Audiologist Responsibilities to Early Hearing Detection and Intervention (EHDI)

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Today's Agenda

- Historical perspectives and current data from EHDI program in KY
- Review of JCIH 2007 guidelines
- Development of Evidence Based Practice (EBP) guidelines for all EHDI follow-up centers
- Case studies (participation requested!)
- Future directions for KY EHDI

Famous “EHDI’s”

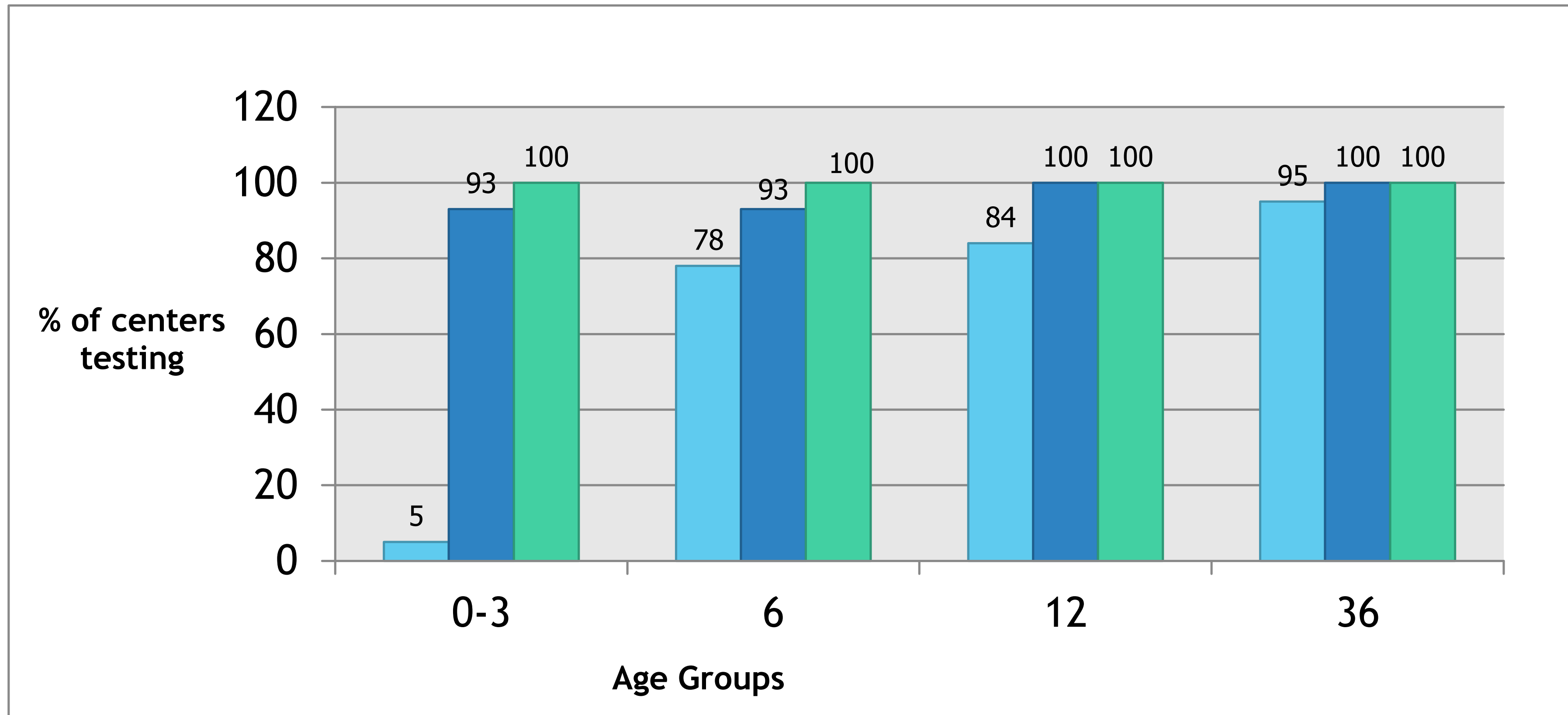
KY EHDI

- The term EHDI reflects the full continuum from screening (UNHS) to diagnostic evaluations and linkage to early intervention services.
- The full implementation of EHDI programs was delayed until the mid to late 90's due to a multitude of factors:
  - Policy statements and recommendations from JCIH relied on data indicating that most babies would be identified through high-risk screening; in reality only 50% of babies with hearing loss have identifiable *risk indicators*
  - Shorter hospital stays for newborns/mothers made it difficult to implement "high risk" screenings in well baby nurseries
  - Convincing families/PCP's of the need for full hearing evaluations of babies with risk factors proved to be difficult
  - Concern that identifying babies with hearing loss early might disrupt the natural bonding process between parents and infants
  - Primary obstacle was the lack of a valid, cost effective and rapid objective technique for newborn hearing screening prior to discharge

