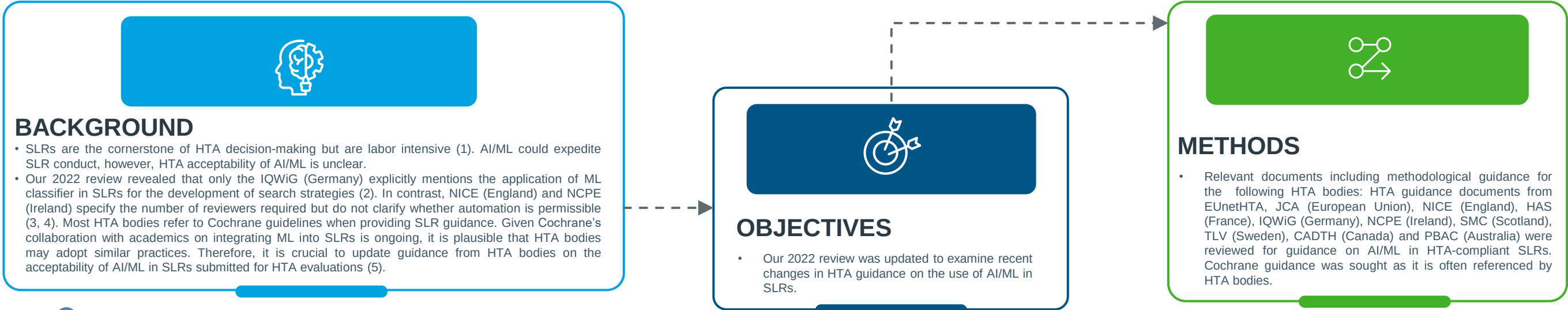


USE OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING (AI/ML) IN SYSTEMATIC LITERATURE REVIEWS (SLR): REVIEW OF STATE-OF-THE-ART HEALTH-TECHNOLOGY ASSESSMENT (HTA) AND FUTURE DIRECTIONS



Ketevan Rtseladze¹, Oikonomidi T², Ferizovic N¹, Pulleddula K³, Geddamura BG³, Agrawal P⁴, Chaudhary T⁴

¹IQVIA, London , LON, UK, ²IQVIA, Athens, Greece, ³IQVIA, Hyderabad, India, ⁴IQVIA, Gurugram, India



RESULTS

We did not identify any guidance in majority of the available documentation from HTA bodies regarding the use or acceptability of AI/ML in SLRs submitted to them as part of an evidence package.

Only IQWiG (2023) explicitly refers to AI/ML for HTA SLRs, stating that validated randomised clinical trial (RCT) classifiers can be used for screening. AI/ML prioritisation of relevant records in screening should be tested on an individual-case basis. Table 1 presents the identified recommendations (6).

Although the NICE HTA SLR guidance (2023) (7) provides no information on AI/ML, the NICE Guideline development manual (2024) (8) supports the use of ML for prioritising references for screening and for automated exclusion of references, provided classifiers' performance characteristics are known. Caution is advised if classifiers are used on data of a different type to the development dataset. If used to prioritise relevant records and define a stopping criterion after which studies are automatically excluded, the methods and stopping threshold should be documented (8).

The Cochrane Handbook (2023) advises using its RCT Classifier to identify RCTs from titles/abstracts. Automated study prioritisation is allowed. Automated exclusion of records based on a stopping criterion, automated data extraction, and use of Large Language Models for screening, are not recommended. Cochrane SLR authors are allowed to use generative AI in reporting (9).

CONCLUSION

Only IQWiG provided updated AI/ML guidance. Future NICE HTA SLR guidance could follow the direction of the NICE Guidelines development manual, recommending some AI/ML, however, guidance from other HTA bodies is still unclear.

Table 1. HTA Body Recommendations on AI/ML in SLRs

HTA body	Documents Reviewed	Reference to AI/ML	Guidance
NICE	NICE health technology evaluations: the manual 2023 (7) Developing NICE guidelines: the manual 2024 (8)	x	- The NICE Guideline development manual 2024 state: <i>“We support the use of machine classifiers if their performance characteristics are known, and if they improve efficiency in the search and screening process. However, caution is needed when using classifiers, because they may not be as effective if used on data that is different to the type of data for which they were originally developed.</i> <i>“Priority screening refers to any technique that uses a machine learning algorithm to enhance the efficiency of screening. Usually, this involves taking information on previously included or excluded papers and using this to order the unscreened papers from those most likely to be included to those least likely. This can be used to identify a higher proportion of relevant papers earlier in the screening process, or to set a cut-off for manual screening, beyond which it is unlikely that additional relevant studies will be identified”.</i> - The NICE Methods 2022/ 2023 explicitly state: <i>“More than 1 reviewer should assess all records retrieved by the search strategy to increase the validity of the decision. Clearly report the procedure for resolving disagreements between reviewers.”</i> The methods do not specify if all reviewers should be human.
HAS	Guide Methodologique Evaluation Economique HAS 2020 (10) Guide Methodologique 2013 (11)	x	The Choix méthodologiques pour l'évaluation économique à la HAS references the Cochrane Handbook as a guide for conducting systematic reviews.
IQWiG	General Methods Version 7.0 - 2023 (6)	✓	- The IQWiG General Methods 2023 states: <i>“Machine learning approaches (e.g. prioritization, application of classifiers) can be tested and used to support study selection”.</i> - The IQWiG General Methods 2023 referred to machine learning classifiers: <i>“Validated classifiers from machine learning may be used for the development of search strategies.”</i> The example given is that of randomised controlled trial classifiers. The Cochrane Handbook is referenced with respect to the databases which should be searched and as a guide for effect measures to be used.
NCPE	Guidelines for Economic Evaluation of Health Technologies 2020 (4) Guidelines for Evaluating Clinical Effectiveness of Health Technologies 2018 (12)	x	- The Guidelines for Economic Evaluation of Health Technologies in Ireland explicitly state that <i>“for best practice, two or more reviewers should be involved in the selection process...”</i> - The document does not specify whether both reviewers should be human. - The Guidelines for Evaluating Clinical Effectiveness of Health Technologies reference Cochrane as a guide for systematic reviews. - Cochrane is also referenced with respect to providing a recognised risk of bias tool but not as a tool for how to conduct a systematic review.
SMC	Guide to Submitting Companies 2022 (13)	x	- The Guidance to Submitting Companies 2022 provides only the following detail for an SLR: <i>“This involves the systematic location, appraisal and synthesis of evidence in order to obtain a reliable overview. Databases searched and literature searching strategies should be reported. There should be a clear rationale for selecting specific studies from those identified.”</i> - No specific further detail is provided on the number of reviewers or the methodology to use. - The Cochrane Handbook is referenced with respect to guidance on handling heterogeneity in indirect treatment comparisons.
TLV	Swedish Agency for Health Technology Assessment and Assessment of Social Services (SBU) Method 2023 (14)	x	The TLV use the guidance from the Swedish Academy for Health Technology Assessment and Assessment of Social Services where it is stated that <i>“Quantitative results are assessed according to GRADE principles and qualitative findings in line with GRADE CERQual.”</i>
CADTH	Procedures for Reimbursement Reviews September 2024 (15) Guidelines Economic Evaluation Health Technologies Canada 2021 (16) Other Research and Resources 2024 (17)	x	- No reference to Cochrane is made in the Procedures for Reimbursement Reviews- May 2024 document. - The external resource section of the website references the Cochrane Handbook for searching for and selection of studies. - No specific further detail is provided on the number of reviewers or the methodology to use.
PBAC	PBAC Guidelines Version 5 (18) PBAC Guidelines Appendix 2 Literature search (19)	x	PBAC state that the Cochrane Handbook is an appropriate source of guidance for conducting systematic literature reviews in “Guidelines for preparing submissions” document: <i>“The methodological standards for the conduct of new Cochrane Intervention Reviews are an appropriate source of guidance for performing a high-quality systematic literature search.”</i>

1. Borah R, Brown AW, Capers PL, Kaiser KA. Analysis of the time and workers needed to conduct systematic reviews of medical interventions using data from the PROSPERO registry. BMJ Open. 2017;7(2):e012545. 2. IQWiG. General Methods 2022 [Available from: https://www.iqwig.de/methoden/general-methods_version-6-1.pdf]. 3. NICE. NICE health technology evaluations: the manual 2022 [Available from: <https://www.nice.org.uk/process/pmg36/chapter/introduction-to-health-technology-evaluation>]. 4. HIA. Guidelines for the Economics Evaluation of Health Technologies in Ireland 2020 [Available from: <https://www.hia.ie/reports-and-publications/health-technology-assessment/guidelines-economic-evaluation-health>]. 5. Cochrane. Cochrane Handbook for Systematic Reviews of Interventions 2022 [Available from: <https://training.cochrane.org/handbook>]. 6. IQWiG. General Methods 2023 [Available from: <https://www.iqwig.de/en/about-us/methods/methods-paper/>]. 7. NICE. NICE health technology evaluations: the manual 2023 [Available from: <https://www.nice.org.uk/process/pmg36/chapter/introduction-to-health-technology-evaluation>]. 8. NICE. Developing NICE guidelines: the manual [Available from: <https://www.nice.org.uk/process/pmg20/resources/developing-nice-guidelines-the-manual-pdf-72286708700869>]. 9. Cochrane. Cochrane Handbook for Systematic Reviews of Interventions 2022 [Available from: <https://training.cochrane.org/handbook/archive/v6.4>]. 10. HAS. Choix méthodologiques pour l'évaluation économique à la HAS 2020 [Available from: https://www.has-sante.fr/upload/docs/application/pdf/2020-07/guide_methodologique_evaluation_economique_has_2020_vf.pdf]. 11. HAS. Choix méthodologiques pour le développement clinique des pansements 2013 [Available from: https://www.has-sante.fr/upload/docs/application/pdf/2013-12/guide_methodologique_17122013.pdf]. 12. HIA. Guidelines for Evaluating the Clinical Effectiveness of Health Technologies 2018 [Available from: <https://www.hia.ie/reports-and-publications/health-technology-assessment/guidelines-evaluating-clinical-effectiveness>]. 13. SMC. Guide to Submitting Companies 2022 [Available from: <https://www.scottishmedicines.org.uk/making-a-submission/>]. 14. SBU. The process of producing a systematic review 2023 [Available from: <https://www.sbu.se/en/method2/the-process-for-conducting-a-systematic-review/>]. 15. CADTH. Finding the evidence: Literature searching tools in support of systematic reviews 2024. [Available from: <https://www.cadth.ca/finding-evidence-literature-searching-tools-support-systematic-reviews-0>]. 16. CADTH. Guidelines for the Economic Evaluation of Health Technologies: Canada 2021 [Available from: <https://www.cadth.ca/literature-searching-tools/other-research-and-resources>]. 18. PBAC. Guidelines for preparing a submission to the Pharmaceutical Benefits Advisory Committee 2016 [Available from: <https://pbac.pbs.gov.au/content/information/files/pbac-guidelines-version-5.pdf>]. 19. PBAC. Appendix 2 Literature search methods 2016 [Available from: <https://pbac.pbs.gov.au/appendices/appendix-2-literature-search-methods.html>].

ISPOR EUROPE, SPAIN - BARCELONA 2024

Copyright © 2024 IQVIA. All rights reserved.