UK National Screening Committee

Screening for permanent hearing loss in children at school entry

27 February 2019

Aim

1. To ask the UK National Screening Committee (UK NSC) to make a recommendation, based on the evidence presented in this document, whether or not screening children at school entry for permanent hearing loss meets the UK NSC criteria for a systematic population screening programme.

Current recommendation

2. The current UK policy is based on a recommendation made by the UK NSC Child Health Sub-Group. Following the introduction of newborn hearing screening, most cases of hearing impairment will have been identified before school entry. However, some cases may be missed or may develop later. Therefore, the UK NSC Child Health Sub-Group recommended that screening for hearing loss in school age children should continue whilst further research was being undertaken. It was therefore suggested that an update of hearing in children policy would have been delayed until the publication of an HTA trial, which aimed at evaluating the cost-effectiveness of screening for permanent hearing loss in children at school entry.

Evidence Summary

3. The 2018 evidence summary was undertaken by Solutions for Public Health, in accordance with the triennial review process. https://legacyscreening.phe.org.uk/hearing-child

4. The current evidence summary looked at the prevalence and type of hearing loss in UK children at school entry age; the accuracy of hearing screening tests and the consequences of school entry hearing screening.

5. The conclusion of the 2018 evidence summary is that the volume, quality and direction of new evidence is insufficient to change the current recommendation about screening for permanent hearing loss in children at school entry.

    - Only 1 study was identified from 1 region of the UK. This study included a large sample, is of good quality and the results are applicable to the current UK screening context where newborn hearing screening is in place. However, no prevalence figure for temporary hearing impairment was identified and it is not clear if the prevalence of permanent hearing loss in this area of North-East London is generalisable to the rest of the UK. **Criterion 1 not met**

    - One systematic review on the diagnostic accuracy of screening tests was identified, which included 10 small studies with a total of 2,566 children. There was a lack of consistency in the results of the included studies, limiting any conclusions that can be drawn about the accuracy of screening tests for children of school entry age. Whilst the systematic review was of good quality, there were some concerns about the quality of the included studies. The applicability of the results to the current UK context is questionable, eg it is uncertain if the prevalence of hearing impairment in the included studies is applicable to the UK and 7 of the 10 studies were conducted in countries where there is no universal newborn screening programme. **Criterion 4 not met**

    - One study reported referral outcomes comparing an area with school entry screening to an area with no screening. The study did not find significant difference in the yield of confirmed cases of hearing impairment between such areas. The number of referrals for assessment was higher in the area without school entry screening; however, there was no significant difference in the mean age at referral. Moreover, there were some concerns about the quality of the study and in the assessment of hearing impairment, and the applicability of the results to the UK population as a whole. No studies were

identified assessing the potential impact of a false negative screening test.

Criteria 11 not met

Consultation

6. A three month consultation was hosted on the UK NSC website. Direct emails were sent to stakeholders of whom eight organisations were contacted directly. **Annex A** Ten responses to the public consultation were received from:
    - National Deaf Children's Society
    - Sally Wood
    - xxxx xxxx, xxxx xxxx Paediatric Audiology, xxxx xxxx, xxxx xxxx
    - The British Association of Audiovestibular Physicians (BAAP)
    - UCL Great Ormond Street Institute of Child Health
    - Royal College of Paediatrics and Child Health (RCPCH)
    - The British Association for Childhood Disability
    - The British Association of Paediatricians in Audiology
    - xxxx xxxx Audiology Service Lead (Strategic), Audiology Department, xxxx xxxx

    Three organisations the RCPCH, the British Association for Childhood Disability and the British Association of Paediatricians in Audiology sent an identical set of comments (See **Annex B** for full comment).

7. Two stakeholders agree with the conclusion of the evidence summary that, due to the lack of evidence identified, the current UK NSC recommendation should not be amended. One stakeholder noted that it is unlikely that new evidence will emerge unless specific research is commissioned, and therefore, in the absence of evidence on the effectiveness and benefit of school entry hearing screening, the current screening programmes available in some part of the UK should be discontinued.

    The remaining stakeholders considered that school entry screening continues to have an important role in detecting hearing loss which would otherwise be missed. The following themes were reflected across stakeholders' comments:

- Some consultees consider a school entry hearing screening programme to have an important role in detecting hearing loss which would otherwise be missed or diagnosed too late. Others suggest that it can also be useful in detecting other medical conditions (e.g. congenital CMV, widened vestibular aqueducts and Alport's syndrome). They believe that newborn and school entry screening programmes are both needed to detect permanent hearing loss and improve outcomes for children. They provide data from unpublished sources to support this. However, they also note that since the introduction of the newborn hearing screening programme in the UK, there have been doubts about the usefulness of the school entry programme and point out the lack of good evidence to answer such questions.

Response: This evidence summary found that the volume, quality and direction of new published evidence (especially in relation to the accuracy of hearing screening tests and reported outcomes of the screening programme) is insufficient to change the current UK NSC recommendation. The review was conducted in keeping with the UK National Screening Committee evidence review process for which only peer reviewed published literature is considered for inclusion in the evidence summary. (https://www.gov.uk/government/publications/uk-nsc-evidence-review-process/appendix-g-literature-searches-for-evidence-summaries).

The review stated that a major limitation of the published peer-reviewed literature was the lack of studies exploring the outcomes of school entry hearing screening, in particular, the lack of follow-up studies to determine whether the impairment detected by screening was permanent or temporary or had any subsequent impact on child development. The evidence summary found some data on the prevalence of permanent hearing impairment in UK children of school entry age. However, it found areas of uncertainty relate to the prevalence of temporary hearing loss in children at school entry, the accuracy of screening tests and the benefit of a school entry hearing screening programme.

- Some consultees raised issues relating to the phraseology and content of the review, eligibility criteria for inclusion in the review and overall analysis.

Response: These suggestions were considered by the reviewer and alterations were made to the evidence review where appropriate. In relation to comments made on the eligibility criteria for inclusion in the review, the protocol of the evidence summary was developed *a priori* following discussion with experts in the field. Information on the inclusion and exclusion criteria are stated in the 'Methods' section of the evidence summary.

Recommendation

8. The Committee is asked to approve the following recommendation:
   At the present there is insufficient evidence to recommend a change to the current UK NSC recommendation about screening for permanent hearing loss in children at school entry
   Further studies comparing outcomes from areas which currently screen with those that do not may help to clarify the value of hearing screening at school entry.

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Criteria (only include criteria included in the review)	Met/Not M
The Condition	
1. The condition should be an important health problem as judged by its frequency and/or severity. The epidemiology, incidence, prevalence and natural history of the condition should be understood, including development from latent to declared disease and/or there should be robust evidence about the association between the risk or disease marker and serious or treatable disease	**Not Met**
The Test	
4. There should be a simple, safe, precise and validated screening test.	**Not Met**
The Intervention	
9. There should be an effective intervention for patients identified through screening, with evidence that intervention at a pre-symptomatic phase leads to better outcomes for the screened individual compared with usual care. Evidence relating to wider benefits of screening, for example those relating to family members, should be taken into account where available. However, where there is no prospect of benefit for the individual screened then the screening programme shouldn't be further considered.	**Not Met**
The Screening Programme	
11. There should be evidence from high quality randomised controlled trials that the screening programme is effective in reducing mortality or morbidity. Where screening is aimed solely at providing information to allow the person being screened to make an "informed choice" (eg. Down's syndrome, cystic fibrosis carrier screening), there must be evidence from high quality trials that the test accurately measures risk. The information that is provided about the test and its outcome must be of value and readily understood by the individual being screened.	**Not Met**

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Annex A

List of organisations contacted:

1. Action on Hearing Loss
2. British Academy of Audiology
3. The British Association of Audiovestibular Physicians
4. British Association of Paediatricians in Audiology (BAPA)
5. British Society of Audiology
6. Communication Trust
7. Faculty of Public Health
8. Institute of Child Health
9. National Deaf Children's Society
10. Royal College of General Practitioners
11. Royal College of Paediatrics and Child Health
12. Royal College of Physicians
13. Royal College of Physicians and Surgeons of Glasgow
14. Royal College of Physicians of Edinburgh

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Annex B

Name:	Vicki Kirwin	**Email address:**	xxxx xxxx
Organisation (if appropriate):	National Deaf Children's Society		
Role:	**Development Manager (Audiology & Health)**		

Do you consent to your name being published on the UK NSC website alongside your response?

