



University College London Hospitals

NHS Foundation Trust

IMPROVING ACUTE IMAGING WORKFLOW IN A LARGE MULTI-TERTIARY TEACHING HOSPITAL

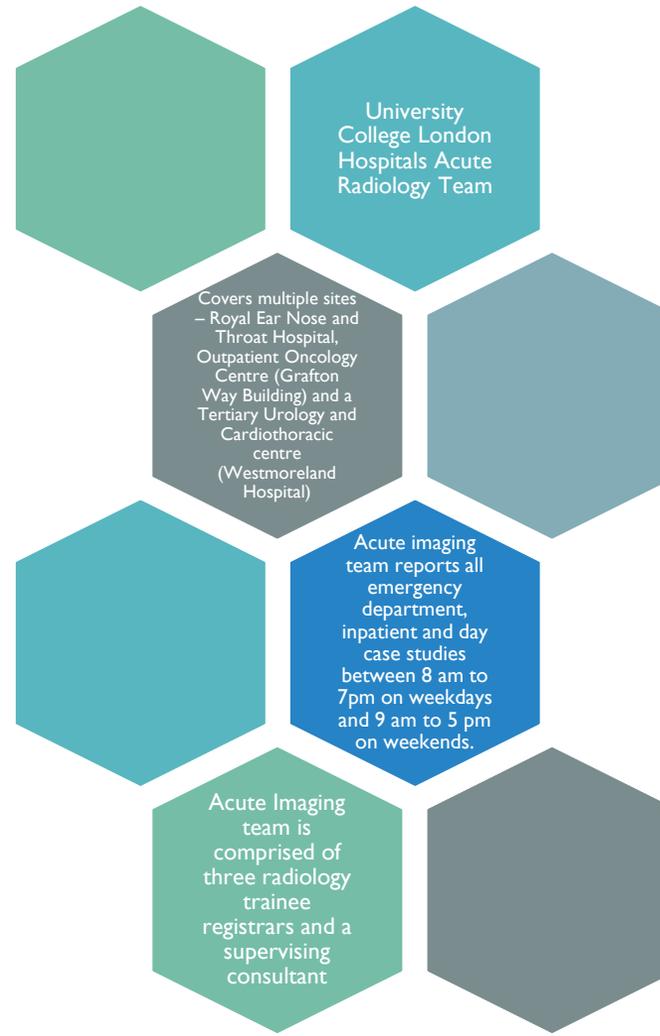
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INTRODUCTION & AIMS

INTRODUCTION

- The role of imaging is becoming increasingly vital to the management of inpatients (IP) and those presenting to emergency departments (ED). Time taken in studies being performed and reported is crucial in ensuring patients are managed promptly and targets for treatment, discharge and admission are met, maintaining patient safety. Therefore, it is vital to ensure acute radiology services are as efficient and streamlined as possible.
- Cross-sectional imaging for trauma makes up a large component of acute imaging workload, with huge impact on patient management and outcome.
- We aimed to evaluate and improve the acute radiology service provided in a multi-tertiary London hospital (a non-major trauma centre).
- We aimed to address delays in scanning, reporting, communication and documentation of urgent findings, as well as improving imaging workflow patterns.



AIMS

CYCLE I

1. To evaluate the Acute Team service provided at UCLH:
 - Map out workflow of a typical weekday
 - Audit compliance of reporting times against locally agreed standards
 - Evaluate overall efficiency of service
2. To evaluate the standard of whole body CT trauma reporting
 - Audit compliance of reporting primary surveys for whole body trauma
 - Audit time taken to report primary and secondary surveys for whole body trauma CT
3. Identify areas for improvement in workflow

CYCLE 2

1. To evaluate improvements in workflow and reporting times
2. To evaluate compliance with primary surveys in whole body trauma CT reporting as well as compliance to trauma reporting targets

METHOD

All acute cross sectional imaging performed over a two week period (01/09/20 to 11/09/20) and all whole body trauma imaging performed over a six month period (06/04/20 to 20/09/20) was acquired from electronic patient records. Preliminary analysis was undertaken to assess current practice. National and local reporting targets and trauma reporting standards for major trauma centres were used to inform targets. The following standards were agreed upon:

Trauma Related Standards:

- [A] All trauma head CT studies should be reported within one hour of being scanned (as per national guidelines 'NICE Head Injury' 2019)
- [B] All whole body trauma CT studies should have a primary survey within five minutes of being scanned (as per national guidelines 'Standards of practice and guidance for trauma radiology in severely injured patients,' 2nd edition RCR, 2017)
- [C] All whole body trauma CT studies should have a full report within one hour of being scanned (as per 'Standards of practice and guidance for trauma radiology in severely injured patients,' 2nd edition RCR)
- [D] All whole body trauma CT studies should have the final report reviewed by a consultant radiologist within 24 hours of the radiology trainee report (as per local guidelines)

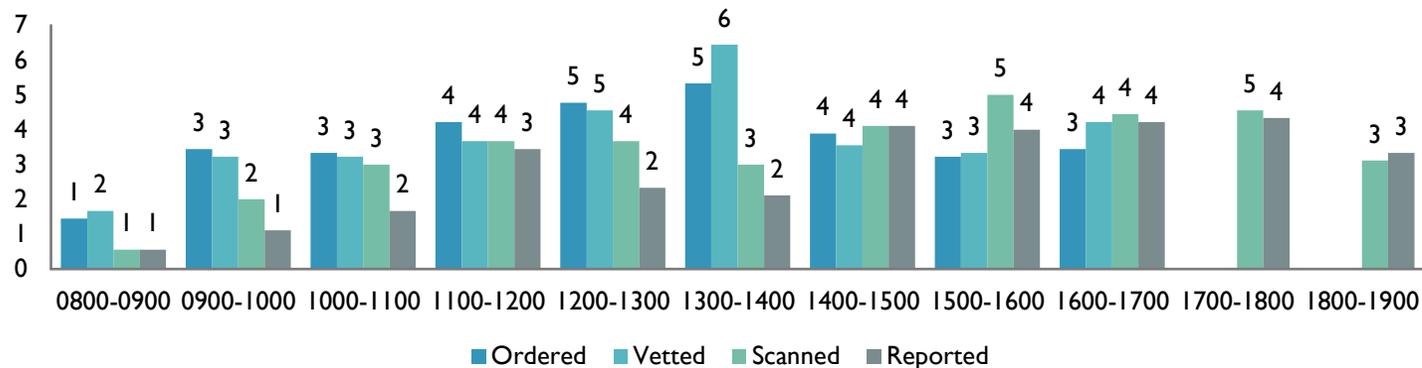
Non-trauma related standards:

- [E] All non-trauma ED body CT studies should be reported within two hours of request (as per local guidelines)
- [F] All IP CT studies should be reported within four hours of request (as per local guidelines)

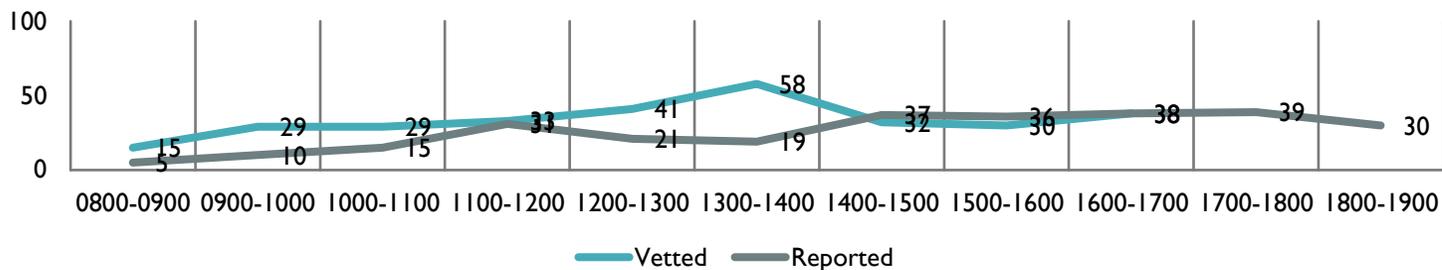
After primary data collection, areas of improvement and intervention were considered and another cycle of data collection and analysis conducted to review the impact of these interventions. Whole body trauma data was collected over a two month period (20/12/20 - 22/02/21), whilst other reporting data was collected over a one week period (15/03/21 - 19/03/21).

WORKFLOW RESULTS & INTERVENTIONS

Average number of studies per day



Total studies



Peak in the number of scans ordered and vetted between 11am – 2pm. This correlates with a proportionate reduction in scans reported.

