

BIAP Recommendation 06/16 - 07/6 Annex 1: Indication of Hearing Assistive Technology (HAT)

Introduction

Several tools can help to establish an indication for the use of HAT-systems.

This annex will focus on questionnaires, audiological evaluation and acoustic environmental conditions.

Recommendation

1. Questionnaires.

Questionnaires can be very useful before starting a trial with HAT, especially for children who cannot indicate difficult situations. In the latter case, observation questionnaires can be used before and after the trial.

Adults can easily explain difficult situations. The **COSI-questionnaire** can give an indication to start a trial.

For **children** many questionnaires in different languages are available. Some of them are represented in this Table:

Name	Content	Age	Purpose and languages	Language
ELF (Anderson, K)	Early Listening Function	5 m-3 y	Observation in 12 listening situations	English ¹² Spanish ⁸
Evaluación Funcional del Sistema de FM en Niños Pre escolares (Adapted by PIP from De Conde Johnson)		1-3 y	10 questions regarding auditory responses in different everyday situations	Spanish ⁸
CHILD (Anderson, K)	Children's Home Inventory for Listening Difficulties	> 3 y	15 questions in everyday environments	English ¹ Spanish ⁸
IT-Mais (Zimmerman-Philips)	Infant Toddler Meaningful Auditory Integration Scale	0-3 y	10 questions about everyday situations	English ³ French Spanish ⁹

PEACH (Ching, T. et al)	Parents' Evaluation of Aural/Oral Performance of Children	3-7 y	15 questions in everyday environments	English ⁴ French ⁴ (error)
TEACH (Ching, T et al)	Teachers' Evaluation of Aural/Oral Performance of Children	3-7 y	13 questions in a school environment	English ⁴
LIFE-R (Anderson, K)	Listening Inventory for Education	> 6 y	Questionnaire about the classroom situation in two versions (child and teacher)	English ⁵
Cuestionario Auditivo Escolar (Adapted by PIP from Canning)	Basado en LIFE UK Valoración de la dificultad auditiva por parte del alumno	> 6 y	Cuestionario para la valoración funcional de los sistemas de micrófono remoto. 13 preguntas acerca del entorno escolar	Spanish ⁸
EHAK	Einschätzung von Hörsituationen im Alltag von Kindern	> 6 y	Questionnaire for assessing hearing situations in children's everyday life	German ⁶
	FM Listening Evaluation for Children	?	Questionnaire with and without FM	English ⁷

- https://www.phonakpro.com/content/dam/phonak/b2b/Pediatrics/Junior_Reports/Fitters/com_elf_questionnaire_gb.pdf
- <http://successforkidswithhearingloss.com/for-professionals/tests-informal-assessments-for-parents-students-teachers/>
- https://www.advancedbionics.com/content/dam/advancedbionics/Documents/Regional/BR/AB_IT-MAIS_Resource.pdf
- <https://outcomes.nal.gov.au/peach>
- <http://successforkidswithhearingloss.com/life-r>
- <http://www.unimedizin-mainz.de/kommunikationsstoerungen/uebersicht/paedaudiologie.html>
- <http://firstyears.org/fyi/FMlisten.pdf>
- <http://www.phonak-pip.es/para-audiologos/pruebas-auditivas/>
- Free App for iPad IT-MAIS Espanol

2. Audiological test protocol.

Depending on age, language level and hearing loss **Speech audiometry** in quiet and noise will show the need of HATS looking at:

- dB SNR
- Level of optimal speech understanding
- Speech intelligibility at SNR +15, +10, + 5, 0 and -5 dB

Ideally use a Speech-in-noise test with age-related norms.

The use of adaptive test protocols is not recommended in this case because they only show the 50%-SRT and give no information of good understanding.

3. Acoustic measurements or checklist of the environment.

- The ideal environmental situations in learning situations are described for normal hearing people by **ANSI**. The **BATOD** (the British Association of Teachers of the Deaf) gives suggestions for hearing-impaired people:

	ANSI (S12.60-2002)	BATOD
Ambient Noise Level (unoccupied classroom)	≤ 35 dBA	< 35 dB
Teachers Voice to Noise Ratio (occupied classroom)	≥ 15 dB	> 15 dB
Reverberation Time (occupied classroom)	$\leq 0.6''$	< 0.4''

Some interesting Apps are available to measure easily the acoustical environment with a tablet or cell phone:

- SoundOut** from NAL (Room Acoustic Analyser) measuring reverberation and background noise.
- ListenApp** for schools is free and available for iPhone on iTunes (NAL).
- I Hear You** (Kelly Trembley) → www.ihear.u.co

! Pay attention that calibration and microphone sensitivity and linearity are correct.

4. Datalogging.

Some hearing aids or Cochlear implants that have data logging capacity can provide useful information on the different environmental situations the user is exposed to.

Datalogging will not give information about the nature of the noise. It will be important to provide information on the different listening environments. Questionnaires can also be very useful.

For teachers the 'Listening Environment Profile' can be used.

References

Seewald R, Tharpe AM (2011) *Comprehensive Handbook of Pediatric Audiology*. Plural Publishing, San Diego Literature and/or other references to this recommendation.

Smaldino J.J. & Flexer C. (2012). *Handbook of Acoustic Accessibility: Best practices for Listening, Learning and Literacy in the Classroom*. New York: Thieme

<https://www.asha.org/public/hearing/American-National-Standard-on-Classroom-Acoustics/>

<https://www.batod.org.uk>

<http://www.ed.gov.nl.ca>

<http://www.phonak-pip.es/para-padres/tecnologia-auditiva/>

<http://soundingboard.earfoundation.org.uk>

This recommendation was created and approved in multidisciplinary cooperation between professionals of all audiophonological disciplines, which are medicine, pedagogy, speech therapy, psychology and hearing instrument audiology.

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