



# Universal Newborn Hearing Screening: *The Good Model*

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Société  
Française  
d'Audiologie

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# Every panelist

Check which if any of the following hearing screenings are mandated by law in your country:

- Newborns
- Later in the 1st year
- At-risk

If yes, please specify when the legislation passed:     (year)

# Every panelist

Give for your country a percentage of professionals who perform the hearing screening from all persons who perform the hearing screening.

- Physicians: \_\_\_ %
- Audiologists/audiological staff: %
- Nurses: %
- Midwives: %
- Community health workers: \_\_\_%
- Others: \_\_\_% (please specify\_\_)

***The numbers need to be 100% in sum***

# Every panelist

Give for your country a percentage of places where the screening is done from all screening places.

- Birthing facilities: \_\_\_ %
- Home: \_\_\_%
- Other outpatient places: \_\_\_%  
Which place? \_\_\_\_\_

***The numbers need to be 100% in sum***

# Every panelist

Percentage of birthing facilities in your country performing a hearing screening from all birth facilities:

....% of ... (number of birthing facilities)



# Universal Newborn Hearing Screening (UNHS)

## Epidemiological Background

**Sensorineural hearing loss is the most frequent sensory deficit in humans**

- Moderate to profound HL: 0.8%
- Mild to profound HL: 1.2%
- Moderate HL 57%, Severe 17%, Profound 26%

*Fortum et al., 2001*

# Every panelist

Percentage of babies or infants born in your hospital/birthing clinic last year who underwent a hearing screening

- At all ... % of ... (number of live births)
- Universal Newborn Hearing Screening (UNHS): ... % of ... (number of live births)
- Later screening in the 1<sup>st</sup> year of life: ...%
- Targeted screening of babies at risk: ...%

# Every panelist

Percentage of infants born last year (or in the reporting year) in your hospital/birthing clinic who needed a diagnostic audiological evaluation:

\_\_\_% of \_\_\_\_\_ (number of born babies)



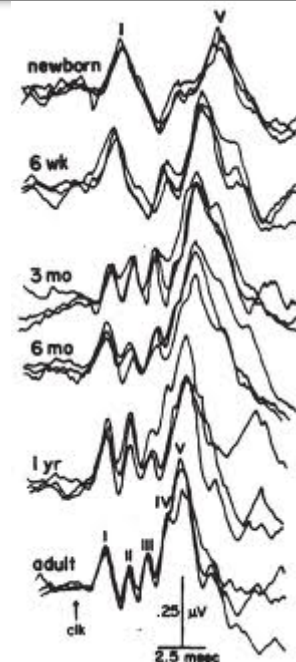
# Every panelist

Percentage of infants born last year (or in the reporting year) in your hospital/birthing clinic who received a diagnostic audiological evaluation:

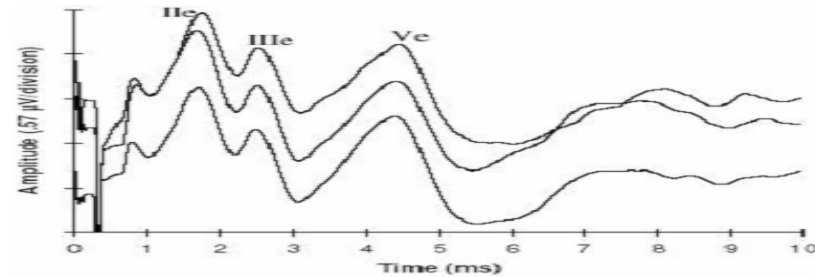
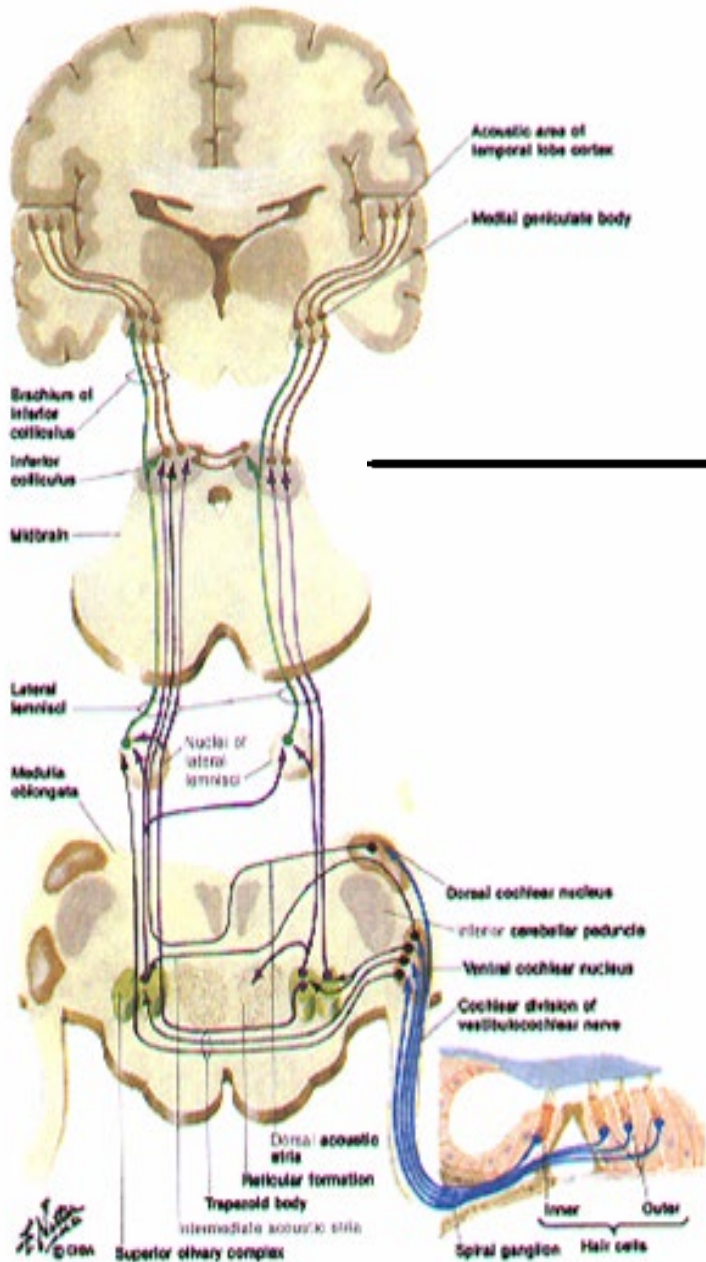
\_\_\_% of \_\_\_\_\_ (number of born babies)

