



Conclusion: Image processing algorithms are a fundamental part of the optimisation process, and must not be neglected. For bed-side chest radiography, it has been demonstrated that MUSICA3+ gives the best 'overall' quality, but changes to image processing should be considered if dense regions are of clinical interest.

P165 Identifying anatomical regions of pelvic X-rays using open-source texture analysis and machine learning software: A proof of concept study

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Background: The radiographic image texture of bone is influenced by density and trabecular pattern. Reporters generally assess texture qualitatively, but texture can also be assessed quantitatively. The open-source textural analysis software qMaZda (Szczyppinski et al., 2009) can calculate approximately 300 texture parameters. These large datasets generated make conventional statistical techniques unfeasible for determining which (if any) of these parameters are useful for differentiating bone structures. However, machine learning algorithms are ideally suited to identify and 'learn from' patterns and relationships within large datasets. Bone texture varies between individuals but some bony structures have characteristic trabecular patterns. This study aimed to determine whether a quantitative approach using open-source software is more accurate than reporters at identifying anatomical regions of pelvic radiographs based solely on their texture.

Method: 'Training' and 'test' datasets consisting of the textural parameters for 50 and 15 pelvic Rols respectively were created using images downloaded from PACS. A variety of machine learning algorithms were trialled on the training set using the open-source data mining software Weka (Frank et al., 2009). Accuracy was then evaluated on the test set and compared to the performance of 5 experienced reporters undertaking the same task.

Results: The 'Simple Logistic' algorithm identified the origins of the Rols of the test set with an accuracy of 93%. This compared to 73% for experienced reporters.

Conclusion: Open source textural analysis and machine learning software successfully identified anatomical regions within the pelvis. In future this approach could be used to identify pathological changes in bo

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SERVICE INNOVATION AND OPTIMISATION

P166 Outsourcing CT scans

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Background: Many hospitals in the UK have introduced outsourcing of CT scans to supplement the demand for imaging required out-of-hours^[1]. However, there is sparse data on how this has affected the number of imaging investigations done out-of-hours. This study addresses this gap by investigating the impact of implementing outsourcing via 'Four Ways' at an UK district general hospital on the number of out-of-hour CT scans requested.

Method: This is a retrospective cross-sectional study. Data was collected on the number, type and indications of CT scans that were undertaken out-of-hours in January 2015, before the use of outsourcing, and compared to data from January 2016 and January 2017. Data was collected using HSS CRIS and analysed using Excel.

Results: Following the introduction of outsourcing, the total number of Emergency Department CT scans that were vetted increased (74 in January 2015, 61 in January 2016 and 123 in January 2017). Furthermore, the total number of Inpatient CT scans vetted during outsourcing hours also increased (23 in January 2015, 18 in January 2016 and 46 in January 2017). This was despite the fact that the total number of CT scans during the non-outsourcing out-of-hour period remained stable from January 2016 and January 2017.

Conclusion: These results indicate that since the introduction of outsourcing, the number of CT scans vetted out-of-hours has increased. This study did not look at the reasons for why outsourcing increased the number of scans, and this will form the basis of future work in this area.

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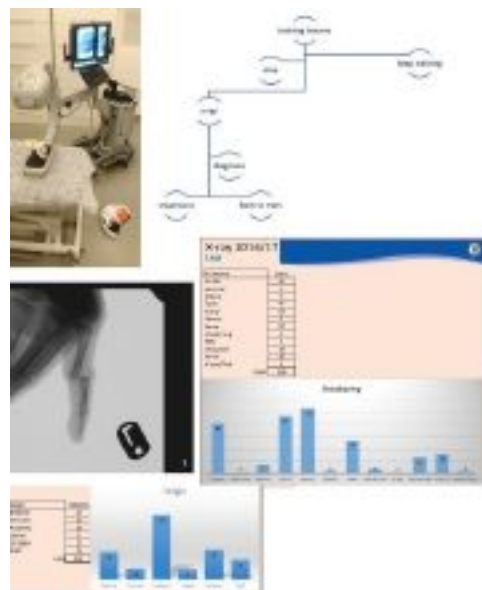


P167 Radiography experience at a premier league football club

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With the high demand of imaging assessment at a top level club, we realise that having a low dose X-ray machine located at our Medical Department could bring down the time of the decision making process. Four years ago, it was decided the purchase of a Mini c-arm low dose X-ray machine and it was placed at the Training Ground facilities. As a result, I will present:

- A quick analysis regarding the workflows to determine the time savings without and with the fluoroscope machine: statistical data of the last 4 seasons
- Cases/images to illustrate the most common football bone injuries across the Club.
- Radiographers' new opportunity - discussion.



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P168 Detecting and reporting domestic abuse of the elderly: Mapping the concerns of experienced radiographers

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Background: While over 65,000 suspected cases of elder abuse are reported to English councils each year, it is estimated that upwards of 95% of incidences are either missed or not reported by healthcare professionals in emergency department settings^[1]. Despite the call from Murray and Devos^[2], two decades ago, for greater investigation of the extant and prospective role of radiographers in identifying abuse of the elderly, the broad phenomenon has continued to receive limited attention in medical imaging research.

Methods: Using a standard model of Interpretative Phenomenological Analysis^[3,4], extended semi-structured interviews with N=8 experienced plain radiographers were analysed.

Results: In A&E contexts, where safeguarding issues have primarily been the responsibility of a physician, it was reported that the degree to which physicians take account of radiographers' concerns about elder abuse is inconsistent at best. This had sometimes resulted in a borderline defeatist attitude among radiographers, who would now only raise such a concern if they were uncategorically certain it would be taken seriously. In the outpatient domain, where radiographers felt more in control of the medical process itself, progressively higher levels of confidence to take a lead around these matters were reported. Even here, however, participants routinely argued that the available information and clinical communication necessary for them to recognise potential elder abuse was often lacking in a way it was not around other forms of domestic abuse.

Conclusions: The analysis signposts some important issues around elder abuse and radiography that foregrounds, above all, the importance of clinical context and communication.

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P169 Retrospective review of Arian Teleheal organisation's international telemedicine and tele-education work; and defining the future vision by conducting world's first augmented reality telemedicine consultation using microsoft hololens

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Arian Teleheal is a "pioneering" telemedicine charity which provides world-class healthcare advice to doctors in war zones and low-resource countries. The volunteer doctors of Arian Teleheal use everyday technology (such as smartphones and secure



social media) to advise local doctors. Arian Teleheal also uses more complex technology to provide educational, learning and research opportunities, helping local doctors develop their abilities to further benefit their patients.

Arian Teleheal is the first in the world to successfully implement international live telemedicine support using everyday technology on a 24/7, 365 days-a-year basis, with rapid response times for most acute cases. Furthermore, the work of Arian Teleheal provides educational and research opportunities for doctors in developed countries, through their work with colleagues around the world. The success of Arian Teleheal has been recognised with a number of awards, including being the first and only UK recipient of a UNESCO Global Hope Coalition award.

Retrospective review conducted in form of anonymised detailed surveys shows that the work of Arian Teleheal has a positive impact on patients' healthcare management and on the participating local medics' education. Being the first in the world to successfully use augmented reality technology (Microsoft HoloLens) to provide live international telemedicine consultation and teaching, Arian Teleheal sits the vision of the future of international telemedicine. Arian Teleheal is finalising collaboration plans to expand to Africa in 2018. The successful use of simple day to day technology, evolution of smartphones and increasing internet connectivity, complement survey evidence to scale up globally.

P171 WHO surgical safety checklist for radiology interventions: Improving compliance through action research

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Purpose: The overwhelming success of implementing the World Health Organisation (WHO) Safe Surgery Saves Lives Checklist^[1] prompted the Royal College of Radiologists (RCR) to publish guidance for implementing the National Patient Safety Agency (NPSA) Safe Surgery requirement^[2]. Subsequently a specific checklist adapted for radiological interventions has been developed with 100% target compliance encouraged by the quality care commission (CQC)^[3]. This work reflects on the action research process used during the introduction and implementation of this safeguarding checklist into clinical practice across a diagnostic imaging department.

Method: This study has been undertaken in a single NHS Trust with data collected across its three hospital sites. An action research approach was adopted to allow collaboration between researcher and practitioners. Data collection included qualitative opinion of a small but varied group of radiology personnel responsible for the delivery and improvement of the service and quantitative safety checklist compliance data for imaging modalities undertaking interventional procedures.

