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Beyond EHDI: Screening Across a Lifetime

Presented by:

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Current state of EHDI in the U.S.

- Almost **all newborns** are screened for hearing loss prior to discharge



HOWEVER...

- “Severe shortages in experienced pediatric audiologists delays confirmation of hearing loss”

Current state of EHDI in the U.S.

- “Current system designed to serve infants with bilateral severe/profound losses---but, the majority of those identified have mild, moderate, and unilateral losses”
- “33% of submissions have no identifying data -- making follow-up by state EHDI staff impossible”
- “Only 17% of states currently have any kind of linkage with other data systems (e.g., Vital Statistics, Heelstick, EI, Immunizations)”



EHDI Phase II Goals

- Improve tracking and surveillance to reduce the number of cases lost to follow-up;
- Address privacy concerns associated with the exchange of health-related information;
- Provide comprehensive coverage of early intervention and amplification devices; and
- Promote an unbiased, family-centered approach to early intervention opportunities to help parents make the best choice for their child.

Outcomes from Phase II

- Increased interest in improving follow-up at the state and federal levels; focus on early intervention
- State legislation to enhance follow-up, expand early intervention, and provide coverage for hearing aids and cochlear implants
- Twelve states enacted hearing aid mandates
- ASHA working with Joint Committee on Infant Hearing (JCIH) on screening protocols beyond infancy

2009 ASHA EHDI Survey

- ◆ Loss to follow-up
- ◆ Exchange of information between health care professionals regarding screening results
- ◆ Ease of data sharing
- ◆ Funding for amplification devices and early intervention
- ◆ Resources for families

Lessons learned from Phase II

- Importance of computer-based data management
 - ◆ Better tracking, improved communication between stakeholders, quality control, funding
- Periodic re-screening needed to catch mild, late onset, and hearing loss missed in initial screening
- Integrating surveillance and screening in the Medical Home: “A medical home is defined as primary care that is **accessible, continuous, comprehensive, family centered, coordinated, compassionate, and culturally effective.**”

American Academy of Pediatrics



“Screening across a lifetime...”

- 12- to 18-month well baby screening
- Pre-kindergarten
- School-age
- Medicare eligible
 - ◆ Approximately $\frac{1}{4}$ of adults aged 65 to 74 years and $\frac{1}{2}$ of adults 85 and older report some degree of hearing loss



Rationale for lifetime screening

- Only about half of all infants who are referred for follow-up actually receive timely assessment or intervention
- NCHAM estimates that by school age, new cases of permanent hearing loss occur in approximately 6 per 1,000 children, in addition to the 3 per 1000 likely to be detected at birth
- 35% of pre-school children experience repeated episodes of ear infections and intermittent hearing loss, some untreated for extended periods



Rational for lifetime screening

- Children not screened at birth, lost to follow-up, or with late onset hearing loss may have serious developmental problems if hearing loss is untreated.
- The American Academy of Pediatrics (AAP) recommends periodic hearing screening between birth and school-age because hearing is central to language development, communication, and learning.
- Part C of the Individuals with Disabilities Education Act (IDEA) requires a timely, comprehensive, multidisciplinary evaluation that includes hearing and communication development.



Current pre-K and school-age screening guidelines

- Early Childhood Hearing Outreach (ECHO) Project and Head Start
 - ◆ In 17 states, training teams led or supported by pediatric audiologists providing hands-on training, and follow-up technical assistance to hundreds of Head Start programs
 - ◆ Preliminary data analysis indicates that approximately two of every 1,000 children are identified with a permanent hearing loss and an additional 18 children per 1,000 are identified with hearing loss.

Current pre-K and school-age screening guidelines

- The majority of states mandate periodic school hearing screenings
 - ◆ However, “[c]urrently implemented school-based hearing screening guidelines are non-standardized and inadequate for the early identification of NIHL [noise-induced hearing loss].” - *American Journal of Audiology* (2007)
- American Academy of Pediatrics (AAP) recommendations for preventative health care
 - ◆ Periodicity schedule



Recommendations for Preventive Pediatric Health Care

Bright Futures/American Academy of Pediatrics



Each child and family is unique; therefore, these Recommendations for Preventive Pediatric Health Care are designed for the care of children who are receiving competent parenting, have no manifestations of any important health problems, and are growing and developing in satisfactory fashion. Additional visits may become necessary if circumstances suggest variations from normal.

