



## Topic Exploration Report

Topic explorations are designed to provide a high-level briefing on new topics submitted for consideration by Health Technology Wales. The main objectives of this report are to:

1. Determine the quantity and quality of evidence available for a technology of interest.
2. Identify any gaps in the evidence/ongoing evidence collection.
3. Inform decisions on topics that warrant fuller assessment by Health Technology Wales.

Topic:	Remote microphone hearing assistance technology for improving speech recognition by hearing impaired adults.
Topic exploration report number:	TER181

### Introduction and aims

HTW Researchers searched for evidence on remote microphone hearing assistance technologies (HAT) for improving speech recognition and perception in noisy environments for patients with impaired hearing.

We focussed on frequency modulation (FM) technology, which has been the centre of the latest advancements in wireless remote microphone HAT. The systems utilize a microphone/radio transmitter unit and radio receiver in order to increase recognition of speech in noisy and reverberant environment or where the signal originates from a distance.

### Summary of evidence

The search focused on remote microphone HAT. We identified one systematic review which assessed the effectiveness of alternative listening devices to conventional hearing aids in adults only ( $\geq 18$  years old) with hearing loss. It included 9 before-and-after studies; the number of participants ranged from 10 to 36 and the follow-up time was a maximum of 1 year. Authors indicate high heterogeneity between studies; the quality of the studies was judged as good ( $n = 2$ ), fair ( $n = 4$ ) or poor ( $n = 3$ ). The majority of studies evaluated speech intelligibility and listening ability. The results suggest that remote microphone systems used in conjunction with hearing aids show promise for adult patients with hearing loss in terms of speech intelligibility. No robust evidence exist for self-reported hearing-specific quality of life (QOL), listening ability and feasibility (e.g. usability, adherence). Two ongoing studies also exist that focus on the technology of interest (see Brief Literature Search Results for details).

## Conclusions

We identified a systematic review that found a small number of before-and-after studies investigating the effectiveness of remote microphone HAT. The results show some promise for this technology, but the studies included a small number of patients and it is unclear if the length of follow-up was sufficient. The population of interest (specifically, the cause of hearing loss) could have an influence on the effectiveness of remote microphone HAT but we did not find sufficient evidence to allow individual populations to be assessed.

## Brief literature search results

Resource	Results
HTA organisations	
<a href="#">Healthcare Improvement Scotland</a>	We did not identify any relevant guidance/advice from this source.
<a href="#">Health Technology Assessment Group</a>	We did not identify any relevant guidance/advice from this source.
<a href="#">Health Information and Quality Authority</a>	We did not identify any relevant guidance/advice from this source.
UK guidelines and guidance	
<a href="#">SIGN</a>	We did not identify any relevant guidance/advice from this source.
<a href="#">NICE</a>	We did not identify any relevant guidance/advice from this source.
Secondary literature and economic evaluations	
<a href="#">EUnetHTA</a>	We did not identify any relevant guidance/advice from this source.
<a href="#">Cochrane library</a>	We did not identify any relevant guidance/advice from this source.
<a href="#">Medline</a>	Maidment D.W. 2018. A systematic review and meta-analysis assessing the effectiveness of alternative listening devices to conventional hearing aids in adults with hearing loss, <i>International Journal of Audiology</i> , 57:10, 721-729. DOI: 10.1080/14992027.2018.1493546
Ongoing primary or secondary research	
<a href="#">PROSPERO database</a>	We did not identify any relevant guidance/advice from this source.
<a href="#">Clinicaltrials.gov</a>	ClinicalTrials.gov: <a href="#">NCT03897634 Remote Microphone Candidacy Study</a> <a href="#">NCT04147611 Remote Microphone (RM) - A Comparative Study</a>
Other	
Provided by topic proposer	Thibodeau L. 2010. Benefits of Adaptive FM Systems on Speech Recognition in Noise for Listeners Who Use Hearing Aids. <i>American Journal of Audiology</i> 19(1), pp. 36-45. DOI: <a href="https://doi.org/10.1044/1059-0889(2010/09-0014)">https://doi.org/10.1044/1059-0889(2010/09-0014)</a>  Thibodeau L. 2014. Comparison of Speech Recognition With Adaptive Digital and FM Remote Microphone Hearing Assistance Technology by Listeners Who Use Hearing Aids. <i>American Journal of Audiology</i> 23(2), pp.201-210. - <b>included in the systematic review</b> DOI: <a href="https://doi.org/10.1044/2014_AJA-13-0065">https://doi.org/10.1044/2014_AJA-13-0065</a>  Rodemerk, K.S., Galster, J.A. 2015. The Benefit of Remote Microphones Using Four Wireless Protocols. <i>American Journal of Audiology</i> 26(8), pp. 724-731. - <b>included in the systematic review</b> DOI: <a href="https://doi.org/10.3766/jaaa.15008">https://doi.org/10.3766/jaaa.15008</a>

Date of search:	7 February 2020
Concepts used:	remote microphone, hearing assistance technology