An economic evaluation of introducing a skills mix approach to CT head reporting in clinical practice

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Key words

Role development, Computed Tomography, NHS financial climate, reporting radiographer, consultant radiologist.

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Abstract

Background: Computed Tomography (CT) head examinations are a common diagnostic examination in National Health Service (NHS) acute hospital trusts. Current NHS England and Royal College of Radiologist (RCR) reports estimate the year on year increase of examinations to be 10%, with the designated workforce of radiologists disproportionate to the increase in demand of imaging reporting.

Objective: To determine an economic evaluation of cost, risk and feasibility of introducing skills mix CT head reporting by radiographers.

Design: Applying a PICO framework study to evaluate the patient workflow demand from retrospective audit data of CT head examination attendance (*n*=7,266) at an acute NHS district general hospital (DGH) to model an example workflow demand over 12 months. Reviewing potential outcome risk data (diagnostic thresholds), and feasibility (workforce capacity) of both interventions. The economic evaluation calculated hourly unit costs for comparison estimation of consultant radiologists and reporting radiographers using Netten et al's Ready Reckoner. Report unit costs were calculated utilising the Gishen's Ready Reckoner to estimate the uninterrupted time of reporting a non-complex CT report using RCR, Centre for Workforce Intelligence (CfWI) and Department of Health (DoH) estimates for both interventions.

Conclusions: The economic evaluation of introducing a skills mix reporting service model to the benefit of service delivery with the NHS has shown a potential £299,359-£124,514 per annum cost saving using a generic acute DGH workload model. Research into recorded discrepancy/error audit data for potential detrimental risk to patient outcomes identified a paucity of evidence, and recommends further research is needed.

Abstract word count 249

Highlights

- There was 5.2 million CT scans from April 2013 to March 2014 in the UK
- In 2015 the RCR estimated there were up to 3,693 unreported CT scans
- Comparison of workforce, reference standards, unit costs and risk
- The use radiographers to report CT heads has a potential for cost savings

Introduction

The National Health Service (NHS) England released the Five Year Forward View[1] in 2014 to consider possible future changes that could be implemented to improve the NHS. The recommendations are hoped to increase patient outcomes and satisfaction, and decrease service delays, with an emphasis on investment for local service changes. In radiology early models of skills mix working have emerged in service improvements projects but the Five Year Forward View[1] sees reshaping delivery of our services must include system efficiencies to reduce poor services, and backlogs.

The two key driving factors for change have been a flexible response to workforce shortages [2,3,4,5,6,7,8], and demand for imaging that outstrips capacity[9,10,11]. With 22 million people attending accident and emergency departments every year (3,500 more patients attending every day compared to five years ago[1]), systemic change in practice to cope with demand is a necessity. The NHS Imaging and Radiodiagnostic activity 2013/14 report[9] findings estimated the number of computed tomography (CT) examinations from April 2013 to March 2014 were 5.2 million, with a 10% growth of examinations from the previous year[9], an increase of 43.1% over five years[12], and 160% increase over a 10 year period[9]. The Centre for Workforce Intelligence (CfWI)[10] expect the overall demand for imaging to increase driven by many factors including growing/aging populations, increase in cancer diagnosis and chronic illness, screening programmes, 24/7 working hours, and future imaging techniques introduced into clinical practice.

The fifth Royal College of Radiologists (RCR) Workforce Report 2012[3], recorded the number of united kingdom (UK) registered radiologists as 2,997 (4.7 working time equivalent consultant radiologist per 100,000 population in the UK), with a current deficit of 283 unfilled posts in the UK and a predicted 17% retirement rate in the next 5 years.

The RCR[13] recommend a formal report for diagnostic examinations within 2 days, but acknowledge through workforce shortages that this is not occurring[12], causing delays in cancer and serious illness diagnosis, hospital stay and the subsequent increased registration of radiology departments to NHS risk registers[13]. In October 2014 a RCR survey[13] highlighted a month delay in results in the 25% of NHS trusts surveyed, this survey was repeated in February 2015 with 71% of surveyed trusts having delays of more than a month, with over 2,883 unreported CT scans, estimated for all trusts to be up to 3,693[13].