Results: Since its introduction locally, WHO safety checklist compliance has increased from 25% to 91%. Modality and Sub-speciality analysis demonstrates that some areas of practice out-perform others, requiring bespoke systems of work. Qualitative enquiry has informed several initiatives to improve compliance including the development of a formal policy and modified checklists as well as empowering staff to own the process. **Conclusion:** The multiprofessional team continues to strive for 100% compliance but this iterative action research cycle has been valuable in staff engagement, changing perceptions and embedding sustainable change. A potential limitation of the study is incomplete compliance data.

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P172 Responding to MRI safety incident trends

Darren Hudson

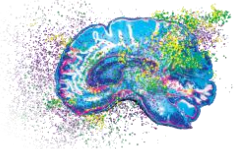
InHealth

Background: Our internal MRI Safety reporting remains relatively low considering the number of patients seen in our facilities each day. Whilst this can be taken to mean safety is well managed, which generally it is, it is a fact that near misses and minor events are occurring more regularly and by luck don't result in significant harm. Staff are encouraged to report any near misses and failings in procedure or practices so the organisation can learn from these and work towards improvement to avoid potential for significant harm.

Purpose: From review of our internal MRI safety events the main trends are around referral of contraindicated devices and failure in the screening process. Therefore, to help learn from these occurrences, improve practice and work to reduce incidents, some materials were developed to coincide with MRI Safety week.

Summary: The poster will provide an overview of the materials produced:

- A short information leaflet which can be shared with referrers outlining the considerations when referring for MRI and the importance of providing reliable patient history. These can then be given to those referrers sending patients to our services with contra-indicated devices in situ, and will proactively be shared where opportunity presents -- CCGs, Trust inductions etc.
- Staff were asked to partake in some structured observational peer review around screening process and patter. This was intended to be an objective and non-judgmental means of reviewing and improving practice with one another.



P173 Misplaced nasogastric tubes, a never event. A trust-wide three-cycle, closed loop, audit (Epsom & St Helier Hospitals Trust, London, United Kingdom)

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Misplaced nasogastric tubes are a never event. A national patient safety alert (NPSA) in 2016 revealed 95 incidents relating to the misplacement of nasogastric tubes, forty-five of which were related to the use of radiographs^[1]. The safety alert provides criteria for optimal gastric placement and clear instructions for required actions if the tube is misplaced. We produced a three cycle audit investigating requests for radiographs, image quality and explicit statements in the resultant report. Secondary end-points included time taken to report radiograph, percentage of reports authorised within one hour and the number of requests out of hours. The final cycle of the audit included a total number of 226 adult patients with information obtained retrospectively via a trust-wide PACS at Epsom & St Helier Hospitals, London.

The results showed an increase in all primary end-points by initiating discussion with consultant radiologists about the standards expected between each cycle. Particularly, the percentages of reports including an explicit statement regarding safety to feed increased from 63% to 80% (between cycle 2 and 3). We concluded 80% of reports in the final cycle were compliant with NPSA requirements in providing an explicit statement regarding safety to initiate feed, average time for radiograph to be reported decreased considerably and more checks were carried out out-of-hours resulting in higher use of teleradiology services.

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P174 Improving quality of care and reducing unnecessary imaging by implementing new adrenal imaging guidelines

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Background: Imaging follow up (FU) of "adrenal incidentalomas" (AI) is resource intensive. Our centre lacked clear guidance on managing AI. The American College of Radiology (ACR) recently published an algorithm for follow up of AI. We set out to (a) map heterogeneity of practice, and (b) identify resource implications of implementing the ACR guidelines.

Methods: To map heterogeneity, data regarding dedicated adrenal imaging over a 1 year period was analysed. Data examined included reason for study (follow up (FU) of previously characterised lesion, or characterisation of newly found lesion), study modality (MRI or CT, +/- contrast), time since previous study if for FU, and number of previous studies. We applied three key questions from the ACR guidelines to our practice, to establish resource implications.

Results: 90 studies were included (62 FU, 28 characterisation). Heterogeneity was found in all aspects of AI imaging; study modality, time from previous study to the FU study (0-84 months), number of adrenal studies preceding the FU study, nature of lesions being FU, and the size of lesions being followed up and characterised. If, by following the ACR guidelines, we hadn't followed up any lesion <10mm, benign lesions >10mm, or indeterminate lesions >10mm but unchanged over a year, we would have avoided 53 studies.

Conclusion: The lack of local guidelines rendered our practice heterogeneous. By adopting the ACR guidelines, we estimate a workload reduction of 59% per year, as well as following a more consistent approach. We aim to re-assess our practice following a period of implementation.

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P175 Real world experience of Nivolumab in a DGH

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Aim: An audit to assess response rate of treatment with Nivolumab in various tumour sites.

Method: Data was obtained from pharmacist department for all patients receiving Nivolumab over the last 3 years. A spreadsheet on survival response rate indication of treatment and performance status at the start of Nivolumab treatment were recorded.

Result: Data from a total of 17 patients were used to assess response to nivolumab treatment. The majority (total of 8) of these were patients with diagnosis of metastatic melanoma who failed the first line treatment.

2 patients with squamous cell carcinoma of the lung; 2 with head and neck cancer; remaining 5 with renal cell carcinoma. The overall survival is about 6 months and patients with performance status of 0-1 generally tolerate Nivolumab better than those with poor performance status. Of the toxicities 8 patients experienced no toxicity with the remaining 9 patients having immune related toxicities grade 3 and above. Immune mediated hepatitis contributes to the majority of the toxicities with 3 out of 9 patients having grade 3 immune hepatitis requiring a temporarily stop to their treatment. 3 of the 17 did not survive long enough for response assessment with a scan. 3 patients out of 17 were on combination immunotherapy for metastatic melanoma.

Conclusion: Nivolumab is a fairly well tolerated drug with limited toxicities and can be delivered in peripheral hospital as provided funding available on NICE.



P176 **Worthwhile and unnecessary radiology visits with general practitioner radiography referrals: an audit of local practice**

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The Rotherham NHS Foundation Trust

Background: The Radiology Department of an NHS Foundation Trust performs over 16,000 plain film referrals from General Practitioners (GPs) per year. Due to a recent local merger this number is predicted to rise to approximately 23,000 referrals per year. The Trust offers GP patients both an appointing and open access service. National guidance on radiological investigations has been published by the Royal College of Radiologists (2017), which aims to standardise practice. Anecdotally, radiographers' feel that a significant proportion of GP patients are turned away without imaging being performed. These represent unnecessary radiology visits and undoubtedly diminish trust in the healthcare system.

Method: Utilising the Radiology Information System (RIS), all GP plain film radiography requests within a 12-month period from August 2016 to August 2017 were retrospectively reviewed, and the number of successfully preformed and cancelled requests were established for each anatomical area.

Results: Over 5% of patients were turned away without imaging being performed, in eleven of the forty-three anatomical areas. All of these were due to unjustified clinical information, whilst almost all (96.3%) of these patients were pre-appointed which meant that the radiology department had time to 'vet' the request prior to arrival. If all requests for these eleven anatomical areas had been 'vetted' prior to booking, there would have been 2.9 requests to vet per working day.

Conclusion: Implementation of a pre-appointment vetting system for GP radiography requests could significantly reduce the number of unnecessary visits to the radiology department, which would offset the slight increase in workload.

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P177 **Service improvement audit on the efficiency of supraorbital fracture diagnosis**

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Introduction: Supraorbital injuries are commonly caused by assaults, falls, sports-related injuries and road traffic collisions^[1] thus encompassing a diverse range of patients that present to Accident and Emergency. A supraorbital injury should be identified as efficiently as possible to avoid further complications^[2]. The audit focuses on the diagnostic value of our supraorbital protocol in combination with patient pathways through CT, supported by literature.

Method: A retrospective audit was carried out from October 2016 - October 2017 evaluating supraorbital radiographic requests, the views performed and the role of CT.

Findings: During this period 9% of all facial bone requests were undertaken for supraorbital injury. 40% of these patients had one view, 60% had 2 views but of that only 27% did a dedicated OF20 view as per protocol. Only 1 patient was recommended to have a dedicated supraorbital view following their examination. 11% of patients were referred to CT. Only 3 patients were diagnosed with a supraorbital fracture.

