

CADTH RAPID RESPONSE REPORT: REFERENCE LIST

Digital Radiography versus Computed Radiography: Comparative Diagnostic Accuracy, Clinical Utility, Safety, and Guidelines

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Research Questions

1. What is the comparative diagnostic accuracy of digital radiography versus computed radiography for the diagnosis of any medical condition?
2. What is the comparative clinical utility of digital radiography versus computed radiography for individuals with any medical condition?
3. What is the comparative safety of digital radiography versus computed radiography for patients receiving imaging and for staff operating the equipment?
4. What are the evidence-based guidelines regarding the replacement of digital radiography and computed radiography systems?

Key Findings

One non-randomized study was identified regarding the comparative diagnostic accuracy of digital radiography versus computed radiography for the diagnosis of any medical condition. One non-randomized study was identified regarding the comparative clinical utility of digital radiography versus computed radiography for individuals with any medical condition. One non-randomized study was identified regarding the comparative safety of digital radiography versus computed radiography for patients receiving imaging and for staff operating the equipment. No evidence-based guidelines were identified regarding the replacement of digital radiography and computed radiography systems.

Methods

Literature Search Methods

A limited literature search was conducted by an information specialist on key resources including Medline and EMBASE via OVID, CINAHL via EBSCO, the Cochrane Library, the University of York Centre for Reviews and Dissemination (CRD) databases, the websites of Canadian and major international health technology agencies, as well as a focused internet search. The search strategy was comprised of both controlled vocabulary, such as the National Library of Medicine's MeSH (Medical Subject Headings), and keywords. The main search concepts were digital and computed radiography. No filters were applied to limit the retrieval by study type for questions #1-3. A guidelines filter was added to question #4. The search was also limited to English language documents published between January 1, 2015 and September 24, 2020. Internet links are provided, where available.

Selection Criteria and Summary Methods

One reviewer screened literature search results (titles and abstracts) and selected publications according to the inclusion criteria presented in Table 1. Full texts of study publications were not reviewed. Open access full-text versions of evidence-based guidelines were reviewed when abstracts were not available.

Table 1: Selection Criteria

Population	Q1-Q4: Individuals (all ages) with any medical condition Q3: Health care providers
Intervention	Digital radiography

Comparator	Computed radiography
Reference standard	Q1: Any reference standard depending on the medical condition Q2-Q4: Not applicable
Outcomes	Q1: Diagnostic accuracy (e.g., sensitivity, specificity, positive predictive value, negative predictive value) Q2: Clinical utility (e.g., quality of life, time to treatment, ability to diagnose) Q3: Patient safety (e.g., dose of radiation exposure); staff safety (e.g., incidence of repetitive strain injury) Q4: Recommendations regarding how and when equipment should be replaced
Study Designs	Health technology assessments, systematic reviews, randomized controlled trials, non-randomized studies, evidence-based guidelines

Results

One non-randomized study¹ was identified regarding the comparative diagnostic accuracy of digital radiography versus computed radiography for individuals with any medical condition. One non-randomized study³ was identified regarding the comparative clinical utility of digital radiography versus computed radiography for individuals with any medical condition. One non-randomized study² was identified regarding the comparative safety of digital radiography versus computed radiography for patients receiving imaging and for staff operating the equipment. No relevant health technology assessments, systematic reviews, or randomized controlled trials were identified. Furthermore, no evidence-based guidelines were identified regarding the replacement of digital radiography and computed radiography systems.

Additional references of potential interest that did not meet the inclusion criteria are provided in the appendix.

References Summarized

Health Technology Assessments

No literature identified.

Systematic Reviews and Meta-Analyses

No literature identified.

Randomized Controlled Trials

No literature identified.

