

**Efficacy, utility, and validity in Computed Tomography
head reporting by radiographers**

by

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Abstract

Introduction: Demand for Computed Tomography (CT) head imaging has increased exponentially within the National Health Service (NHS) coinciding with a limited consultant radiologist workforce, resulting in time-critical CT reporting delays for patients. The safety and effectiveness of the NHS improvement initiative increasing reporting capacity with radiographers is not yet established.

Aim: To establish the diagnostic accuracy (efficacy) of trained radiographers reporting CT head examinations; their role in the patient pathway (clinical utility); beneficial outcomes of radiographers' reports (validity); and an economic assessment of the role.

Methods: A literature review using validated critique frameworks assessing methodological quality (QUADAS-2, CASP, CHEERS) and reporting (STARD, StaRI) of radiographers reporting CT head examinations studies established the 'knowledge gap' in evidence and requirement for research rigour. A further literature review identified an efficacy framework to structure the pragmatic mixed-method research strategy. Seven studies assessed diagnostic accuracy, radiographers' roles within the NHS, and economic evaluation, against the same frameworks to demonstrate research rigour.

Results: Radiographers trained to report CT head scans demonstrated an efficacy level (AUC 0.98) equivalent to consultant radiologists. Radiographers communicated actionable reports and advice to multidisciplinary teams aiding clinician's decisions including medical interventions and surgical referral evidencing clinical utility. Cross-sectional surveys demonstrated radiographers' scope of practice included all referral pathways of trauma, health screening, disease diagnosis, staging, and monitoring treatment, and patient groups. The role was cost-effective (up to £328,865 per annum, per radiographer) and contributed a cost-benefit, attesting to the validity of the role within the patient pathway and healthcare system.

Conclusion: Novel findings evidence trained CT head reporting radiographers' efficacy is equivalent to radiologists, with beneficial impact for service design and delivery of expanding the workforce safely to potentially reduce reporting delays. An emerging theme from the findings underscores the need for robust study design to generate translational evidence for clinical practice.
