

# Abbreviated Breast MRI – A Systematic Review

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## BACKGROUND

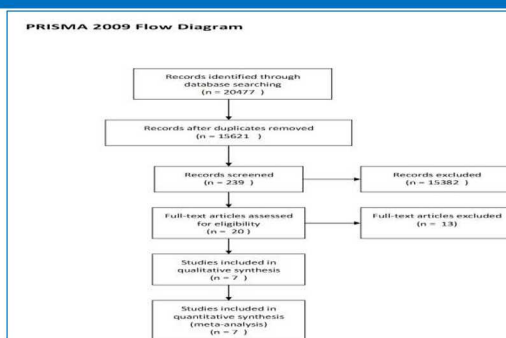
The goal of the NHSBSP mammographic breast screening programme is to reduce mortality from breast cancer. However there is a continued incidence of stage 2-4 breast cancers, and interval cancers occur at a rate of 20-30% in women of screening age. Breast cancer is a biologically heterogeneous disease which has implications for the sensitivity profile of imaging markers. Contrast enhanced MRI is an imaging marker that detects cancers based upon angiogenic and protease properties directly reflecting carcinogenesis, cell proliferation and aggressiveness. Christiane Kuhl first proposed an abbreviated protocol (AP) MRI for breast cancer screening that consisted of a single pre and post contrast acquisition and the derived images (First Post Contrast Subtracted FAST and Maximum Intensity Projection MIP).

## OBJECTIVES SYSTEMATIC REVIEW

- 1) Evaluate the current evidence as to whether an AP MRI containing the FAST sequences is an effective alternative to the full protocol (FP) MRI to detect breast cancer in a screening setting.
- 2) Establish whether there are any published articles that compared the performance of AP MRI with any mammographic modality to detect breast cancer.

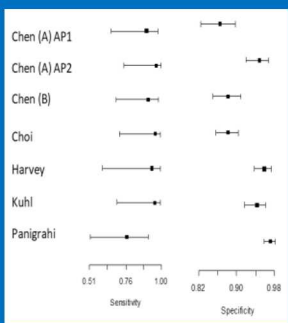
## METHODOLOGY

- Comprehensive literature search February 2018
- Keywords- Breast, MRI, Screening, Abbreviated (all variations)
- Online databases – Ovid, Cochrane Central Register of Controlled Trials, Cochrane database of Systematic Reviews
- Limited to studies published in English after 2000
- Title/abstract screening - single author
- Full paper review - 2 authors
- Only included studies where the AP MRI incorporated the FAST sequences and were performed in the screening setting.

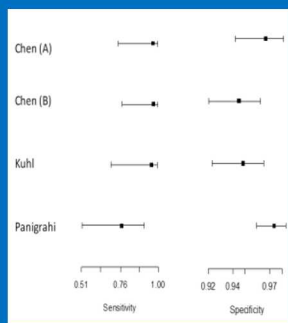


## RESULTS/META-ANALYSIS

A total of 7 studies were included in the review, these exhibited a wide geographical variation including Europe, North America, Australia and Asia. All studies were performed between 2009 and 2016 and published between 2014 and 2018. The review incorporates 3844 women and 4447 MRI studies with a total of 84 cancers detected.



Forest plot for sensitivity and specificity for each study (using continuity correction) for AP MRI



Forest plot for sensitivity and specificity for each study (using continuity correction) for FP MRI

- The overall sensitivity was estimated as 89.7 (95% CI 79.8-95.1) and the specificity as 93.1% (95% CI 89.1-95.6) for the AP, which gave an area under the receiver operator curve of 95.6.
- The overall sensitivity was estimated as 92.9 (95% CI 74.9-98.3) and the specificity as 95.9% (95% CI 94.1-97.2) for the FP, which gave an area under the receiver operator curve of 97.7.
- The sensitivities for the AP did not significantly differ from those for the FP ( $p=0.91$ ) or the specificities ( $p=0.07$ ).
- The summary receiver operator curve for the FP is higher than that for the AP but their associated confidence regions overlap; suggesting that using an AP would not be significantly worse than using the FP.

- No currently published articles offering a direct comparison of abbreviated MRI Vs Mammography
- No currently published articles comparing the performance of abbreviated MRI with Tomosynthesis or Contrast Enhanced Spectral Mammography (CESM)

## CONCLUSION

This systematic review demonstrates a gap in our current knowledge as to whether abbreviated breast MRI could outperform mammograms for cancer detection in breast cancer screening.

## REFERENCES

- Chen et al. Abbreviated MRI Protocols for Detecting Breast Cancer in Women with Dense Breasts. *Korean J Radiol* 2017;18(3):470-475.  
 Chen et al. Application of Abbreviated Protocol of Magnetic Resonance Imaging for Breast Cancer Screening in Dense Breast Tissue. *Acad Radiol* 2017;24:316-320  
 Choi et al. Usefulness of abbreviated breast MRI screening for women with a history of breast cancer surgery. *Breast Cancer Res Treat* 2018;167:495-502  
 Harvey et al. An Abbreviated Protocol for High-Risk Screening Breast MRI Saves Time and Resources. *J Am Coll Radiol* 2016;13:374-380  
 Jain et al. FAST MRI breast screening revisited. *Journal of Medical Imaging and Radiation Oncology* 2017;61:24-28  
 Kuhl et al. Abbreviated Breast Magnetic Resonance Imaging (MRI): First Postcontrast Subtracted Images and Maximum-Intensity Projection—A Novel Approach to Breast Cancer Screening With MRI. *J Clin Oncol*. 2014 Aug 1;32(22):2304-10  
 Panigrahi et al. An Abbreviated Protocol for High Risk Screening Breast Magnetic Resonance Imaging: Impact on Performance Metrics and BI-RADS Assessment. *Acad Radiol* 2017;24:1132-1138