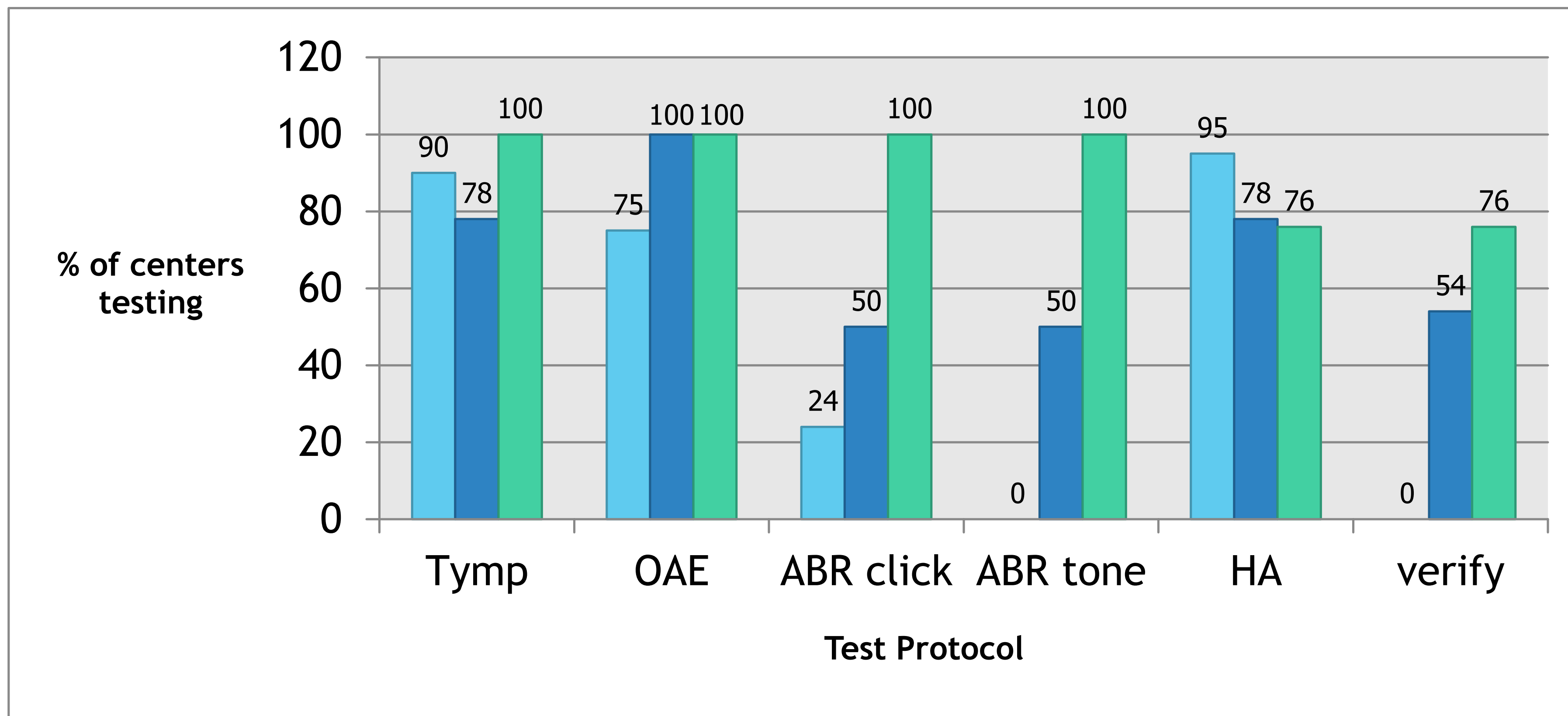
KY-EHDI Historical Perspectives

- January 2001: Kentucky implemented Universal Newborn Hearing Screening (UNHS) statewide
  - 52% screened in 2000 (Legislation signed July 1, 2000-implemented Jan 1, 2001)
  - 98% screened in 2001
  - 99% screened in 2015
- Paradise and Bess (1994): Predicted inability to provide quality follow-up from UNHS due to high numbers
- Madell (2013): “Many audiologists see both adults and children. Many audiologists who work primarily with adults work well with older children. But there is a difference between adult and pediatric audiology. Pediatric audiology is more than fitting hearing aids. A good pediatric audiologist will monitor all aspects of a child’s development, will assist parents in selecting and managing therapy, will refer to other specialists as needed, will work with schools to get appropriate accommodations and will teach school staff what they need to know to assist a child with hearing loss in succeeding in school.”

