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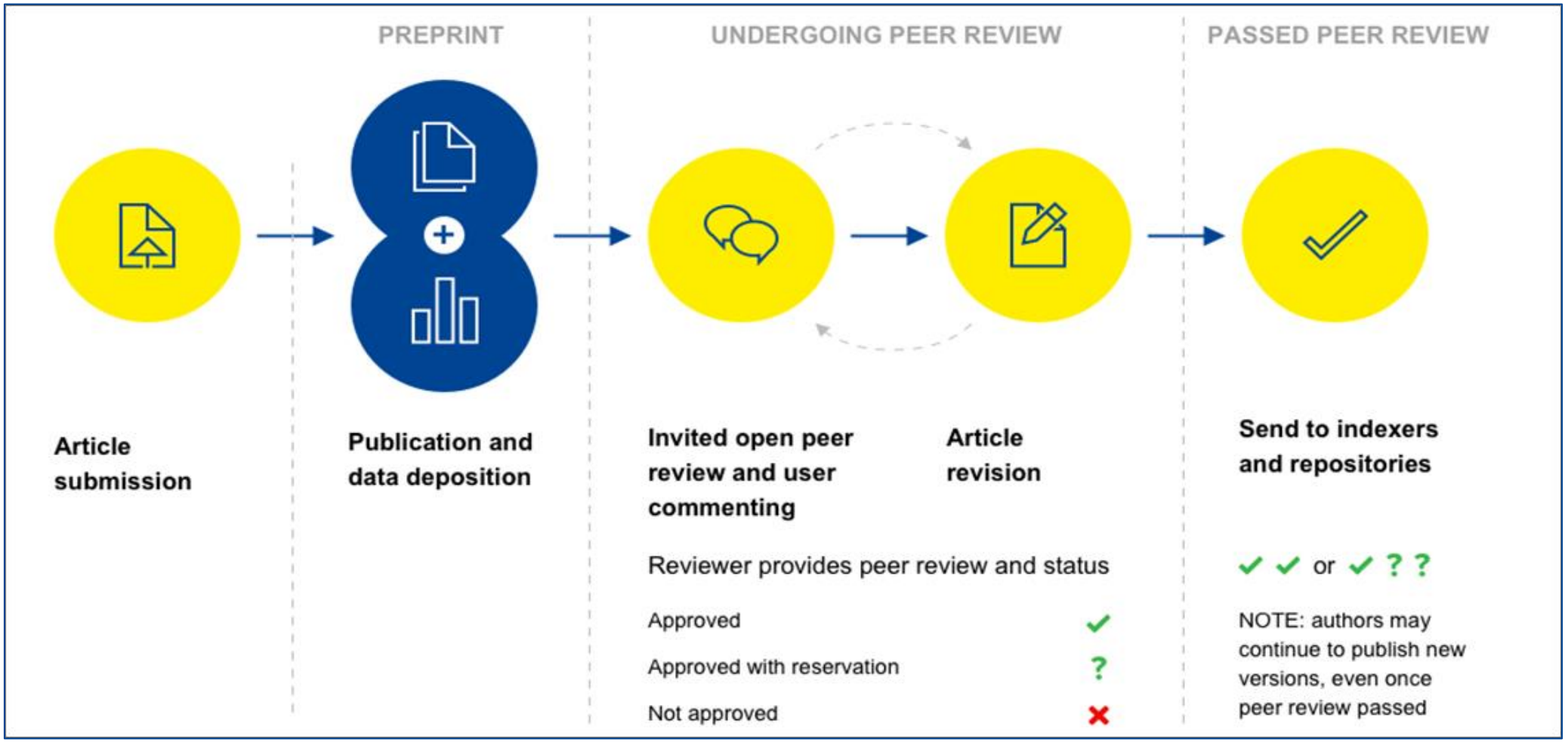

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REVIEW

REVISED **Leveraging the trust of nurses to advance a digital agenda in Europe: a critical review of health policy literature [version 2; peer review: 3 approved]**

Paul De Raeve, Patricia M. Davidson, Franklin A. Shaffer, Eric Pol, Amit Kumar Pandey, Elizabeth Adams

This article is included in Societal Challenges gateway

Article | Authors | Metrics

Abstract

This article is a critical and integrative review of health policy literature examining artificial intelligence (AI) and its implications for healthcare systems and the frontline nursing workforce. A key focus is on co-creation as essential for the deployment and adoption of AI. Our review hinges on the European Commission's White Paper on Artificial Intelligence from 2020, which provides a useful roadmap. The value of health data spaces and electronic health records (EHRs) is considered; and the role of advanced nurse practitioners in harnessing the potential of AI tools in their practice is articulated. Finally, this paper examines "trust" as a precondition for the successful deployment and adoption of AI in Europe.