# Maturation of the Auditory System

- Inner ear is mature as soon as the 7<sup>th</sup> month in utero
  - Sound-induced movements and changes in cardiac rhythm
- Maturation of brainstem afferent auditory pathway up to the age of 2
  - Myelination
  - Cortical organization

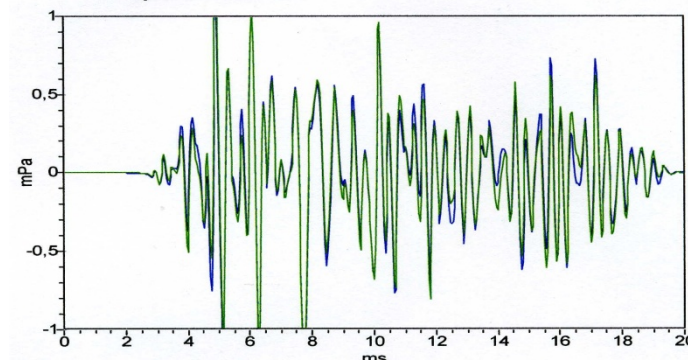


# Available Screening Tools

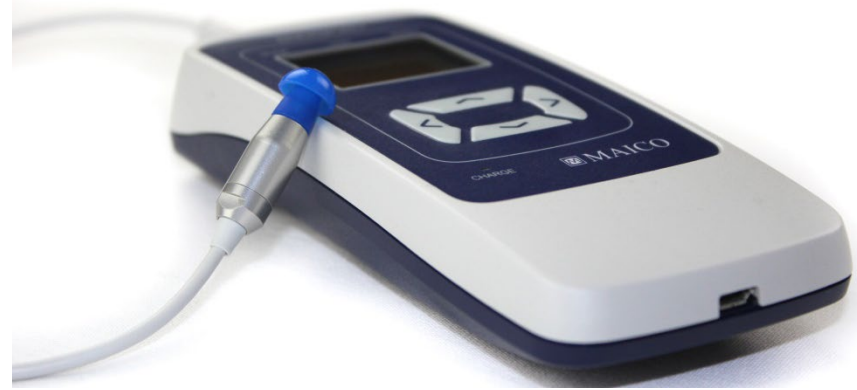


Auditory Brainstem Responses

Otoacoustic emissions



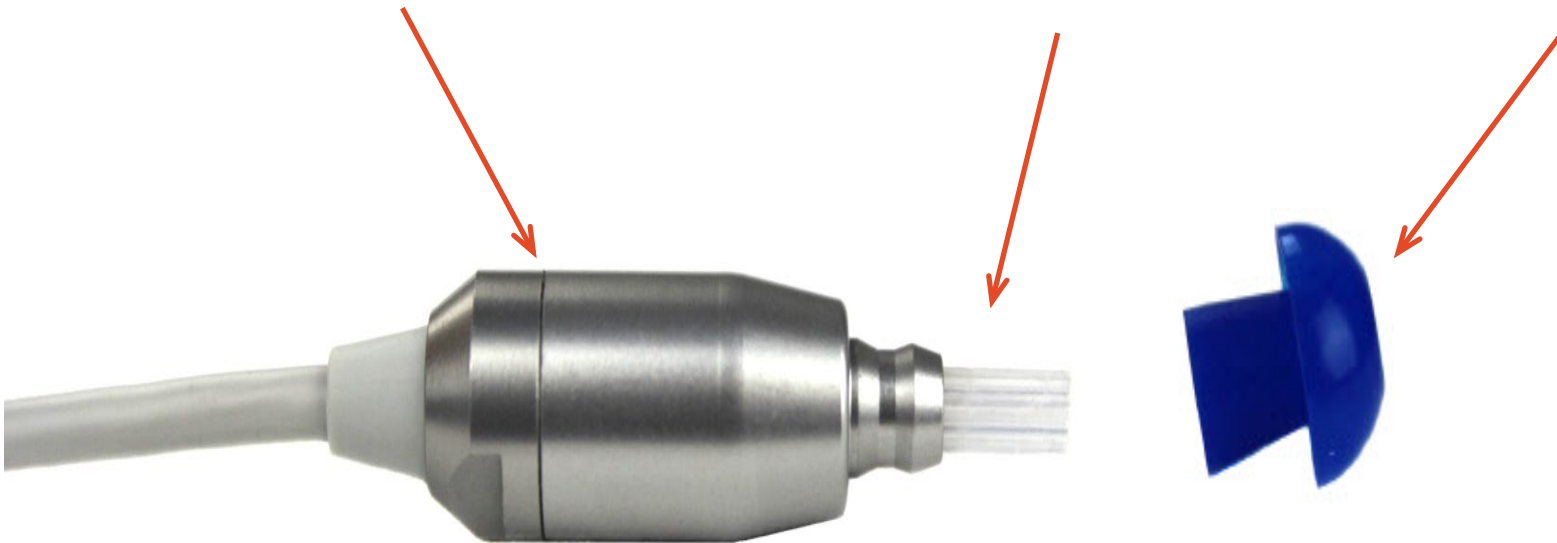
# Otoacoustic Emissions : TEOAE/DPOAE



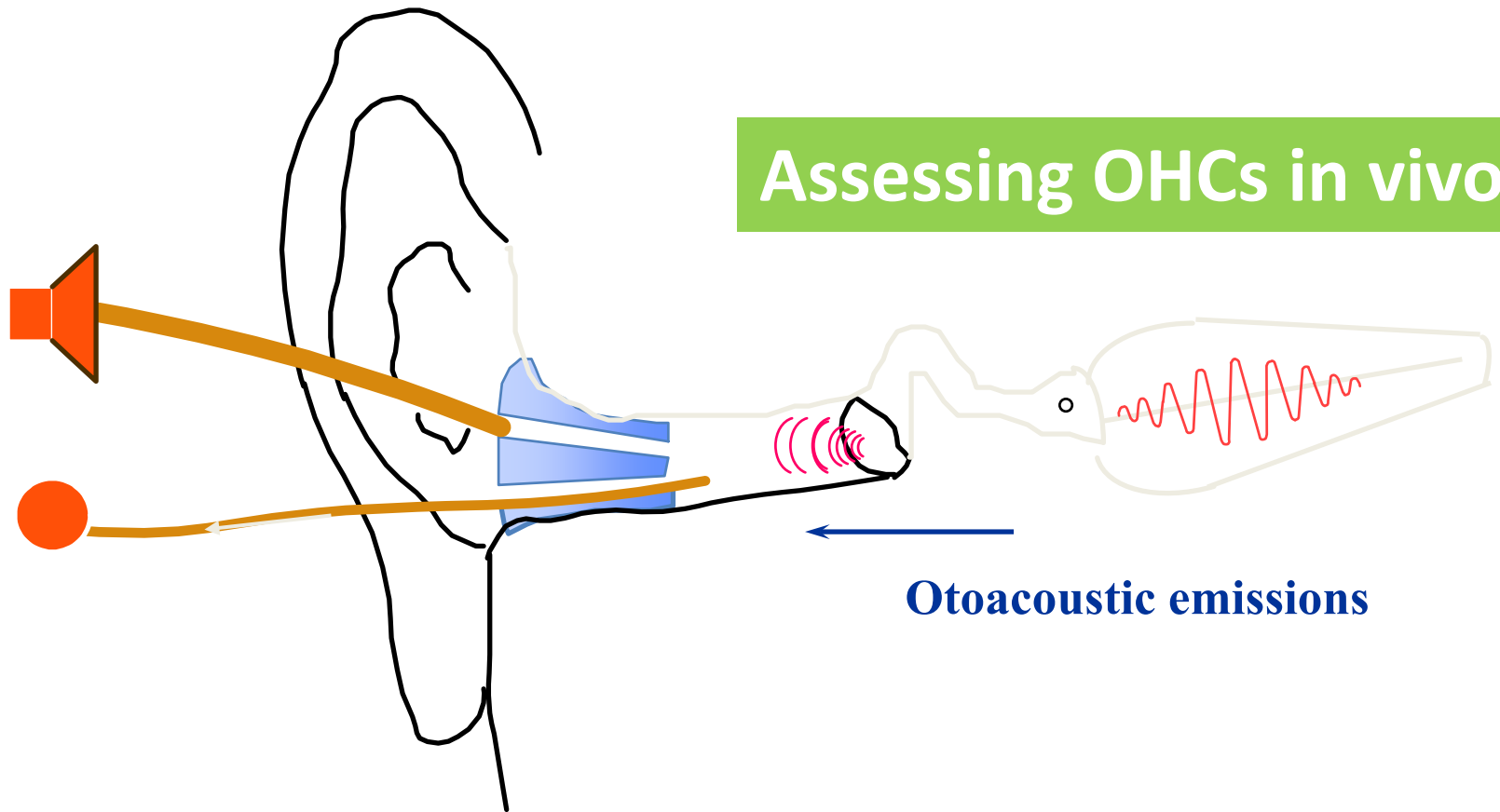
Probe

Probe Tube

Tip



# Transient evoked otoacoustic emissions



# Automated Auditory Brainstem Responses (AABR) with disposable recording electrodes





# AABR with no consumables

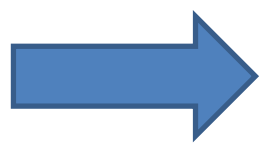


# Feasibility of AABR in very premature babies

## AABR



Elongated vertex electrode useable as soon as 30 weeks gestation time



Electrode for premature



Standard electrode



# Every panelist

What method are you using to do hearing screening?

- OAE alone: .... % of ....(number of screened babies)
- AABR alone: ... %
- 2-stage OAE-AABR screening: ... %

**Please be aware:** 2-stage means that you at first screen with one method (most often TEOAE), and only in case of a failed screening with another one (most often AABR). If you have such a screening for let's say 100 percent of babies and 90 pass an OAE screening and do not need an AABR, and the remaining 10% babies undergo an additional AABR-screening, you have a 100% 2-stage OAE-AABR screening and 0% OAE alone screening (and not a 90% OAE alone screening and a 10% 2-stage OAE-AABR screening)

# Weighting the Pros and Cons

## OAE

- ▶ Quick, but very sensitive to ambient noise levels
- ▶ Twice as many false positives compared to automated ABR
- ▶ Not recommended in NICU (prevalence of auditory neuropathy 1.96%)

## AUTOMATED ABR

- ▶ Test for HL of cochlear and retrocochlear origin
- ▶ Cannot diagnose neural dyssynchrony (conventional ABR still needed)
- ▶ Informative about auditory system maturation

# Every panelist

Proportion of infants born last year (or the reporting year) in your country who were identified with a Permanent Childhood Hearing Loss ( PCHL)\* from all born babies including late identified cases (=prevalence for a one year cohort):

... per 1000 of ..... (number of born babies)

\* ***PCHL includes unilateral or bilateral permanent hearing loss, which has been confirmed through a battery of audiometric tests that result in hearing loss detection at the better ear and averaged over frequencies 0.5, 1, 2, and 4 kHz greater than 20 dB HL***

# Every panelist

Percentage of infants with a permanent childhood hearing loss (PCHL) born last year (or in the reporting year) in your country who received intervention\* from all babies diagnosed with PCHL:

\_\_\_ % of \_\_\_\_\_ (number of babies with PCHL)

\* ***Intervention may include (but is not limited to) fitting with hearing devices, speech-language therapy, early intervention programming by a parent-infant specialist, medical or surgical treatment, etc. In cases where it is unclear whether treatment is required, further monitoring also counts as intervention***

# Every panelist

Percentage of infants with PHCL born last year (or in the reporting year) in your country who received intervention before 6 months of age from all babies receiving intervention:

\_\_\_\_% of \_\_\_\_ (number of babies who received intervention) )

\* ***Intervention may include (but is not limited to) fitting with hearing devices, speech-language therapy, early intervention programming by a parent-infant specialist, medical or surgical treatment, etc. In cases where it is unclear whether treatment is required, further monitoring also counts as intervention***

# Thank you!



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