<table>
<thead>
<tr>
<th>Title</th>
<th>Fact and fallacy in neonatal screening</th>
</tr>
</thead>
<tbody>
<tr>
<td>Author(s)</td>
<td>Au, DKK</td>
</tr>
<tr>
<td>Citation</td>
<td>The 2005 Conference and Workshops on Advances in Deafness Management, The University of Hong Kong, Hong Kong, China, 8-9 October 2005.</td>
</tr>
<tr>
<td>Issued Date</td>
<td>2005</td>
</tr>
<tr>
<td>URL</td>
<td><a href="http://hdl.handle.net/10722/108407">http://hdl.handle.net/10722/108407</a></td>
</tr>
<tr>
<td>Rights</td>
<td>This work is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License.</td>
</tr>
</tbody>
</table>
Fact and Fallacy in Neonatal Screening

Dennis K.K. Au  Au.D.
Division of Otorhinolaryngology
Department of Surgery
University of Hong Kong Medical Centre
Early Hearing Screening

• Prerequisite for speech, language and communication development
• NIH (1993) recommended 2-stage screening before 3 months old
• Controversies in terms of economic, political and sociological implication
Fallacy

- Pass AABR/ABR

Fact

- Hearing loss in low frequencies
<table>
<thead>
<tr>
<th>Fallacy</th>
<th>Fact</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Normal OAE</td>
<td>• No ABR response</td>
</tr>
<tr>
<td></td>
<td>• Poor hearing</td>
</tr>
<tr>
<td></td>
<td>• Auditory Neuropathy</td>
</tr>
</tbody>
</table>
Otoacoustic Emission Audiology Report

To: [Redacted]

Our Ref. No.: 30637
Your Ref. No.: [Redacted]

Patient's Name: [Redacted]
Sex/Age: M/20 days
Telephone No.: [Redacted]
Date: 17th June, 2004

Transient Otoacoustic Emission (TEOAE)

RIGHT EAR: NORMAL
responses from 1 - 4 KHz

LEFT EAR: NORMAL
responses from 1 - 4 KHz

Comment:

OAE hearing screening test "PASS" in both ears.
Fallacy Fact

- Failed ABR twice (2 cases)
- Normal hearing
- Normal DP
- New type of auditory neuropathy?
Fallacy

- Pass the screening indicates no further hearing loss

Fact

- Delayed on-set of hearing loss
- Ongoing surveillance
Recommendation from the 2000 Joint Committee to follow

- Parental or caregiver concern regarding hearing, speech, language, and/or developmental delay
- Family history of permanent childhood hearing loss
- Stigmata or other findings associated with a syndrome known to include a sensorineural or conductive hearing loss or eustachian tube dysfunction
- Postnatal infections associated with sensorineural hearing loss, including bacterial meningitis
- In utero infections such as cytomegalovirus, herpes, rubella, syphilis, and toxoplasmosis
- Neonatal indicators, specifically hyperbilirubinemia at a serum level requiring exchange transfusion, persistent pulmonary hypertension of the newborn associated with mechanical ventilation, and conditions requiring use of extracorporeal membrane oxygenation (ECMO)
- Syndromes associated with progressive hearing loss, such as neurofibromatosis, osteopetrosis, and Usher syndrome
- Neurodegenerative disorders, such as Hunter syndrome, or sensory motor neuropathies, such as Friedreich ataxia and Charcot-Marie-Tooth syndrome
- Head trauma
- Recurrent or persistent otitis media with effusion for at least 3 months
- Ototoxic medications (aminoglycosides)
Fallacy

• Good sensitivity and specificity of tests

Fact

• No sufficient large sample sizes and good follow-up to definitively establish sensitivity and specificity of techniques
Fallacy

- No harmful effect with false-positive result
- Benefit of early detection outweigh anxiety

Fact

- Parents feel guilty and depressed
- Parent-child relationship can be in danger
Fallacy

• Screening all babies for early hearing aid fitting and rehabilitation

Fact

• Create an alarm
• Sufficient facilities for follow-up diagnostic tests
• Sufficient knowledge and experienced manpower to fit hearing aid in very young infants
Fallacy

• Combination of techniques for screening

Fact

• OAE + ABR?
• AABR + ABR?
Fallacy

• Cost effective for per unit cost

Fact

• Low prevalence of deafness 2-6 per
• Efficiency (EF) – percentage of total test results that are correct

\[ EF = HT \times PD + (1-FA) \times (1-PD) \]
TABLE 15.2  Posterior probabilities and efficiency for several audiological tests.\textsuperscript{a}

<table>
<thead>
<tr>
<th>TEST</th>
<th>HT/FA</th>
<th>PR[D/+]</th>
<th>PR[N–]</th>
<th>EF</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2%</td>
<td>5%</td>
<td>50%</td>
</tr>
<tr>
<td>ETT</td>
<td>99/5</td>
<td>29</td>
<td>51</td>
<td>95</td>
</tr>
<tr>
<td>ABR</td>
<td>95/11</td>
<td>15</td>
<td>31</td>
<td>90</td>
</tr>
<tr>
<td>TDT</td>
<td>70/13</td>
<td>10</td>
<td>22</td>
<td>84</td>
</tr>
<tr>
<td>BEK</td>
<td>49/7</td>
<td>13</td>
<td>27</td>
<td>88</td>
</tr>
</tbody>
</table>

\textsuperscript{a}All measures in percent. 2%, 5%, 50% indicate disease prevalence. Abbreviations explained in Tables 15.1 and 15.4. ETT: excellent theoretical test.