❑ The audiologist should perform a series of screens to determine:
 - ❑ If a hearing loss exists
 - ❑ Type
 - ❑ Degree
 - ❑ Configuration of the loss

Types of Hearing Evaluation (Screening and Diagnostic)

- Case History Documentation
- Automated Auditory Brainstem Response (AABR)
- Auditory Steady State Response (ASSR)
- Otoacoustic Emission (OAE)
- Behavioral Audiometry
- Audiological Monitoring

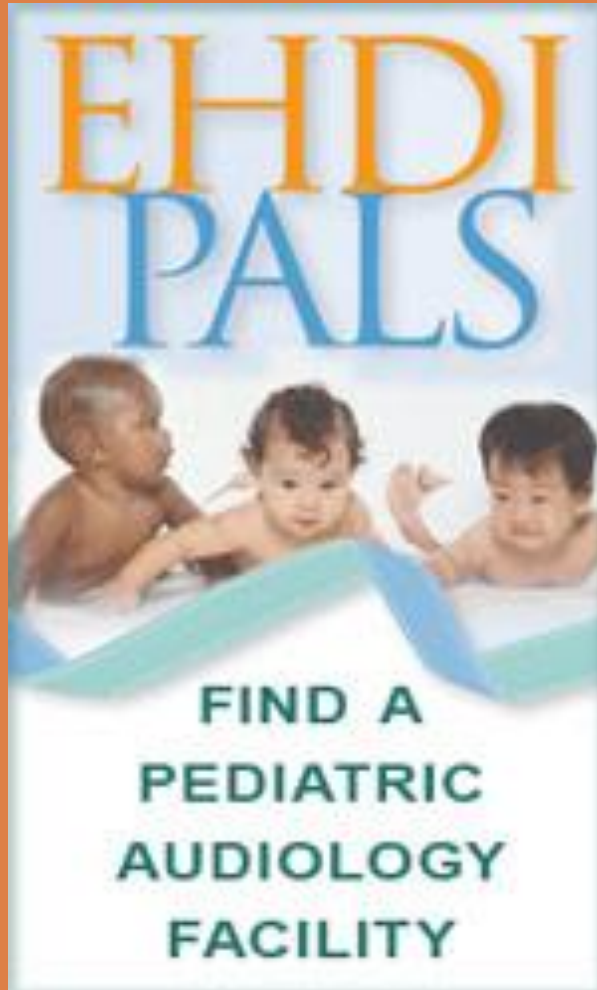
Audiology Intervention



- Hearing aids, if needed, may be prescribed at any age, and should be fit before 6 months of age
- Routinely monitor the effectiveness of hearing aids
- Routine assessment by audiologist after hearing aids are fit should be completed and new ear molds or hearing aids prescribed if needed
- Hearing should be retested on a regular basis to assess levels of hearing change and to identify any issues

EHDI – PALS

Early Hearing Detection & Intervention – Pediatric Audiology Links to Services



- ❑ EHDI-PALS is a web-based link to information, resources, and services for children who have been identified as Deaf or Hard of Hearing (D/HH)
- ❑ A national web-based directory of facilities that offer pediatric audiology services to children less than five years of age
- ❑ The medical home can use EHDI-PALS to help refer families to the most appropriate diagnostic facility and services

<http://www.ehdipals.org/>

Specialty Referrals

Otolaryngology

- Assess integrity of ear canal and middle ear
- Order appropriate diagnostic screening such as temporal bone CT, MRI, etc.
- Discuss possible surgical interventions
- Counsel family and follow for success of intervention

Genetics

- Evaluate for possible genetic causes of hearing change
- Counsel family and patient

Ophthalmology

- Assess integrity of visual system
- Evaluate for visual problems known to be associated with hearing changes

Early Intervention



- ❑ Early Intervention (EI) services are provided to children and families under the Individuals with Disability Education Act (IDEA) of 2004, Part C
- ❑ All families of infants who have been identified as D/HH regardless of degree or bilaterality/unilaterality, should be considered eligible for early intervention services
- ❑ Children identified as D/HH who begin services before 6 months old develop language (spoken or signed) on a par with their hearing peers (Yoshinaga et al., 1998)
- ❑ Access several early intervention tools by visiting www.infanthearing.org/earlyintervention/

Family Support



Physician and Family Collaboration

- ❑ The physician's role as supporter to families to meet the 1-3-6 model is critically important
- ❑ Families feel supported by professionals when they perceive the relationship to be a collaborative partnership built on trust and respect
- ❑ This process takes time and involves mutual respect, honest and clear communication, understanding, cultural awareness and sensitivity and empathy