Current Health and Care Professions Council (HCPC)[14] estimates there are 29,711 radiographers registered within the UK, which is an increase above the predicted radiographer workforce by the CFWI[15] of 19,830. A study by Clarke et al[16] showed that two UK universities in 10 years had trained 114 radiographers to report CT heads, and it is known at least 9 UK universities have run CT head reporting courses for radiographers. The last survey by the Society and College of Radiographers (SCoR) of radiographic practice in 2012[17], recorded at least 17 UK hospitals had started using CT head reporting by radiographers. With the SCoR promoting the national CT head reporting special interest group (CTSIG) Scheme of work[18] to report examinations from a wide scope of referral sources including accident and emergency, inpatient, outpatient and general practitioner requests.

Methodology

In order to define the perspective of the study, and the key drivers of cost effectiveness (capacity and demand, benefits and risks) a PICO framework was adopted. Comprising of P = the patients having CT head imaging; I = Intervention of radiographers reporting of CT head examinations; C = comparison to existing intervention of radiologists; O = outcome comparison of current and alternative service provision through costs, savings, and risk outcomes.

The study received university research ethical and governance approval to calculate a deterministic scenario based upon costs and risks of the current and new intervention of reporting against data from a retrospective audit of CT examination attendance at an acute NHS district general hospital (DGH) and national tariffs. Using a defined time horizon of 12 months (Table 1), identified the key resource demand for CT examinations (*n*=19,578), and in particular CT head examinations (*n*=7,266).

Decision tree modelling illustrated the process mapping of the current intervention (Table 2), allowing evaluation of costs and outcomes from each intervention for internal validity. Applying the audit data allowed external validation of the model as an example of workflow demand in a generic DGH. A decision tree was chosen over conventional Markov models as data for chronic returning patients was not available to consider all feasible transitions of patient's health states or cohorts of particular disease categorised patients.

Patient group

The retrospective data from the audit identified *n*=7,266 CT head examinations (Table 1) from a wide range of referral pathways including In and outpatients, accident and emergency, stroke wards, dementia clinics, and general practitioner sources.

The current Intervention

The NHS at present utilises radiologists to report CT head examinations, but the drivers for change from this service include the low workforce numbers of UK registered radiologists[12]. To reach comparable radiologist levels with the rest of the European Union (EU) countries, the RCR estimated it would require an 82% increase of consultants[10].

The CfWI report on Clinical Radiology[10] commissioned by the Department of Health (DoH) with multiple stakeholders including the RCR and SCoR reviewed the RCR 2012[11] report for the Medical Programme Board and the Joint Working Group on Speciality Training Numbers. Recommendations included (but not implemented) an increase of 60 trainees per year due to the increasing demand of imaging, and the use of radiographers to effectively support the future expansion of radiology.

Unit costs and discounting

To determine an average hourly rate for radiologists, Netten et al's Ready Reckoner for staff costs in the NHS[19] and the Personal Social Services Research Unit (PSSRU) Unit Costs of Health and Social Care 2014[20] were adopted. The salary was based on a full time equivalent (FTE) mean of NHS medical consultant wages[20]. An additional 33.5% was added to reflect payments for activity such as overtime, shift work, geographic allowances[20], National Insurance (NI) contributions[21], and employer's contribution to superannuation[22]. The costs for education and training use the PSSRU[20] standard estimation approach to review the components of training, tuition fees, clinical placement costs, infrastructure (books, journals, computers), and lost production costs of staff training days.

Costs included the discounting system used by PSSRU[20] and HM Treasury[23] to convert all costs and benefits to 'present values' to compare, using a 3.5% discount rate. Allowing a net present value of an intervention to be calculated which is the primary indicator used by the UK government to justify action. This is the adopted system in use by the National Institute for Health and Care Excellence[24] (NICE) for all DoH[25] assessment and appraisals of health technologies, techniques, and screening programmes. The hourly unit cost of a consultant radiologist (2014-15) was calculated at £156 (Table 3).