Access to Services in KY by Age 2001, 2009, 2015 Center Questionnaires



Test Protocol
2001, 2009, 2015 Center Questionnaires



KY EHDI Loss to Follow-Up (LTF)/ Loss to Documentation (LTD)

Birth Year	Screened	Referred	Follow-up	LFU/LTD
2000	142	67	3	95.52%
2001	4856	1361	287	78.91%
2002	4856	1778	542	69.52%
2003	4587	1991	734	63.13%
2004	5137	2276	884	61.16%
2005	5725	2295	1094	52.33%
2006	9265	2193	1232	42.82%
*2007	53466	2114	1334	36.90%
2008	54766	2415	1655	31.47%
2009	54094	2158	1703	21.09%
**2010	52502	2334	1969	15.64%
2011	52392	2561	2229	13.97%
2012	52868	2356	2107	10.57%
2013	52855	2383	2147	10.01%
2014	53014	2411	2170	9.99%
***2015*	*52603*	*2176*	*1831*	*15.85%*

* KY CHILD HSR
** AUF
*** INCOMPLETE DATA
Data courtesy of Cabinet for Health and Family Services

JCIH 2007- Our Roadmap

- **Review of JCIH principles regarding EHDI:**
  - “1-3-6”
  - EHDI system should be FAMILY CENTERED
  - Immediate access to high quality technology when HL identified
  - Monitoring of all children for HL in the medical home
  - High quality, focused early intervention
  - Information systems (i.e. EHR) should work together so outcomes can be measured

JCIH: Audiology Specifics

- Audiology test battery must:
  - Include physiological/objective measures
  - Be developmentally appropriate
  - Utilize measures that evaluate integrity of auditory system
  - Be able to estimate degree, configuration, and type of hearing loss
  - **Cross check principle** (Jerger 1976): "Results of a single test are cross-checked by an independent test measure."

