

Reporting checklist for observational implanted and non-implanted neural interface studies: protocol for a Delphi process

Martijn G.J. de Neeling¹, MD, Katya Hill², PhD, Ricardo Chavarriaga³, PhD, Jane E. Huggins⁴, Luigi Bianchi⁵, PhD, Armani Porter⁶, Msc, Mariska Vansteensel⁷, PhD

1. Department of Neurology and Clinical Neurophysiology, Amsterdam University Medical Centers, Amsterdam, the Netherlands. 2. AAC-BCI iNOVATION Laboratory, Communication Science and Disorders, School of Health and Rehabilitation Sciences, University of Pittsburgh, Pittsburgh, PA. 3. Responsible AI Innovation Group ZHAW School of Engineering, Winterthur, Switzerland. 4. University of Michigan, Ann Arbor Michigan, United States. 5. Department of Civil Engineering and Computer Science, University of Rome Tor Vergata, Rome, Italy. 6. Avano Neuroscience. 7. Department of Neurology and Neurosurgery, UMC Utrecht Brain Center, Utrecht, The Netherlands

Introduction

Standardization of reporting in neuroscience and electrophysiology literature has been a long-standing topic of interest. With the rise of neural interfaces (NIs), such as the brain-computer interface, electrophysiology has made its way into real-time clinical applications. Due to the complexity of these systems, the biomarkers they depend on and their recording and their various applications, reporting of this type of research is challenging. The IEEE Standards Working Group (SWG) P2794 aims to reduce heterogeneity in reporting and improve findability, interpretability and reproducibility (FAIR principles) of NI research by drafting and publishing a reporting checklist.

Objective

Identify and describe a consensus-based set of reporting criteria for implanted and non-implanted observational and interventional neural interface studies.

Methods

Executive committee. From 2019 till 2025 the IEEE SWG P2794 has held numerous meetings to design and draft a reporting standard for neural interface research. Currently, the working group is conducting a multi-step approach to validate a reporting checklist by literature search, expert review and dissemination to the wider scientific community. **Systematic review.** Reporting guidelines that may include items relevant to observational and interventional neural interface studies and related research fields will be analyzed and compared with items that were found relevant by the IEEE SWG P2794, resulting in a finalized draft reporting checklist. We will search the following electronic databases from inception: EMBASE, Cochrane Library, PubMed, Web of Science, EQUATOR network. **Expert review.** From November 2024 till June 2025 a series of meetings are being held to review this reporting checklist for both observational and interventional neural interface research with selected subject matter experts (SMEs). **Consensus process.** During the BCI society meeting in June 2025, a Delphi procedure will be held as a workshop to finalize the checklist. A follow-up online meeting will be organized with the attendants. The Guidance on Conducting and REporting DELphi Studies (CREDES) will be used for the design, implementation and reporting of this study. **Guideline validation.** Expert reviews to the checklist will be analyzed qualitatively using semi-structured feedback and interviews, while the consensus process will utilize anonymous quantitative feedback and semi-structured qualitative feedback for adjusting and optimizing the checklist. Consensus will be defined as an anonymous agreement of >70% on each checklist item by workshop attendees. The final checklist will contain items that reached consensus and submitted to a peer-reviewed scientific journal by August 2025.

Conclusion

The finalized checklist is expected to reduce heterogeneity in the reporting of various non-implanted and implanted brain-computer interface studies by integrating feedback from literature, SMEs and the wider scientific community.

Acknowledgments and Disclosures: This work would not have been possible without the support of the IEEE SWG P2794 members. The authors don't have any conflicts of interest to disclose.