Yes X☐ No ☐

Section and / or page number	Text or issue to which comments relate	Comment *Please use a new row for each comment and add extra rows as required.*

Other comments:

NDCS is the leading charity working with children and young people with all types and levels of deafness, their families, and the professionals who support them. We believe that deaf children can do anything other children do given the right support from the start and therefore believe the that identification of deafness and offer of intervention at the earliest stage possible is of vital importance.

Whilst it is still government policy that children receive this hearing screening between the ages of 4 and 5 (England and Northern Ireland)[1][2] and 5-7 years (Wales)[3], more than 10% of services across the UK had been found to be no longer providing hearing screening at school entry in 2007[4]. Scotland no longer carries out school entry hearing screening[5] and from our work in the regions we understand further areas across England have gradually withdrawn services. We agree with the evidence uncertainties highlighted in the review.

Due to the patchy nature of provision along with the evidence uncertainties identified, NDCS agrees with that there is not enough evidence to change the current recommendation about screening for permanent hearing loss for children starting school. We believe that this interim recommendation should continue alongside additional guidance on expectations of screening provision:

- A pathway and clear guidelines for onwards referral to audiology are developed and implemented from the school entry hearing screen.
- Pathways are additionally developed that enable timely review by audiology services for:
  - children identified as requiring hearing surveillance following the newborn hearing screen[6][7]
  - children known to be at risk of developing deafness
  - children in response to parental concern about their hearing
  - children referred from other professionals, such as health visitors, school nurses, speech and language therapists etc. without the need for families to have to seek further referral from their GP or wait until hearing screening takes place.
- Data should be collected locally and nationally on coverage, referral rates, age of confirmation of deafness, and prevalence of deafness. Information should be also be reported annually to the local Children's Hearing Services Working Group (CHSWG). Information systems should be capable of identifying those children who should be offered screening, managing them through the pathway, and ensuring that the best outcomes are reached for the child and family.
- School entry hearing screening is included in local audit and clinical governance arrangements. The information and IT systems should also enable adequate fail-safe systems and support performance management of the screening programme.

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[1] The Healthy Child Programme (England) 2009 https://www.gov.uk/government/publications/healthy-child-programme-pregnancy-and-the-first-5-years-of-life

[2] Healthy Child, Healthy Futures (Northern Ireland) 2010 https://www.health-ni.gov.uk/publications/healthy-child-healthy-future

[3] Healthy Child Wales Proramme 2016 http://gov.wales/topics/health/publications/health/reports/healthy-child/?lang=en

[4] Bamford J, Fortnum H, Bristow K, Smith J, Vamvakas G, Davies L, *et al*. Current practice, accuracy, effectiveness and cost-effectiveness of the school entry hearing screen. *Health Technol Assess* 2007;**11**(32).

[5] Child Health Programme Scotland 2005 http://www.isdscotland.org/Health-Topics/Child-Health/Child-Health-Programme/Child-Health-Systems-Programme-Pre-School.asp

[6] Guidelines for surveillance and audiological referral of infants & children following the newborn hearing screen, NHSP 2012 https://www.gov.uk/government/publications/surveillance-and-audiological-referral-guidelines

[7] *Guidelines* for *surveillance* and audiology referral of infants & children following the *newborn hearing* screen, NHS Scotland 2012 http://www.nsd.scot.nhs.uk/Documents/UNHStargetedFollowUpGuide2012.pdf

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- Informed parental consent is gained before hearing screening. The recommendation of the UK NSC is that the explicit informed consent of parents should be obtained before any screening test is carried out.
- In places where there is high movement of at risk populations (such as some immigrant populations) into the area, that there is targeted screening/referral in place to ensure children who would not previously have newborn or school entry hearing screening or otherwise been in the NHS system are not missed.
- Parents, teachers and other professionals are given information about signs to look out for and are able to understand/act on it (e.g. through the local offer, information from their Health Visitor before the child starts school, early years settings etc.).

Thank you for the opportunity to respond to the consultation at this time. We would urge the Committee to consider timely review of the evidence as it becomes available.

