

Review Group Membership

**MaHTAS Reviewer:**  
Maharita Ab Rahman  
Dr Junainah Sabirin

**External Reviewer:**  
Dr. Norzi bt Dato' Gazali  
Puan Nur Azyani bt. Amri

**Disclaimer:**

Technology review is a brief report, prepared on an urgent basis, which draws on restricted reviews from analysis of pertinent literature, on expert opinion and / or regulatory status where appropriate. It is subjected to an external review process. While effort has been made to do so, this document may not fully reflect all scientific research available. Additionally, other relevant scientific findings may have been reported since completion of this review.

For further information please contact:

Health Technology Assessment Section (MaHTAS)  
Medical Development Division  
Ministry of Health Malaysia  
Level 4, Block E1, Precinct 1  
Government Office Complex  
62590 Putrajaya.

Tel: 603 8883 1229

Fax: 603 8883 1230

Available at the following website:  
<http://www.moh.gov.my>

2015

**Introduction**

Hearing loss is one of the most common major abnormalities that presents at birth and if undetected will impair speech, language and cognitive development.

In 2009, World Health Organization (WHO) reported that around zero point five to five (0.5 to 5) in every 1000 neonates and infants have congenital hearing loss. Basically, first three years of life is a critical period for language and speech development in children. Therefore, a neonatal hearing screening is the best mean to minimize the adverse effects of hearing loss. Universal neonatal hearing screening (UNHS) program is the current standard of practice in developed countries to detect hearing loss among children at early age. In Ministry of Health (MOH), the high risk neonatal hearing screening program (HRNHS) has been introduced in hospitals since 2001. The 2015 Guideline for Neonatal Hearing Screening involved two stages of screening which used two different method of hearing screening which is automated auditory brainstem response (AABR) and otoacoustic emission (OAE). Based on UNHS analysis for 2014, the outcome of UNHS using OAE showed higher referral rate compared to automated auditory brainstem response.

**Objective/Aim**

To assess the safety, efficacy and cost-effectiveness of automated auditory brainstem response (AABR) and otoacoustic emissions (OAE) devices in universal newborn hearing screening

**Results and Conclusions**

There were 12 studies included in this technology review. Three studies were using OAE, one study using AABR, one study on comparison of OAE and AABR and four studies were combination of OAE and AABR for newborn hearing screening. Three cost-effectiveness analyses on universal newborn hearing screening also included in this technology review.

In conclusion, there were studies which showed various findings based on the types of screening protocols used. In OAE alone, the pooled referral rate and false positive rate was lower when screening was done after two days of life compared to within two days of life. However, it varies according to the frequency used. Then, for AABR alone, limited evidence to suggest double screening steps with AABR before discharge was effective to lower the referral rate. While comparing OAE and AABR, limited evidence to suggest that initial screening with AABR had significantly lower referral rate compared to initial screening with OAE for newborns younger than 48 hours. Nevertheless, the evidence showed that combination of OAAE and AABR was the best protocol compared to the single used device and was considered as cost-effective for long term practice.

**Safety**

No retrievable evidence on safety. Both OAE and AABR have received United State Food and Drug Administration approval.

**Cost/Cost-Effectiveness**

Cost of OAE ranged from RM30,000 to RM50,000 and AABR ranged from RM70,000 to RM80,000. Two cost-effectiveness studies suggest potential long-term cost saving for UNHS.

**Methods**

Electronic databases were searched through Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations and Ovid MEDLINE(R) 1948 to present, and Embase 1996 to 2015 June 08. Searches were also run in PubMed, Horizon

Scanning databases, UM Library website, FDA website and INAHTA for published reports.

Search was limited to studies published within 1990s to 2000s. Google and Google Scholar were also used to search for additional web-based materials and information about the technology. Besides, additional articles from reviewing the references of retrieved articles also included.