Conclusion and recommendations: The protocol is not being followed. Contributing factors to the lack of completion of an OF20 view include; inexperience of an OF20, under appreciation of this dedicated view, referrer's knowledge and interpretation. However, with only 67 requests and of this only 3% reported fractured, raises the question is a dedicated view necessary? Many patients also have associated head injuries and as per NICE guidelines, automatically bypass having radiographs thus, further reducing the amount of supraorbital requests. An extended audit could be completed to complement these findings.

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P178 **An audit of preliminary clinical evaluation practice in magnetic resonance imaging examinations**

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Aim: This study aimed to audit magnetic resonance imaging (MRI) preliminary clinical evaluations (PCE) of the brain, spine and knee completed by a cohort of diagnostic radiographers in postgraduate training.

Methods: The audit of PCE data was taken from prospective clinical workloads in 27 MRI departments in England. The Radiographers (n=27) PCE commentaries (n=532 brain, n=592 spine, and n=496 knee examinations) were graded against reference standard answers from consultant radiologists. Applying true negative/positive and false negative/positive fractionated scoring. The audit statistical analysis assessed individual performance against the assessment of sensitivity, specificity, and accuracy. Interrater performance of sensitivity was further evaluated with d' prime. The reliability of independent interrater



agreement applied Fleiss' Kappa coefficients. Interrater accuracy was verified with receiver operating curves (ROC) and Area under the Curve (AUC).

Results: The radiographer's observer performance audit results for brain PCE demonstrated a sensitivity of 80% ($d'=2.479$), specificity of 89% and accuracy of 86%, $p=0.046$ (AUC 0.922, $k=0.68$). For the spine PCE commentaries were 88% sensitivity ($d'=2.213$), 70% specificity and 85% accuracy, $p=0.143$ (AUC 0.853, $k=0.59$). The knee PCE interpretations 85% sensitivity ($d'=2.001$), 74% specificity and 80.7% accuracy, $p=0.213$ (AUC 0.843, $k=0.51$).

Conclusions: The findings of this limited audit indicate that a small cohort of radiographers demonstrated a consistent level of accuracy in the interpretation of 1,620 brain, spine and knee MRI examinations in a clinical environment. This innovative extension of radiographer roles in MRI has the potential to improve clinical practice and initial clinical decisions.

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P179 An audit of preliminary clinical evaluation in nuclear medicine

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Aim: To assess the observer performance of preliminary clinical evaluations (PCE) in bone, lung, renal and thyroid nuclear medicine (NM) examinations among diagnostic radiographers.

Methods: The audit reviewed 1,200 NM examination ($n=519$ bone scans, $n=226$ lung scans, $n=282$ renal scans, $n=173$ thyroid scans) PCE commentaries provided by a cohort of radiographers ($n=20$) participating in a nine month postgraduate training programme. All PCE commentaries were graded against formal radiologist reference standard reports. Applying true negative/positive and false negative/positive fractionated scoring. The audit statistical analysis assessed individual performance against the assessment of sensitivity, specificity, and accuracy. Interrater performance of sensitivity was further evaluated with Kappa coefficients. Interrater accuracy was verified with empirical and fitted receiver operating curves (ROC) and Area under the Curve (AUC) analysis.

Results: The radiographer's observer performance in NM PCE demonstrated an overall sensitivity of 93% (91.3-94.4 .95% CI), specificity of 91% (89.7-93.0 .95% CI), and accuracy of 92% (90.5-93.7 95% CI), $p>0.001$ ($k=0.84$). All categories of examinations demonstrated high AUC scores as a metric for predictive modelling of diagnostic accuracy.

Conclusions: An observed consistent level of accuracy in the interpretations of NM PCE examinations by a small sample of radiographers was demonstrated in a clinical environment. The main contribution of this paper is to present a new extension of radiographer roles in NM that has the potential to improve clinical practice, and to communicate urgent and unexpected findings for clinical management.

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P180 Adequate completion of computed tomography request forms

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Background: The motivation for this audit was to improve the standard of CT requesting. IR(ME)R provides a legal framework within which the referrer is required to supply sufficient information for the practitioner to justify the radiation exposure to patients. At our DGH, an electronic referral system is used.



Methods: As per the standards set out by the RCR, 100% of CT request forms should include: patient's clinical information, relevant clinical question, patient details and referrer details. At our DGH, CT vetting is performed by radiographers, usually under the guidance of a consultant radiologist. During the vetting process, data was collected prospectively using a proforma based on RCR standards. This was used to scrutinise the quality of referral requests over a two week period.

Results: 114 CT request forms were sampled. All the requests were made for the intended patient. 100% included the correct patient information. 91% included the relevant clinical information and question. However 20 out of the 114 (17%) did not include the referrer's details and 9% did not include details of the responsible clinical team.

Conclusions: Despite using an electronic system, these results fell short of the standard set. We raised awareness of the importance of the referral process through presentation of these results at doctors' induction meetings and an intranet protocol on adequate radiology referral completion. Incomplete request details delays radiological diagnosis and subsequent action. The promotion of better interdepartmental communication, through radiology requests, subsequently leads to improved patient outcomes.

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P181 An audit assessing the diagnostic yield of acute abdominal radiographs in diagnosing bowel obstruction

Barry Stevens

Walsall Healthcare NHS Trust

Background: Abdominal radiographs are commonly requested to investigate acute non-traumatic abdominal pain. However, routine use is reported as being of little value (Campbell & Gunn 1988), with the diagnostic yield previously being questioned (Kellow et al 2008). Specifically, abdominal radiographs are reported as being non-sensitive for investigating colonic obstruction as the cause of pain (Ahn et al 2002).

Method: A retrospective audit of 50 abdominal requests from the Emergency Department (ED) with clinical indication of obstruction was undertaken to evaluate the propensity of positive findings of colonic obstruction.

Results: Of the 50 abdominal radiographs, 47 were considered normal and three were positive, of which only one had a small bowel obstruction (SBO). Twenty-two patients had further imaging; 15 had CT and seven had US. Ten CT scans were positive but only two showed a SBO, demonstrating one that was not visible on the abdominal radiograph. Five US examinations were positive with non-obstruction findings.

Conclusion: Abdominal radiographs to rule out an acute obstruction were seen to be negative in 98% of cases. Additional imaging with Computed Tomography (CT) was only positive for presence of colonic obstruction in 4% of cases. These findings correlate with previous work (Campbell & Gunn 1988; Ahn et al 2002). ED referrers need to be aware of the increased patient dose and length of hospital stay resulting from inappropriate abdominal requests for acute presentations. A confident clinical acumen will improve the quality of service whilst paying due respect to making the best use of radiology services.

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P182 Audit of CT guided nerve root injections cancellations secondary to incomplete peri-procedural anticoagulation management

Elizabeth Robinson¹; **Shahab Shahipasand**²; **Panagiotis Liantis**¹; **Ramin Mandegaran**¹; **Ali Zavareh**¹

¹Guy's and St Thomas' Foundation Trust; ²London North West Healthcare NHS Foundation Trust

Background: CT guided steroid injection is a well-recognised, conservative treatment of localised spinal pain and radiculopathy^[1,2]. An extremely rare complication is the development an epidural haematoma with potential to cause permanent neurological damage^[3]. Anticoagulation at the time of procedure is therefore contraindicated. Routinely injections are performed as an outpatient requiring the referring physician to implement a peri-procedural anticoagulation plan. Anecdotal experience suggested cancellations were occurring as patients remained on anticoagulation at the time of their appointment.

Purpose:

- Identify the incidence of cancelled CT guided spinal injections secondary to incorrect peri-procedural anticoagulation management
- Develop an intervention to help reduce the incident rate
- Re-audit to assess the effect of the intervention.

Methods:

Audit Standard: 100% of outpatients attending for a CT guided nerve root injection should have an appropriate anticoagulation plan implemented.

Data collection:



- Prospective data collection between 1st September-30th November 2016
- Population: All elective CT guided spinal nerve root injections scheduled
- Requesting clinicians not specifically made aware of ongoing audit
- Descriptive analysis was completed.

Intervention:

- Revised electronic request form implemented (Figure1)
- New compulsory fields to be completed concerning anti-platelets and anticoagulants.

Re-audit following intervention:

- Prospective data collection between 1st September-30th November 2017
- Same data collection methods.