JCIH 2007 Diagnostic Audiology Guidelines Birth-6 months

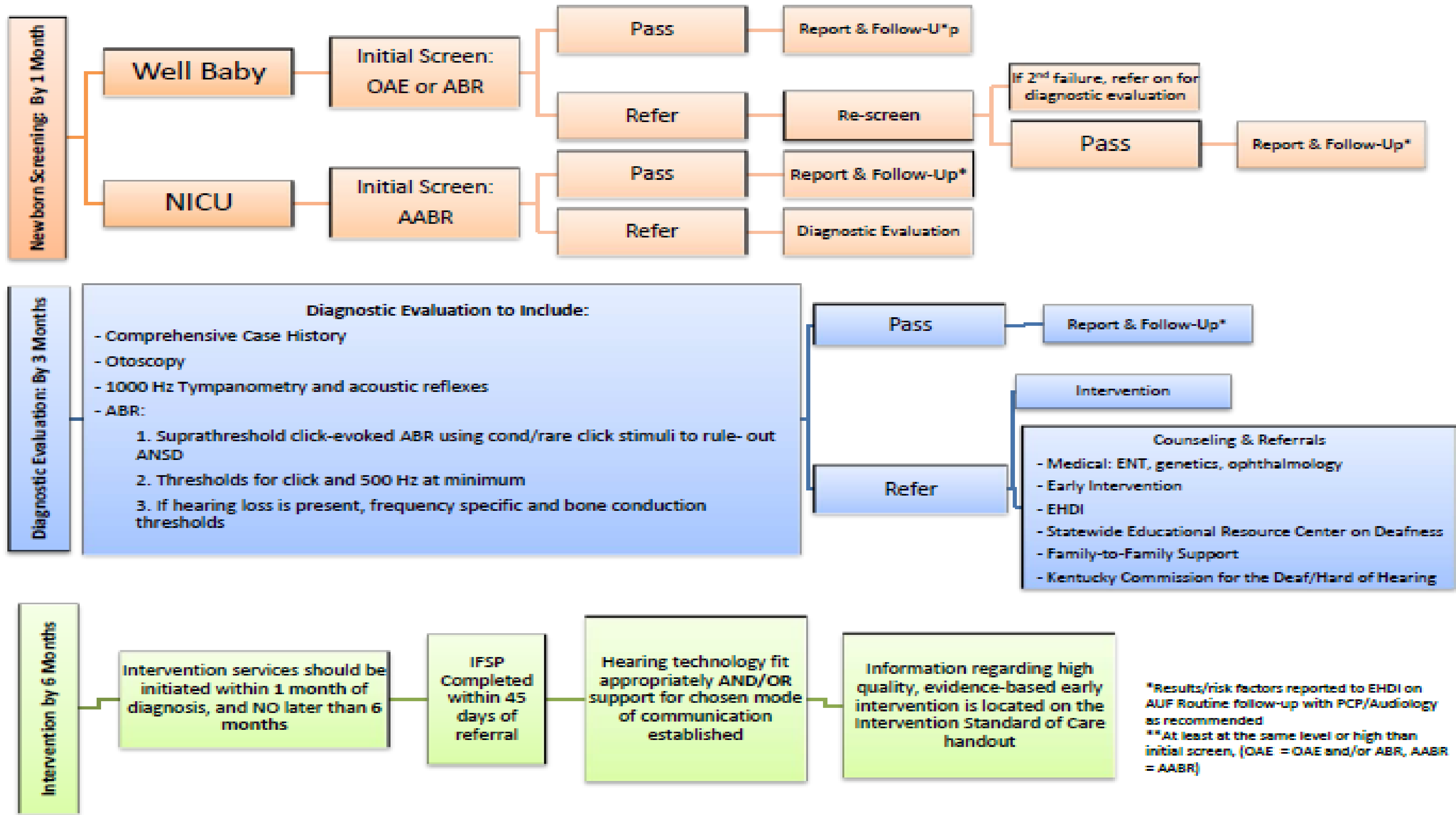
- Comprehensive child and family history
- Frequency-specific electrophysiological testing
- Otoacoustic emissions
- Middle ear function test using 1000 Hz probe tone
- Behavioral observation audiometry

Next Steps After Confirmation of Hearing Loss- The Audiologist as Case Manager

- Refer to Part C (First Steps) within 48 hours of diagnosis
- Otologic evaluation
- Other medical workups
- Eye health and vision examination
- Amplification within one month of diagnosis
- Coordination of services

KY-EHDI Evidence Based Practice Guidelines

- KY-EHDI Advisory Board subcommittee reviewed evidence-based practice (EBP) documents from the following organizations:
  - AAA
  - AG Bell
  - ASHA
  - JCIH
- The result?