Name:	Sally Wood	**Email address:**	xxxx xxxx
Organisation (if appropriate):	xxxx xxxx		
Role:	**Consultant Clinical Scientist (Audiology)**		

Do you consent to your name being published on the UK NSC website alongside your response?

Yes x☐ No ☐

Section and / or page number	**Text or issue to which comments relate**	**Comment** *Please use a new row for each comment and add extra rows as required.*
P20, Table 3	Terminology error-degree of hearing loss is measured in dB. The term “kHz” is superfluous unless the intention is to specify which frequencies (in kHz) are to be included in the average.	

P11	Inclusion of conductive hearing loss in the target condition	Conductive hearing loss arising from glue ear is dependent on age, gender, season amongst other things. It is not appropriate to include it as the target condition. The optimal treatment path for glue ear is not clear. If it were truly the intention to identify these cases a direct measure of middle ear function could be used rather than current screening tests which use a severity measurement which will fail to identify a significant number of cases.
P11	Definition of target condition of permanent hearing loss	There are 2 suggestions for the target group. 1. “Children with a permanent hearing impairment that might benefit from prompt intervention” This is not meaningful without specifying the degree of hearing loss and the affected frequencies. 2. “any hearing loss regardless of permanence or severity” –see comments above re temporary hearing loss.
P11	Benefits of intervention	There is a lack of evidence about the effects of mild permanent hearing loss and the benefits of intervention. See comments above re intervention for temporary hearing loss.
P7	Recommendations-insufficient evidence to change the current recommendations	Further evidence is unlikely to emerge unless work is specifically commissioned. In my opinion given the absence of evidence for 1.effectiveness and 2.benefit school entry hearing screening should be discontinued.

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xxxx xxxx | xxxx xxxx
xxxx xxxx | xxxx xxxx Dear Sir /Madam

I am writing as xxxx xxxx at xxxx xxxx and as xxxx xxxx which represents children with hearing loss in xxxx xxxx, xxxx xxxx and xxxx xxxx that fall into the hospital catchment area. We are responsible for delivering the school hearing programme for xxxx xxxx schools.

It is the belief of the professionals involved that the school hearing screening programme is vital for identifying children with all types of hearing loss at the start of their school career. If intervention is necessary this can be achieved at an early stage and reduce the impedance to accessing the school curriculum. In many cases parents are not aware that their child has a problem with hearing or do not wish to acknowledge it and therefore a parent questionnaire is not a suitable means of identifying children at risk from a hearing loss.

My colleague xxxx xxxx has submitted the statistics for our service but on average we are finding xxxx xxxx children who are identified with permanent hearing loss per year. The yields from the NHSP are similar. The two programmes run effectively together to identify as many children as possible at an appropriate age and allow suitable management. We would strongly urge the recommendation to keep the school hearing screening programme in place.

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Name:	xxxx xxxx	**Email address:**	xxxx xxxx
Organisation (if appropriate):	xxxx xxxx		
Role:	xxxx xxxx		

Do you consent to your name being published on the UK NSC website alongside your response?

Yes ☐ No x

Section and / or page number	**Text or issue to which comments relate**	**Comment** *Please use a new row for each comment and add extra rows as required.*
Page 6, 9, 18, 21	Background, Line 4, 'sensorial' and on the other pages	It is 'sensorineural' hearing loss not 'sensorial'. Please correct.
	Line 8 Screening tests for hearing impairment do not distinguish…'	Some school screeners do distinguish between temporary and permanent hearing loss by using bone conduction, depending on the local school screening protocol. This is carried out in one area I work in and it helps with triaging the referral and managing the next appointment in audiology.
Page 10	Penultimate line 'There **may** be cases missed or that develop after newborn screening'	The word 'may' underestimates the fact that it is well established that there **are** cases of permanent hearing loss missed by the newborn hearing screen, especially low to mid frequency, or U- shaped hearing losses (which are often genetic and require genetic testing and counselling). This is

