THE UNIVERSITY OF

WARWICK

Original citation:
Kunar, Melina A., Watson, Derrick G. and Taylor-Phillips, Sian (2016) The low prevalence effect in mammograms : computer aided detection both benefits and impairs visual search for cancers. In: Experimental Psychology Society (EPS), Durham, 6-8 Apr 2016
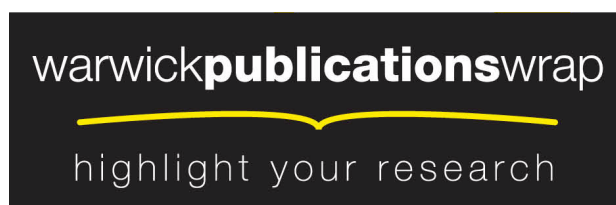
Permanent WRAP url:
http://wrap.warwick.ac.uk/77715

warwickpublicationswrap

highlight your research

http://wrap.warwick.ac.uk/

The Low Prevalence Effect in Mammograms: Computer Aided Detection Both Benefits and Impairs Visual Search for Cancers

Melina Kunar, Derrick Watson & Sian Taylor-Phillips

Previous research has shown that, in visual search, people miss a high proportion of targets when they only appear rarely (Wolfe et al., 2005). This 'Low Prevalence' (LP) effect is alarming as it highlights the high miss errors that could potentially occur in real world search (e.g., radiologists searching mammograms for low prevalence cancers). Recent research has focussed on trying to understand and combat this LP effect. However, this research has mostly used visual search displays consisting of letter stimuli (e.g. search for Ts among Ls), thus it remains unknown whether the LP effect occurs in more realistic mammogram displays. We examine this further. Experiment 1 replicated the LP effect using mammograms containing simulated cancers. The results showed that observers missed more cancers under LP conditions compared to when the target had a high prevalence. Experiment 2 examined the influence of Computer Aided Detection (CAD) to help observers find cancers. CAD is a diagnostic tool that prompts observers to 'suspicious' areas which may contain a cancer. The results showed that if CAD correctly identified a cancer, miss errors were reduced. However if CAD failed to highlight a cancer, miss errors were increased in comparison to a no CAD baseline.

Reference:

Wolfe, J. M., Horowitz, T. S., & Kenner, N. M. (2005). Rare items often missed in visual search. *Nature , 435*, 439-440.