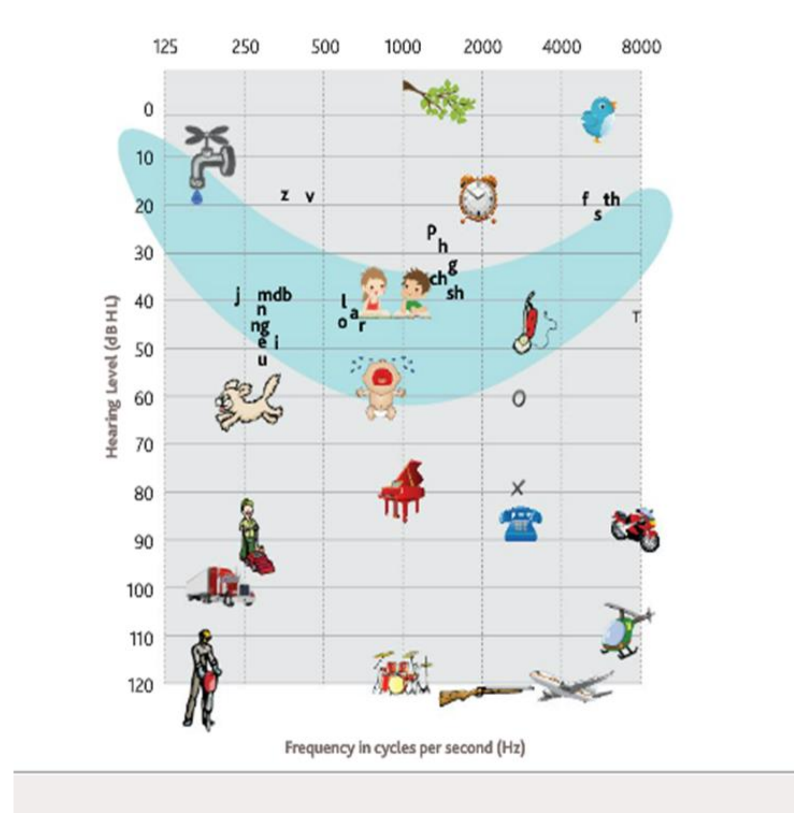
Audiology Diagnostics: Standard of Care for Infants
Newborn Screening: By 1 Month
Well Baby
Initial Screen: OAE or ABR
Pass
Report & Follow-U*p
Refer
Re-screen
If 2nd failure, refer on for diagnostic evaluation
Pass
Report & Follow-Up*
NICU
Initial Screen: AABR
Pass
Report & Follow-Up*
Refer
Diagnostic Evaluation
Diagnostic Evaluation: By 3 Months
Diagnostic Evaluation to Include:
- Comprehensive Case History
- Otoscopy
- 1000 Hz Tympanometry and acoustic reflexes
- ABR:
1. Suprathreshold click-evoked ABR using cond/rare click stimuli to rule- out ANSD
2. Thresholds for click and 500 Hz at minimum
3. If hearing loss is present, frequency specific and bone conduction thresholds
Pass
Report & Follow-Up*
Refer
Intervention
Counseling & Referrals
- Medical: ENT, genetics, ophthalmology
- Early Intervention
- EHDI
- Statewide Educational Resource Center on Deafness
- Family-to-Family Support
- Kentucky Commission for the Deaf/Hard of Hearing
Intervention by 6 Months
Intervention services should be initiated within 1 month of diagnosis, and NO later than 6 months
IFSP Completed within 45 days of referral
Hearing technology fit appropriately AND/OR support for chosen mode of communication established
Information regarding high quality, evidence-based early intervention is located on the Intervention Standard of Care handout
*Results/risk factors reported to EHDI on AUF Routine follow-up with PCP/Audiology as recommended
**At least at the same level or high than initial screen, (OAE = OAE and/or ABR, AABR = AABR)

EHDI Process

- Birthing hospital reports the newborn hearing screening results on every infant that is discharged from their hospital via KY-CHILD
- The data is transferred from the KY-CHILD application to the CCSHCN’s database (CUP)
- If a child refers/passes with risk indicators a letter is sent to the family within 48 hours of the data receipt
- New- physician letters for refers- more on this in a minute!

Applying the KY-EHDI EBP Document: Case Study #1

- Child referred on NBHS in both ears; diagnosed with Waardenburg Syndrome
- Tested at 1 month, 2 months and 3 months of age
- Diagnosis of hearing loss made at 3 months of age
- Referred for hearing aids



Case Study # 1

- Toneburst ABR testing completed at facility where the infant was referred for ABR testing at 4 months of age

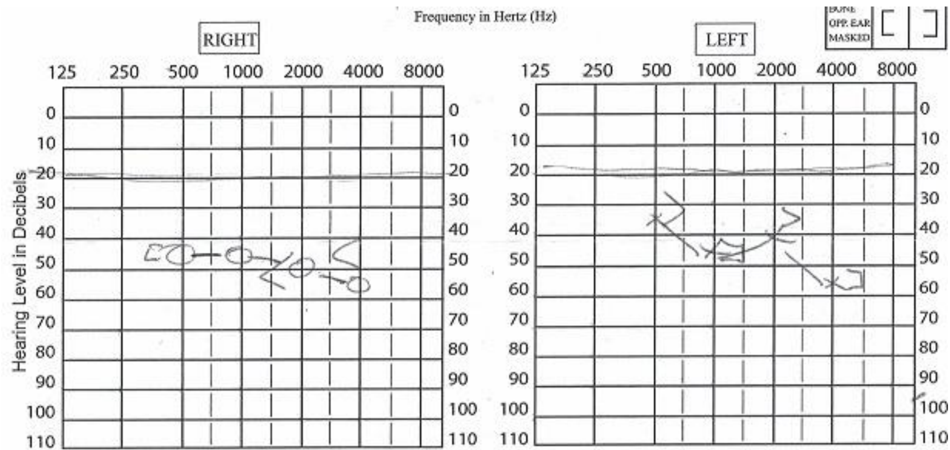
Case Study #1: Where did the system fail?