Non-Randomized Studies

1. Hong S, Song SY, Park B, et al. Effect of digital mammography for breast cancer screening: a comparative study of more than 8 million Korean women. *Radiology*. 2020 Feb;294(2):247-255.
[PubMed: PM31793847](#)
2. Teferi S, Zewdeneh D. Variation of pediatric doses undergoing digital and computed radiography examination in Addis Ababa, Ethiopia. *Ethiop*. 2020 Mar;30(2):269-276.
[PubMed: PM32165817](#)
3. Timmermans L, Bleyen L, Bacher K, et al. Screen-detected versus interval cancers: Effect of imaging modality and breast density in the Flemish Breast Cancer Screening Programme. *Eur Radiol*. 2017 Sep;27(9):3810-3819.
[PubMed: PM28289944](#)

Guidelines and Recommendations

No literature identified.

Appendix — Further Information

Previous CADTH Report

4. Topfer LA, de Léséleuc L. Diagnostic imaging equipment replacement and upgrade [CADTH environmental scan, issue no. 56]. Ottawa (ON): CADTH; 2016 Mar: https://www.cadth.ca/sites/default/files/pdf/ES0303_DI_Equipment_Replacement_es_e.pdf Accessed 2020 Sep 29.

Non-Randomized Studies

Unclear Intervention

5. Ozcete E, Boydak B, Ersel M, Kiyani S, Uz I, Cevrim O. Comparison of conventional radiography and digital computerized radiography in patients presenting to emergency department. *Turk J Emerg Med.* 2015 Mar;15(1):8-12. [PubMed:PM27331189](https://pubmed.ncbi.nlm.nih.gov/27331189/)

Alternative Comparators

6. Prummel MV, Muradali D, Shumak R, et al. Digital compared with screen-film mammography: measures of diagnostic accuracy among women screened in the Ontario Breast Screening Program. *Radiology.* 2016 Feb;278(2):365-373. [PubMed:PM26334680](https://pubmed.ncbi.nlm.nih.gov/26334680/)
7. Théberge I, Vandal N, Langlois A, Pelletier É, Brisson J. Detection rate, recall rate, and positive predictive value of digital compared to screen-film mammography in the Quebec Population-Based Breast Cancer Screening Program. *Can Assoc Radiol J.* 2016 Nov;67(4):330-338. [PubMed:PM27451910](https://pubmed.ncbi.nlm.nih.gov/27451910/)

Alternative Outcomes

8. Brydon M, Kephart G, Payne JI, Blake J. Transitioning to full field digital mammography in Nova Scotia: using interrupted time series methods to study the impact of technology change on mammography volumes. *J Med Imaging Radiat Sci.* 2020;51(2):227-234. <https://www.sciencedirect.com/science/article/pii/S1939865420300369> Accessed 2020 Sep 29
9. Mackenzie A, Warren LM, Wallis MG, et al. Breast cancer detection rates using four different types of mammography detectors. *Eur Radiol.* 2016 Mar;26(3):874-883. [PubMed:PM26105023](https://pubmed.ncbi.nlm.nih.gov/26105023/)
10. Taylor N. The art of rejection: Comparative analysis between Computed Radiography (CR) and Digital Radiography (DR) workstations in the Accident & Emergency and General radiology departments at a district general hospital using customised and standardized reject. *Radiography.* 2015 Aug;21(3):236-241. <https://www.sciencedirect.com/science/article/pii/S1078817414001564> Accessed 2020 Sep 29.

Unclear Outcomes

11. Elbakkoush AA, Atique S, Chiang IJ. Screening mammography efficacy: a Comparison between screen-film, computed radiography and digital mammography in Taiwan. *Stud Health Technol Inform.* 2015;216:914.
[PubMed: PM26262216](#)

Review Article

12. Oberle R. Radiation exposure in the NICU: computed radiography versus digital detector radiography. *Radiol Manage.* 2015 Jan-Feb;37(1):38-42.
[PubMed: PM26710555](#)

Additional Reference

13. NHS England and NHS Improvement Transforming imaging services in England: a national strategy for imaging networks London, England: National Health Service (NHS) 2019,Nov
https://improvement.nhs.uk/documents/6119/Transforming_imaging_services.pdf
Accessed 2020 Sep 29.
See *section*: 1.4 Equipment, p12-13.