

# **X-ray reporting in accident and emergency departments — an area for improvements in efficiency.**

M. R. JAMES, A. BRACEGIRDLE & D. W. YATES

*University Department of Accident & Emergency Medicine, Hope Hospital, Salford, Manchester.*

## **SUMMARY**

All Accident and Emergency departments in England seeing more than 20 000 new patients each year were surveyed for the extent and mechanism of their radiological reporting service. A total of 190 of the 210 departments replied, 39% of these departments were not satisfied with the service available to them. A 'hot' reporting service was available in 2.6% of departments and 49% did not have films reported in under 48 h.

The methods used to detect radiological abnormalities missed by the A&E doctor were investigated further. A total of 60% of departments had a traditional reporting system but 29% had introduced systems that required the A&E doctor to include his or her radiological diagnosis with the films prior to their being returned to the X-ray department for reporting. This allowed rapid audit of radiological assessment. Its introduction to all A&E departments is recommended.

## **INTRODUCTION**

There are currently several problems with A&E radiology services. Many departments do not have all films reported, there are delays receiving reports, and considerable time is spent by senior A&E doctors checking X-ray reports against A&E records for incorrect diagnoses by their juniors.

Some departments operate a system where the radiographers place a red dot on the films that they consider to be abnormal to alert the A&E doctor, which has been shown to reduce the incidence of missed abnormalities (Berman, 1985).

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*Correspondence: Mr M.R. James, Senior Registrar in Accident and Emergency, Dept of Accident & Emergency, Royal Preston Hospital, Sharoe Green Lane, Fulwood, Preston, Lancs. PR2 4HT, U.K.*

Various methods are used to pick up radiological abnormalities that may have been missed on the patient's initial attendance. The traditional method is to draw all the notes for X-ray reports indicating an abnormality and check which have been missed. This is time consuming and misses the false positives (those where the initial doctor has interpreted a normal film as abnormal). There are also several techniques to enable the radiologist to be aware of the A&E doctors radiological diagnosis when the films are reported. This enables the radiologist to rapidly identify those patients who have been misdiagnosed by the A&E doctor. Some of these administrative systems are far more efficient than others.

The aim of the study was to find the extent and speed of X-ray reporting and the methods used to detect missed abnormalities.

## METHOD

All A&E departments in England seeing more than 20000 new patients per year were surveyed (CSA Handbook, 1990.) The consultants in charge of these departments were each sent a questionnaire. The questionnaires were coded to ascertain who had replied but were not identified further in the analysis.

Consultants were asked if they were satisfied with the radiological reporting service available to them, which films were reported and how long it took to receive the reports. They were also asked if a radiographer 'red dot' system or equivalent was in operation. The final question covered the methods used to detect fractures or other radiological abnormalities missed by the A&E doctor who initially saw the patient.

One reminder letter was sent to those not initially replying.

## RESULTS

A total of 210 departments were surveyed and 190 replied (90.5% response).

Only 61% of the departments replying were satisfied with the radiological reporting service available to them. The commonest reason given for dissatisfaction was the time to receive reports. The mean was 3.7 days but with a wide range (0–28 days). There was a marked difference in the mean time to receive reports between those departments satisfied with the reporting service (2.2 days) and those not satisfied (6.1 days).

Only 5 (2.6%) of departments had a 'hot' reporting service available during working hours with films returned to the A&E department with a formal report at the time that they were taken. Only one department offered this service out of hours when it was provided by middle grade radiology staff. Table 1 shows a breakdown of the time taken to receive the X-ray reports in the A&E departments. In 87.9% of departments all the films were reported but a few offered more limited reporting (Table 2).

**Table 1.** To show time taken to receive reports

Immediate	5 (2.6%)
Less than 24 h	42 (22.1%)
24–48 h	50 (26.3%)
2–7 days	70 (36.9%)
More than 1 week	23 (12.1%)
Total	190

**Table 2.** To show types of X-rays reported in all departments

All	167	(88.0%)
Request only	5	(2.6%)
Discharge from A&E, no clinic apt.	8	(4.2%)
All X-rays interpreted as normal by A&E doctor	7	(3.7%)
Skulls + requests	1	(0.5%)
Children + h.i. + requests	1	(0.5%)
Adult torso + children + h.i.	1	(0.5%)

A radiographer 'red dot' system or equivalent was in operation in 24.7% departments.

The methods used to pick up X-ray abnormalities missed by the A&E doctor are shown in Table 3.