AI applications in healthcare can enhance safety and quality, and mitigate against common risks and challenges, once the necessary level of trust is achieved among all stakeholders. Such an approach can enable effective preventative care across healthcare settings, particularly community and primary care. However, the acceptance of AI tools in healthcare is dependent on the robustness, validity and reliability of data collected and donated from EHRs. Nurse stakeholders have a key role to play in this regard, since trust can only be fostered through engaging frontline end-users in the co-design of EHRs and new AI tools. Nurses hold an intimate understanding of the direct benefits of such technology, such as releasing valuable nursing time for essential patient care, and empowering patients and their family members as recipients of nursing care.

This article brings together insights from a unique group of stakeholders to explore the interaction between AI, the co-creation of data spaces and EHRs, and the role of the frontline nursing workforce. We identify the pre-conditions needed for successful deployment of AI and offer insights regarding the importance of co-creating the future European Health Data Space.

Open Peer Review

Reviewer Status ✓ ✓ ✓

Reviewer Reports

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	1	2	3
Version 2 (Revision) 13 May 21		✓ read	✓ read
Version 1 26 Mar 21	✓ read	? read	✓ read

1. **Pamela Hussey**, Dublin City University, Dublin, Ireland
2. **Andreas Xyrichis**, King's College London, London, UK
3. **Dorota Kilanska**, Medical University of Lodz, Lodz, Poland

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The paper is scientifically sound in its current form and only minor, if any, improvements are suggested

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Key revisions are required to address specific details and make the paper fully scientifically sound

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Fundamental flaws in the paper seriously undermine the findings and conclusions

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Open peer review example

Reviewer Report

14 May 2020 | for Version 1

Richard Dortch, Division of Neuroimaging Research, Barrow Neurological Institute, Phoenix, AZ, USA

? APPROVED WITH RESERVATIONS

This well-written manuscript seeks to develop and evaluate a silent myelin-specific MRI sequence for applications in infants and the elderly, where loud imaging sequences can be problematic. Recent work has demonstrated that so-called inhomogeneous MT (ihMT), which arises primarily from dipolar order effects in myelin lipids, may be a more specific assay of myelin content than other MRI measures (e.g., T_2 relaxation, diffusion, conventional magnetization transfer). As a result, there is significant interest in developing clinically feasible ihMT sequences for applications in neurodegenerative diseases, development, and aging. Overall, the study was well designed (e.g., strong repeatability and ROI analyses) and the results were compelling. However, there are several minor-to-moderate flaws, particularly in the motivation (e.g., the need for silent ihMT sequences) and methods (e.g., the influence of head orientation on ihMT), that slightly reduced my enthusiasm and lead me to recommend a minor revision.

1. The case made for silent MT sequences is not particularly compelling. The authors mention that these are "among the loudest" sequences because they use fast gradient-echo readouts to obtain whole-brain data in clinically feasible scan times. However, these sequences are usually SAR-limited with fairly reasonable TRs (typically between 25-50 ms) that are acquired at lower resolutions to ensure adequate SNR. Together, this results in a sequence with reduced acoustic noise compared to most rapid, high-resolution gradient echo sequences as well as other quantitative approaches that use EPI (e.g., diffusion). (moderate)

2. Furthermore, the benefits of using a silent myelin sequence may not outweigh the drawbacks. For example, the proposed method requires very low flip angles (2 degrees), which results in a significant SNR penalty relative to standard ihMT sequences. In addition, the RUFIS readout results in a small increase in scan time. Given than SNR is already relatively low for ihMT indices, the proposed method may be suboptimal in many clinical scenarios. (moderate)

3. The study was not designed to specifically measure the effect of head orientation on ihMT. Subjects were scanned four times (across two sessions), but head orientation was not directly controlled or measured across these scans. Instead a mixed effects model was used and head orientation was inferred from the images (rather than the orientation of individual tracts being measured using DTI for example). Furthermore, the confounding influences of T_1 and B_1 were not measured. The authors attempt to overcome this by using

Responses (1)

AUTHOR RESPONSE 19 Aug 2020

Tobias C. Wood, King's College London, London, UK

We thank the reviewer for their time and insight. There were in total five reviewers, with many helpful suggestions, and hence there have been many edits to the paper. Responses to this particular review follow below.

1. We concede that the acoustic noise from any scan will depend on the precise sequence settings. However, we note that recent ihMT work has used both an MP-RAGE style acquisition, with an imaging TR of 4.3ms and also SSFP with a TR of only 5ms. The introduction has been amended to explicitly reference these papers.

