

# Hearing Industry Research Consortium

# Request for Proposals (RFP) 2023:

# “Indirect benefits of hearing-aids: psychosocial, functional or physical improvements”.

## Brief Description of Purpose and Opportunity

The Hearing Industry Research Consortium wishes to support pre-competitive research that advances understanding of indirect (including psychosocial, physical-health, functional, quality-of-life) benefits of hearing aids.

‘Pre-competitive’ means that, while research results of the proposed project may suggest perspectives to improve the generic design and provision of hearing aids, the research itself should not be concerned with the development of specific features of hearing-aid systems.

The funding pool for this RFP is 300,000 US Dollars, and the period for execution of projects under this RFP is two to three years from 1 January 2024. Proposals for two-year projects are preferred. It is expected that one or two project proposals will be funded.

A detailed description of the application procedure, as well as the guidelines for research under this scheme and the proposed research area, can be found in the following sections.

# Research Area 2023

Many research studies have demonstrated clear improvements in auditory abilities, e.g., restored audibility and improved speech intelligibility, in hearing-impaired individuals owing to hearing aids (Woods et al. 2015). Improvements in auditory abilities are expected to yield various other benefits. For instance, facilitated speech understanding may, on its own, result in reduced cognitive effort during listening – and consequently reduced cognitive fatigue – as well as increased communication effectiveness, thus facilitating social interactions. These indirect consequences of hearing-aid induced ameliorations in auditory abilities may, in turn, yield further indirect benefits, such as more frequent and enjoyable social interactions, reduced stress, an improved mood, and thus, an improved overall quality of life (QoL) (Holman et al. 2021; Hyams, Hay-McCutcheon, and Scogin 2018).

The existence of indirect benefits of improved auditory abilities in hearing-aid users is partly supported by reports from hearing-care professionals, significant others (partner, friend, family member or caretaker), and/or the users themselves. In particular, individuals with hearing loss often report reduced daily fatigue, improved mood, improved social interactions, and an improved QoL, especially, during the first weeks or months following hearing-aid fitting (e.g., Holman et al. 2019; Zahl 2023; Jilla et al. 2020); see also: Eurotrak, 2022.

Nonetheless, many questions remain regarding the factors that mediate or promote such indirect benefits. In particular, due perhaps to limitations of self-report measures, expected statistical relationships between direct and indirect consequences of improved auditory abilities – for instance, between listening effort and fatigue, or listening effort and social connectedness or, between these variables and well-being – are not always borne out in experimental data (Alhanbali et al. 2017; Hughes et al. 2018). Related to this, causal mechanisms linking improved auditory abilities to improved social connectedness and QoL in hearing-aid users often remain putative. Relationships between improved auditory abilities and physical health remain largely unexplored to date. At a more fundamental level, some of the constructs needed to solidify the design and interpretation of experimental studies of, for example listening-related fatigue and its impact on QoL, are still incompletely elaborated (Hornsby 2013; Hornsby, Davis, and Bess 2021).

Besides documenting indirect benefits of well-fitted hearing-aids, and fostering a better understanding of the factors that mediate these benefits, studies aimed at measuring such benefits have the potential to, not only, reduce the socio-economic burden of hearing-loss -- by helping to promote the adoption and regular use of hearing-aids in hearing-impaired individuals who could benefit from them – but also, to identify target populations that may require increased support to fully benefit from their hearing-aids; for instance, children or adults with unilateral or asymmetric hearing loss (Haukedal et al. 2022; Wong et al. 2017; Bakkum et al. 2023; Briggs, Davidson, and Lieu 2011).

Moreover, since an obvious prerequisite for obtaining benefits from hearing aids is *acquiring* and *using* hearing aids -- which in turn requires information- and help-seeking behaviors – results of studies that help to demonstrate benefits of hearing-aids to the public at large, could help to motivate hearing-aid adoption and use by hearing-impaired individuals. From this standpoint, the present call for proposals falls in line with comparable attempts to encourage healthy behaviors, by emphasizing positive consequences of such behaviors (e.g. improved social interactions), as opposed to negative consequences of not embracing treatment (e.g., an increased probability of depression or cognitive decline).

In this context, IRC wishes to encourage research investigating relationships between improvements in auditory abilities and psycho-social or other (physical-health, general well-being, quality-of-life) benefits in users of professionally fitted hearing-aids. This includes, but is not limited to: small- or large-scale retrospective or prospective, longitudinal or transversal studies of statistical relationships between hearing-aid induced improvements in auditory abilities (e.g., speech understanding performance and/or listening effort, spatial awareness) and changes in sociological, psychological or physical-health variables (e.g., social connectedness, mood, stress levels, physical activity, cardiovascular health, balance and risk of falls). Studies employing new, or less-traveled methodological approaches to overcome limitations of self-reports in assessing real-world auditory abilities, listening effort or fatigue, mood or stress, QoL, or physical health, such as data-logging or biometric measures (e.g., Christensen et al. 2021; 2021; Reinhart et al. 2021), are welcome.Projects involving the use of statistical designs and models to infer *causal* factors and mechanisms of improvements in psychosocial or other benefits of hearing-aids, even if non-interventional, are also welcome.

