

Davies, Sarah, Miller, Paul K. ORCID: <https://orcid.org/0000-0002-5611-1354>
and Donovan, Tim ORCID: <https://orcid.org/0000-0003-4112-861X> (2024)
Evaluating human-AI interaction in the detection of lung, breast and colorectal cancers: a systematic scoping literature review. In: UK Imaging and Oncology Congress 2024 (UKIO 2024): Vision and values: Putting people first, 10-12 June 2024, Liverpool ACC, UK. (Unpublished)

Downloaded from: <http://insight.cumbria.ac.uk/id/eprint/7581/>

Usage of any items from the University of Cumbria's institutional repository 'Insight' must conform to the following fair usage guidelines.

Any item and its associated metadata held in the University of Cumbria's institutional repository Insight (unless stated otherwise on the metadata record) may be copied, displayed or performed, and stored in line with the JISC fair dealing guidelines (available [here](#)) for educational and not-for-profit activities

provided that

- the authors, title and full bibliographic details of the item are cited clearly when any part of the work is referred to verbally or in the written form
 - a hyperlink/URL to the original Insight record of that item is included in any citations of the work
- the content is not changed in any way
- all files required for usage of the item are kept together with the main item file.

You may not

- sell any part of an item
- refer to any part of an item without citation
- amend any item or contextualise it in a way that will impugn the creator's reputation
- remove or alter the copyright statement on an item.

The full policy can be found [here](#).

Alternatively contact the University of Cumbria Repository Editor by emailing insight@cumbria.ac.uk.

Evaluating human-AI interaction in the detection of lung, breast and colorectal cancers: A systematic scoping literature review

Sarah Davies, Paul K. Miller & Tim Donovan

Institute of Health, University of Cumbria, UK

UK Imaging and Oncology Congress, Liverpool ACC, 10th to 12th June 2024.

Abstract

Background: In forthcoming years, Artificial Intelligence (AI) will become an increasingly integral part of medical imaging practice, and automated image interpretation, including Computer-Aided Detection (CADe), represents a particularly significant application of AI within this domain. It is, therefore, imperative that diagnostic radiographers develop an understanding of the role, value and potential pitfalls of using AI in medical image interpretation. Consequently, this paper reports findings from a systematic scoping literature review of studies addressing human-AI interaction in the detection of lung, breast and colorectal cancers.

Method: The Cochrane Central Register of Controlled Trials, PubMed and ScienceDirect were used to locate CADe observer performance studies in three reading paradigms: second-reader, concurrent and interactive. Conversant experimental studies were also retrieved. Key findings from a total of N=46 articles were extracted and organised according to reading paradigm and imaging modality.

Results: Aggregated evidence indicated that concurrent and second-reader CADe systems improved observer sensitivity, particularly among less experienced observers,

but could also deleteriously affect attention allocation. Interactive CADe systems demonstrated a weaker impact upon observer sensitivity, though a smaller number of studies was available for analysis. Evidence also indicated that observer performance with CADe could be influenced by prompt design, level of participant expertise, lesion size and number of CAD false positives.

Conclusions: Concurrent and second-reader paradigms have equivalent potential to improve observer performance, though concurrent CADe is more time-efficient; an important consideration in practical clinical terms. Further research is needed to comprehensively understand the value of interactive CADe, particularly in volumetric imaging.