

Current practice, accuracy, effectiveness and cost-effectiveness of the school entry hearing screen

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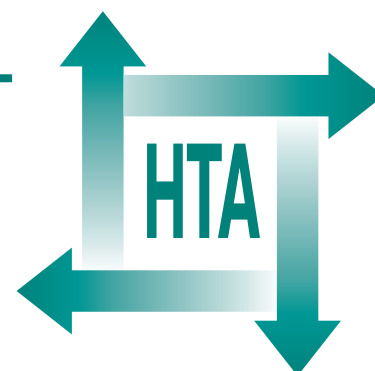
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Executive summary

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Executive summary

Background

The ability to hear is important, particularly during children's formal education. Hearing impairment is amenable to intervention and hence a screening programme when children begin their school careers has potential value. School entry hearing screening (SES) has been implemented throughout the UK since the 1950s. There is evidence of mixed practice and uncertainty about the value of the screen. In addition, recent changes in childhood hearing screening policy (abandonment of a screen at 8 months and introduction of universal newborn screening) have implications for identification of children with hearing impairment at school entry.

Objectives

This report aimed to determine answers to the following three questions:

- What is current practice for the SES in the UK?
- What is known about the accuracy of alternative screening tests and the effectiveness of interventions?
- What is known about costs, and what is the likely cost-effectiveness of the SES?

Methods

A national postal questionnaire survey was addressed to all leads for the SES in the UK, considering current practice in terms of implementation, protocols, target population and performance data. Primary data from cohort studies in one area of London were examined. A systematic review of alternative SES tests, test performance and impact on outcomes was carried out. Finally, a review of published studies on costs, plus economic modelling of current and alternative programmes was prepared.

Results

The evidence from the national survey of current practice is that:

- the SES is in place in most areas of England, Wales and Scotland; just over 10% of respondents have abandoned the screen; others are awaiting guidance in the light of the national implementation of newborn hearing screening
- coverage of the SES is variable, but is often over 90% for children in state schools
- referral rates are variable, with a median of about 8%
- the test used for the screen is the pure tone sweep test but with wide variation in implementation, with differing frequencies, pass criteria and retest protocols; written examples of protocols were often poor and ambiguous
- there is no national approach to data collection, audit and quality assurance, and there are variable approaches at local level
- the screen is performed in less than ideal test conditions
- resources are often limited and this has an impact on the quality of the screen.

The evidence from the primary cohort studies is that:

- the prevalence of permanent childhood hearing impairment continues to increase through infancy
- of the 3.47 in 1000 children with a permanent hearing impairment at school screen age, 1.89 in 1000 required identification after the newborn screen
- the introduction of newborn hearing screening is likely to reduce significantly the yield of SES for permanent bilateral and unilateral hearing impairments; yield had fallen from about 1.11 in 1000 before newborn screening to about 0.34 in 1000 for cohorts that had had newborn screening, of which only 0.07 in 1000 were unilateral impairments
- just under 20% of permanent moderate or greater bilateral, mild bilateral and unilateral impairments, known to services as 6-year-olds or older, remained to be identified around the time of school entry.

The evidence from the systematic review of the alternative tests and of the effectiveness of interventions is that:

- no good-quality published comparative trials of alternative screens or tests for school entry hearing screening were identified
- studies concerned with the relative accuracy of alternative tests are difficult to compare and often flawed by differing referral criteria and case definitions; with full pure tone audiometry as the reference test, the pure tone sweep test appears to have high sensitivity and high specificity for minimal, mild and greater hearing impairments, better than alternative tests for which evidence was identified
- there is insufficient evidence to draw any conclusions about possible harm of the screen
- there were no published studies identified that examined the possible effects of SES on longer term outcomes.

The evidence from the cost-effectiveness study is that:

- no good-quality published economic evaluations of SES were identified
- a universal SES based on pure tone sweep tests was associated with higher costs and slightly higher quality-adjusted life-years (QALYs) compared with no screen and other screen alternatives; the incremental cost-effectiveness ratio for such a screen is around £2500 per QALY gained; the range of expected costs, QALYs and net benefits was broad, indicating a considerable degree of uncertainty
- targeted screening could be more cost-effective than universal SES
- lack of primary data and the wide limits for variables in the modelling mean that any conclusions must be considered indicative and exploratory only.

A national screening programme for permanent hearing impairment at school entry meets all but three of the criteria for a screening programme, but at least six criteria are not met for screening for temporary hearing impairment.

Conclusions

The lack of good-quality evidence in this area remains a serious problem. Services should

improve quality and audit screen performance for identification of previously unknown permanent hearing impairment, pending evidence-based policy decisions based on the research recommendations.

Recommendations for research

Further research is highlighted in the following areas:

- evaluation of an agreed national protocol for services delivering the SES to make future studies and audits of screen performance more directly comparable
- development and evaluation of systems for data monitoring so that robust data on screen performance are available
- determination with greater certainty of the prevalence of congenital unilateral hearing impairment, and permanent mild and minimal hearing impairment at school entry, that could be identified by a suitable quality-assured screen protocol
- a comparison of the effectiveness, efficacy and efficiency of alternative approaches (reactive services, formal surveillance, targeted screening and universal screening at school entry age) to the identification of permanent hearing impairment postnewborn screen
- controlled studies of the effectiveness of hearing screening and subsequent interventions for later outcomes in children with permanent mild, minimal and unilateral hearing impairment identified at school entry
- determination of the distribution of detection thresholds for pure tones in the population at school entry.

Publication

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