Family Support Resources



Organizations Supporting Children who are D/HH and their Families

- ❑ Hands & Voices

<http://www.handsandvoices.org/>

- ❑ Alexander Graham Bell Association

<http://www.listeningandspokenlanguage.org/>

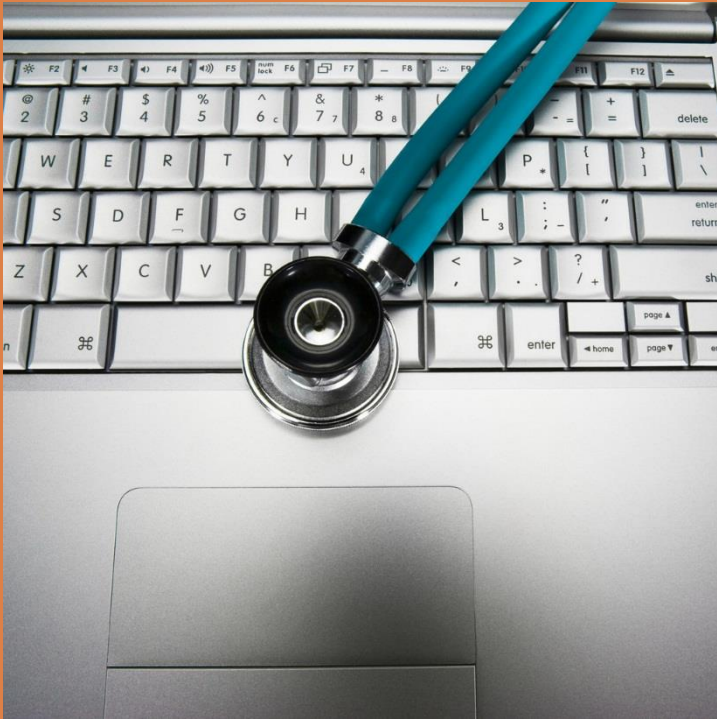
- ❑ Family Voices

<http://www.familyvoices.org/>

- ❑ American Society for Deaf Children

<http://deafchildren.org/>

Tracking & Data Management

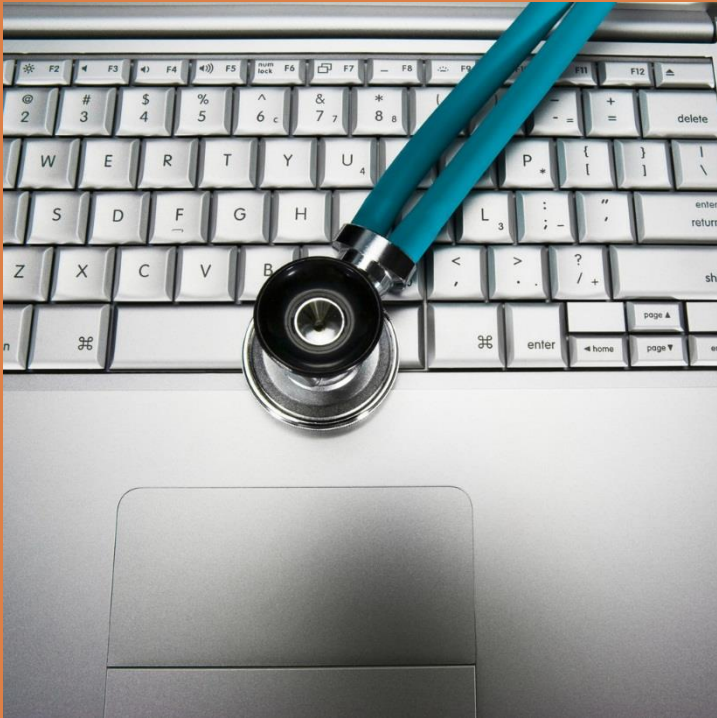


The success of these programs depends on reporting, tracking, and follow-up!

According to the Joint Committee on Infant Hearing, information management is used to:

- Improve services to infants and their families
- Assess the quality and timeliness of screening, evaluation, and enrollment into early intervention services
- Facilitate collection of demographic data on neonatal and infant hearing status

Tracking & Data Management



The Role of the Medical Home in Tracking and Reporting

- Medical home providers confirm
 1. That newborn hearing screening has been conducted
 2. Which technique (OAE or AABR) was used
 3. Screening results are reported to the state EHDI program

- If conducting an in-office screen, providers **must** report the results directly to the state EHDI program

- It is important that medical homes learn their unique state reporting system

- AAP State EHDI Laws and Regulations Resource:

http://www.aap.org/en-us/Documents/pehdc_ehdi_%20state_requirements.pdf

Helpful Resources from the National Center for Hearing Assessment and Management (NCHAM)

- ❑ NCHAM Interactive Web-based Newborn Hearing Screening Training Curriculum
- ❑ Educational and Training Videos
- ❑ NCHAM EHDI eBook: A Resource Guide for Early Hearing Detection and Intervention
- ❑ Slideshow Presentations

*All materials can be found on the NCHAM website under the "Resources" heading:

http://www.infanthearing.org/resources_home/

Useful Web sites



- ❑ American Academy of Pediatrics (AAP) EHDI page
<http://www.aap.org/en-us/advocacy-and-policy/aap-health-initiatives/PEHDIC/Pages/Early-Hearing-Detection-and-Intervention.aspx>
- ❑ Joint Committee on Infant Hearing (JCIH)
<http://www.jcih.org/>
- ❑ Boys Town National Research Hospital
<http://www.boystownhospital.org/>

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