- Refer to your KY-EHDI EBP document and discuss this case with your neighbors- come up with at least one issue to present to the group

Case Study #2

- **4 year, 4 month old female referred to pediatric audiologist by ENT for hearing aid evaluation and fitting**
- **Case History:**
  - Refer on NBHS, no risk factors for HL, has two older siblings with normal hearing
  - EHDI contacted family via letter for 8 months with no follow up
  - History of chronic OME and 2 sets of PE tubes; hearing issues documented at ENT were attributed to OME and age
  - Parental concerns: inconsistent listening, “what/huh?”, speech, behavior

Case Study #2



- Mild-moderate SNHL AU
- Recommendations:
  - Comprehensive medical workup
  - Refer to family-to-family support
  - Speech-language evaluation
  - School referral for IEP evaluation

- Fit with hearing aids 3 weeks after diagnosis; lots of progress; does not qualify for IEP; parents have not pursued recommended medical evaluations or speech-language eval

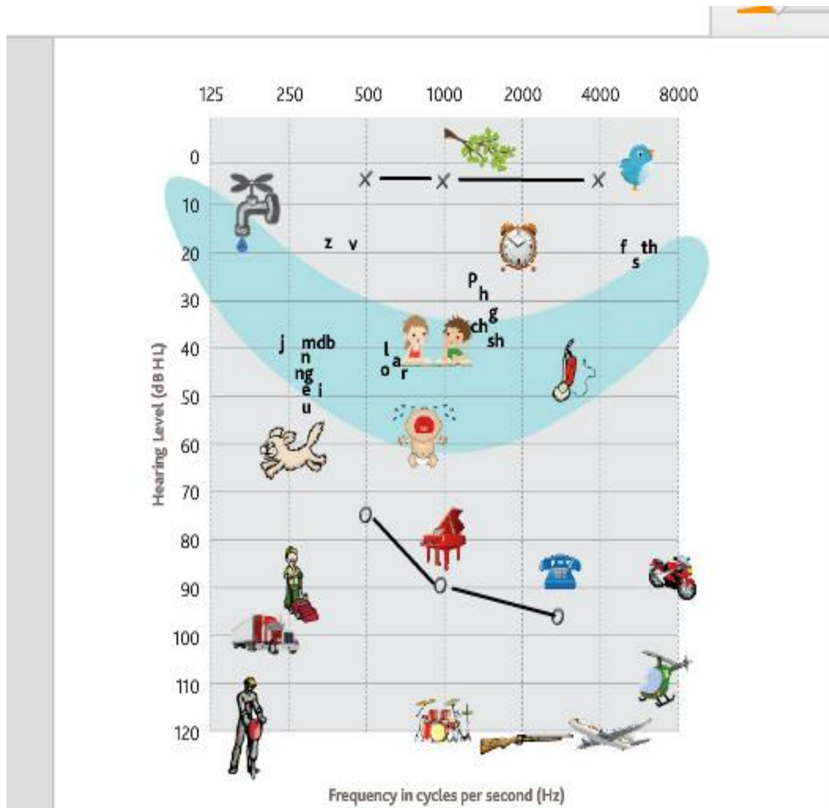
Case Study #2: Where did the system fail?

- Refer to your KY-EHDI EBP document and discuss this case with your neighbors- come up with at least one issue to present to the group

Case Study #3

- Infant failed NBHS AU, no risk factors for HL, no family members with HL
- Mother reported no response to sounds/no startle
- Diagnosed with **severe to profound SNHL AU at 2 months of age** by community audiologist
- Hearing aid fitting at 4 months of age; parent report and functional testing on multiple occasions revealed no benefit; **referred for CI evaluation**
- Sedated ABR completed as part of CI workup at 12 months of age

Case Study #3



- Severe/profound HL in R ear
- **Normal hearing in L ear**

- Recommendations:
  - Continue with HA use R
  - D/C HA use L
  - Monitor hearing in L

Case Study #3: Where did the system fail?

- Refer to your KY-EHDI EBP document and discuss this case with your neighbors- come up with at least one issue to present to the group

Case Study #4

- Refer on NBHS in R ear, no risk factors for hearing loss
- Diagnostic evaluation which consisted of click ABR, OAE's and tympanometry at **24 days of age**; probable mild-moderate SNHL in R ear
- Repeat evaluation in 3 months was recommended
- Re-eval at **4 months** of age (OAE's); "r/o mild hearing loss in R ear, normal hearing in L ear; recheck in 3 months"
- Re-eval at 7 months of age (ABR-click??, Tymps, OAE's); "r/o hearing loss in R ear, retest in 5 months"