Developmental, psychosocial, and chronic disease issues for children and adolescents may require frequent counseling and treatment visits separate from preventive care visits.

These guidelines represent a consensus by the American Academy of Pediatrics (AAP) and Bright Futures. The AAP continues to emphasize the great importance of continuity of care in comprehensive health supervision and the need to avoid fragmentation of care.

The recommendations in this statement do not indicate an exclusive course of treatment or standard of medical care. Variations, taking into account individual circumstances, may be appropriate.

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AGE	INFANCY								EARLY CHILDHOOD						MIDDLE CHILDHOOD					ADOLESCENCE														
	PRENATAL	NEWBORN	3-5 d*	By 1 mo	2 mo	4 mo	6 mo	9 mo	12 mo	18 mo	18 mo	24 mo	30 mo	3 y	4 y	5 y	6 y	7 y	8 y	9 y	10 y	11 y	12 y	13 y	14 y	15 y	16 y	17 y	18 y	19 y	20 y	21 y		
HISTORY																																		
Initial/Interval	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
MEASUREMENTS																																		
Length/Height and Weight	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Head Circumference	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Weight for Length	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Body Mass Index																																		
Blood Pressure*		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
SENSORY SCREENING																																		
Vision	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Hearing	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
DEVELOPMENTAL/BEHAVIORAL ASSESSMENT																																		
Developmental Screening†																																		
Autism Screening†																																		
Developmental Surveillance†		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Psychosocial/Behavioral Assessment		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Alcohol and Drug Use Assessment																																		
PHYSICAL EXAMINATION*																																		
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
PROCEDURES*																																		
Newborn Metabolic/Hemoglobin Screening‡		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Immunization‡		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Hemostatic or Hemoglobin‡							•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Lead Screening‡								•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Tuberculin Test‡							•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Dyslipidemia Screening‡																																		
•																																		
STI Screening‡																																		
•																																		
Cervical Dysplasia Screening‡																																		
•																																		
ORAL HEALTH‡																																		
•																																		
ANTICIPATORY GUIDANCE*																																		
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

1. A child whose earlier visits for the first time at any point on the schedule, or if any items are not accomplished at the suggested age, the schedule should be brought up to date at the earliest possible time.
2. A prenatal visit is recommended for parents who are at high risk, for first-time parents, and for those who request a consultation. The prenatal visit should include antenatal education, partner-related history, and a discussion of benefits of breastfeeding and physical method of feeding per AAP statement "The Physical Exam" (2007) [URL: <http://www.aap.org/pubs/newspubs/newspubs.nsf?v=tableofcontents&tableofcontents=11834495>].
3. Every infant should have a newborn evaluation after birth, breastfeeding encouragement, and instruction and support offered.
4. Every infant should have an evaluation within 9 to 11 days of birth and within 48 to 72 hours after discharge from the hospital, to include evaluation for feeding and jaundice. Breastfeeding infants should receive formal breastfeeding evaluation, encouragement, and instruction as recommended in AAP statement "Breastfeeding and the Use of Human Milk" (2008) [URL: <http://www.aap.org/pubs/newspubs/newspubs.nsf?v=tableofcontents&tableofcontents=11834495>]. For newborns discharged in less than 48 hours after delivery, the infant must be examined within 48 hours of discharge per AAP statement "Hospital Stay for Healthy Term Newborns" (2004) [URL: <http://www.aap.org/pubs/newspubs/newspubs.nsf?v=tableofcontents&tableofcontents=11834495>].
5. Blood pressure measurement in infants and children with specific risk variables should be performed at visits between ages 3 to 6 years.
6. If the patient is unimmunized, discuss within 8 months per the AAP statement "Eye Examination in Infants, Children, and Young Adults by Pediatricians" (2007) [URL: <http://www.aap.org/pubs/newspubs/newspubs.nsf?v=tableofcontents&tableofcontents=11834495>].
7. All newborns should be screened per AAP statement "Newborn Screening: Principles and Options for Early Hearing Detection and Intervention Programs" (2008) [URL: <http://www.aap.org/pubs/newspubs/newspubs.nsf?v=tableofcontents&tableofcontents=11834495>].

