Report 19JUN13 of EFAS Working Group on pre-School and school age children Hearing Screening (WG-SHS)

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Introduction

In the last two decades newborn hearing screening (NHS) has seen a significant evolution internationally. Today, in many European countries a (general) neonatal hearing screening program is operational and very successful. There is already a body of data available demonstrating that NHS has led to early habilitation and significantly better outcomes in hearing, speech and language development and educational achievement in hearing impaired children. The biannual reports at the international conferences NHS in Como also have testified this progress.

On the other hand, in the last decade an increased interest has been focused on screening in the adult population, together with interest for aspects as cognition, listening effort, cognitive load. This has been made more concrete in recent organization of new conferences and focus group workshops on adult hearing screening (AHS).

In the last 5 years more and more attention has given to the discussion of hearing screening of pre-school and school age children (SHS). This evolution is most probably fuelled by the success of NHS and the suggested necessity to prevent long-time effects of acquired and often persistent or irreversible hearing loss beyond NHS. The apparent lack of well-organized hearing screening beyond newborn age, in relation with the scholar evolution and progress of the child, is of prime interest in this framework.

A first step to fill this gap, and to bring this situation to the attention of the European Parliament, were taken at the time of the EFAS-conference 2011 in Warsaw, under the initiative of Skarzynski (chair of the Warsaw-conference) and under the then Polish Presidency of the European Union. This resulted in a European consensus statement at the EFAS-conference, 22jun11, Warsaw. This

As a second step, EFAS decided to form an EFAS Working Group to investigate SHS issues. This Working Group WG-SHS was established on 21mar12, to investigate and gather information on different aspects of SHS with the aim to fill in more specifically and practically the general descriptions of SHS in the European Consensus statement.

Installation of working group

EFAS Working Group on pre-School and school age children Hearing Screening (WG-SHS)

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First activities of WG-SHS

The first meeting was held at the NHS/AHS-meeting in Como on 05jun12 18:30h-20:00h (local organization FG). The meeting was prepared by emails.

Attended the WG-SHS meeting: FC, AD (partim), FG (partim), TS, Anna Piotrowska + colleague for HS, Kurt Stephan (EFAS president), JW

Apologies from WD, EL, HS

Discussion items:
- proposal of study topics of WG-SHS
- work plan in phases
- deadlines and distribution of work

Proposal & consensus on work plan 05jun12
- 1: What is the status in different countries? What is used for hearing screening 4-18y of age and how is it organized?
- 2: What do we want? What is the evidence that SHS is needed? How to prepare for optimal SHS?
- 1 & 2 will be studied simultaneously, may possibly lead to protocol for future investigation & build-up of evidence-base
- Aim: report on 1 & 2 ready at EFAS meeting jun13 Budapest
First phase: agree on list of requested information
Next phase: gathering of info from all WG-SHS partners by 01dec12, JW will collect info and edit draft report

Concrete Action points with deadlines:

- JW: Send around ppt of report of meeting WG-SHS at EFAS General Assembly (GA) (26sep12)
- JW: send around draft list of representative information to request from different WG-SHS-partners (26sep12)
- All: correction & additions to list (07oct12)
- JW: compiles and sends to WG-SHS the final version of list items (13oct12)
- All: each WG-SHS-partner gathers the requested info on own situation in own country and/or parts of the country, and send to JW (01dec12)
- JW: makes first draft of report on this inventory of different approaches in Europe, and sends around to partners for corrections & additions
- JW&HS: presentation report of WG-SHS at EFAS-meeting Budapest jun13
- All: “How to proceed” meeting in Budapest jun13 (to be organized)

Requested SHS-information

List of representative information to request from different WG-SHS partners

A What is the status of SHS, for 4-18y of age, in your country or parts of the country:

A1 on what scale is it organized (national, regional, …)?
A2 What organization pays for it?
A3 Which hearing screening methods are being used?
A4 At which ages SHS?
A5 Who is doing the screening (level of qualification and experience)?
A6 Type of follow-up for the existing SHS? What measures, if any, are used to quantify the follow up?

B What do we want for future SHS?

B1 What is the evidence that SHS is needed?
B2 What would be the optimal SHS?
B3 Is it enough to screen children as receivers or do we have to include other parts of the chain also (qualities of teacher's speech and room acoustics in particular)
Report SHS-information from WG-SHS

The information from the WG-SHS partners has been gathered between October 2012 and January 2013.