Importantly, studies focusing on the impact of hearing-aids on cognitive decline or dementia are considered to be out of the scope of the present call for proposals. Studies involving over-the-counter (OTC), direct-to-consumer (DTC), or self-fitting products or prototypes thereof, are also out of scope. Proposals involving partnerships between audiology specialists and researchers from other fields (sociology, medicine) are welcome. Nevertheless, all study participants wearing hearing-aids should have been fitted under the supervision of a trained, professional audiologist or hearing-aid dispenser.

References

EuroTrak (2022) https://www.ehima.com/surveys/

Alhanbali, Sara, Piers Dawes, Simon Lloyd, and Kevin J. Munro. 2017. “Self-Reported Listening-Related Effort and Fatigue in Hearing-Impaired Adults.” *Ear and Hearing* 38 (1): e39–48. <https://doi.org/10.1097/AUD.0000000000000361>.

Arlinger S. 2003. Negative consequences of uncorrected hearing loss--a review. Int J Audiol. 2003 Jul;42 Suppl 2:2S17-20. PMID: 12918624.

Bakkum, Kim H. E., Emma M. Teunissen, Arno M. Janssen, Judith E. C. Lieu, and Myrthe K. S. Hol. 2023. “Subjective Fatigue in Children With Unaided and Aided Unilateral Hearing Loss.” *The Laryngoscope* 133 (1): 189–98. https://doi.org/10.1002/lary.30104.

Briggs, Lauren, Lisa Davidson, and Judith E. C. Lieu. 2011. “Outcomes of Conventional Amplification for Pediatric Unilateral Hearing Loss.” *The Annals of Otology, Rhinology, and Laryngology* 120 (7): 448–54. https://doi.org/10.1177/000348941112000705.

Christensen, J. H., G. H. Saunders, L. Havtorn, and N. H. Pontoppidan. 2021. “Real-World Hearing Aid Usage Patterns and Smartphone Connectivity.” *Frontiers in Digital Health* 3: 722186. https://doi.org/10.3389/fdgth.2021.722186.

Christensen, J. H., G. H. Saunders, M. Porsbo, and N. H. Pontoppidan. 2021. “The Everyday Acoustic Environment and Its Association with Human Heart Rate: Evidence from Real-World Data Logging with Hearing Aids and Wearables.” *Royal Society Open Science* 8 (2): 201345. https://doi.org/10.1098/rsos.201345.

de Boer TG, Rigters SC, Croll PH, Niessen WJ, Ikram MA, van der Schroeff MP, Vernooij MW, Goedegebure A. The Effect of Hearing Aid Use on the Association Between Hearing Loss and Brain Structure in Older Adults. Ear Hear. 2022 May/Jun;43(3):933-940. doi: 10.1097/AUD.0000000000001148. PMID: 34711744.

Francis AL, Oliver J. 2018. Psychophysiological measurement of affective responses during speech perception. Hear Res. Nov;369:103-119. doi: 10.1016/j.heares.2018.07.007.

Haukedal, Christiane Lingås, Ona Bø Wie, Stefan K. Schauber, Björn Lyxell, Elizabeth M. Fitzpatrick, and Janne von Koss Torkildsen. 2022. “Social Communication and Quality of Life in Children Using Hearing Aids.” *International Journal of Pediatric Otorhinolaryngology* 152 (January): 111000. https://doi.org/10.1016/j.ijporl.2021.111000.

Holman, Jack A., Avril Drummond, Sarah E. Hughes, and Graham Naylor. 2019. “Hearing Impairment and Daily-Life Fatigue: A Qualitative Study.” *International Journal of Audiology* 58 (7): 408–16. https://doi.org/10.1080/14992027.2019.1597284.

Holman, Jack A., Benjamin W. Y. Hornsby, Fred H. Bess, and Graham Naylor. 2021. “Can Listening-Related Fatigue Influence Well-Being? Examining Associations between Hearing Loss, Fatigue, Activity Levels and Well-Being.” *International Journal of Audiology* 60 (sup2): 47–59. https://doi.org/10.1080/14992027.2020.1853261.

Hornsby, Benjamin W. Y. 2013. “The Effects of Hearing Aid Use on Listening Effort and Mental Fatigue Associated with Sustained Speech Processing Demands.” *Ear and Hearing* 34 (5): 523–34. https://doi.org/10.1097/AUD.0b013e31828003d8.