8. Pediatrician/Physician, Joint Committee on Infant Hearing, Year 2007 position statement: principles and guidelines for early hearing detection and intervention programs. Pediatrics. 2007;119:189-201.
9. AAP Council on Children With Disabilities, AAP Section on Developmental Disabilities, AAP Bright Futures Steering Committee, AAP Medical Board Initiative for Children With Special Needs Project Advisory Committee. Identifying Infants and young children with developmental disorders in the medical home: an algorithm for developmental surveillance and screening. Pediatrics. 2005;116:499-509 [URL: <http://www.aap.org/pubs/newspubs/newspubs.nsf?v=tableofcontents&tableofcontents=11834495>].
10. Single VL, Hyman SL, Johnson CL, et al. Identifying children with autism early? Pediatrics. 2002;110:1043-1052 [URL: <http://www.aap.org/pubs/newspubs/newspubs.nsf?v=tableofcontents&tableofcontents=11834495>].
11. At each visit, age-appropriate physical examination is essential with intent to identify, detect, and address oral and ocular changes.
12. There may be medical, counseling or safety risks to the schedule and individual visit.
13. Newborn metabolic and hemoglobin screening results should be done according to state law. Results should be reviewed at visit and appropriate feeding or referral done as needed.
14. Refer to the Committee on Immunizations, published annually in the January issue of Pediatrics. Every visit should be an opportunity to update and complete a child's immunization.
15. See AAP Position Statement (available in E-Tools) (2002) for a discussion of selected oral medicine counseling options. See also Recommendations to prevent and control iron deficiency in the United States. MMWR. 1999;CVII-01-06.
16. For children at risk of lead exposure, consult the AAP statement "Lead Exposure in Children: Prevention, Detection, and Management" (2008) [URL: <http://www.aap.org/pubs/newspubs/newspubs.nsf?v=tableofcontents&tableofcontents=11834495>]. Additional counseling should be done in accordance with state law where applicable.

17. Pediatrician/Physician, Joint Committee on Infant Hearing, Year 2007 position statement: principles and guidelines for early hearing detection and intervention programs. Pediatrics. 2007;119:189-201.
18. Refer to the Committee on Immunizations, published annually in the January issue of Pediatrics. Every visit should be an opportunity to update and complete a child's immunization.
19. See AAP Position Statement (available in E-Tools) (2002) for a discussion of selected oral medicine counseling options. See also Recommendations to prevent and control iron deficiency in the United States. MMWR. 1999;CVII-01-06.
20. For children at risk of lead exposure, consult the AAP statement "Lead Exposure in Children: Prevention, Detection, and Management" (2008) [URL: <http://www.aap.org/pubs/newspubs/newspubs.nsf?v=tableofcontents&tableofcontents=11834495>].
21. Pediatrician/Physician, Joint Committee on Infant Hearing, Year 2007 position statement: principles and guidelines for early hearing detection and intervention programs. Pediatrics. 2007;119:189-201.
22. At the visit for 8 years and 6 years of age, it should be determined whether the patient has a dental home. If the patient does not have a dental home, a referral should be made to one. If the primary care source is a pediatrician, pediatrician and dentist cooperation is essential.
23. Refer to the ocular guidelines by age or level in Bright Futures Guidelines (Hogan JJ, Shaw JJ, Owens PL, eds. Bright Futures: Guidelines for Health Supervision of Infants, Children, and Adolescents, 3rd ed. Elk Grove Village, IL: American Academy of Pediatrics; 2004).

KEY
 • = to be performed • = risk assessment to be performed, with appropriate action to follow if positive ← • → = range during which a service may be provided, with the symbol indicating the preferred age

What to consider?

- ***Testing and equipment:*** using the most appropriate screening method available for the population being served
 - ◆ Otoacoustic emissions (OAE): an objective method that screens hearing in a range of sound frequencies critical for normal speech and language development, whereby a small probe containing microphone is placed in the ear
 - ◆ OAEs can be used as part of a comprehensive test battery for children and adults
 - ◆ Children who need further evaluation should be referred to an audiologist who is capable of evaluating children

What to consider?

- *Other methods:*

- ◆ Pure Tone Audiometry: a series of beeps at a variety of different test frequencies; best for older children and adults
- ◆ Tympanometry: measures how well the eardrum moves, i.e. if there is fluid behind the eardrum or a perforation or a hole in the eardrum; useful in combination with pure tone
- ◆ Otoscopic inspection: looking in the ear with an otoscope, usually done if child fails a hearing screening to rule out other causes (i.e., ear wax)

What to consider?

