The Diagnostic Accuracy of Reporting Radiographer Chest X-ray Interpretations and their Influence on Clinicians' Diagnostic Decision-Making: A Comparison with Consultant Radiologists

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Abstract

Background: Diagnostic imaging plays an expanding and central role in patients' medical care. Radiographer clinical reporting is being increasingly used in patient focused services. There is a paucity of research that has examined radiographer chest X-ray reporting.

Aim: To determine the diagnostic accuracy of reporting radiographer chest X-ray (CXR) reporting and the influence that CXR reports have on clinicians' diagnostic decision-making.

Method: A quasi-experimental study determined the diagnostic accuracy of a cohort of reporting radiographers in CXR interpretation, using a free-response methodology. The influence of CXR reports on clinicians' diagnostic decision-making was determined with a cohort study. A non-inferiority approach was used, in line with Royal College of Radiologists and College of Radiographers guidance that reporting radiographers must be comparable to consultant radiologists.

Results: The diagnostic accuracy of reporting radiographers (RR) was non-inferior to consultant radiologists (CR) for all measures, all $p<0.0001$; unweighted JAFROC (RR Figure of Merit [FoM]=0.828, 95%CI 0.808–0.847; CR FoM=0.788, 95%CI 0.766–0.811), weighted JAFROC (RR FoM=0.830, 95%CI 0.811–0.849; CR FoM=0.786, 95%CI 0.764–0.808) and inferred ROC (RR Area Under the Curve [AUC]=0.909, 95%CI 0.887–0.931; CR AUC=0.903, 95%CI 0.882–0.924). No difference was found in the number of CXR reports that produced a correct most likely and/or most serious diagnosis (RR 876 of 1337 cases; CR 810 of 1368; $p=0.103$). Uncorrected most likely diagnostic confidence (RR 72.5 to 80.2; CR 71.0 to 80.4) and uncorrected most serious diagnostic confidence (RR 34.0 to 41.9; CR 33.5 to 39.2) of reporting radiographer CXR reports was non-inferior to consultant radiologists ($p<0.001$). Corrected most likely diagnostic confidence, calculated using the Tsushima methodology, was lower (RR 4.61; CR 5.02) with no apparent difference, but non-inferiority was not confirmed ($p>0.05$).

Conclusion: With appropriate postgraduate education, reporting radiographers are able to interpret chest X-rays at a level comparable to consultant radiologists.

Lay Abstract

Background: Diagnostic imaging plays an expanding and central role in patients' medical care. Radiographer clinical reporting is being increasingly used in patient focused services. There is a paucity of research that has examined radiographer chest X-ray reporting.

Aim: To determine the accuracy of reporting radiographer chest X-ray (CXR) reading and how doctors use different chest X-ray reports in patient care.

Method: One study established the accuracy of chest X-ray interpretation of a group of reporting radiographers. A second study explored the influence that chest X-ray reports had on a group of doctors who use chest X-ray reports when treating patients. The study designs enabled direct comparison with consultant radiologists, to ensure the radiographers were safe practitioners.

Results: The group of reporting radiographers had similar accuracy to the consultant radiologists when reading chest X-rays, and this was statistically significant. The chest X-ray reports of consultant radiologists and reporting radiographers were used in comparable ways by doctors. Some aspects, for example the number of correct diagnoses, were statistically significant. Other measures, for example corrected diagnostic confidence, were broadly equal between the two groups but not statistically significant.

Conclusion: With appropriate postgraduate education, reporting radiographers are able to interpret chest X-rays at a level comparable to consultant radiologists.