Hornsby, Benjamin W. Y., Hilary Davis, and Fred H. Bess. 2021. “The Impact and Management of Listening-Related Fatigue in Children with Hearing Loss.” *Otolaryngologic Clinics of North America* 54 (6): 1231–39. https://doi.org/10.1016/j.otc.2021.07.001.

Hughes, Sarah E., Hayley A. Hutchings, Frances L. Rapport, Catherine M. McMahon, and Isabelle Boisvert. 2018. “Social Connectedness and Perceived Listening Effort in Adult Cochlear Implant Users: A Grounded Theory to Establish Content Validity for a New Patient-Reported Outcome Measure.” *Ear and Hearing* 39 (5): 922–34. https://doi.org/10.1097/AUD.0000000000000553.

Hyams, Adriana V., Marcia Hay-McCutcheon, and Forrest Scogin. 2018. “Hearing and Quality of Life in Older Adults.” *Journal of Clinical Psychology* 74 (10): 1874–83. https://doi.org/10.1002/jclp.22648.

Jayakody DMP, Wishart J, Stegeman I, Eikelboom R, Moyle TC, Yiannos JM, Goodman-Simpson JJ, Almeida OP. 2022 Is There an Association Between Untreated Hearing Loss and Psychosocial Outcomes? Front Aging Neurosci.

Jilla, Anna Marie, Carole E. Johnson, Jeffrey L. Danhauer, Michael Anderson, Jenna N. Smith, James C. Sullivan, and Kristin R. Sanchez. 2020. “Predictors of Hearing Aid Use in the Advanced Digital Era: An Investigation of Benefit, Satisfaction, and Self-Efficacy.” *Journal of the American Academy of Audiology* 31 (2): 87–95. https://doi.org/10.3766/jaaa.18036.

Reinhart, Paul, Kendra Griffin, and Christophe Micheyl. 2021. “Changes in Heart Rate Variability Following Acoustic Therapy in Individuals With Tinnitus.” *Journal of Speech, Language, and Hearing Research: JSLHR* 64 (4): 1413–19. https://doi.org/10.1044/2021\_JSLHR-20-00596.

Wong, Cara L., Teresa Y. C. Ching, Linda Cupples, Laura Button, Greg Leigh, Vivienne Marnane, Jessica Whitfield, Miriam Gunnourie, and Louise Martin. 2017. “Psychosocial Development in 5-Year-Old Children With Hearing Loss Using Hearing Aids or Cochlear Implants.” *Trends in Hearing* 21: 2331216517710373. https://doi.org/10.1177/2331216517710373.

Woods, David L., Tanya Arbogast, Zoe Doss, Masood Younus, Timothy J. Herron, and E. William Yund. 2015. “Aided and Unaided Speech Perception by Older Hearing Impaired Listeners.” Edited by Emmanuel Andreas Stamatakis. *PLOS ONE* 10 (3): e0114922. https://doi.org/10.1371/journal.pone.0114922.

Zahl, Sverre Morten. 2023. “Effects of Receiving Hearing Aids on Health-Related Quality of Life in Adults With Mild Hearing Loss.” *Journal of Audiology & Otology* 27 (1): 24–29. https://doi.org/10.7874/jao.2022.00227.

## Procedure

## Submission

To submit a proposal, complete the application form available on the IRC website [www.hearingirc.com](http://www.hearingirc.com), and submit the completed application form as a **single** PDF file on the proposal submission form at http://proposals.hearingirc.com. You will know that your application has been received when you receive a confirmation via e-mail.

## Review

Proposals will be reviewed by the IRC board and their nominated representatives. The review process may include further dialogue with the applicant for clarification and/or revision.

## Deadlines

Submission of proposals: August 1st.

Announcement of grant winner by October 1st.

## Contact

Further information and enquiries may be directed to ‘contact@hearingirc.com’.

The mission, activities and membership of IRC are described in detail on the IRC website [www.hearingirc.com](http://www.hearingirc.com).

## Guidelines

Projects must be defined pieces of research with clearly stated objectives, experimental plan, and expected outcomes. The level of ambition should correspond to the funding magnitude.

The funding pool for this RFP is 300,000 US Dollars, and the time period for execution of projects under this RFP is 2-3 years from 1st January 2024. Proposals for projects of two years duration are preferred. It is envisaged that one or two project proposals will be funded.

There is no restriction regarding how many proposals may be submitted by the same investigator or institution.

Proposals may include aspects of co-funding from other sources. However it must be possible to separately identify what the IRC Grant is supporting, and co-funding must not hinder the fulfillment of the terms and conditions of the IRC Grant.