A What is the status of SHS, for 4-18y of age, in your country or parts of the country:

A1 on what scale is it organized (national, regional, …)?

GB
Nationally but not universal, most places will do this. It is organized at a local level. There are no standards at present. No uniform reporting.
Screening (hearing checked) is part of the good practice endorsed by children and young people strategy (Dept of Health). Age around 4-5 years, at school entry. There is no universal or targeted screening of hearing after School entry hearing screen in the UK. There is targeted testing for some groups of children e.g. cleft palate, craniofacial, Downs etc. There is no national screening per se after school entry. However, it is recommended that hearing should be checked professionally (i.e. not screening) if there is professional or parental concern

N
Since the introduction of 100 % neonatal screening around 2007-2008, the later follow-up is not settled under new guidelines. Earlier we had a fixed protocol from 6-10 months, through 2 and 4 years, then on entering school and several times throughout schooltime.
The organization at present is regional but work is going on to make it national.

I
In Italy, at a central level, the Ministry of Health has identified a number of screening tests for a variety of diseases/medical conditions (Essential Levels of Care, or, in Italian; LEA=Livelli Essenziali di Assistenza) and the basic guidelines and quality. SHS is not included, while NHS is in the list. It is the responsibility of each single Region (there are 20 Regions) to run and cover the related expenses for the screening tests (for ANY screening tests, from PAP to mammography etc).
I am not aware on any Region in Italy implementing any form of SHS. In the past, some 5 to 10 years ago, a few Regions were doing it, but not now any more. However, there are a few opportunistic programs, largely based on some local projects funded by nonprofit organizations. They are based on PTA, with screening audiometers, for children of the first classes of primary schools (6 to 8 years of age).
Independently, the team of FG is finalizing the definition of a protocol for screening children (around 8 to 9 yrs) with the SUN test (ref?). Approval of the relevant bioethical committee(s) is expected soon.
On national level hearing screening tests based on whispered voice test are performed at schools (at the age of 6 at school entrance and at the age of 13) as a part of school medicine care. Since 2007, there have been various activities undertaken in order to implement more accurate methodology to screen children for hearing disorders. Among the largest programs there have been 2 actions based of formal audiometry: 1) a program aimed at population of 1st grade children from primary schools in rural areas across Poland, in total over 290000 children were screened within 4 years. 2) a 3-year program aimed at 1st and 6th grade children from primary schools in Warsaw (the capital of Poland), covering by the end of 2011 approx. 57000 children. This program is being continued. Additionally there are occasional actions and regional/local programs of different coverage and with the use of PTA. In other small programs and projects realized in selected cities of Poland another 10000 children in primary schools were screened.

School & Education policies are not a federal issue, but decided and implemented on a state level. Germany has 16 states, so there are 16 different ministries of education. Each of them might/will have its own rules, also for school entry tests. In NRW (the state with Cologne, Düsseldorf, Bonn, Dortmund etc) the implementation of SHS is even implemented differently at a regional level.

SHS is organized by region (Flemish & French Community separately)

SHS not done, only hearing screening at about 9 months of age is described in the law. The legislation on hearing screening at young age dates from 2002, description still has to be changed to incorporate the change to the NHS

What organization pays for it?

GB
No one model: education or locally paid either by health or local authority.

N
The procedures will be coming from official health authorities and as such paid by the government
SHS not done. It is however the responsibility of each single Region (there are 20 Regions) to cover the related expenses for any screening test.

P
The two big programs mentioned above have been organized by the Institute of Physiology and Pathology of Hearing which provided a medical expertise, scientific and organizational input – these elements were financed by the Institute’s own resources. The programs have been financially supported by various partner-institutions: local authorities, organizations or foundations (such as: Farmers Social Insurance and the Agricultural Social Insurance Fund, Warsaw Municipal or McDonald’s Foundation). There have been also small-scale actions aimed at small-group populations (i.e. individual schools) undertaken on occasion by local authorities, and some of them with the support of local medical services.

D
School service departments in cities and communities

B
Flemish community: Ministry of Education; French community: Ministry of Education & Health

NL
No SHS done. By law, the town or municipality level should be responsible

A3 Which hearing screening methods are being used?