Case Study #4

- Missed recommended follow up appointment and was seen at 21 months of age; concern regarding speech-language delay reported
- Result: normal hearing in L ear, **probable mild-moderate hearing loss in R ear** (Tymps/OAE's)
- Referred to another facility for evaluation and possible amplification
- New facility completed evaluation at 22 months of age
- SAT's (ear specific) normal in the left, mild in the right; did not tolerate inserts well; felt to be suprathreshold
- Nothing reliable obtained for frequency specific stimuli
- Normal tymps
- Normal OAE's
- Referred for sedated ABR testing and results were normal in both ears

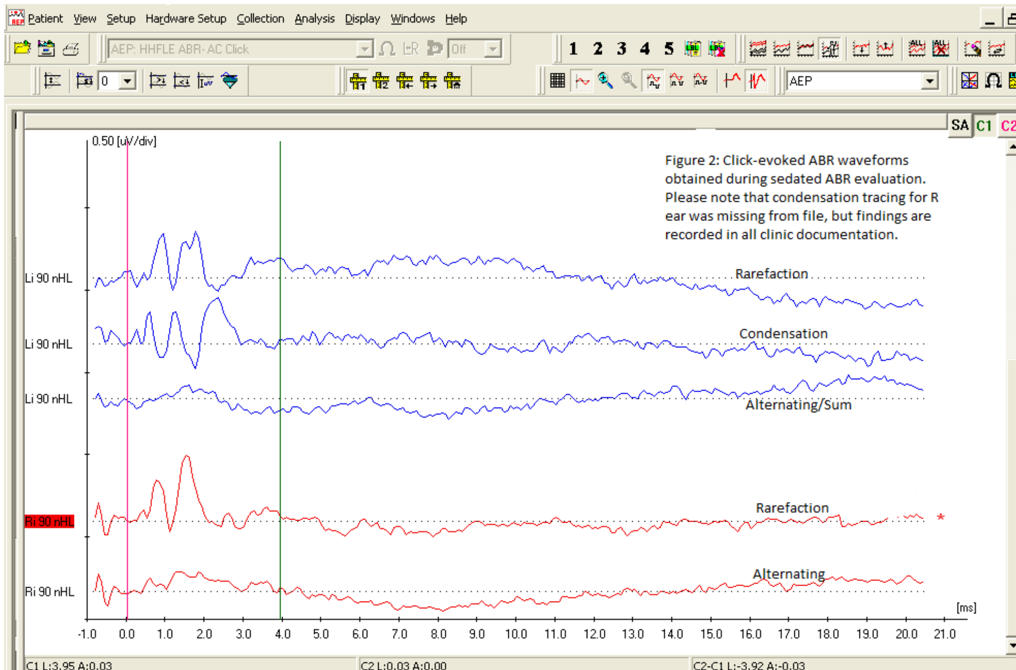
Case Study #4: Where did the system fail?

- Refer to your KY-EHDI EBP document and discuss this case with your neighbors- come up with at least one issue to present to the group

Case Study #5

- 21-month-old male referred for sedated ABR following abnormal hearing evaluation by referring audiologist
- Significant communication delays, “good and bad hearing days”; recently enrolled in early intervention due to parent concerns
- Birth history includes delivery at 35 weeks due to maternal pre-eclampsia, NICU stay, jaundice with peak bilirubin level 19 mg/dl
- Failed AABR NBHS AU; passed OAE screening at 7 months of age as outpatient
- Had issues with chronic OME and had bilateral PE tubes placed at 16 months of age; no pre or post-operative hearing evaluations were completed at ENT office

Case Study #5



- PE tubes functioning AU
- DPOAEs present at normal to slightly reduced amplitudes AU
- High level click-evoked ABR was completed- see results- **what is the diagnosis based on the combination of these results?**

Case Study #5: Where did the system fail?

- Refer to your KY-EHDI EBP document and discuss this case with your neighbors- come up with at least one issue to present to the group

Case Study #6

- 4 week old female with family Hx of HL- passed NBHS AU, initially identified at 4 with L SNHL; now also has R SNHL at age 6
- Normal pregnancy and delivery, passed NBHS
- Mom feels that baby hears, but is extremely concerned due to older sibling with HL
- Initial evaluation:
  - 1K tymp WNL R, OAE's WNL R, high level click ABR WNL R- woke up here
  - CNT L- baby would scream every time L ear was touched!