Results:

Audit: 55 patients -3 cancellations (5%)

Re-audit: 93 patients -0 cancellations (0%)



Figure 1: New order form for guided/CT guided injections. Highlighted area shows the new additional fields required by the requesting clinician to be completed. These include whether the patient is on aspirin, clopidogrel, metoprolol or other antiplatelets and if an hour alternative plans have been made to the procedure.

Conclusions: The new request form prevented 5% of all patients referred for CT guided nerve root injection being cancelled, secondary to incorrect peri-procedural anticoagulation management. Extrapolated over 1 year the potential savings through lost activity £5171

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P183 Audit of adherence to trust guidance in elective vascular patients undergoing contrast procedures

Elizabeth Robinson¹; **Annelies Sweeney**¹; **Krishanthi Sathanandan**²; **Judith Partridge**¹

¹Guy's and St Thomas' Foundation Trust; ²Barking and Havering NHS Trust

Background: Increasingly vascular patients are undergoing endovascular interventions, placing them at risk of contrast induced nephropathy (CIN)^[1]. For the majority CIN is benign and transient however approximately 20% will experience a permanent deterioration in their renal function^[2]. There is no treatment for CIN, however many prevention strategies exist (*Table1*). Local guidance advises strategies according to pre-procedure stratified risk (*Figure1*). Anecdotal experience suggested multi-morbidity was leading to admissions the day before for optimisation and guidance was not being adhered to.

Table 1: A table to show the factors that put a patient more at risk from contrast induced nephropathy (CIN).

• If Cr clearance < 30ml/min	• Intravenous administration of contrast
• Older age (> 70 years)	• Large contrast doses
• Cardiac failure	• High osmolar contrast media
• Diabetes	• Ischaemia
• Hypotensive medication	• Acute kidney injury
• Hypovolaemia	

Table 2: A table to demonstrate the different fields of data collection for elective, vascular admissions for contrast procedures over September 2017.

Data collected on the day of admission	Data collected the day 1 following procedure	Data collected on the day of discharge
Patient ID	Procedure	Renal function 24hrs post procedure
Gender	Renal function 30hrs post procedure	Contrast dose administered
Ethnicity	Cardiac agent used	Fluid given prior to procedure
Age	Cardiac dose administered	Fluid given post procedure
Baseline renal function	Medications withheld	
Diabetic status		
Heart failure (Yes/No)		
Septic (Yes/No)		
Hypotensive (Yes/No)		

Table 3: Analysis of non-adherence to guidance in each risk category.

	High risk patients (eGFR <30 or eGFR 30-39 and diabetic)	Intermediate risk patients (eGFR 30-39 or eGFR 30-39 and diabetic)	Low risk patients (eGFR ≥45 or diabetic)
Adherence to guidance	2% (3/1)	25% (2/8)	86% (24/28)
Adverse outcome not followed	All post procedure hydration. No discussion with renal team.	All post procedure hydration. Medications not withheld (Glyceryl, Coumadin, warfarin)	All fluid given where no requirement. Medications not withheld (all patients)

CONTRAST INDUCED RENAL FAILURE PRE-PROCEDURE CHECKLIST

WARR 00-01 OR 01-00-01

LOW RISK

- Diabetic, elderly, female, previous AKI or contrast allergy have been excluded for all elective pre-procedures
- Fluids have been advised post procedure

Please contact referring team for elective procedures, if there are any on-checklist items

Name of doctor and contrast details:

WARR 00-01 OR 01-00-01

INTERMEDIATE RISK

- Diabetic, elderly, previous AKI or contrast allergy have been excluded for all elective pre-procedures
- Diabetic medication has been given pre-procedure and 24hrs post-procedure have been advised post procedure
- Fluids have been advised on the day of procedure and discharge, fluid has been advised post procedure
- AKI admission and registration if required details have been excluded for all elective pre-procedures
- All AKI has been checked 24 hours post procedure (24 hours pre-ADT)

WARR 00-01 OR 01-00-01

HIGH RISK

- Diabetic, elderly, previous AKI or contrast allergy have been excluded for all elective pre-procedures
- Diabetic medication has been given pre-procedure and 24hrs post-procedure have been advised post procedure
- Fluids have been advised on the day of procedure and discharge, fluid has been advised post procedure
- AKI admission and registration if required details have been excluded for all elective pre-procedures
- All AKI has been checked 24 hours post procedure (24 hours pre-ADT)
- Diabetic medication has been given post procedure

Page 1 of 8

Aims:

- Identify the incidence of CIN in elective vascular patients
- Establish adherence to trust guideline.

Methods:

Audit Standard: Trust guidance-100% adherence expected.

Data collection:

- Prospective data collection September 2017 of all elective vascular admissions for contrast procedures.
- Vascular team not specifically made aware.
- Data collected throughout admission (*Table2*).



Results:

- 40 patients (3 cancelled)
- Risk stratification: 28 Low risk, 8 Moderate risk, 1 High risk
- 3 cases of CIN (8%)
 - Incidence did not correspond to contrast dose in any case
 - Guidance not followed in each case
 - 65% adherence to trust guidance (*Table3*)

Conclusions:

- Variable adherence to guideline
- Most commonly:
 - Not post-hydrated
 - Continuation of nephrotoxic drugs
 - Low risk patients admitted the day before procedure for IV hydration
- Only 3 patients developed CIN despite non-adherence in multiple patients.
- Findings in line with AMACING trial^[9]
 - Suggested not giving prophylactic hydration is non-inferior to IV hydration in the prevention of CIN in high risk groups.
- Estimated cost of beds for pre-hydration over 1 year £113,602

Plan to change vascular admissions practice

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P184 Advancing practice in radiography: A focus on CT head reporting in Scotland

Emma Gilmour

Robert Gordon University

Background: Computed Tomography (CT) head Radiographer Reporting is an area of advanced practice in Radiography that could benefit the profession, the service it provides and enhance patient satisfaction. However, this is an underutilised skill throughout Scotland, where there are currently little CT head Reporting Radiographers, unlike other countries in the UK. The inclusion of CT head Radiographer Reporting in daily practice throughout Scotland could enhance the patient pathway through medical imaging by decreasing waiting times and allowing more prompt treatment of conditions, such as cancer treatment. In turn, Scottish Radiographers will benefit through being able to advance their practice, from increased knowledge and enhanced job satisfaction. Also, Radiologists in Scotland will benefit from having more time to focus on highly specialised procedures and other forms of reporting that Radiographers cannot assist with such as MRI scans.

Purpose: To explore the use of the CT head reporting role in Scotland and how it could enhance radiographic practice if more commonly utilised. To identify the need for change and highlight how overcoming the limitations will benefit the service and service users throughout Scotland. Identifying these aspects and acknowledging the barriers can promote service change and in turn result in increased uptake of the role and benefit the profession.

Summary: This poster includes background information on CT head reporting and evidence of Radiographer competence, healthcare policy, regulations and guidance, drivers and barriers to the role and leadership and management considerations to be applied to CT head reporting

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P185 CT imaging for head injury in a busy Emergency department: Does the stage of training affect compliance to NICE guidelines?

Muzzammil Hussain; Michael Roshen; Umber Shakil; Sana Fatima; Nicholas Reading

Bart's Health

Background: A large number of CT Head requests for 'head injury' are received at the Radiology department from a busy A&E department. A spot audit revealed some requests were not meeting NICE guidelines. The aim of this audit is to ascertain whether doctors working in A&E are complying with nice guidelines for head injuries. Secondly, whether the training grade determines the conformity to NICE guidelines.

Method: Records of adults who had CT head requests in the A&E between 1st Feb to 31st 2018 were reviewed. A five point 'quality scoring' system was developed;

1. Sufficient information on indication from A&E documentation (1 point)
2. Sufficient information of indication from CT head request (1 point)
3. Clinical question to be answered (1 point) and
4. Clear adherence to nice guidelines (1 point)
5. GCS documented (1 point).

The training level of the doctor was recorded. Non-parametric statistical tests were used.

Results: 265 CT Head scans (43.6%) were requested by A&E for head injury out of a total of 608 in Feb 2018. Registrars requested 106 scans, followed by SHOs (52), FY2s (31), Nurse Practitioners (10) and Consultants (2). 64 requests did not mention a referring clinician. The median 'quality score' for all requests was 4/5. 84.5% of requests met NICE head injury guidelines and 87% had good clinical documentation. There was no stastical difference between 'quality' scores or conformity to nice guidelines based on doctor grade ($P>0.5$).

