



<b>Title</b>	<b>Impact of Computer-placed Prompts on Sensitivity and Specificity With Different Groups of Mammographic Film Readers</b>
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<b>Reference</b>	Health Technol Assess 2005;9(06). Feb 2005. <a href="http://www.ncchta.org/execsumm/summ906.htm">www.ncchta.org/execsumm/summ906.htm</a>

## Aim

To determine whether computer aided detection (CAD) tools could improve the efficiency of the breast cancer screening program. Two studies used selected sets of mammograms with known outcomes to assess the impact of the R2 ImageChecker (the current market leader for CAD tools) on the sensitivity and specificity of film readers.

## Conclusions and results

Main outcome measures were the mean sensitivity and specificity of film readers in two conditions: prompted (with CAD) or unprompted (without CAD). One analysis was done for sensitivity, another for specificity. For Study 1, mean sensitivity was 0.78 in both conditions ( $p=1.0$ ) and mean specificity was 0.82 unprompted and 0.81 prompted ( $p=0.4$ ). Hence, there is no evidence that CAD affected readers' sensitivities or specificities. The study was sufficiently powered to detect differences of less than 0.1 in sensitivity or specificity. The analyses for Study 2 were similar. Sensitivity is improved in the prompted condition (0.81 from 0.78), but the difference is not significant ( $p=0.10$ ). Specificity is also improved (0.87 from 0.86); again the difference is not significant.

Economic analysis showed increased costs for computer prompting (an additional cost of £5209 per 1000 women screened compared to non-prompted) due to greater equipment costs, and no significant savings in terms of reading or assessment costs. Improvements in sensitivity and specificity are small and uncertain.

The relative cost effectiveness of computer prompting can be judged by comparing the cost per cancer detected of computer prompting with the cost per cancer detected estimated in other breast screening studies in the UK. Comparing the previous estimates of cost per cancer detected with the results from this study shows that computer prompting has a higher cost per additional cancer detected (ranging from £23 269 for study 1 to £80 587 for single reading [one radiologist with CAD] compared to double reading [1 radiologist and 1 radiographer]) than previous studies (ranging from £2168 to

£7993 per additional cancer detected). The number of additional cancers detected with computer prompting is much lower than the number detected in previous studies, as reflected in the high cost per cancer detected.

## Recommendations

Similar studies have assessed CAD with varying results. Our evaluation is the largest of its kind and our conclusions are likely to be robust. Prospective (but uncontrolled) trials have been published and tend to report an impact from CAD. While we recognize the limitations of studies (such as ours) based on test rollers, the methodology used in prospective trials fails to distinguish between the impact of the prompts and that of a second look at the image. Current implementations of CAD are unlikely to impact significantly on readers' decision making.

## Methods

In Study 1, 50 film readers read test sets with 180 cases, whereof 60 were cancers (40 screen detected cancers and prior films from 20 false negative interval cancers). Participants viewed all cases, both with and without CAD. The second study tested the hypothesis that improved sensitivity due to CAD could be detected using a specially selected set of cases. In this study, 35 readers read 120 cases including 40 cancers selected to meet 2 criteria: correctly prompted by the R2 ImageChecker and previously missed by a film reader. The procedure for reading films was the same as in Study 1.

## Further research/reviews required

The NHS should consider the approach it takes toward assessing technologies such as CAD. A fuller understanding of the impact of the prompting system requires a study of a very different type. We are conducting a prospective study with a larger group of radiologists and radiographers using double reading in a UK screening program. We believe that existing funding mechanisms for HTA seem inappropriate for rapidly changing technologies. In the case of CAD, the obvious approach would be to fund evaluations directly via NHSBSA.