GB
No one model used but sweep audiometry most frequent (See Bamford et al 2007): Sweep audiometry at 25, 20, 20 and 20dB 500Hz to 4kHz in most places (no universal agreement)

N
From 4 years, pure tone screening may be used, 20 dB screening level mostly.

P
In programs organized by the Institute of Physiology and Pathology of Hearing: Pure Tone Audiometry and Central Tests (in some programs). As a part of school medical care: whispered voice tests

D
This is not standardized and maybe different.
One common procedure is screening at fixed level of 40 dB HL. Six frequencies on both left and right ear.

B
Flemish community: Pure-tone audiometry (headphones) and otoscopy
French community: Pure-tone audiometry (fixed audiometer (headphones) or hand-held audiometer (free-field)), otoscopy, and sometimes the whispered voice test
No standard on which frequencies to be tested and testing procedures. No standard on referral criterion (often a 30 dB HL criterion is used).
In Flemish community, a pilot project is running for screening children at the age of 10 and 14 years with speech-in-noise using digit triplets via internet (sensitivity and specificity higher than 90% for noise-induced hearing impairment can be obtained).
Soon (schoolyear 2013-14) a pilot will be running for screening children, 6-7 years old, using a standardized procedure of pure-tone-audiometry and otoscopy, testing frequencies 1000 and 4000 Hz and using a 30 dB HL criterion. Children, 3 to 4 year old will be tested by pure-tone-audiometry (1000 and 4000 Hz and 35 dB HL criterion) standardized procedure when having one or more risk factors for developing neurosensonal hearing loss.

NL
Advise given by the description in an official document of the Jouth Health Care department: The hearing test for 4-19y should done using screening audiometry and/or threshold audiometry

A4 At which ages SHS?

GB
Around age 5 years. Some schools may do more

N
At present agreement exists about age when entering school (5-6 years).

P
1st grade students (6-7 y) – biggest group
6th grade students (12 y) – second biggest group
on occasion other groups: kindergarten children and students of 2nd to 5th grade in primary schools

D
Half a year before school entry, i.e. about at age 5-6.
No systematic/universal screening later.

B
Flemish community (current situation as defined by law):
pre-school: 4y (2\textsuperscript{nd} year)
primary school: 10y (5\textsuperscript{th} year)
secondary school: 14y (3\textsuperscript{rd} year)

Flemish community (new guidelines to implement from 2014)
pre-school: 3y (1\textsuperscript{st} year): only for at risk children (no NHS, or specific risk factor for persistent hearing impairment as prematurity, prenatal CMV infection, bacterial meningitis, head trauma…)
primary school: 6y (1\textsuperscript{th} year): all children
primary school: 10y (5\textsuperscript{th} year): all children
secondary school: 14y (3\textsuperscript{rd} year): all children

French community:
pre-school: 3y and 5 y (1\textsuperscript{st} and 3\textsuperscript{rd} year), also at 4y in case of absent or unreliable test at 3y
primary school: 7y and 11y (2\textsuperscript{nd} and 6\textsuperscript{th} year), also at 6y in case of absent test at 5y
secondary school: 13y and 15y (2\textsuperscript{nd} and 4\textsuperscript{th} year), selection of 12y (students who did not succeed the 6\textsuperscript{th} year of primary school)

NL
The description in an official document of the Jouth Health Care department says: it is necessary to make at least 1 screening audiogram from all children in the age category 4-6y

A5  Who is doing the screening (level of qualification and experience)\

GB
Varies from school nurses to health visitors, audiologists or assistant audiologists (varying level: typically non graduate)
Health Visitors are usually from nursing background and have a degree but I am not entirely sure whether every single HV in the UK has a degree.

N
Tests are made by nurses at the Child Health Centers (local municipality)
In the programs organized by the Institute of Physiology and Pathology of Hearing the screening tests are done by the recruited and trained personnel. Institute’s staff is responsible for preparing and conducting the trainings, monitoring of trained personnel qualifications, and later for the realization of the whole program and its quality control. Whispered voice test, being a part of school medicine care, is performed by school nurses.

D
Personnel with special training in various school-relevant screening (not only hearing).

B
Audiogram measured by nurse (‘social nursing’, bachelor level)
Otoscopy and interpretation by physician (specialized in general practice or youth health care)

A6 Type of follow-up for the existing SHS? What measures, if any, are used to quantify the follow up?