The new Intervention

The RCR with the SCoR have jointly published guidance[26] to promote the collaborative skills mix of radiographers and radiologists to work in complimentary reporting roles (not substitution or replacement of roles) to support service shortages. The SCoR Scope of Practice[27, 28] legally entitles radiographers with accredited education, training and competence to report a wide range of diagnostic imaging examinations. The CfWI[15] have predicted an increase of 17% (to 19,830) of radiographers from 2012 to 2016, currently the HCPC[14] have 29,711 radiographers registered which is above the projected increase of workforce by the CfWI[15], helped in part by Health Education England (HEE)[29] increasing educational commissioning.

The average UK radiographer unfilled vacancy rate was 5.1% at Band 7 reporting level[30]; the SCoR[30] estimate 3,662 radiographers are in advance practiced and 86 in consultant roles (including reporting), with a further 1,288 in postgraduate training[30].

Unit costs and discounting

To calculate an hourly rate for a reporting radiographer, we used Netten et al's Ready Reckoner for staff costs in the NHS[19] and PSSRU Unit Costs of Health and Social Care 2014[20]. The salary was based on a FTE mean of Band 7 (point 30) of the Agenda for Change[31] wages for allied health professionals. An additional 7.2% was added to reflect payments for additional activities such as overtime, shift work, geographic allowances[20], NI contributions[21], and employer's contribution to superannuation[22]. The costs for education and training use PSSRU[20] standard estimation approaches to review the components of pre-registration and post-graduate training, tuition fees, clinical placement costs, infrastructure, and lost production costs of staff training days. A 3.5% discounting rate was applied and the hourly unit cost of a band 7 reporting radiographer (2014-15) was calculated at £53 (Table 4).

Comparison of costs per Intervention

Using the estimated unit cost per hour of both interventions, calculations of cost per examination for both interventions can be approximated. The RCR activity reporting guidelines[32] calculate time per test for reporting, which is the measure for setting workload standards in radiology (suggesting a maximum of 50% of time spent reporting examinations). The RCR acknowledged that in attempting to find one method to model the costings for reporting was difficult and each proposed system had limitations, the RCR opted to calculate work output using the Gishen's Ready Reckoner[32]. The RCR modality-based method estimated against 1 hour of uninterrupted time a range of 3-6 (non-complex) CT reports were possible[32], with three variable time calculations of slow, medium and fast (20, 13.33 and 10 minutes per exam per report respectively). The CfWI and DoH[10] use weighted factors of 24, 16, 12 minutes per exam per report. The CfWI calculated each FTE radiologist was allocated 10.3 programmed activities (PAs); 2 PAs for non-reporting administration of paperwork, teaching, and other duties, with 8 weeks deducted for annual leave / study. Calculating 8 PAs over 44 weeks (the RCR[12] calculations use 10.3PAs). The SCoR have no published costings of reporting radiographers' unit costs per non-complex CT examinations to compare against, so the RCR[32] and CfWI and DoH[10] systems have been adopted for comparisons (table 5). No published studies were found on the time taken for radiographers to report CT head scans, the study for arguments sake reverted to the evidence of previous published studies from academic[33] and clinical[34] environments that used timed reporting of CT head case banks (same caseloads) on radiographers and radiologists producing near equivalent accuracy, agreement, sensitivity and specificity results.

Comparison of diagnostic thresholds per Intervention

The risk of error in patient outcomes is an additional important measure to include in the evaluation of assessing interventions. This will determine if there is potentially an impact on patient outcomes (mortality, morbidity, functional status and quality of life) from the change of service delivery. The DGH audit data did not provide statistics from error/discrepancy meetings to assess the potential for detrimental risk to patient outcomes through reporting. A literature search[33] identified 45 studies comparing radiologist reporting levels; unfortunately the variation and quality of the studies methodologies and results did not provide sufficient detail, sample size, and pathology range. Reference standards varied, with some studies only providing accuracy/agreement levels, mostly without confidence intervals, sensitivity or specificity. Only 5 papers supplied sufficient details of results to provide a reference level for radiologists reporting CT head scans.

Observer variation studies from a number of published sources comparing against set reference standards have identified radiologist agreement levels range from 66% (Briggs[35]), 84% (Schringer[36] and Nagaraja[37]), 86.6% (McCarron[38]), 95% (Erly[39]) and 97.3% (Le[40]).

The introduction of reporting radiographers to interpreting CT head examinations has been reviewed previously by the author in an academic training setting[33] using timed examinations of same case load (and pathology) producing an agreement range of 88.1 to 90.8%, sensitivity of 97.4 to 99.8% and specificity of 93.1 to 97.7%.

A further multi-reader multi-centre study[34] by the author in a clinical environment of 6 NHS hospitals using 6 qualified and experienced CT head reporting radiographers and 2 radiologists used timed examinations of same case load (and pathology) to gauge results for both professions on CT head reporting. Demonstrated a sensitivity range of 82.3 to 95.1%, specificity 90.1 to 100%, and accuracy of 89.3 to 95%[34] for reporting radiographers. Radiologist's sensitivity range was 80 to 86.7%, specificity of 86.7 to 93.3%; and accuracy of 83.3 to 90%[34]. The findings indicated that radiographer's results are approaching and similar to the range of results identified for radiologists both in those studies and the literature review (table 6), taking into account the possible variations present in the study designs.

Results (Outcomes) of interventions to national tariffs and reference standards

The estimated monetary value of radiologist's hourly rate calculated against reporting radiographer's hourly rate using RCR[32] unit costs per non-complex CT report demonstrated a potential difference of £34-£17 per patient/report. Applying the CfWI and DoH[10] time range against radiologist and reporting radiographer's hourly reporting rate for comparison estimated a potential cost difference of £41-£20 per patient/report (Table 5).

Monitor 2014-15 direct access and outpatient diagnostic imaging services tariff (unbundled)[41] advise the cost paid by clinical commissioning groups for a CT scan (one area, no contrast) to be £77[41] with reporting, with cost of reporting alone £20[41] (NICE tariffs apply £78[42] for a CT head). Although there are regional variations of cost and local modifications[43], this price is set out in the current Healthcare Resource Groups (HRG4) costs currently in use by the NHS national tariff payment system (2014/15) and is enforced by the Health and Social Care Act 2012[44] for NHS trusts, NHS foundation trusts and private providers. This is the dedicated price that local NHS providers and commissioners agree to cost at as set by the sector regulator Monitor[45], to reduce anti-competitive practice that are opposed to patients interests. Opportunity costs modelling using the national tariff costs of £20 for a CT head report, compared to the estimated cost to report the examination by both interventions approximates the reporting radiographer option as cost effective for the NHS.

The results also allowed estimation over the observed range using the data (*n*=7,266) from the acute DGH 12 month audit to calculate potential savings of between £249,514-£124,757 could be achievable using reporting radiographers and the RCR[32] workload model (fast, medium and slow reporting times). Calculating the reporting radiographer's unit costs against the CfWI and DoH[10] reporting ranges provides a projected annual cost saving of £299,359-£149,679 (Table 7).

Discussion

The RCR[13] have reviewed and looked for solutions to the capacity demands of reporting services and have identified the use of radiographers as one of several solutions (including out sourcing, locums, additional catch up sessions, and review of current radiologists performance). The use of locums and outsourcing to commercial private companies is not without a large additional financial burden and may not be a sustainable policy for the future on current NHS financial and fiscal constraints.

The study has illustrated that both interventions have the diagnostic thresholds to achieve similar reporting standards. The societal cost/benefit to patients for the new intervention alongside the existing intervention could potentially together decrease reporting backlogs, evidence from previous studies in X-Ray[46,47,48,49,50,51], CT[52,16], ultrasound[52] and magnetic resonance imaging[52] support achievable increases in reporting turnaround times. The effects of introducing a system efficiency to improve the timeliness of examination reporting helps to enhance patient management and treatment, which studies have shown[53,54,55,56] has a direct link to quality of care and patient satisfaction.

Healthcare economic evaluations review the trade off in any comparisons between two interventions of benefits, harms and costs, to review if the current treatment is dominated (more expensive and worse than an alternative) or if the new treatment is better but more expensive, or dominant (cheaper and better). There has been precedence in the past from studies in X-Ray[47, 50,57,58,59], CT[60] and fluoroscopy[61] to establish the cost effectiveness of radiographers reporting. This study predisposes any additional cost between the interventions could not be appropriately calculated to Incremental Cost Effectiveness Ratios (ICER) or Quality Adjusted Life Years (QALYs) as the patient sample group data did not recorded the impact of the intervention on treatment and management plans, as evidence from discrepancy audit meetings were unavailable.

An additional limitation of this study recognises that a percentage of teaching hospitals use registrars in training to report CT heads and as such are a cost effective approach to reporting. In justifying why registrars were not included in this study, the DGH where the data was collected did not train registrars. Moreover the potential impact of using registrars could be questionable as they are often at different levels of experience and exposure to reporting so will still require some level of double reporting at a greater cost of time and money.

Conclusion

The literature[9,10,11,12] available indicates that current practice is not conducive to future service delivery, a consideration of future workforce planning to cope with capacity and demand should include a whole-team approach to developing an effective service delivery with involvement from professional bodies, commissioners and stakeholders. The current scope and boundaries of imaging professions will need to consider sufficient overlap of roles to optimise and enable a modern skills mix of service delivery.

The economic evaluation of introducing a skills mix reporting service model has shown one potential option to assist the problems currently faced by NHS imaging department, with a possible £299,359-

£124,514 per annum cost saving example using a generic acute NHS DGH workload model. Research into discrepancy/error audit data for potential detrimental risk to patient outcomes identified a paucity of evidence on eventual patient mortality/morbidity and quality of life, further research into this is recommended.

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Tables

Table 1. Audit results of CT demand at an average sized generic DGH (2014-2015).

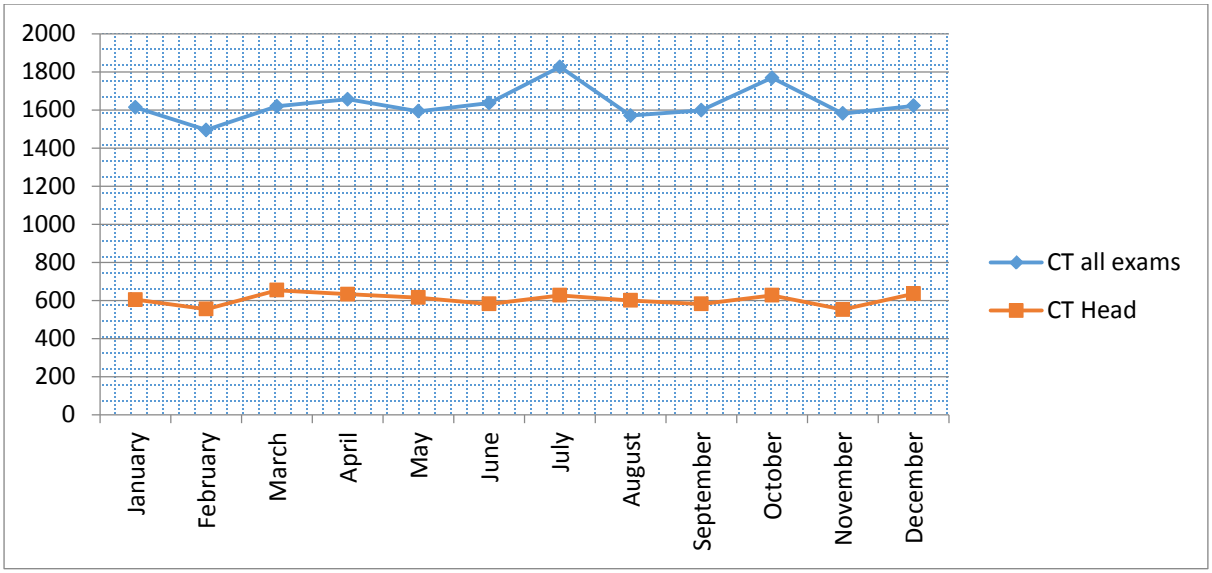

Table 2. Decision tree populated with risk probabilities. Square nodes = decision nodes, round nodes = chance points, triangular nodes = terminal points.

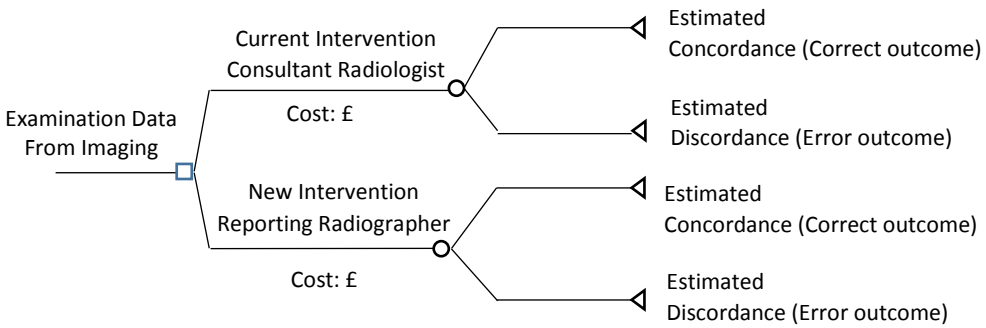

Table 3. Consultant radiologist hourly unit cost calculation.

	Costs and Unit Estimation	2014/2015 value	Notes
A	Wages / Salary	(+) £87,060 per year	Medical Consultant average[20]
		£29,165 per year	33.5% Allowances[20] for overtime / shift work / etc
B	Salary oncosts	(+) £5,012 per year	National Insurance Secondary threshold (ST) deduction[21]
		(+) £11,753 per year	Superannuation - NHS Pensions 13.5% - Tier 6[22]
	London multiplier	1.19 x (A+B) & 1.39 x G	Allow for higher costs of living in London[20]
	Non London multiplier	0.97 x (A+B) & 0.97 x G	Allow for lower costs of living outside of London[20]
C	Qualifications	(+) £72,197 per year	Taken from PSSRU[20], using Netten et al[19] costs from DoH and HEE Consultants = 2 foundation years, 6 speciality registrar years
D	Fees	(+) £420 per year	GMC[62]
E	Overheads, management, administration and estates staff	(+) £20,048 per year	Taken from PSSU - NHS (England)[20] Management and non-care staff 19.31% of direct care salary
F	Non-staff	(+) £43,575 per year	Non-staff costs 41.97% of direct salary costs (include costs to provider - office, travel/transport, telephone, education, training, supplies, services, utilities of water, gas, , electricity[20]
G	Capital Overheads	(+) £8,411 per year	Capital costs annuitised over 60 years (discount rate of 3.5%) based on PSSRU[20] New build and land requirements of NHS hospitals (adjusted for both treatment and non-treatment space)
H	Working time	(÷) 42.4 weeks per year (÷) 37.5 hours per week	PSSRU[20] calculated unit costs of 1,589 hours per year : 212 working days (minus sickness absence, and training)[20]
	Unit costs 2014/2015	**£156 per hour**	

Table 4. Reporting radiographer hourly unit cost calculation.

	Costs and Unit Estimation	2014/2015 value	Notes
A	Wages / Salary	£35,891 per year	AfC Band 7 mean- point 30[31]
		£2,584 per year	7.2% Allowances[20] for overtime / shift work / etc
B	Salary oncosts	(+) £4,197 per year	National Insurance Secondary threshold (ST) deduction[21]
		(+) £3,337 per year	Superannuation - NHS Pensions 9.3% - Tier 4[22]
	Inner London multiplier	£4,117 - £6,342per year	20% of basic salary[31]
	Outer London multiplier	£3,483 - £4,439 per year	15% of basic salary[31]
	Fringe multiplier	£951 - £1,649 per year	5% of basic salary[31]
C	Qualifications	(+) £6,120 per year	BSc Diagnostic Radiography Tuition Fees, living expenses, clinical placement[20] and Postgraduate clinical placement[20] and Postgraduate Certificate in Clinical Reporting(CT Head) fees[63] - Expected annual cost at 3.5%
D	Fees	(+) £70 per year	HCPC[64]
F	Overheads Management, administration and estates staff	(+) £8,385 per year	Taken from PSSU - NHS (England)[20] Management and non-care staff 19.31% of direct care salary
G	Non-staff	(+) £18,225 per year	Non-staff costs 41.97% of direct salary costs (include costs to provider - office, travel/transport, telephone, education, training, supplies, services, utilities of water, gas, electricity[20]
H	Capital Overheads	(+) £8,411 per year	Capital costs annuitised over 60 years (discount rate of 3.5%) based on PSSRU[20] New build and land requirements of NHS hospitals (adjusted for both treatment and non-treatment space)
I	Working time	(÷) 42.4 weeks per year (÷) 37.5 hours per week	PSSRU calculated unit costs of 1,589 hours per year : 212 working days (minus sickness absence, and training)[20]
	Unit costs 2014/2015	**£53 per hour**	

Table 5. Unit costs of per exam of current and new interventions using RCR[32], CfWI and DoH[10] calculations.

Non-Complex CT Report	Configuration	Cost per hour	RCR[33] Slow Report (20 minutes)	RCR[32] Medium Report (13.33 minutes)	RCR[32] Fast Report (10 minutes)
Current Intervention	Radiologist reporting	£156	£52 per patient/report	£34.66 per patient/report	£26 per patient/report
Non-Complex CT Report	Configuration	Cost per hour	CfWI/DoH[10] Slow Report (24 minutes)	CfWI/DoH[10] Medium Report (16 minutes)	CfWI/DoH[10] Fast Report (12 minutes)
Current Intervention	Radiologist reporting	£156	£62.40 per patient/report	£41.60 per patient/report	£31.20 per patient/report

Non-Complex CT Report	Configuration	Cost per hour	RCR[33] Slow Report (20 minutes)	RCR[32] Medium Report (13.33 minutes)	RCR[32] Fast Report (10 minutes)
New Intervention	Radiographer reporting	£53	£17.66 per patient/report	£11.77 per patient/report	£8.83 per patient/report
Non-Complex CT Report	Configuration	Cost per hour	CfWI/DoH[10] Slow Report (24 minutes)	CfWI/DoH[10] Medium Report (16 minutes)	CfWI/DoH[10] Fast Report (12 minutes)
New Intervention	Radiographer reporting	£53	£21.20 per patient/report	£14.13 per patient/report	£10.60 per patient/report

Table 6. Estimated mean diagnostic thresholds of current and new interventions.

	Configuration	Agreement Range %	Sensitivity Range %	Specificity Range %
Current Intervention	Radiologist - reporting	66 - 97.3% [34,35,36,37,38,39,40]	80 – 86.7% [34]	86.7 – 93.3% [34]
New Intervention	Radiographer - reporting	88.1 - 95% [35,34]	82.3 – 99.8% [34,35]	90.1 - 100% [34,35]

Table 7. Potential unit costs of per annum of current and new interventions using DGH audit of workload against the RCR[32], CfWI and DoH[10] calculations.

Non-Complex CT Report	Configuration	Annual DGH Workload	RCR[32] Slow Report (20 minutes)	RCR[32] Medium Report (13.33 minutes)	RCR[32] Fast Report (10 minutes)
Current Intervention	Radiologist reporting	7,266 CT head scans	Annual cost £377,832.00	Annual cost £251,839.56	Annual cost £188,916.00
Non-Complex CT Report	Configuration	Annual DGH Workload	CfWI/DoH[10] Slow Report (24 minutes)	CfWI/DoH[10] Medium Report (16 minutes)	CfWI/DoH[10] Fast Report (12 minutes)
Current Intervention	Radiologist reporting	7,266 CT head scans	Annual cost £453,398.40	Annual cost £302,265.60	Annual cost £226,699.20
Non-Complex CT Report	Configuration	Annual DGH Workload	RCR[32] Slow Report (20 minutes)	RCR[32] Medium Report (13.33 minutes)	RCR[32] Fast Report (10 minutes)
New Intervention	Radiographer reporting	7,266 CT head scans	Annual cost £128,317.56	Annual cost £85,520.82	Annual cost £64,158.78
Non-Complex CT Report	Configuration	Annual DGH Workload	CfWI/DoH[10] Slow Report (24 minutes)	CfWI/DoH[10] Medium Report (16 minutes)	CfWI/DoH[10] Fast Report (12 minutes)
New Intervention	Radiographer reporting	7,266 CT head scans	Annual cost £154,039.20	Annual cost £102,668.58	Annual cost £77,019.60

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Conflicts of Interest

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