

Title	The safety and efficacy/effectiveness of using automated testing devices for universal newborn hearing screening: an update
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Aim

To update a 2007 IHE report on universal newborn hearing screening (UNHS) (http://www.ihe.ca/documents/IHE_Report_Screening_Newborns_for_Hearing_Feb_2007.pdf) by examining the evidence on the safety, efficacy/effectiveness, and cost-effectiveness of using automated testing devices to detect permanent congenital hearing loss (PCHL).

Conclusions and results

Safety and efficacy/effectiveness

Three systematic reviews were identified. Their results are summarized below.

- Automated evoked otoacoustic emissions (AOAE) and automated auditory brainstem response (AABR) appear to be equally accurate in detecting moderate to profound PCHL.
- A two-stage protocol, using AOAE (transient evoked otoacoustic emissions, (TEOAE)) testing followed by AABR testing, was increased early identification of moderate to profound PCHL and may lead to earlier intervention in diagnosed infants.
- The impact of a UNHS program on patient outcomes, such as language and educational development, quality of life, and employment status, has yet to be established.
- AABR and AOAE technology was safe for newborns. Limited data on the psychosocial harms of UNHS indicated no significant differences between families with newborns who pass the screening test and families whose newborns do not pass, or between parents of screened and unscreened newborns.
- It was not possible to determine the relative superiority of the automated testing devices currently available in Canada.

Cost-effectiveness

There was limited published evidence on the cost effectiveness of UNHS strategies. Four additional cost-effectiveness studies have been published since the completion of the 2007 IHE report, but only one was of acceptable quality. This single study concluded that TEOAE followed by AABR soon after birth was cost effective and

should replace the infant distraction test screen (response to low-level sounds conducted at 8 months of age).

Based on the economic evaluation conducted in the 2007 IHE report, one-stage AABR screening was less costly and more effective than one-stage AOAE screening. The cost-effectiveness of two-stage screening with AABR and AOAE was dependent on whether the additional effectiveness is worth the additional cost.

Recommendations

The report confirms previous findings that UNHS using AOAE (TEOAE) followed by AABR testing in a two-stage protocol was effective in increasing early identification of moderate to profound PCHL. The evidence indicated that when this protocol was used with a UNHS program, referral for confirmatory diagnostic testing and PCHL management occurred earlier and more frequently than when it was not used with a UNHS program. The risks and harms of UNHS were negligible.

UNHS using automated testing devices represents only one component of a well-integrated and structured system of early identification and management for infants with hearing loss. Resources need to be available for diagnosis and intervention before a UNHS program is considered.

Methods

Please refer to the full report for details of the methods.

Further research/reviews required

Further investigation into the effects on longer term patient outcomes, such as quality of life and educational development, is warranted. No definitive data exist to determine the relative superiority of the AOAE and AABR devices currently available in Canada. In addition, these devices require validation against an accepted gold standard.

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