

Background:

Plain film radiographs (X-rays) are a key investigative tool used by clinicians in the Emergency department (ED).

- Addenbrooke's Hospital employs a safety-net whereby consultants check abnormal radiological reports and corroborate this with the patient's medical notes during a designated Admin, Trauma and Teaching (ATT) shift.
- This aims to ensure that any radiological finding identified by the radiologist that was missed during the initial assessment by clinicians in the ED is acted upon.

Method:

- We retrospectively reviewed a Microsoft Access database logging abnormalities missed on X-rays in the ED at Addenbrooke's Hospital between September 2015 and January 2018.
- A missed radiological finding was defined as an abnormality on the plain radiograph which the initial clinician did not identify, was reported by the radiologist and reviewed during a subsequent ATT shift.
- The Chi square test was used to compare the frequency of discrepancies between the missed findings.

Data collection:

- Addenbrooke's Hospital's *Electronic Patient Record System (EPIC)* was used to gather information on the demographics of the patients.

Results & Discussion:

96 incidents of missed radiological findings were identified in the database during the study period. This signifies a missed abnormality rate (as recorded by the database) of 0.49% (96/19493).

1. Abnormalities of the spine were found to be the most frequently overlooked, with a total discrepancy rate of 1.81% (6/332).
2. Paediatric abnormalities were more commonly missed than those in any other age group.
3. The clinical consequences of the missed findings were variable with 36.5% (n=35) of the cases requiring 'advice only', 32.3% (n=31) were referred to the fracture clinic, and 18.8% (n=18) required a return visit to the ED.
4. Logging of data was heavily dependent on the consultant assigned to the ATT shift, with an average of 0.21 abnormalities logged per shift.

Type of radiograph	Number films with radiographic abnormalities	Number of films with radiographic abnormalities missed
Total	19493	96 (0.49%)
Spine	332	6 (1.81%)
Skull	290	3 (1.03%)
Pelvic Girdle	321	3 (0.93%)
Knee	436	4 (0.92%)
Ankle	1483	13 (0.88%)
Foot	1678	13 (0.77%)
Wrist	2675	14 (0.52%)
Hand	4250	22 (0.52%)
Pectoral Girdle	1358	7 (0.52%)
Elbow	1253	5 (0.40%)
Leg	377	1 (0.27%)
Chest	4037	5 (0.12%)
Abdomen	128	0 (0.00%)
Arm	875	0 (0.00%)

Table 1: Number of radiographic abnormalities by anatomical region

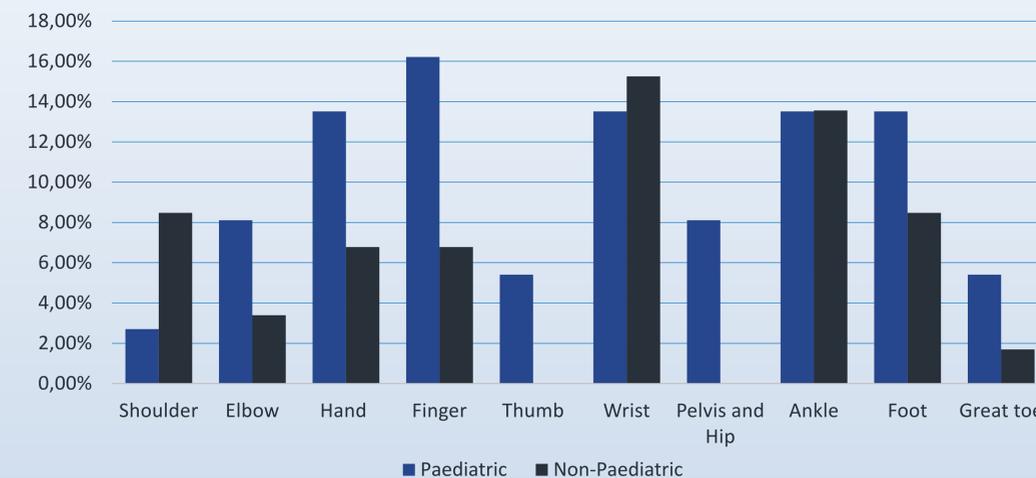


Figure 1: A comparison of percentage of missed findings between paediatric and non-paediatric populations by EPIC radiograph order option.

Conclusion & Perspectives :

There is evidence that a database logging missed radiological abnormalities can form the basis of clinical improvement. This, coupled with the NHS NPSA (2007) recommendations as to the need for a review system, signifies the merit of continuing to review and log missed findings within the ED at Addenbrooke's.

- The process of logging incidents should be made simpler to allow maintenance and internal auditing of this safety-net.
- The results of the study show that there are certain anatomical regions which seem to have more abnormalities missed and thus care should be taken in interpretation of these X-rays.
- Paediatric films are also associated with an increased risk of overlooking an abnormality. Enhanced teaching in this area and care when reviewing such images is suggested.

References:

National Health Service (NHS) National Patient Safety Agency (NPSA) (2007). *Early identification of failure to act on radiological imaging reports*