GB
If fail then referred to local second tier audiology. Follow up by audiologist or pediatrician (medic) with specialty in audiology

N
If test is failed, the child is referred to the nearest hospital with audiological service. Unfortunately, the criteria for referring is not quite clear at the moment

P
All children screened in the program conducted in Warsaw have the opportunity to be admitted for follow-up in the Institute of Physiology and Pathology of Hearing or other centers of audiology in Warsaw Voivodship – for this group of patients a system of special care has been created.
Children diagnosed with hearing disorders in program conducted in rural areas across Poland undergo healthcare system accordingly to regulations of Polish law. Currently, the team of the Institute of Physiology and Pathology of Hearing is carrying out activities which aim at organization of the follow up system. For that purpose a System of Integrated Communication Operations “SZOK”® was created and has been developed. “SZOK”® includes the Base of Knowledge, central database enabling to collect and manage screening results which are sent from various sources and health units, and can be used not only for follow up but also for epidemiological analyses.
Based on its own experiences, the team of the Institute of Physiology and Pathology of Hearing and Polish Ministry of Health are preparing a Program for early detection of hearing, vision and speech disorders in primary school children (a national healthcare policy program).

D
Mostly: referrals to pediatric audiologist and/or special educational support.

B
Referral through general practitioner to ENT-specialist, No standard for follow-up. Written feedback to parents or directly to older students by physician. The GP or ENT-physician will be invited to communicate with the social nurse or physician of the SHS on the results after referral.
B What do we want for future SHS?

GB
Certainly school entry screen to be universal. School entry is after 4.5 yrs and should take place before 5.5 yrs but this is dependent on availability of staff to do the screen.

N
A test at 4 years would be necessary since long time has passed since neonatal screening and possible late onset or progressive hearing losses may then be discovered. 4 years old children will also normally be able to cooperate on pure-tone screening methods.
After a 4 years test, a test when entering school (2 years later) is quite natural. After that I am a bit uncertain. Otitis media will be less common, but late onset and progressive hearing losses may still be a problem. Later, the youngsters may be involved in noisy activities, i.e. music. So a screening of teenagers may be of interest. Too many tests may be problematic from an economical point of view.

B
A more efficient test for SHS.
A guideline for uniformity in screening on hearing loss.

B1 What is the evidence that SHS is needed?

GB
Incidence of late onset hearing loss following NHS
We need more evidence of yield and better outcomes
In the UK we have prepared a report in 2007 on the evidence for pre school screening. It has been published by our HTA organisation.
In the meantime we have been trying to get further recognition and standards for this screening. But this has not yet been accepted as a national screening programe. But it is a part of the clinical programme for children and young people and there is an exhortation to 'check' hearing and vision at key points in school progress. That exhortation does not carry any teeth in terms of incentives or national 'MUST DO' statements.

N
partly covered under general response for part B

I
Increasing evidence of children who passed the NHS but develop HL at an older age
P
Literature that mild hearing loss (MHL), which is the most often hearing loss in school children, can have a negative impact on speech, language, and cognitive development, and subsequently on academic achievements; that MHL is a condition which may put children in risk for academic, social and behavioral problems; that identification of even mild hearing loss (followed by treatment) prevents from serious consequences.

D
For peripheral hearing loss:
There is only clinical experience, no evidence-based facts on a scientific level, because NHS screening is earlier than before, however acquired hearing loss in the first year of life is missed then. Statistical data has to be collected
For APD:
Consequences of APD are observed when symptoms are there and children have serious problems in acquiring literacy skills. This is basically too late. Better to screen for APD at age 4 and start preventive actions.

B2 What would be the optimal SHS?

GB
Minimum school entry screen. Not sure about screening later as there are financial limitation and need to show the cost effectiveness. Depends on the evidence of practicality, cost and benefits

N
partly covered under general response for part B

I
I don’t believe there is any agreement on this issue.
I herewith propose that the WG-SHS would identify the most suitable technique for any class of age (for instance 0-3 yrs – 3 to 5, and 5 to 7), on the base of practical / scientific evidence. The three classes above should cluster: i) children who do not cooperate at all – therefore only objective test can be used; ii) do start to cooperate, but cannot implement simple tasks – such as reading on a touch screen, or interacting with the tester without the presence of the mother, and iii) those who can – on average- indeed cooperate – for instance they can read simple words or letters.