		because the newborn hearing screen can be passed when there is a mild loss and also because the newborn hearing screen concentrates on testing at one high pitch (4KHz) and the hearing at this pitch may be satisfactory or normal in such cases. This is a known limitation. In Wales currently, unilateral referrals from the newborn hearing screen are not seen for diagnostic testing, resulting in a delay in the confirmation of unilateral hearing loss. Secondly we know that that there **are** hearing losses which develop after the newborn hearing screen,('late-onset losses'), as evidenced by the epidemiological figures (doubling of prevalence from 1/1000 for 3 year olds and 2/1000 for children aged 9-15 years old according to your reference number 4). This is due to various causes such as meningitis, congenital cytomegalovirus infection, head injury, structural causes such as widened vestibular aqueduct, genetic causes, otoxicity etc. There are also cases of children identified with hearing loss by the newborn hearing screen whose families have not engaged fully with audiological services, may not have accepted the diagnosis, declined audiological care, or moved away. The school screen also picks these cases up. They also pick up cases of children who have moved to the UK from an area without newborn hearing screening. The wording needs changing to 'There **are** cases missed and that develop after screening'. It is because of these cases that the school screen is important, otherwise they are likely to be missed or diagnosed late because it is difficult for parents and

		carers to detect mild to moderate hearing losses, and for the child to report it. This is particularly the case for mild or unilateral hearing loss, which still can impact a child's education and progress.
Page 11	Line 3 'some cases may be missed'	As above, suggest change to 'some cases **are** missed' which better reflects the current scientific evidence and clinical reports.
Page 15, 16, 18, 23, 29, 32, 50	Excluding cases with 'cytomegalovirus' infection	This terminology is not quite accurate and could be misleading. I assume it is referring to children with **congenital** (i.e. infection before birth) cytomegalovirus (CMV) infection, who are at risk of developing late-onset sensorineural hearing loss. (Acquired cytomegalovirus infection is very common and does not cause increased risk of hearing loss). Therefore advise **change 'cytomegalovirus infection' to 'congenital cytomegalovirus infection'** Another important point to make here is that the majority (90%) of children with congenital CMV are born without symptoms and therefore the congenital CMV infection goes undiagnosed. Hearing loss is usually their only problem arising from the infection. The school screen is an important detector of late onset hearing loss due to congenital CMV. However, congenital CMV can also cause developmental or cognitive problems, autism, and/or balance problems for the child. The detection via the school screen and diagnosis prompts referral/provides an explanation for such difficulties.
Page 50	Outcomes for children	Need to mention the lack of data on the rehabilitative and medical interventions enabled by identification of hearing loss

		via the school screen i.e. figures for the number of children prescribed aided, and the aetiology (cause) of the hearing loss detected. Identification of the aetiology of the hearing loss can lead to identification of other associated health conditions e.g. congenital CMV, balance (vestibular) disorder, genetic hearing loss requiring genetic counselling for the child and the family. Some causes of hearing loss result in specific counselling regarding steps to try to prevent further hearing loss e.g. avoiding head injury in widened vestibular aqueducts, avoiding aminoglycoside antibiotics with genetic hearing loss called A1555. Detection of A1555G can result in prevention of hearing loss in other family members by avoiding the above antibiotics. Hearing loss can also be a feature of genetic conditions affecting kidney function (e.g. Alport syndrome) and vision (e.g. Usher syndrome) which are important to detect early.
Conclusion		Audiovestibular Physician and audiology colleague feedback is that the school screen has a vital role in detecting hearing loss which would otherwise be missed or diagnosed later, at a time which is crucial for the child's education. It also can detect important associated symptoms such as tinnitus and balance disorder, and medical conditions e.g. congenital CMV, widened vestibular aqueducts, Alport's syndrome, genetic hearing loss. The newborn hearing screen cannot replace the school hearing screen because of late-onset hearing losses. Both

		screens are needed to detect permanent hearing loss in a timely manner, to enable amplification, interventions in education, investigation of hearing loss and improve outcomes for children. For example: One borough's figures: Children age 0-18 years seen 2005-2018 Of 170 children with permanent hearing loss wearing hearing aids, 29 were referred from the school hearing screen. Of 140 children with permanent hearing loss who don't wear hearing aids, 58 were referred from the school hearing screen. Detection rate 0.2-0.3% (2-3 per 1000) Another borough's figures: 27 children identified with permanent hearing loss from 2013-2018: 12 wearing hearing aids 15 not wearing hearing aids (1 offered and parents declined) Detection rate 0.23 % (2.3 per 1000) A national study whereby the data on hearing loss in children age 7 years in areas with and without the school hearing screen is compared, and school screening test protocols are submitted, along with their sensitivity and specificity, would provide relevant evidence for the committee:

		• Prevalence and age of detection of permanent hearing loss in areas with and without school hearing screen And for those children identified with hearing loss following the school hearing screen useful outcome data would include: • Amplification (hearing aids) • Sensory support input/advice for school • Aetiological investigation and diagnoses arising from the identification of hearing loss • Interventions for temporary hearing loss (grommets, hearing aids) • Consider including identification of associated problems: tinnitus, balance disorder, speech and language delay/difficulties as a result of the school hearing screen.

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Name:		**Email address:**	
Organisation (if appropriate):	UCL Great Ormond Street Institute of Child Health		
Role:			

Do you consent to your name being published on the UK NSC website alongside your response?

Yes ☒ **No** ☐

Section and / or page number	**Text or issue to which comments relate**	**Comment** *Please use a new row for each comment and add extra rows as required.*
Page 34; Review Summary	Conclusions and implications for policy	The conclusion drawn of 'Criterion Not Met' for each question is supported by the evidence summarised in the review. This justifies the final conclusion that a change to the current recommendation is not warranted.
Page 6, paragraph 2 (Background); age 9, paragraph 3 (Background)	Sensorial	The use of the term sensorial at this point does not seem appropriate – should this not be 'sensorineural'? The description given on page 6, paragraph 2 is of sensorineural hearing loss. The terms sensorial and sensorineural are both used throughout the document and their definitions should be clarified.
Page 7, Focus of the review	The first key question in paragraph 1: "what is the prevalence of hearing loss in children in the UK?"	It would be more appropriate for this question to be: "what is the prevalence of hearing loss in children in the UK *that remains undetected at the age of school entry*?"

also relevant to: Page 8 (Evidence uncertainties) Page 12, Table 1, column 2		Only children who have not already been identified as having hearing loss at the time of school entry will benefit from a hearing screening test at this age. Therefore children who have already been diagnosed due to newborn hearing screening should be identified as a separate subgroup within the overall prevalence estimate and excluded from those who would benefit from screening at school entry.
Page 11, paragraph 2	Target of screening	Although the 'target group' is discussed on page 11 (paragraph 2) the review does not subsequently provide a clear case definition for the type of hearing loss that is the target of screening. Is this the same as for newborn hearing screening, i.e. bilateral permanent hearing loss averaging >= 40dBnHL across 0.5 to 4kHz? Without this clarification, it is more difficult to understand how results of past studies relate to a screening system that may be used in the UK.
Page 7, Findings and gaps	Bullet point 1	Is temporary hearing loss included as a screening target and how is it defined? If so, does the case definition include follow-up to confirm hearing loss is temporary or identify specific causes that are known/assumed to be temporary?
Page 14, Eligibility…	Points number 4 and 5	Although further explanation is eventually provided in the body of the report, the presentation of the review methods in the executive summary is confusing. For example, it is unclear whether the quality assurance process in point 5 involves scoring the quality of included papers (e.g. against the CASP described on page 17 or the QUADAS described on page 27) or reviewing the accuracy of decisions about eligibility.

		It is also unclear whether the 'second senior reviewer' in point 5, is the same as the 'second reviewer' in point 4 or a third independent reviewer.
Page 14	Paragraph 2	The dates selected as inclusion criteria (i.e. 2006 and 2014) for papers in the review should be justified. It seems likely that the inclusion criteria were based on the introduction date of newborn hearing screening and/or previous reviews but there did not appear to be a statement confirming this.
Page 14 / Page 15 / Page 18	Page 14, Page 15 (Table 2), Page 18	There are differences in the lists of inclusion and exclusion criteria provided on page 14, 15 (Table 2) and 18, as well as within each of the three sections relating to the individual questions. This may be due to an attempt to summarise the eligibility criteria however it is currently confusing.
Page 15	Table 2, Inclusion criteria, Study type, Question 2	The review states that populations had to be 'consecutively' enrolled for papers to be eligible for inclusion; presumably any studies using methods for unbiased/unselected/randomised recruitment were also eligible?
Page 16	Table 2, Inclusion criteria, Study type, Question 3	Were controlled intervention studies that were not RCTs also included?
Page 16	Table 2, Inclusion criteria, Intervention, Question 3	The definition of 'school entry hearing screening programme' is not provided in the table or on page 29. It would be helpful to specify the essential characteristics for an intervention to be considered as such, for example the age range, test, setting, and whether both universal and selective programmes were included?

