White Rose Research Online

eprints@whiterose.ac.uk
https://eprints.whiterose.ac.uk
Universities of Leeds, Sheffield and York

Deposited via The University of Sheffield.

White Rose Research Online URL for this paper:
https://eprints.whiterose.ac.uk/id/eprint/173708/

Version: Accepted Version

Article:
Franklin, M. and Young, T. (2021) Correspondence on "How can we estimate QALYs based on PHQ-9 scores? Equipercentile linking analysis of PHQ-9 and EQ-5D" by Furukawa et al. Evidence Based Mental Health, 24 (4). e5. ISSN: 1362-0347

https://doi.org/10.1136/ebmental-2021-300265

© 2021 The Author(s). This is an author-produced version of a letter subsequently published in Evidence-Based Mental Health. Distributed under the terms of the Creative Commons Attribution-NonCommercial Licence (http://creativecommons.org/licenses/by-nc/4.0/). You may not use the material for commercial purposes.

Reuse
This article is distributed under the terms of the Creative Commons Attribution-NonCommercial (CC BY-NC) licence. This licence allows you to remix, tweak, and build upon this work non-commercially, and any new works must also acknowledge the authors and be non-commercial. You don't have to license any derivative works on the same terms. More information and the full terms of the licence here:
https://creativecommons.org/licenses/

Takedown
If you consider content in White Rose Research Online to be in breach of UK law, please notify us by emailing eprints@whiterose.ac.uk including the URL of the record and the reason for the withdrawal request.

UNIVERSITY OF LEEDS
University of Sheffield
UNIVERSITY of York

Full title: Correspondence on "How can we estimate QALYs based on PHQ-9 scores? Equipercentile linking analysis of PHQ-9 and EQ-5D" by Furukawa et al

Short title: Estimating QALYs based on PHQ-9 scores? Correspondence

Matthew Franklin (MF)[1], ORCID ID: 0000-0002-2774-9439
Tracey Young (TY) [1], ORCID ID: 0000-0001-8467-0471
[1] Health Economics and Decision Science (HEDS), ScHARR, University of Sheffield, West Court, 1 Mappin Street, Sheffield, UK. S1 4DT.

Corresponding author
Dr Matthew Franklin, BA, MSc, PhD
Health Economics and Decision Science (HEDS),
School of Health and Related Research (ScHARR),
University of Sheffield,
West Court, 1 Mappin Street,
Sheffield. UK.
S1 4DT.
Email: matt.franklin@sheffield.ac.uk
Tel: (+44) 114 222 4226

Acknowledgements. We would like to thank the ScHARR Outcomes group at the University of Sheffield for taking part in a discussion which led to the writing of this letter.

Conflicts of interest. MF and TY are part-funded by the NIHR Applied Research Collaboration Yorkshire and Humber (NIHR ARC-YH). As part of the NIHR ARC-YH, we are exploring the potential to map from non-preference-based mental health focussed measures to preference-based measures which includes the PHQ-9 to the EQ-5D-3L or EQ-5D-5L.

Funding. The writing of the article was part-funded by the NIHR Applied Research Collaboration Yorkshire and Humber (NIHR ARC-YH). The views expressed are those of the author(s) and not necessarily those of the NIHR or the Department of Health and Social Care. The funding agreement ensured the authors' independence in developing the purview of the manuscript, writing, and publishing the manuscript.

Individual author contributions. MF and TY provided written contributions throughout the article and act as guarantors for the content of the manuscript.

Key words: PHQ-9, EQ-5D, mapping, cross-walking, utility, preference-based, mental health

Letter

Furukawa, et al. [1] posed the question: how can we estimate QALYs based on PHQ-9 scores? They recommend equipercentile linking analysis between the depression-severity PHQ-9 and preference-based EQ-5D three-level version (EQ-5D-3L; UK value set), the latter used to estimate utility data for QALYs.

Furukawa, et al. [1] refer to the process of 'cross-walking', whereby the practice of fitting a statistical model to health utility data has been referred to as 'mapping' and 'cross-walking' [2]. Furukawa, et al. [1] reference two mapping-related papers (their references 7 & 9); however, their analysis seems to have missed rigorous mapping methodology and previous studies which have used these mapping processes, alongside other conceptual considerations when wanting to 'cross-walk'/'map' from a non-preference-based (often condition-specific) measure like the PHQ-9 to the preference-based EQ-5D-3L.

Clear guidance for mapping has been set out by Wailoo, et al. [2]. A case for equipercentile linking for mapping has been made based on suggested limitations of the more commonly used regression methods [3]; the case for regression is described by Alava, et al. [4]. A systematic review of mapping studies published in 2019 states: "There were 180 papers with 233 mapping functions in total [identified]…The last 10 years has seen a substantial increase in the number of mapping studies and some evidence of advancement in methods with […] greater reporting of predictive ability of mapping functions"[5]. From this review, the majority of mapping functions were generated to obtain EQ-5D-3L/ EQ-5D-5L/EQ-5D-Y (n=147) among other preference-based measure scores (e.g. SF-6D, n=45).

Furukawa, et al. [1] reference one study, which was also identified by Mukuria, et al. [5], which maps from the PHQ-9 to the SF-6D (not EQ-5D-3L). which concluded that: "mapping from mental health condition-specific measures, such as the widely used *PHQ-9*, GAD and HADS, may not be an appropriate approach to generating *EQ-5D* and SF-6D scores as these measures focus on specific symptoms and not on the wider impact of mental health conditions" (their reference 7).

Furukawa, et al. [1] is mapping and therefore existing rigorous mapping methods should be used and compared to the suggested equipercentile linking analysis. We recommend not using the suggested conversion table by Furukawa, et al. [1] until further conceptual and statistical analyses have been conducted, including reporting of performance statistics to allow method performance to be judged and compared against existing mapping studies in the empirical literature. We make this recommendation on the basis that Furukawa, et al. [1] currently provides no reported performance statistics or comparisons to suggest the potential predictive ability of using the conversion table; therefore there is no way to judge to what extent the conversion table could lead to biased, inaccurate, and imprecise QALY estimations which could lead to suboptimal decision making.

References

1. Furukawa TA, Levine SZ, Buntrock C, et al. How can we estimate QALYs based on PHQ-9 scores? Equipercentile linking analysis of PHQ-9 and EQ-5D. *Evidence-Based Mental Health* 2021
2. Wailoo AJ, Hernandez-Alava M, Manca A, et al. Mapping to estimate health-state utility from non–preference-based outcome measures: an ISPOR good practices for outcomes research task force report. *Value in Health* 2017;20(1):18-27.
3. Fayers PM, Hays RD. Should linking replace regression when mapping from profile-based measures to preference-based measures? *Value in Health* 2014;17(2):261-65.
4. Alava MH, Wailoo A, Pudney S, et al. Mapping clinical outcomes to generic preference-based outcome measures: development and comparison of methods. *Health Technology Assessment (Winchester, England)* 2020;24(34):1.
5. Mukuria C, Rowen D, Harnan S, et al. An updated systematic review of studies mapping (or cross-walking) measures of health-related quality of life to generic preference-based measures to generate utility values. *Applied health economics and health policy* 2019:1-19.