## Terms and Conditions

The terms and conditions for IRC research grants are given below where IRC is referred to as “we”, “us” or “our”, the Institution administering the grant is referred to as “you”, “your” or “yours”, and the Principal Investigator managing the execution of the Research is referred to as “PI”.

**Research Practice**

* + The PI must conduct the Research as it is described in the Application and in accordance with any other reasonable requirements notified to you by us from time to time.
  + You must obtain institutional and personal licenses and consents from relevant ethical committees as necessary for proper conduct of the Research, and adhere to guidelines from relevant authorities in your Territory.

**Finance**

* + The IRC Grant is payable only to you and may only be passed in whole or in part to a third party outside your institution in accordance with explicit provisions of the submitted project plan.
  + The IRC Grant will be paid in two annual installments during the Term. The first payment will be made on or before the Start Date, or once a counter-signed copy of the offer letter is received, whichever is later. The second payment will be made within one month of your submission of the progress report at 12 months, if IRC’s evaluation of that report determines that satisfactory progress is being made on the Research.
  + IRC policy is to pay indirect costs (institutional overhead) amounting to max. 15% of the total grant amount.
  + Payments will be made in US Dollars and the sums paid over to you will be inclusive of any currency conversion fees that may be incurred.
  + The IRC Grant must be used exclusively for the purpose of the Research.
  + If we become aware that the IRC Grant or any part of it is not being used exclusively for the Research we may withhold any payments not yet made, and recover any part of the IRC Grant which has not been properly used.
  + One year after the Start Date you must send us a signed statement detailing the IRC Grant income and expenditure. Within two months of the End Date, you must send us a statement detailing the overall income and expenditure.
  + You must return any of the IRC Grant which remains unspent at the end of the Term.

**Dissemination and Publicity**

* + The findings from the Research must be published in an appropriate form, usually as one or more papers in a peer-reviewed journal, preferably as open access articles. Failure to do so will jeopardize any further sponsorship of the PI’s research by IRC.
  + IRC’s contribution to the Research must be acknowledged every time the Research is published or disseminated.
  + The PI must inform IRC of any press statements about the IRC Grant or the results of the Research, and should consider formulating such statements jointly with IRC.

**Reporting and Activities**

* + IRC will nominate one of its board members as a Project Owner for the granted project. The Project Owner will be the PI’s primary point of contact with the IRC regarding issues of substance during the course of the Research.
  + The PI will submit a written progress report to the Project Owner every six months after the Start Date, detailing progress of the Research and identifying successes, failures and, if appropriate, any circumstances which may prevent the Research from being completed within the Term.
  + Efforts should be made for the PI to meet the Project Owner in person for a verbal report at the end of the first and second year of the Research.
  + Given reasonable circumstances of location and events, the PI may be requested to make a report in person to the IRC board.
  + On reasonable notice, you will permit a person delegated by IRC to observe the Research.
  + Within three months of the End Date, the PI will also provide us with a comprehensive report of the Research.
  + You grant us the right to use any non-confidential information from the reports for publicity purposes.

**Intellectual Property**

* + The topic areas within which IRC issues Requests for Proposals are considered pre-competitive and unlikely to generate valuable Intellectual Property (IP). For this reason, and for simplicity of administration, it is a requirement that you do not take any steps to protect any IP which might arise during the project, but on the contrary that the PI publishes the results of the Research in a timely and complete manner, such that the results remain free of protective restrictions and available for all.

**Variation and Termination**

* + No amendments to the grant will be effective or enforceable unless agreed by us and evidenced in writing.
  + The PI must inform us as soon as practicable of any significant divergence from the original aims and directions of the Research. We may withhold any payments not yet made if we are no longer satisfied that the research is in keeping with our objectives.
  + If you or the PI do not comply with the terms of this offer we may give you 28 days written notice to remedy the non-compliance or provide acceptable evidence it will be remedied in a timely fashion. If you do not remedy the failure or provide suitable evidence, we may terminate the IRC Grant, and you will not be entitled to any further payments.
  + If we believe that satisfactory progress is not being made on the IRC Grant, we will notify you in writing. If there is a not a prompt and sufficient improvement, we will terminate the Grant with immediate effect and you will not be entitled to any further payments. Any decision as to whether satisfactory progress is being made will be entirely at our discretion.

**General**

* + You are responsible for ensuring that the PI adheres to all of the terms of the Grant.
  + Any staff recruited by you in connection with the Research are your employees and you shall be solely responsible for them and for any costs, taxes and liabilities arising under any present or future employment law or regulations.

**Governing Law**

* + Without prejudice to your obligations to comply with the laws and regulations of your Territory, the terms of this offer will be interpreted in accordance with the laws of Denmark, and courts of Denmark will have exclusive jurisdiction.

[END]