Interventions

1. An automatic primary survey template for body trauma scans
2. A 'trauma protocolling' button to highlight trauma scans on reporting lists
3. Encouraged reporters to document communication of urgent findings
4. Encouraged radiographers to inform reporters once trauma body scan performed
5. Increased number of acute reporters during peak hours
6. A twice daily radiographer-radiologist handover to schedule non-urgent scans to off peak times

RESULTS: CT HEAD REPORTING

National NICE guidelines for CT head reporting times in the context of trauma¹

- **100%** of studies should have a provisional report available within **1 hour** of the scan being performed



Cycle 1 Results

94 CT head studies performed

76 were reported within 1 hour of being performed

81% compliance with guidelines

Cycle 2 Results

50 CT head studies performed

42 were reported within 1 hour of being performed

84% compliance with guidelines

RESULTS: EMERGENCY DEPARTMENT REPORTING

Locally agreed standards for reporting times:

- **100%** of Emergency Department CT studies should have a provisional report available within **2 hours** of the scan being requested



Cycle 1 Results



Cycle 2 Results



RESULTS: TRAUMA REPORTING

Primary Survey (RCR)

Should be done (100%)
Cycle 1: 12%
Cycle 2: 73%

Within 5 min (100%)
Cycle 1: 10%
Cycle 2: 0%

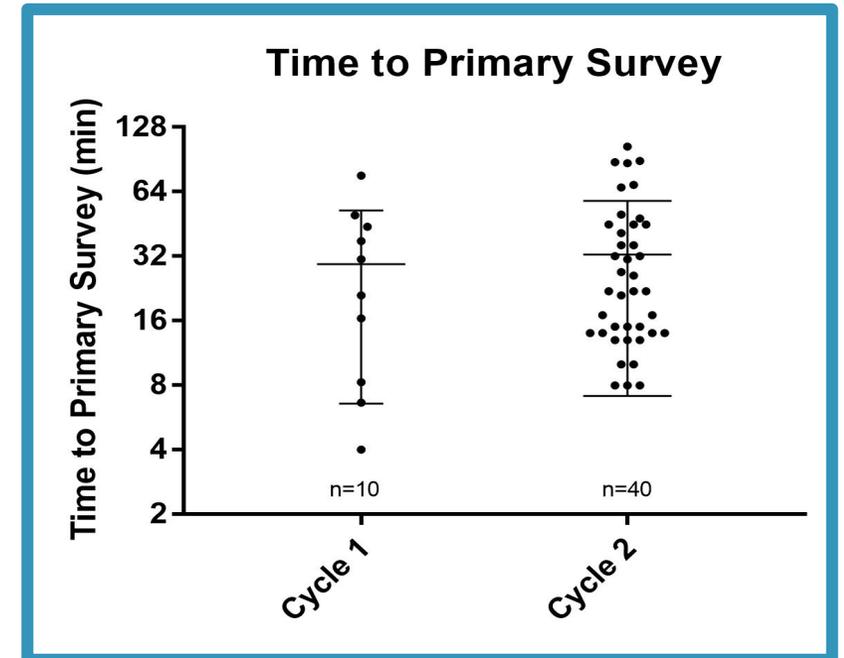
Clear documentation of communication of life threatening injuries (100%)
Cycle 1: 70%
Cycle 2: 100%

Provisional report (NICE)

Time from end exam to provisional report should be 1 hour (100%)
Cycle 1: 48%
Cycle 2: 43%

Consultant report (In house)

