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# Universal Neonatal Hearing Screening Is it obligatory, voluntary or not really necessary?

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# Facts and Figures

Hearing impairment is the most frequent disorder in newborns

- 1-2 babies in 1000 are born deaf or severely hearing-impaired
- another 2-4 suffer from moderate hearing loss



# Facts and Figures

5000 deaf-born babies a year in the European Community

- Another 5000-10000 require intervention



*Germany:*  
800-1200 babies



*Poland:*  
400-800 babies

# Facts and Figures

Armenia: 40-80 deaf-born babies a year



- Currently there are 35 Cochlear Implant recipients in total
- Waiting list
- 1-2 Million EURO p.a. to treat all deaf-born

# Facts and Figures

A deaf child will not be able to acquire speech and spoken language.

- Language → hearing society
- integration and inclusion programs
  - better education and employment prospects
  - better self-realization
  - enhanced quality of life

# Facts and Figures

Hearing loss without NHS is recognized when the child is already 2 to 3 y. old.

The first year of life is the most important for language development!



# Facts and Figures

## Normal hearing behaviour in a baby



### 0-3 months

- is irritated by sudden loud noises
- recognizes and calms to mother's voice

### 3-6 months

- begins to turn eyes or head to sounds
- stops crying when spoken to
- begins making vowel sounds

# Facts and figures

## Normal hearing behaviour in a baby



### 6-9 months

- looks for family members when her/his name is called
- normally turns head towards sound
- will respond to her/his name
- responds to simple requests with gestures
- uses voice to get your attention

### 9-12 months

- understands “No”, “Bye, bye”
- responds to soft sounds
- looks at pictures when named
- repeats simple sounds that we make
- uses voice when playing alone



# Facts and Figures

Carol Flexer (quote):

*“Identification of newborn hearing loss should be considered a neuro-developmental emergency”*



# History

## Milestones

- 1944 – recognition of need to determine hearing abilities by the age of one (Ewing & Ewing)
- 1940s – introduction of audiometers
- Since 1964 – Marion Downs
- 1969 – establishment of the Joint Committee on Infant Hearing
- 1978 – David Kemp measuring otoacoustic emissions
- 1986 - Automated Auditory Brainstem Response Equipment becomes available
- 1998 - The first **European Consensus Conference**, Milano

# History

## The European Consensus Statement



- Permanent childhood hearing impairment (1) (PCHI) is a serious public health problem affecting at least one baby in one thousand. Intervention is considered to be most successful if commenced in the first few months of life. Therefore, identification by screening at or shortly after birth has the potential to improve quality of life and opportunities for those affected.
- Effective programmes of intervention are well established.
- Methods for identification of PCHI in the neonatal stage are now accepted clinical practice. They are effective and can be expected to identify at least 80% of cases of PCHI whilst incorrectly failing 2-3% of normally hearing babies in well-controlled programmes.
- Neonatal testing in maternity hospitals is more effective and less expensive than behavioural screening conventionally carried out at 7-9 months.
- Targeting neonatal testing on only the 6-8% of babies at increased risk (2) of PCHI reduces costs but cannot identify more than 40-50% of cases. Targeted neonatal hearing screening in parallel with 7-9 month behavioural testing is more expensive and less effective than universal neonatal screening.
- Hearing screening in the neonatal period cannot identify acquired or progressive hearing loss occurring subsequently. Surveillance methods are required to identify those cases, which may be 10-20% of all permanent childhood hearing impairment.
- Risks associated with neonatal hearing screening include anxiety from false positive results and possible delayed diagnosis from false negative results, but these risks are acceptable in view of the expected benefits.
- Neonatal hearing screening should be considered to be the first part of a programme of habilitation of hearing impaired children, including facilities for diagnosis and assessment.
- A system of quality control is an essential component of a neonatal hearing screening programme. Quality control includes training of personnel and audit of performance. The person responsible for quality control should be identified.
- Although the healthcare systems in Europe differ from country to country in terms of organisation and funding, implementation of neonatal hearing screening programmes should not be delayed. This will give new European citizens greater opportunities and better quality of life into the next millenium.

# Overview of the Worldwide Situation

The situation is very heterogeneous



*USA:*

90% of newborns screened

*Germany:*

Law passed in 2009,  
responsibility lies with  
federal lands

Loss to follow-up varies within  
2 to 50%.

# Definition and Quality of Screening

by the World Health Organization

- The main purpose of screening is the initial identification of undistinguishable diseases and disorders by using adequate methods. Screening allows selecting from the whole population patients with a high probability.



# Definition and Quality of Screening

The American Academy of Paediatrics, 1999

- Sensitivity, specificity and easy use to minimize referrals
- Undetectability by clinical parameters
- Available interventions to correct the conditions detected by screening
- Early screening, detection and intervention result in improved outcome
- Acceptable cost-effective range.

# Definition and Quality of Screening

NHS meets all criteria

- Deafness is the most frequent disorder in newborns.
- Screening for congenital hearing loss is non-invasive, objective and not expensive.
- Adequate equipment to measure OAE and AABR is available.
- Leading manufacturers state that the sensitivity of their equipment is 99% and the specificity 97%.

# Definition and Quality of Screening

How to organize screening



The baby is screened on the 2<sup>nd</sup> or 3<sup>rd</sup> day after birth while still in hospital

- retest
- referral to a diagnostic center for in-depth analysis
- parents are informed of the results
- a second screening before school should be recommended



# Definition and Quality of Screening

## Prerequisites for hospitals



- All neonatal departments of hospitals are connected by Internet and deliver the data of their measurements to a central institution
- Suitable software to ensure quick and reliable data transfer
- Adequate training for the personnel that implements the screening test

# Definition and Quality of Screening

Parents are the key



Parents are informed of the possible results and actions to be taken

Family to family support is encouraged via modern ways of web-based communication (Internet, Skype and LiveOnline Rooms) to share knowledge and exchange experience

# NHS is the First Step Only

## Hearing Aids



- Rehabilitation should begin straight after the test, within the first 6 months of life
- Hearing aids should be fitted and adaptive software supplied
- Cochlear implantation should be suggested

# NHS is the First Step Only

## Cochlear Implants



- Quality
- Reliability
- Excellent service network
- Surgical techniques that are less damaging and preserve residual hearing
- Cosmetic appeal

# NHS is the First Step Only

Jay Rubenstein (2004):

*“In 20 years, an implant will be the treatment of choice for anyone with a hearing loss greater than 50 dB”*



# Conclusions

Universal screening for hearing loss must be obligatory for newborns

- Universal screening for congenital hearing loss is feasible and cost-effective.
- The success is dependent on sufficient educational effort for community professionals, commitment on the part of the programme planners and data systems.
- One of the most decisive factors is counselling of parents in order to avoid loss to follow-up.
- Pre-school screening is strongly advocated.

# Conclusions

Martin Hyde (quote):



***“Infants cannot complain of lack of hearing and cannot seek intervention we would surely not deny ourselves. We can and we must do their complaining for them. Infants and families have a fundamental right to early and effective communication”***

# Thank you for your attention!