- *When to screen beyond infancy*
 - ◆ 12- to 18-months, pre-K, school-age



Photo courtesy of Oticon A/S

School-age children

- Centers for Disease Control (CDC): an estimated 12.5% of children and adolescents aged 6–19 years (approximately 5.2 million) and 17% of adults aged 20–69 years (approximately 26 million) have suffered permanent hearing damage from excessive exposure to noise.
- AAP: hearing screening should be conducted: at school entry for all children; at least once at ages 6, 8, and 10; at least once during middle school; at least once during high school; and for any student entering a new school system without evidence of a previous hearing exam.

Other considerations:

- ***Reporting/data management*** – who ensures transmission of information and data maintenance
 - ◆ How children with each outcome will be tracked and who will be responsible for follow-up actions
- ***Privacy*** of information
- ***Integrating*** EHDI data with other data from computerized child-health information systems
- ***Expertise*** working with children with hearing loss
- ***Training*** – speech-language pathologists, nurses, volunteers, physicians, technicians



Recommended Immunization Schedule for Persons Aged 0 Through 6 Years—United States • 2009

For those who fall behind or start late, see the catch-up schedule

Vaccine ▼	Age ►	Birth	1 month	2 months	4 months	6 months	12 months	15 months	18 months	19–23 months	2–3 years	4–6 years	
Hepatitis B ¹	HepB		HepB		<i>see footnote 1</i>	HepB							Range of recommended ages
Rotavirus ²			RV	RV	<i>RV</i> ²								
Diphtheria, Tetanus, Pertussis ³				DTaP	DTaP	DTaP	<i>see footnote 3</i>	DTaP				DTaP	Certain high-risk groups
<i>Haemophilus influenzae</i> type b ⁴				Hib	Hib	<i>Hib</i> ⁴	Hib						
Pneumococcal ⁵				PCV	PCV	PCV	PCV				PPSV		
Inactivated Poliovirus				IPV	IPV	IPV						IPV	
Influenza ⁶						Influenza (Yearly)							
Measles, Mumps, Rubella ⁷							MMR			<i>see footnote 7</i>		MMR	
Varicella ⁸							Varicella			<i>see footnote 8</i>		Varicella	
Hepatitis A ⁹							HepA (2 doses)				HepA Series		
Meningococcal ¹⁰											MCV		

This schedule indicates the recommended ages for routine administration of currently licensed vaccines, as of December 1, 2008, for children aged 0 through 6 years. Any dose not administered at the recommended age should be administered at a subsequent visit, when indicated and feasible. Licensed combination vaccines may be used whenever any component of the combination is indicated and other components are not contraindicated and if approved by the Food and Drug Administration for that dose of

the series. Providers should consult the relevant Advisory Committee on Immunization Practices statement for detailed recommendations, including high-risk conditions: <http://www.cdc.gov/vaccines/pubs/acip-list.htm>. Clinically significant adverse events that follow immunization should be reported to the Vaccine Adverse Event Reporting System (VAERS). Guidance about how to obtain and complete a VAERS form is available at <http://www.vaers.hhs.gov> or by telephone, 800-822-7967.

Role of Audiologists

- *Assessment, diagnosis, and evaluation* of hearing loss
- Integral part of *EHDI* team
- Coordination with the *medical home*, including primary care physicians
- *Monitor* hearing screening results and follow up
- Assist with *transition services* to early intervention, pre-K, school

Role of Speech-Language Pathologists

- ***Monitor*** speech and language development and ensure timely hearing screenings and follow-up
 - ◆ Children with developmental disabilities are at a higher risk for hearing loss
- Provide families with ***support and strategies*** to encourage language development for their child with hearing loss (sign language, auditory-oral focus, cued speech, etc.) that support a family's choices for their child's ***communication development***



Role of Speech-Language Pathologists

- *Screening and follow-up services* such as re-screening, auditory training, speechreading, etc.
- OAE, pure tone, otoscopic inspection, and tympanometry are within the SLP scope of practice – for initial *identification and/or referral* purposes



ASHA's Lifetime Screening Campaign

- Developing comprehensive *screening and follow-up protocols* that address:
 - ◆ Age appropriate testing, training and personnel issues, documentation (contemporaneous), and setting and equipment standards
- ***Coordination*** with AAP, JCIH, CDC, and other organizations
 - ◆ Linking recommendations to campaign goals
- Monitor trends in *health care technology*





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