Page 16	Table 2, Exclusion criteria, Question 3	What does 'analogous to the UK context' mean? Could this be further explained in terms of the tests used, the age at screening, the healthcare setting, follow-up and treatment? For example, the studies described on page 27 (paragraph 2) originate from countries that appear to cover a range of healthcare systems and not all appear clearly analogous to the UK system so further explanation would be helpful.
P28	Summary of findings relevant to Criterion 4: safe, simple, acceptable test	This summary does not specify the further research required to provide adequate evidence for Criterion 4 to be met in future – this would be a helpful clarification. Overall, it seems that further research should focus on identifying which test, or combination of tests, would be most appropriate for screening. To understand this, as per earlier comments, the recommended case definition for screening needs to be more clearly specified as this will determine screening performance.
P33	Summary of findings relevant to Criterion 11: outcomes with versus without screening	Further details would be helpful to indicate which screening 'outcomes' are of interest, and the target case definition of screening. In the identified study, both temporary and permanent hearing loss, of unclear severity, were identified in areas with and without screening. No difference in outcomes was found between the areas. This may have been different if the focus was only on hearing loss types that school entry screening would aim to detect.

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We received two sets of identical comments (see below) from Dr Winifred Baddoo representing the RCPCH, the British Association for Childhood Disability and the British Association of Paediatricians in Audiology

Name:	Dr Winifred Baddoo	**Email address:**	xxxx xxxx
Organisation (if appropriate):	British Association of Paediatricians in Audiology		
Role:	**Chair of British Association of Paediatricians in Audiology**		

Do you consent to your name being published on the UK NSC website alongside your response?

Yes X☐ **No ☐**

Section and / or page number	Text or issue to which comments relate	Comment *Please use a new row for each comment and add extra rows as required.*
Page 5 Page 6 Page 9	Page 5 - 'Hearing loss can affect development…' Page 6 - 'Hearing loss can interfere with…….' Page 9 – 'Hearing deficits can interfere with…..'	I think effects on behaviour should be added to the list of consequences of a hearing loss as it is one of the symptoms we see often in children with a hearing loss. References NICE -Otitis media with effusion https://cks.nice.org.uk/otitis-media-with-effusion#!backgroundsub:4 (Accessed January 2019 WHO Childhood Hearing Loss. Strategies for prevention and care 2016

Page 15 – Table 2	What is the prevalence of hearing loss in children in the UK? Description of population	Description of population: This part of the table is slightly unclear. For population this should be for all children of that particular age group who have a hearing loss as prevalence is the numbers in a group with a particular condition at a particular time. If certain children are excluded from the prevalence, I think this should be mentioned alongside the question.
Page 24 Page 26	transient-evoked optoacoustic emissions	Typing error in transient-evoked optoacoustic emissions. Correct spelling is transient-evoked otoacoustic emissions (without a 'p'). This error has been made throughout the text.
Page 26	optoacoustic emissions	Typing error in optoacoustic emissions. Correct spelling is otoacoustic emissions (without a 'p').
Page 7 Page 11 Page 21 Page 29	The prevalence of temporary hearing loss in children at school entry Others suggest that any hearing loss, regardless of permanence or severity, should be identified so that any intervention can be recommended. No UK studies reporting the prevalence of temporary hearing impairment were identified Question 3 – What are the reported outcomes of school entry hearing screen programmes.	Since the advent of the new-born hearing screen programme in the UK, there has always been the question about the usefulness of the school entry hearing screen. Audits have been performed on hearing screening in different parts of the country looking particularly at permanent childhood hearing loss (PCHI) and temporary hearing loss. Information on some of these is shown below: **1. Audit in Gloucestershire** School Year: 2015/2016 Number of children in reception class: 6785

Number of children screened	6646 (97.9%)
Number of children referred to audiology	407 (6.1%)
Number of children with PCHI	9
Number of children with PCHI prescribed hearing aids	5
Number of children referred to ENT	57
Number of children prescribed grommets	10
Number of children prescribed hearing aids	3
Number of children with cholesteatoma had surgery	1
Number of children - tonsillectomy and adenoidectomy	1
Number of children with removal of foreign body	1

This area no longer performs the school entry hearing screen.