Case Study #6

- Second attempt completed 4 weeks later
  - Baby slept! ☺ ☺ ☺
  - 1K tymps WNL AU
  - OAEs WNL AU
  - High level click ABR WNL AU
  - Broadband CE-Chirp and 500 Hz CE-Chirp thresholds WNL AU

Case Study #6: Where did the system fail?

- Refer to your KY-EHDI EBP document and discuss this case with your neighbors- come up with at least one issue to present to the group

Future Directions and Improvements for KY-EHDI: Loss to Follow-Up and Loss to Documentation

- Physicians in KY now receive letters when one of their patients refers on NBHS, similar to how results of other abnormal newborn screens are handled
  - Also sending letters to PCP when child is identified with PCHL
- EHDI program continues to follow up with audiology providers via phone/email/fax to make sure documentation is entered when a child is seen
- Education programs for PCP and other medical providers such as ENT, infectious disease, neurology are being discussed.

Future Directions and Improvements for KY-EHDI: Improving Adherence to Evidence-Based Practice (EBP)

- Form presented today has been used to develop a **compliance checklist** for audiologists who provide diagnostic services.
- All Level 2 centers – annual, random chart review to determine adherence to EBP standards
- If EBP standards are not met on annual review, second stage chart review
- If additional issues are found on second review, facility will be required to develop an action plan for remediation, and submit to re-review in 3 months
- Facilities who do not practice EBP will no longer be on the EHDI referral list for KY per state regulations
- Facilities who do not elect to participate in the compliance review will no longer be on the EHDI referral list
- Technical assistance is available from the EHDI program at any time!

Compliance Checklist for KY-EHDI Level Two Centers

- This form will be used to review cases submitted from each center in a systematic and consistent manner
- "N/A" will require good documentation on the part of the provider, i.e. "could not test due to child's waking state"
- Please note that First Steps referrals are to be made within 48 hours of diagnosis, per state regs
- Calling the pediatrician…
- Please share your feedback!

Audiology Standard of Care Compliance Checklist

	Meets Standard	Does Not Meet Standard	N/A	Comments
Comprehensive Case History				
Pregnancy and birth history				
Comprehensive child health history				
Family health history				
Any family history of PCHL				
Otoscopy				
1000 Hz tympanometry				
Otoacoustic Emissions				
Acoustic Reflexes				
Diagnostic ABR				
Suprathreshold click with rare/con				
Threshold for minimum of two frequencies (high/low)				
Bone conduction				
Results Entered in KY-CHILD?				
If PCHL:				
Consults for ENT, genetics, eye health/vision				
EI referral within 48 hours of Dx				
Contact PCP/pediatrician				
If Medical Referral:				
Refer back to PCP				
Refer to ENT if required				
Is follow-up plan documented with next appointment scheduled?				
If Inconclusive or Incomplete:				
Is follow-up plan documented with next appointment scheduled?				

Future Directions and Improvements for KY-EHDI: Family Resources and Support

- Family Support Subcommittee of KY-EHDI Advisory Council is working on updating printed parent resource information that is available

- Collaborations through KY-EHDI Advisory Council with First Steps, KCDHH, DBHID, KY Chapter Hands and Voices, AGBell KY, SERCD (member representation)

- Collaboration between Hands and Voices and CCSHCN "Family 2 Family" program to provide another mechanism for support services

Future Directions and Improvements for KY-EHDI: Physician and Provider Education

- Discussion of risk factors for PCHL and monitoring schedule; making medical home providers more aware of risk factors – collaboration with U of L Department of Public Health to analyze KY specific data

- Discussion of how to implement screening for congenital CMV infection statewide

- **Pediatric audiology providers: what educational needs do you require to best support children who are referred from EHDI and how would you like to receive that information?**

Audiologist Responsibilities to EHDI: EHDI Recap

E:

EHDI reporting to state program and medical home

H:

Have properly calibrated, functioning equipment and know how to use it

D:

Diagnostic evaluations are performed in a manner consistent with EBP

I:

Informed and involved with IFSP, advocacy, and empowerment for patients and families

Audiologist Responsibilities to EHDI: Permanent Childhood Hearing Loss (PCHL)

P:

Prepare information to share with families in various formats and native language

C:

Communicate and collaborate with family, medical home, EHDI, First Steps, and other providers

H:

Habilitation initial oversight to ensure that families get to next step in process.

L:

Listen attentively, answer questions, and inform of next steps.

Link the families to support systems and refer as warranted to additional resources.

Thank you for your attention!

Questions or comments welcome!

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