P
SHS should be implemented and conducted according to EBP.

D
Systematic/universal screening for peripheral HL and APD at ages 4, 6 and 10.
Regional screening center, where parents can go to (without referral of a doctor) for checking/screening the hearing of their child, in any case where parents have doubts.

**B3** Is it enough to screen children as receivers or do we have to include other parts of the chain also (qualities of teacher's speech and room acoustics in particular)

GB
This is good question. Acoustics within the classroom is extremely important for educational outcome of all children and there must be minimum standards that schools have to observe and there needs to be legislation around this. It is not good enough to screen children, needs sender characteristics etc and evidence of what interventions may make a cost effective difference

N
Teachers may be contacted, but I believe the most important input is to make 100% control of classrooms since we know from many investigations that room acoustics (noise and reverberation) is not satisfactory. Even normal hearing children may suffer from poor room acoustics

I
I think including teacher’s speech quality is not feasible, for many reasons. Instead I do believe that room acoustics has been dramatically underestimated, especially for old buildings- as well as in some new buildings. It is very relevant, in my opinion, to raise this point: even normal hearing children would greatly benefit from an increased care about anti-reverberant classrooms.
I am very much sensitive to this, in that I shall be personally involved in a new project funded by two Italian non-profit associations (I am serving as President of one of the two!) whose goal is mainly showing how great can be the advantages of anti-reverberant classrooms in a few schools, in which some of the rooms have been modified, at a relatively low cost.

P
Due to the complexity (and diversity) of the subject – other parts should be treated as separate issues.

D
More and more, children attend day-care centers at a very early age. Uncertain is whether the auditory development of the child can cope soon and well enough with the “challenging” acoustic circumstances: a lot of noise, originating from many other children in the room.
Having a problem with listening-in-noise is not only a child-based factor, but also environment-based (cf. vulnerability model: category “risk factors”).
Optimizing auditory learning therefore should also include the screening of these risk factors (classroom acoustics, quality of teacher speech).

B
The acoustical quality of classrooms is of course very important for communication, for every child and teacher. However, this is a separate (although related) issue, and some information and prescriptions do exist already, see classroom acoustics ANSI-standard ANSI S12.60-2002 that can be used as some practical guidance.
SHS will be communicating with schools on the issue of hearing-friendly classrooms
Summary:

Resume of responses to the specific questions

AWhat is the status of SHS, for 4-18y of age, in your country or parts of the country:
A1 on what scale is it organized (national, regional, …)?
Varies widely: National, regional, local, not organized, certainly not universal

A2 What organization pays for it?
Varies widely: education, health, school services, institutes, none pays

A3 Which hearing screening methods are being used?
No standards: sweep audiometry, pure tones, whispered voice

A4 At which ages SHS?
Variable: ~5 y, 1st, 2nd, 3rd, 5th, 6th grade, no systematic screening later than ~5y, or at 13y, 14y, 15y (the latter only in B). However, in principle in many cases effectively close to school entrance (before or after).

A5 Who is doing the screening (level of qualification and experience)?
Variable: school nurses, assistant audiologists, …

A6 Type of follow-up for the existing SHS? What measures, if any, are used to quantify the follow up?
No standard: Audiologist, medic-pediatrician, general practitioner to ENT-specialist

B What do we want for future SHS?
B1 What is the evidence that SHS is needed?
Incidence of late onset hearing loss after NHS
Impact of mild hearing loss
More data and evidence needed

B2 What would be the optimal SHS?
Certainly pre-school, beyond that age evidence base limited
No agreement on optimal technique

B3 Is it enough to screen children as receivers or do we have to include other parts of the chain also (qualities of teacher’s speech and room acoustics in particular)
Variable responses
General observations
No standards exist! Approaches very variable across the European countries
The cost model will be important (this message resonates from all reports)
More data should be accumulated for supporting or quantifying evidence base
Maybe practical aspects of screening should be rethought in view of modern multimedia

References

Current practice, accuracy, effectiveness and cost-effectiveness of the school entry hearing screen. Health Technology Assessment 11;32

Skarzynski H, Piotrowska A (2012)