2. Audits in Doncaster

School Year	2010/2011	2011/2012	2014/2015	2015/2016
Number of children in reception class	3425	3396	3894	3764
Number of children screened	3339 (97.4%)	3354 (98.8%)	3605 (92.5%)	3393 (90.2%)
Number of children referred to audiology	126 (3.8%)	103 (3.1%)	120 (3.3%)	124 (3.6%)
Number of children with PCHI	5	5	0	2

Number of children with PCHI prescribed hearing aids	5	5	0	2
Number of children referred to ENT	22	32	34	33
Number of children prescribed grommets	6	7	12	9
Number of children prescribed hearing aids for middle ear effusions	1	0	3	0

This area continues to perform the school entry hearing screen.

3. Audit by British Association of Paediatricians in Audiology (BAPA) members in North West England

An audit over several years looking at late identified cases of permanent childhood hearing impairment organised by the North West Region BAPA members, showed that 35% of these cases were referred from the school entry hearing screen. This is an audit that is ongoing.

Comments:

		1. Professionals in different areas around the UK have made decisions on whether or not to continue using the school entry hearing screen. A comparison of two areas, one with the school entry screen (Nottingham), and the other without the screen but other methods of referrals (Cambridge)[1], showed no difference in the numbers of children found to have a hearing loss. Concern has been shown about certain limitations to this study including – lack of description of hearing loss and possibly a difference in epidemiological and social circumstance in the two areas. This illustrates the need for a more robust study to be undertaken. 2. As paediatricians, we look at children as a whole and we do find that many of the ones we see referred from the school entry hearing screen may have a temporary hearing loss rather than a permanent hearing loss. This hearing loss may have a great impact on a young child's life impinging on his behaviour, speech and language development, his social interaction and education[1]. Through the school entry hearing screen most of the children are found to have a temporary hearing loss as a result of middle ear effusions rather than a permanent hearing loss. Many of these children have intervention (grommets inserted/hearing aids) according to the

		Nice Guidelines -Otitis media with effusion[3]. The fact that intervention was used does imply that they had a difficulty that needed to be addressed. With appropriate management this difficulty should be overcome. 3. Most of the permanent hearing loss confirmed at the school entry level is either unilateral or mild binaural which has <u>not</u> been identified by the newborn hearing screen, or has progressed since then. Children with this type of hearing loss also do have their difficulties which are also very relative to their cognitive ability. They mishear information and this may impact on their behaviour, speech and language development their social interaction and education. Again, if this is confirmed at this stage it is advantageous to the children as appropriate intervention is helpful. References [1] Health Technology Assessment 2016; Vol.20: No.36 A programme of studies including assessment of diagnostic accuracy of hearing screening tests and a

		cost-effectiveness model of school entry hearing screening programmes. Fortnum H. Ukoumeunne OC. Hyde C. Taylor RS. Ozolins M. Errington S. Zhelev Z. Pritchard C. Benton C. Moody J. Cocking L. Watson J. Roberts S. [2] World Health Organisation. Childhood Hearing Loss: Strategies for prevention and Care. 2016 [3] NICE Otitis Media with Effusion https://cks.nice.org.uk/otitis-media-with-effusion#!scenariorecommendation:5 (Accessed January 2019)

Dear Sir/Madam

I am aware that you are currently investigation the validity and cost effectiveness of universal school age screening. I have read a number of the articles on this piece of work and understand that due to lack of data the evidence is currently inconclusive and at the present time the recommendation is to continue screening.

At xxxx xxxx we have collated a significant amount of data on our screening service and delved down to individual patient outcomes following the screen. We currently hold data from 2013-14 program to the current day. Unfortunately none of this information has been written up as a research piece however if somebody is interested in knowing what we have done and our outcomes please contact myself on the email address below.

Kind regards,

xxxx xxxx