Conclusion: NICE guidelines are not currently met. Doctors of all grades need to improve conformity to NICE head injury guidelines and improve the 'quality' of requests for CT Head.

Head injury: assessment and early management | Guidance and guidelines | NICE [Internet]. Nice.org.uk. 2018 [cited 12 April 2018]. Available from: <https://www.nice.org.uk/guidance/cg176> Van Borsel, M.D., Devolder, P.J. and Bosmans, J.M., 2016. Software solutions alone cannot guarantee useful radiology requests. *Acta Radiologica*, 57(11), pp.1366-1371. Stetson, P.D., Morrison, F.P., Bakken, S., Johnson, S.B. and eNote Research Team, 2008. Preliminary development of the physician documentation quality instrument. *Journal of the American Medical Informatics Association*, 15(4), pp.534-541.

P186 Introduction of a direct booking system in the appointment of patients for CT colonography (CTC) examinations: A common sense approach

Michael Smith; Christopher Marsh

University Hospital of North Midlands

CTC requires rigorous and complicated bowel preparation. Not only is this often confusing and distressing to the patient, they are also required to re-attend the hospital to pick up bowel preparation. Many patients are attending clinic at the time of the request therefore collection of preparation at the same attendance, via a direct booking service, provides a common sense approach, enhancing patient experience. The system also accelerates the process of appointing 63 day cancer pathway patients referred for CTC as these examinations have to be performed and reported by Imaging 14 days from the initial referral. This target was not being achieved for all patients.

Liaising closely with the Colorectal multi-disciplinary team, Imaging department line managers and appointments staff, it was decided that a dedicated team of administration and clerical staff and advanced practitioner radiographers (APR) would manage the appointments. Faecal tagging or bowel preparation has to be checked and signed by a nominated APR, following protocol of the request, according to our local standard operating procedure for distribution of bowel preparation. We have introduced a hospital mobile phone system so that an APR will be available at all times to check requests and sign for bowel preparation whilst the patient is present in the department.

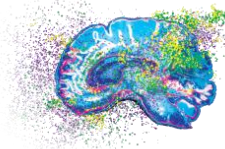
This poster will aim to describe the system of direct booking, initial difficulties in setting up the service, the advantages of such a system and the improvement made to patient experience utilising flow diagrams, standard operating procedures, charts, tables, images and text.

P187 C-Rad coding of CT colonography (CTC): Intra-observer agreement justifies appropriately trained advanced practitioner radiographers (APR) to perform and provide a preliminary interpretation of CT colonography

Michael Smith; Christopher Marsh

University Hospital of North Midlands

Using a modified C-Rads coding system to assess intra-colonic findings it has been possible to assess the accuracy of APR preliminary interpretation of CTC in comparison to the final radiology report. A recent study (awaiting publication) has concluded that APR C-coding of CTC is comparable to the final report by a radiologist. The evidence is supportive of radiographer reporting of intra-colonic pathology on CTC. Once an APR preliminary interpretation has been provided and is negative for colorectal cancer or its precursors, the patient can be removed from the 2 week wait cancer pathway. In addition, the APR can also provide patient triage at request and an on-table assessment of the acquired images.



If positive pathology is detected, go on to autonomously perform a staging chest scan and therefore reduce the examination to treatment time on the cancer pathway. It is essential that an APR led CTC service is developed in each Trust to facilitate the enhanced patient pathway for colorectal cancer imaging and the bowel cancer screening programme (BCSP). APRs should be appropriately trained in line with the BCSP training and education guidelines (TBA). Poster will demonstrate how to set up and successfully maintain an APR led service and APR performing and reporting CTCs, utilising tables, images and text.

P188 Switching to a lower cost bowel preparation model for CT Colonography

Christopher Marsh; Michael Smith; Ingrid Britton

University Hospital of North Midlands

CTCs require bowel preparation in the form of bowel cleansing to enable adequate detection of polyps and malignancies, the accuracy of the exam is improved with faecal tagging^[1]. The ideal programme of bowel preparation remains a debated subject, however it is agreed that it must be safe, effective and well tolerated by the patient. At this trust CTCs are performed with a two day preparation regime with 100ml of Gastrografin given the day before the exam. At £19.80 per bottle and 3000 CTC exams performed this incurs a £60,000 cost to the service, in comparison switching to Citramag and E-Z-Paque based preparation would be significantly less at £8.18 equating to £24,540, this is less than half the cost of using Gastrografin.

A pilot of 50 patients were given citramag with E-Z-Paque aliquoted into three 20 ml doses taken throughout the day before their exam. Exams were blind double reported with the adequacy of the bowel preparation and faecal tagging graded as inadequate, adequate and good. This poster aims to compare the adequacy, acceptability and cost saving implications of using Citramag bowel cleansing agent taken with E-Z-Paque (barium sulphate 40% w/v) against Gastrografin for Computed Tomography Colonography (CTC).

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P189 The appropriateness of lumbar spine X-ray referrals in a primary care trust

Vishnu Naidu

Barts Health

Background: Lower back pain is the leading cause of long term disability worldwide^[1] and makes up 7% of GP consultations with a resultant loss of an estimated 4.1 million working days a year^[4]. Lumbar spine X-rays (LSXr) expose patients to over 17 times the radiation received during a chest X-ray (0.07mSv vs 1.2mSv); the highest of all plain films^[5]. Both iRefer and NICE have guidelines for when to refer for a LSXr^[2,3]. This audit aims to measure adherence to the guidelines from a primary care trust as well as the referral quality.

Methods: Adults who had received a LSXr between 1st July 2017- 31st September 2017 were selected. Manual screening of notes was undertaken to retrieve (a) presenting complaint, (b) clinical indication, (c) referral wording, (d) X-ray outcome. A good referral is one with a clear clinical question and a bad referral was one without. Results 40 patients were included in this audit. 22/40 (55%) referrals adhered to the guidelines. 18/40 (42.5%) did not meet guidelines. 24/40 (60%) of referrals were deemed poor, with no clinical questions asked. 13/40 were good (32.5%) and 3/40 could not be accessed (7.5%)

Conclusion: Although most referrals met the guidelines, a significant portion did not; thus, were exposed to radiation unnecessarily. This may mean the knowledge of iRefer and NICE guideline are not well known in primary care. Furthermore, most referrals were poor, with no clinical question being asked of the radiologist. A re-audit is planned after education.

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P190 A comparative analysis of PACS/RIS reporting efficiency from a user perspective

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¹Imperial College London; ²Royal Brompton & Harefield NHS Trust; ³Imperial College Healthcare NHS Trust

Background/aims: PACS and RIS are integral to radiology reporting in NHS hospitals. Despite efforts to improve efficiency in radiology, little is known about the impact of PACS/RIS on radiologists' reporting efficiency. This study evaluates the efficiency of two different PACS/RIS, comparing time taken to report CXRs on each system and the amount of 'useful' and 'wasted' reporting time between the systems.

Method: 5 radiologists reported a total of 200 CXRs in batches of 5. 3 radiologists reported solely at Royal Brompton & Harefield (RBH) NHS Trust (2009 AGFA PACS/RIS), 1 reported solely at Imperial College NHS Trust (2016 Carestream PACS/Soliton RIS), and 1 reported on both systems. Each radiologist was timed using an electronic stopwatch with split-timer functionality. Directly looking at a patient's CXR and dictating the report were 'useful' time. All other time was 'wasted' time. The relative proportion of useful and wasted time was compared.



Results: Average wasted time per batch of 5 CXRs was 51% and 33% for the two systems. For the radiologist reporting on both systems, a substantial difference in average time taken to report 5 CXRs was noted (9 minutes versus 2 minutes). Average overall time taken to report 100 CXRs was double using one system compared to the other.

Conclusion: Depending on the PACS/RIS, up to ~50% of time spent reporting CXRs is 'wasted', not directly related to radiograph reporting. With shortages of radiologists resulting in backlogs of unreported radiographs, the detrimental effects of inefficient systems on reporting efficiency should not be underestimated.

P191 Installation of pacs workstations in a teaching hospital: The need for a team approach for reporting ergonomics

Richard Tucker

Derby University

This poster sets out the key aspects required for generic PACS workstations. The poster covers the background at a major teaching hospital in the East Midlands from the initial implementation of the PACS units in the early 2000's to the current set up, whereby PACS workstations are no longer assigned to individuals but have been utilised in a "hot desk" approach. This "hot desk" approach means that all the desks have to be versatile to support a multitude of users across Radiology.

A study of the literature has been undertaken including key papers from the Royal college of Radiologists to the Health and Safety executive. This collaborate approach to ergonomics has standardised the reporting rooms to adopted best practice and to ensure that all reporters have access to the correct reporting conditions.

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P192 A systematic review guide for chest reporting radiographers

Francesca Leonard; Nick Watson

University Hospital North Midlands

In an increasing number of centres appropriately trained and supported radiographers have an important role in the reporting of chest radiographs ensuring delivery of a timely and high-quality chest imaging service. "A Review Guide for Chest Reporting Radiographers" poster will demonstrate the importance of a logical system when reporting radiographs of the chest. The poster will aid radiographers, and others reviewing chest films, to formulate a systematic approach to chest radiograph interpretation. Due to the complexity of the anatomy on the chest radiograph, a systematic review is essential to ensure that all areas of the chest film are considered in a methodical way, particularly those areas where pathology can "hide". The classic review areas will be discussed and comprehensively illustrated with examples of pathologies which might otherwise be overlooked.

P194 Errors in voice recognition generated radiology reports: a re-audit

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Burton Hospitals NHS Foundation Trust

Background: Studies have shown that use of Voice Recognition Software (VRS) significantly reduces the turnaround time for production of radiology reports. With the ever-increasing workload on radiologists, departments are increasingly adopting the use of VRS. However, use of such technology is not without risk and this audit examined the error rate of such equipment.

Aim: To look at the error rate of VRS reports generated by the Consultant Radiologists in a District General Hospital (DGH) within the UK.

Methodology: An initial retrospective audit was carried out in November 2016 using the RCR Guidelines. The guidelines state that the Overall error rate should be <5% & Major errors should be 0%. The initial audit examined reports over a four-month period from 1st January 2016 to 30th April 2016. The results found the Trust was missing the RCR targets and so recommendations were made and a subsequent re-audit carried out six months later using the same method.

Results: The initial audit showed that the department was missing the RCR targets of Overall error rate and Major error rate by 7% and 0.3% respectively. Following a number of recommendations which included proofreading reports at least once before verifying, a re-audit six months later found the department had successfully achieved the RCR standards - Overall error rate was 4.6% and Major errors was 0%.

Conclusion: The re-audit demonstrated that if certain recommendations are successfully implemented into the daily practice of a Radiology department, the overall percentage of errors can be reduced to acceptable.



P195 Written vs verbal consent for ultrasound guided biopsies - which one to use?

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Background: Ultrasound (US) guided biopsies are commonly conducted in UK radiology departments. They provide a sample for histological diagnosis without the need for surgery. However, they are invasive and with potential complications thus requiring informed consent. There are 2 types of consent; verbal and written. We look at the following question: written VS verbal consent - which one to use? The Royal College of Radiologists standards for consent is generic and does not provide a list of procedures that require written consent. It states a judgment be made by the operator based on the nature of the procedure.

Method: We retrospectively collected data on written vs verbal consent for fine needle aspiration (FNAs) and core biopsies (CB) over a period of 10 months in 2017.

Results: 127 US guided FNAs and 63 US guided CB were performed. All 127 FNAs were conducted with verbal consent. 33/63 CBs were conducted with written consent, 27 abdominal or pelvic biopsies, 2 thoracic, 3 neck and 1 arm.

Conclusion: Procedures with potentially riskier complications, such as intra-abdominal bleeding, were conducted with written consent. Some advantages of written consent include a permanent document of patient agreement and it facilitates formal discussion of the procedure. Decisions regarding which procedures require written vs verbal consent are often made at a local or operator level. Without clear guidance, there needs to be more discussion regarding consent for US guided biopsies. We look at advantages and disadvantages of written consent and a potential decision-making process.

P196 Patient perceptions of a rapid access radiology-led lung escalation pathway

Peter Hewitt; Julie Cox; Jonathan Spratt; Ralph Marsh; Kelly Gribbon; Susan Pollock; Paula Goodson;

Joanne Anderson

City Hospitals Sunderland NHS Foundation Trust

Patient satisfaction is a key outcome measure in healthcare^[1] within the UK, but this is often overlooked in radiology services. In April 2014, a new lung escalation pathway (LCEP) was implemented in CHSFT to improve access to diagnostic services for patients with suspected lung cancer. The design and results of this pathway were presented at UKRCO 2016 and published in the journal *Clinical Radiology* in 2017. The current evaluation aims to assess the patient perspective of the LCEP, focusing on the information provided, anxiety levels and delays^[1].

The pilot evaluation obtained 16 responses from patients who had been part of the LCEP. Of the respondents, 88% (n=14) were aware that further tests could be arranged as part of the LCEP. The average time frame between chest X-ray and CT was 8 days. We have demonstrated concordance with the patient perception which averaged 5.4 days, with 94% (n=15) patients accepting the delay is "about right". 100% (n=15) understood the CT results but only 64% (n=9) felt a copy of the report would be useful. 63% (n=10) of patients rated their anxiety as 4-5/5.

As a development of the LCEP we are implementing new strategies to ensure that patients are better informed and less anxious once the LCEP has been initiated. Information and posters are to be re-established in GP waiting rooms and a new patient leaflet is being produced. Contact details are to be made clearer, especially specialist nurse contacts for patients booked for CT. The evaluation is on-going.

1. Putting patients first: Understanding what matters to lung cancer patients and carers'. UK Lung Cancer Coalition. November 2013

P197 An investigation into the concerns of pregnant women regarding the fetal anomaly scan using online forums

Penny Settle; Pauline Reeves

Sheffield Hallam University

Rationale: The research aimed to provide insights into the concerns of pregnant women regarding the fetal anomaly scan offered at 18+0 to 20+6 weeks gestation in the UK.

Methods: A qualitative study of comments on a UK-based parenting web forum was undertaken. Thematic analysis was conducted on 48 threads containing 591 posts made over the period of one year from January 2017 to January 2018.

Results: Four main themes emerged from the analysis; advice and reassurance; physical aspects of the scan; finding out the sex of the fetus, and; a sense of wonder.

Conclusion: Pregnant women post on web forums predominantly to seek advice and reassurance concerning all aspects of the scan. There is an opportunity for health professionals to engage with women in these forums and provide expert advice. The increase of availability and uptake of commercial, non-clinical, scans can be complementary to the fetal anomaly scan. The increase in use of commercial scans highlights the need for hospitals to have clear policies regarding how many people are permitted in the scan room, and the providing of information in writing or to third parties. The expansion of technological capabilities in ultrasound equipment continues to raise increasing ethical dilemmas, prompting a need to re-evaluate sonographer led pre-scan counselling.

P198 Radiographer led discharge: Implementation of a new pathway to release staff capacity and improve patient experience in accident & emergency

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Brighton and Sussex University Hospital NHS Trust

Background: Radiographer-Led Discharge (RLD) has been associated with improved waiting times, interpretations of X-rays and re-attendance rates^[1], however the impact on patient experience is not yet known. This study aimed

1. To determine whether implementing a new RLD pathway at BSUH could reduce time in hospital and
2. Assess patient experiences of RLD.

Method: The RLD pathway was developed by a multi-professional group. Patients aged 17-74 years attending A&E for assessment for closed bony injury of the clavicle, upper limb or lower limb excluding hips, were eligible for RLD. Time in hospital was compared between patients discharged using standard practice and those receiving RLD. Self-reported patient experience of RLD was assessed.

Results: Fifty-two patients met the inclusion criteria and were referred for RLD (RLD group). Forty-six patients met the inclusion criteria for RLD but were discharged using standard practice (A&E group). The median time spent in hospital was 92.0 minutes (IQR 62.8; 117.8) for those in the RLD group and 147.0 minutes (IQR 99.8; 180.0) for the A&E group (median difference = 55.0 minutes) ($p < 0.0001$). Twenty-eight (53.8%) of those in the RLD group completed feedback questionnaires of whom 27 (96.4%) indicated that they would be likely to refer the service to a friends/family and 24 (85.7%) indicated that the service should be continued.

Conclusion: RLD significantly reduced the time patients spent in hospital and patient experience ratings were excellent. A planned audit of the service will compare the quality of care between patients receiving RLD and standard care.

Henderson, D, Gray, WK, Booth, L. (2013) Assessment of a reporting radiographer-led discharge system for minor injuries: a prospective audit over 2 years. *Emerg Med J* 30:298-302

P199 Cystography and trial without catheter in the imaging department: Feasible and safe patient centred service

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University Hospitals of North Midlands

Trial without catheter (TWOC) is a procedure normally undertaken as a day case or inpatient by urology team, including specialist nurses, within a hospital setting. These patients have a cystography to ensure that the urinary bladder injury has healed following which TWOC may be done. We present our initial experience of 16 patients to see if TWOC was a safe and feasible service within the imaging department.

Data was collected by searching radiology patient information system by using codes for cystography was done in the Imaging department from June 2015 to March 2017. Patients who only had cystogram without TWOC were excluded from the study. All eligible patients' reports were reviewed. Total of 16 patients (M:F=4:12; Age range was 27 to 86 years with a median age of 56 years) had TWOC immediately following the cystography within the imaging department.

All 16 patients had a successful TWOC during their visit to the imaging department with none requiring further catheterisation. TWOC following a normal cystography routinely is on the same day in an ambulatory ward or on a later date. This has added costs to the health service in addition to inconvenience to the patient with regard to multiple appointments to the hospital. We propose that in the appropriate group of patients, cystography followed by TWOC within the Imaging department is feasible and beneficial for both the patients and the hospital.

P200 Post-mortem computed tomography in natural death investigation - a review of progress

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Background: Post mortem computed tomography (PMCT) is a relatively new radiographic speciality. Initial services diagnosed traumatic causes of death. With growing cultural and religious objections to the invasive autopsy, angiographic and ventilation techniques were developed to diagnose natural causes of death in up to 92% of cases^[1]. We launched a PMCT service to investigate natural deaths in 2015, developing and expanding it in 2017 to become the first NHS, local authority funded, PMCT service.

Method: A retrospective audit was conducted of all PMCT cases referred by HM Coroner for natural death investigation. The aims of the service set in 2015 were the standards used. Results 182 patients had PMCT scans and a cause of death was given in 176 cases (96.7%) exceeding the 90% target. A limited autopsy was predicted prior to the scan in 1 case and in a further 2 cases, the cause of death was unascertained after autopsy with histology and toxicology. 98.9% had the cause of death issued in 3 days of referral, meeting the target. The mean time from referral to radiology report being issued reduced to 10.5 hours in 2017.

Conclusion: PMCT is now a viable alternative to some autopsies, providing cause of death in a comparable time scale to autopsy. Implementation of such services is possible within the NHS, funded by local authorities.

1. Rutty G, Morgan B, Robinson C, Raj V, Pakkal M, Amoroso J, Visser T, Saunders S, Biggs M, Hollingbury F, McGregor A, West K, Richards C, Brown L Harrison R, Hew R (2017) Diagnostic accuracy of post mortem CT with targeted coronary angiography versus autopsy for coroner requested post mortem investigations: a prospective, masked comparison study. *The Lancet*; 390(10090); 145-154



P201 Coronary artery calcification scoring could avoid angiography in post-mortem computed tomography

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Post-mortem computed tomography angiography (PMCTA) can give a cause-of-death (CoD) for most natural deaths investigated for HM Coroner, but angiography increases invasiveness and cost. Coronary artery calcium (CAC) scoring, in clinical practice, correlates with risk of coronary artery disease (CAD) events, although it cannot predict them. We hypothesised that although CAC would not predict a cardiac CoD, CAC over the clinical threshold could predict significant CAD, making angiography unnecessary.

Consecutive PMCTA for natural death investigation were identified. CAC scoring was completed using Siemens SYNGO workstation. Cases were stratified based on clinical thresholds. The primary cause of death was recorded and whether there was significant CAD on the angiogram (moderate stenotic disease affecting all vessels or severe disease in any single vessel). 100 cases were recruited (M/F=56/44, average age 74(36-96) yrs). CAC was 0-10 (mild)=15, moderate (10-400)=38 and significant (400-3778)=47 cases. CAD was the cause of death in 55 cases: with 3(20%) mild, 19(50%) moderate, and 33(70%) significant CAC score. Fifteen cases had failed angiography. In the 85 remaining cases, 49(58%) had CAD as CoD and significant disease on angiogram in 61(72%) cases. 37 of 39 cases with a CAC>400 were confirmed as significant CAD on angiogram. The other two had CAC<600 and CAD not considered sufficient to cause death. Their CoD, based on PMCT and clinical history, was lung disease and cardiomegaly. Significant CAD could be assumed in nearly 50% of cases at PMCT avoiding angiography. In this series this would have resulted in 2 cases having CAD "over-reported" on their death certificate.

P202 Optimisation of 4dct with the siemens somatom confidence ct scanner™ and varian respiratory gating for scanners (rgsc™)

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Royal Surrey County Hospital

Background: In retrospective 4DCT there are often image artefacts due to irregular respiration and under sampling of prolonged breathing cycles during image acquisition. Optimisation of scanning parameters is known to minimise these artefacts. There is limited clinical experience with the combination of Varian RGSC and Siemen's Confidence CT scanner for 4DCT acquisition. This study is novel as optimal scanning protocols using these systems have not yet been documented.

Method: A retrospective audit of ten patients scanned using Siemen's Confidence CT scanner and Varian RGSC was completed. Helical 4DCT acquisition included 'Care dose 4D' modulation and 'ADMIRE' iterative reconstruction. Average respiratory rate was monitored using the RGSC and trigger card to select the appropriate respiratory rate setting. Image quality and scanner parameters were evaluated.

Results: Image quality was clinically acceptable in all patients in the average CT reconstruction and respiratory phases. Observed doses were lower than previous 4DCT experience. Interpolation artefacts were present in 5 patients. Review of actual respiratory rate during the scan and that selected, identified that a lower respiratory rate setting would have been beneficial for these patients.

Conclusion: To reduce interpolation artefacts in 4DCT with this equipment it is suggested that the minimum respiratory rate is used to inform the selection of the respiratory rate setting. This was a small study, further study is required to improve image quality, identify optimal iterative reconstruction and dose parameters.

P203 Perceptions of radiology staff on appointing the first consultant radiographer within an NHS Trust

Robert Milner

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Background: In 2016, an NHS Trust in the North of England, developed a business case seeking to employ their first consultant radiographer. The role was created in response to a difficulty in recruiting radiologists, and to manage a small, yet increasing backlog of plain film radiographs. Prior to commencing post, the successful candidate sought to gauge the sentiments of staff who already worked in the radiology department.

Method: Prior to commencement, an email containing a link to an online questionnaire was sent to every staff member working within radiology department at the appointing NHS Trust. The inclusion criteria were wide and incorporated all staff employed within radiology, regardless of role.

Results: Respondents were generally positive about the role, but themes were identified between professional groups: Radiographers perceived benefits such as "More approachable than radiologists", whilst radiologists hoped benefits would include "reduce interruptions (such as) radiographers disrupting us for trauma X-rays". Common themes included faster report turnaround times, more education and training, investment in reporting radiographers and improvement in standards and quality. Respondents suggested possible challenges would include breaking down traditional barriers, high workload, resentment to change, and pressure from radiologists.

Conclusion: Several studies have evaluated new consultant radiographer roles from the perspective of the consultant; however, this is the first study that examines the role from the perception of the individuals already working in radiology. It captures their



hopes, as well as some reservations; many similar themes were identified but there were also key differences between differing professional groups.

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P204 The voice of the AP: views on role and career prospects

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Introduction: Assistant practitioners (APs) form a key part of the career framework in imaging colloquially termed the '4-tier' structure. However, there is little research exploring their roles and in particular their views on their place in the imaging team. This presentation represents the final analysis of a study considering the personal perspective of APs in the UK imaging field.

Method: This was an electronic survey of APs (and trainees) working in diagnostic imaging and breast screening. The survey was open for 8 weeks in late summer 2017 and comprised closed questions on role, scope of practice, aspirations and allowed respondents to expand on their answers. Following exclusion of statements of fact the free-text responses describing personal views were analysed qualitatively with themes generated.

Results: 193 responses were received from 95 organisations. 246 free-text statements were reviewed. Specific themes emerged evidencing a key sense of frustration with lack of career prospects and routes. Future opportunities, including Band 5 AP and in house developments (apprenticeships) were proposed. There are many who 'love' the role and perceive themselves as a 'valued team member', but role overlap with radiographers and scope creep has left a sense of exploitation particularly where departments are short staffed. The APs were not convinced of the value of voluntary accreditation with the professional body, with cost and restricted training as the main reasons.

Conclusion: APs feel like the forgotten tier and let down by the lack of opportunities to progress in their chosen field.

P205 The role of diagnostic imaging departments in the identification of osteoporosis

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St Helens & Knowsley NHS Trust

The National Health Service (NHS) faces an increase in fragility fractures putting pressure on acute and community services^[2]. Vertebral fractures are the most common osteoporotic fracture and the most predictive of subsequent hip fractures (HFs). The cost to the patient and the NHS of HFs can be avoided if systems are designed which allow quick identification and management following vertebral fractures^[4]. The data below was collected over six months however the completed audit will address twelve months. All females aged forty-five and above who attended A&E for plain film imaging (PFI) of their pelvis were considered. Only patients with HFs and previous findings of osteopenia, bone demineralisation (BD) or fractures reported on thoracic and/or lumbar spine X-rays were included.

The aim of this audit was to establish how frequently Dual Energy X-ray Absorptiometry (DEXA) scans were advised from PF spinal reports in cases where there was no known history of the disease. Twenty-three patients with previous findings of osteopenia, BD or fractures noted on spinal reports sustained HFs. In 52% of these cases, patients had no previous history of the disease and a DEXA scan was not advised or performed before a vertebral or subsequent HF was identified. Radiology teams need to understand the importance of fracture prevention^[1].

Recommendation for DEXA should be included in the report if there is no previous evidence of osteoporosis. In conjunction with a Fracture Liaison Service, this could prompt more referrals for DEXA and potentially reduce the number of HFs and subsequent hospital admissions^[3].



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P206 Engagement of the radiotherapy workforce through the use of staff survey

Rosaleen Crouch

Weston Park Hospital

Background: There is a growing body of evidence that demonstrates the importance of employee engagement in healthcare organisations and the strong links between staff and patient experience. Organisations with higher levels of employee engagement have increased levels of patient satisfaction and improved clinical outcomes^[1,2,3,4].

Purpose: This poster aims to share the process of creating and carrying out a series of department wide staff surveys of Therapeutic Radiographers working within the radiotherapy department at Weston Park Hospital Sheffield UK. The survey was originally designed back in 2013 following a series of national and trust wide staff engagement surveys. These surveys were by design generic and whilst they aimed to address issues on the wider scale of Sheffield Teaching Hospitals NHS Foundation Trust and the NHS our staff felt that some issues needed to be assessed on a more local level.

Aim: The aim of these surveys was to enhance radiotherapy staff engagement and have proved to be a useful tool for identifying those issues that are pertinent to our team. Improved staff engagement has created a workforce who feels their contribution is valued improving staff morale and the service provided for our patients.

Summary: The poster will detail the processes involved in the survey development analysis and dissemination of results. The strategies used for implementing the findings and subsequent changes will also be discussed with recommendations for future research.

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P207 Bridging between diploma and undergraduate radiography education: development of a short programme of study

Christopher Alvey

University of Derby

Purpose: We developed and implemented a short programme of study to enable 'diploma' level qualified radiographic staff to join our undergraduate radiography programme with advanced standing. A large proportion of routine (plain film) workload of an imaging department is performed by Assistant Practitioner's (AP) - with the high shortage of qualified Practitioner staff, we sought to develop those AP staff to become fully qualified radiographers.

Methods and materials: We consulted with our clinical colleagues, and existing APs within our local geographical area to identify barriers to Practitioner status. We then developed a series of learning outcomes in the form of a short programme of 6 months to address the limitations in the AP scope of practice. This would consider both academic and clinical practice elements. The programme was approved by our University, and our Professional Body.

Results: We are currently running the programme, which has been more widely embraced than we originally forecast. It does represent a longer time commitment, however, candidates do not have to choose between employment and education as a means of progressing their careers. In doing so, it widens access to the registered profession, for candidates who might otherwise not be empowered to address their full potential. **Conclusion:** Candidates are able to progress with advanced standing into the third year of the undergraduate degree programme. In doing so it can act as a catalyst for NHS trusts to 'grow' their own staff; it represents an alternative to the standard training and education pathway.

P208 Student radiographer's accuracy measuring Bohler's angle: Implications for training and abnormality detection systems

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University of Liverpool

Background: Under the HCPC Standards of Proficiency, it could be reasonably expected that newly-qualified radiographers should have competence in angle measurement since it is an integral part of the radiography abnormality detection schemes. This study aimed to assess whether student radiographers in their final year of training prior to their first-post could accurately measure Bohler's angle to reliable indication of calcaneal fracture.

Method: A total of 24 students were asked to measure Bohler's angle, following a dedicated tutorial, on 25 lateral foot/calcaneum radiographs and record their results. An experienced MSK reporting radiographer was then asked to measure the same images set to act as a gold standard measurement.



Results: Results from the reporting radiographer showed a $\sim 2^\circ$ intra-participant variation in angle. Inter-participant results showed that a total of 14 participants estimated on average the angle to within 2° of the gold standard on average, although the standard deviation of each participant ranged between $2-9^\circ$, with the students as a whole generally overestimating the angle.

Conclusion: The results showed that Bohler's angle was generally not measured accurately or reliably enough suggesting further training interventions are required. Reasons include lack of clinical experience measuring Bohler's angle and the absence of a radiography abnormality detection scheme at the student's placement site. It is recommended that time on placement is established for students to practice measuring anatomical angles and more stringent guidelines are established in relation to radiographer abnormality detection systems and the measuring of angles.

P209 Values-based practice (VBP) training for radiographers

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VBP is consideration of a patient's values in decision-making. It is an approach that compliments evidence-based radiography to ensure a holistic service. By patient values we mean the unique preferences, concerns and expectations each patient brings to a practice encounter. VBP takes into account and highlights what matters to the patient (Fulford et al., 2012).

A small team including committee members of the Association of Radiography Educators (ARE) and other interested radiography educators have adapted materials from a handbook, originally developed for medicine (Fulford and Handa, 2011), this has been adapted for radiography. The handbook has been produced with the intention that it will be used by and for radiographers. The scenarios included have been piloted with radiographers and undergraduates at study days and in teaching sessions.

We are grateful to participants for their input. Raising the awareness of values is essential to enable contemporary person-centred care. Sustainable implementation, however, depends on a whole-systems approach where patients are at the centre of service delivery. The handbook introduces the concept and provides examples. ARE have facilitated two successful VBP radiography study days and also facilitated teaching sessions with student radiographers at their individual universities. Our aim has always been to share this material; we advocate that all radiographers must gain an understanding of VBP and adopt the approach in practice. The handbook is a method of raising awareness. This is the beginning of VBP conversations in radiography; when embedded, VBP will provide assurance we put the patient at the centre.

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EDUCATION & RESEARCH

P210 Improving the experience of LGBTQ patients in the healthcare environment: An analysis of a Twitter chat

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Background: Twitter provides a popular international platform for medical radiation professionals to connect and share their experiences. The medical radiation sciences' MedRadJournalClub (MRJC) attracts a global group of participants to monthly sessions to discuss selected articles. The September 2017 session explored discrimination against LGBTQ people within the healthcare environment. The aim of the chat was to establish what current training was available to medical radiation professionals how their organisations approached the issue and what participants would do differently at work or at home following the chat.

Method: Data was extracted using the Twitter advanced search function with #MedRadJClub from the 19th-23rd September. A first review was conducted to eliminate tweets from authors or those pre/post chat. A second review allowed for each tweet to be categorized by their main theme using a spread sheet. A thematic analysis was then performed.

Results: 44 participants took part in the September Twitter chat. 50 tweets were deemed appropriate for analysis. Almost all of the participants disclosed they had no undergraduate education or workplace training in this area. Workplaces of a limited few participants had specific approaches to improve experiences for LGBTQ patients. Many participants were eager to talk to managers about future training at their workplaces or lectures for their students following the Twitter chat.

Conclusion: There is a great deal of work to be done to educate radiography staff to enhance their LGBTQ patients' experience. Specially tailored lectures e-learning modules or training sessions would prove beneficial to both students and qualified professionals.