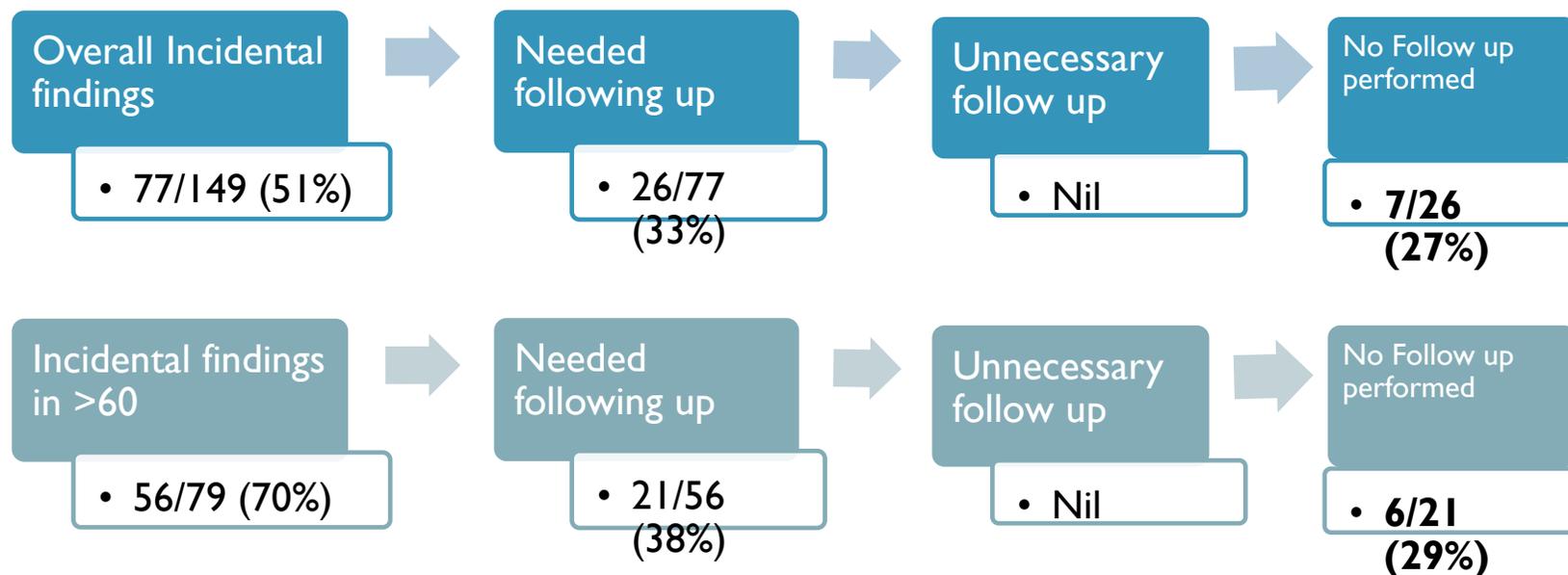
Time from end exam to consultant report should be 24 hours (100%)
Cycle 1: 90%
Cycle 2: 100%



INCIDENTAL FINDINGS IN WHOLE BODY TRAUMA STUDIES

- 149 patients had a whole-body CT over a 6-month time period in cycle I of which 79/149 (53%) > 60 years old
- Most common injury was unspecified fall, followed by RTA with unspecified falls and falls from <2 m in height making up to 47% of clinical indications for a whole-body trauma scan and 72% in those over 60 years old
- 9% of people (13/149) had a significant injury, including 6% of those >60. This included 6 Intracranial haemorrhages, 4 Abdominopelvic injuries (splenic lacerations) and 3 Pneumothoraces/Hydropneumothorax. 5 patients died of their injuries, 4 patients >60, 1 under 60.

- Incidental findings Multiple systems and included e.g. renal and liver cysts, aneurysms, calculi, hernias, meningiomas, intrahepatic duct dilatation, lung nodules, pancreatic mass, thyroid nodules, diverticulosis
- Total: 77/149 (51%)
- >60 : 56/79 (71%)



DISCUSSION

- UCLH Acute Team reporting is efficient on the whole with a majority of scans being reported within our set standards, however there is still scope for improvement.
- By implementing targeted interventions to try and improve Acute Team efficiency based on analysis of our workflow, there was improvement in reporting target compliance for both trauma and non-trauma CT studies.
- The interventions implemented for trauma reporting resulted in improved compliance with the number of primary surveys being done and the communication of life-threatening injuries, although there was no improvement in the number of primary surveys being issued within the 5 minute target.
- One consideration is whether non-trauma centres should be held to the same standards as trauma centres given they will not have the same infrastructure.
- Incidental findings on non-trauma scans, a majority performed in those >60 were also highlighted and methods for more robust follow-up systems is an important consideration
- Disruptions were identified as having a significant impact on reporting efficiency as demonstrated by reduced average numbers of scans reported at times of peak scan ordering and vetting.
- Further ideas proposed to reduce disruptions and therefore improve efficiency include:
 - Administrative support to triage phone calls and redirect non-clinical requests
 - Increased Radiographer CT vetting (e.g. CT heads, HRCT)
 - Proactive vetting