CoRIPS Research Award 086

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Establishing the diagnostic accuracy of radiographer chest x-ray reports and their influence on clinicians’ clinical reasoning: A comparison with consultant radiologists

Awarded £9720

Lay Summary
It is essential that x-rays reports are accurate to help provide a correct diagnosis. It is not known whether clinicians view an x-ray report differently depending on whether it has been issued by a radiographer (non-medical practitioner) or by a consultant radiologist (medical practitioner), and if the report source influences their clinical diagnosis and reasoning.

This study will compare the accuracy of radiographers’ and radiologists’ chest x-ray reports, and investigate whether the origin of x-ray reports - radiographer or radiologist - influences clinicians’ reasoning and their decisions for regarding patient diagnosis.

Description of the project:
(a) Principal Aim
To demonstrate the accuracy of chest x-ray (CXR) reporting and whether the influence of a CXR report on clinicians’ diagnosis and treatment decisions in affected by the source of the report.

(b) Primary Research Question
In the context of reports produced for hospital based adult patients, are the chest x-ray reports produced by reporting radiographers equivalent in accuracy and influence on clinicians clinical reasoning to those produced by consultant radiologists?

(c) Secondary Research Questions
Phase 1: What is the accuracy of reporting radiographer (RR) and consultant radiologist (CR) interpretations of adult chest x-rays (CXR) from hospital based patients in a simulated environment using two independent chest CRs in agreement as the reference standard?

Phase 2: Is there any clinically significant difference between the influence that radiographer and radiologist CXR reports on hospital based patients have on clinicians’ clinical reasoning and decision-making in a simulated environment?

(d) Outcomes
Phase 1 Diagnostic Accuracy: Relative accuracy of RR & CR CXR interpretation, using sensitivity, specificity and area under the curve (AUC) of receiver operator characteristic (ROC) curves.

Phase 2 Influence on Diagnosis: Difference in proportion of RR and CR reports that have an influence on the clinical reasoning, using changes in diagnostic confidence.

(e) Review of literature and identification of current knowledge gaps
Government targets, person-centred care, developing technology and an aging population have resulted in an unprecedented rise in imaging workload (1-4). In response to these increasing demands trained radiographers now undertake image interpretation (5,6). There is limited high quality research underpinning the benefit of many radiological investigations despite the considerable cost burden that many of these procedures bear (7). It is also not clear whether a CR or RR-derived report influences clinical decisions.

Image interpretation is a subjective task (8), and studies demonstrate significant variation in x-ray interpretation between radiologists (9-17). While the evidence for the accuracy of trained radiographers reporting skeletal radiographs is definitive (1), there has been little work comparing the accuracy of practising RRs to CRs in CXR interpretation (18,19).

Radiology investigations are frequently used by clinicians to reduce uncertainty by providing additional information (20,21). Studies have examined the role of other imaging modalities (22-28), however there is limited work examining the impact of chest x-ray reports. The major work examining the influence of x-rays, conducted 35 years ago in the United States, confirmed that radiology reports influence clinicians’ diagnostic thinking. In this study CXR reports produced by CRs were found to lead to a new most important diagnosis in 50% of cases in an A&E setting (29).

Only one study examined the impact that incorrect radiographer skeletal reports had on patient management, reporting that patient care was more negatively influenced by incorrect CR reports (30). There appears to be no work examining the influence of RR CXR reports on clinicians’ clinical decision-making.

If RRs are shown to interpret CXR with comparable accuracy to CRs, and there is no clinically significant difference in the influence that these reports have on clinicians’ clinical decision-making, RRs could provide an additional reporting resource to the NHS in an efficient and effective way. This could increase the volume and timeliness of reporting, enable streamlined patient pathways and improved patient care, while maximising the limited resources available.

This research will form part of the work submitted for the award of PhD.

(f) Methodology & Methods
   i. Methodology
A quasi-experimental approach will be used for both phases of the research programme. The diagnostic accuracy study (Phase 1) has been constructed using the Standards for Reporting Diagnostic accuracy (STARD) framework (31), incorporating the suggestions of Brealey & Scally (8). Methodological issues identified in the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE)(32) statement and the Consolidated Standards of Reporting Trials.
References:


