

Australian Breast Reader Assessment Strategy on mammographic improves radiologists' test reading performance

Wasfi I Suleiman PhD, Mohammad A Rawashdeh PhD, Sarah J Lewis PhD, Mark F McEntee PhD, Warwick Lee MD, Kriscia Tapia, and Patrick C Brennan PhD

Background

Error and variability in mammography interpretation are frequently reported, however, factors responsible for these are unclear. It is important to explore parameters that impact upon performance as well as ways of improving performance and reducing inter-reader variability. To provide feedback on performance, and explore parameter to reduce error in mammography interpretation, Breast Reader Assessment Strategy (BREAST) was established in Australia in 2009. BREAST was designed to complement existing BreastScreen Australia quality assurance and quality improvement activities. This work aims to assess whether radiologists who regularly undertake the Breast Reader Assessment Strategy (BREAST) demonstrate improvement in performance over time.

Materials and Methods

Fourteen Royal Australian and New Zealand College of Radiology (RANZCR) radiologists independently assessed a year-specific BREAST mammographic test-set in each of the years, 2011, 2012 and 2013. The mean sensitivity, specificity, location sensitivity, JAFROC FOM and inferred ROC AUC were calculated and compared.

Results

Significant increases were noted in mean sensitivity ($p = 0.01$), specificity ($p = 0.01$), location sensitivity ($p = 0.001$), JAFROC FOM ($p = 0.001$) and ROC AUC ($p = 0.001$) between 2011 and 2012. There were also increases in mean sensitivity ($p = 0.002$), specificity ($p = 0.001$), location sensitivity ($p = 0.001$), JAFROC FOM ($p = 0.001$) and ROC AUC ($p = 0.001$) between 2011 and 2013.

Conclusion

These findings demonstrate that regardless of experience, radiologists who undertake the BREAST programme demonstrate significant improvements in test-set performance during a 3-year period. BREAST show great promise and demonstrates that carefully constructed test-sets for education can improve lesion detection with Digital Mammography in test-set conditions.