2. We agree that radial sequences are SNR constrained relative to cartesian sequences, this has now been explicitly stated in the discussion. Although the 3D radial readout does imply a time penalty relative to cartesian, we note that our overall scan time is competitive with recent cartesian ihMT papers. This has been added to the discussion.

3. We agree that it would have been preferable to acquire explicit T1 & B1 maps for comparison, but total protocol time prevented that in this study. In our opinion the ihMTRinv maps display more even contrast than the ihMTR maps, we hope that the revised figures with axial and coronal sections make this clearer.

4. We did not have a conventional cartesian ihMT implementation available when this study was conducted. However, as there are multiple such implementations in the literature, it is possible to broadly compare image quality and achieved ihMTR values. We have added a table of ihMTR values to make this comparison easier. We concede that it is not possible to compare acoustic noise levels, because it is not standard in the MR literature to record and report the acoustic noise of a sequence. In previous work (reference 22) we did directly compare noise levels between a radial ZTE and cartesian implementation of Variable Flip-Angle T1 mapping, which in our opinion would be similar to the noise levels in this work and found a 30 dB reduction in noise level.

5. Figure 1 has been updated with a reduced number of spokes to emphasise the stepped gradients. We hope this is clearer.

6. We thank you for pointing out that the frequency offset is not ideal for generating single-sided MT contrast. With hindsight, this is obvious. The discussion has been amended to reflect this.

7. Because the MT pulses are applied off-resonance they should not significantly interact with the

REVISED Amendments from Version 1

The manuscript has been updated in response to the reviewer's helpful and insightful comments. The most important changes are that the figures have been redesigned and the emphasis on the head-orientation study reduced. The MR images have been updated to use a consistent set of slices, Figures 3 & 4 have been merged into a single figure, and the average within-subject CoV has been added. Figure 1 (the number of spokes) and Figure 6 (colour scheme) have been updated for clarity. We hope that these new figures are clearer and more intuitive than the previous figures. The language used to refer to the head orientation study has been clarified to refer to results as "highly statistically significant" rather than "strong". A reviewer provided a plausible explanation for the negative values of ihMTR in CSF, namely the use of Fermi pulses in the preparation module, and this limitation has been discussed. A table with the mean ihMTR and inverse ihMTR values has been added. The discussion has been expanded to better set the context of the paper within existing literature, with better comparisons between our results and previous papers. We think the resulting paper is much improved and thank the reviewers again for their valued input.

See the authors' detailed response to the review by Douglas Dean
See the authors' detailed response to the review by Gunther Helms
See the authors' detailed response to the review by Richard Dortch
See the authors' detailed response to the review by Olivier Girard and Lucas Soustelle

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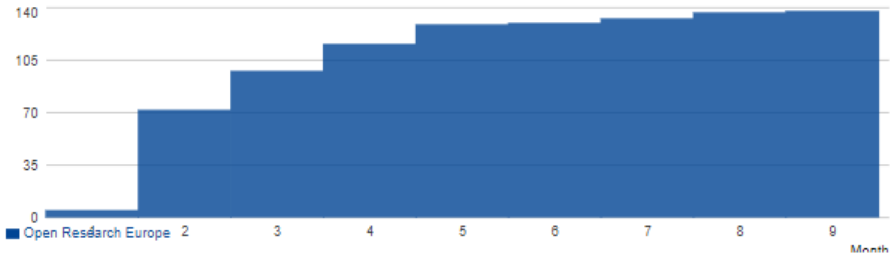

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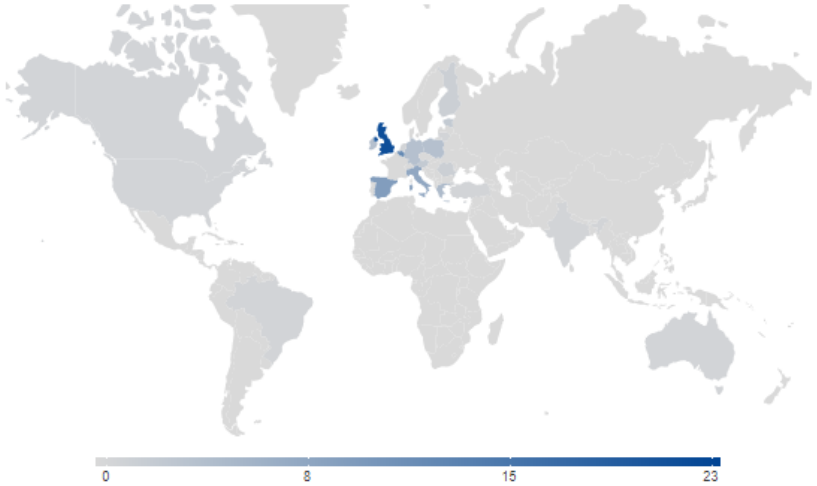

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