## DISCUSSION

Misinterpretation of X-ray films is a common error among A&E SHOs (Carew-McColl, 1983; Vincent, 1988) and it is important to detect these false positives and negatives as rapidly as possible in order to correct any management errors.

A system such as the 'red dot' system allows radiographers to alert the A&E doctor to those films considered abnormal at the time that they are taken. Such a system has been shown to approximately halve the missed abnormality rate (Berman, 1985). This system was only used in 25% of the departments surveyed and could probably be more widely introduced with considerable benefit. The medico-legal fears of such a system are probably groundless (Fielding, 1990).

This survey showed that 87.9% of responding departments in England report all A&E films. This falls short of the Royal College of Radiologists' guidelines on X-ray reporting which recommend that all films should be seen and reported by a radiologist (Fielding, 1990).

The major complaint in A&E departments was the time taken to receive reports with 48.9% not receiving them within 48 h. Some consultants stated that the time

**Table 3.** To show methods to detect radiological abnormalities initially missed by the A&E doctor

(1) All positive X-ray reports checked against notes.	125 (65.7%)
(2) A&E doctors diagnoses available to radiologist (total)	56 (29.5%)
(3) No method of checking	2 (1.1%)
(4) Other	
a) All films seen by senior. A&E Doctor	3 (1.6%)
b) Only X-rays interpreted as normal by A&E doctor reported, therefore all positive reports followed up	4 (2.1%)

taken to receive reports was so long that they checked all the films taken in the previous 24 h themselves prior to their return to the X-ray department. Several respondents gave examples of very late reports. In one an undetected pneumothorax was reported 3 months after the patient's attendance. In another recent study a third did not receive reports in under 48 h. (Beggs & Davidson, 1990). However this other study looked at 44 U.K. radiology teaching departments, with a much lower response rate to their questionnaires (57% analysed) and it did not address the problem of exactly how to improve the service without increasing the staffing.

This survey has shown that there is cause for concern with regard to the speed of X-ray reporting in A&E departments. Those consultants expressing satisfaction with the radiology service had a quicker reporting time than those who were dissatisfied. We would therefore recommend a rapid reporting system. The ideal service would be one offering 'hot' reporting during working hours with rapid next day reporting for overnight and weekend films. This service was attained in only 2.6% of departments responding to the survey. The service available in one hospital with middle grade radiology staff available 24 h a day will be considered impossible in most departments. In the absence of adequate staffing levels to attain a 'hot' reporting service it is important to make the most efficient use of what is available.

However it is possible to improve the system without an increase in staffing. The majority of departments (65.8%) have a traditional reporting system with typed reports. Those reports indicating an abnormality are then checked against the notes for misdiagnoses. This is very time consuming and does not detect the false positives.

Several departments (29.5%), have introduced systems that alert the radiologist to the A&E doctors radiological diagnosis. This immediately allows the radiologist to sort out those patients with an incorrect diagnosis, and bring these to the attention of the A&E consultant for rapid action. Those films where the doctors interpretation is correct (the majority) need only the briefest report which in some cases could be written on the X-ray form or A&E notes as 'agreed'. This saves considerably on clerical and typing time.

The methods used to alert the radiologist are listed in Table 4. The best systems seem to be placing either a slip of paper or carbon copy of the X-ray form with the A&E doctors radiological diagnosis recorded on it, in the X-ray packet. The extra carbon copied leaf on the X-ray form is particularly efficient as the radiologist can

**Table 4.** Showing methods used to alert the radiologist to the A&E doctors radiological diagnosis

Item sent with X-rays (Has A&E doctors radiological diagnosis recorded on it).	Numbers
Slip of paper	23
X-ray form — carbon copy	7
— original	14
A&E card — carbon copy	4
— original	8

merely stamp this as 'agreed' and no typing will be necessary. All those with 'disagreed' get a full report and are returned to A&E forthwith for action. Because the majority of films are normal there would be considerable savings on secretarial time.

REFERENCES

Beggs I. & Davidson J. K. (1990) Accident and Emergency Reporting in U.K. Teaching Departments. *Clinical Radiology* **41**, 264–267.

Berman L., De Lacey G., Twomey E. et al. (1985) Reducing errors in the accident department: a simple method using radiographers. *British Medical Journal* **290** 421–22.

Carew-McColl M. (1983) Radiological interpretation in an Accident and Emergency department. *British Journal Clinical Practice* Nov 375–77.

Fielding J. A. (1990) Improving Accident and Emergency Radiology. *Clinical Radiology* **41**, 149–151.

Vincent C. A., Driscoll P.A., Audley R.J. et al (1988). Accuracy of detection of radiographic abnormalities by junior doctors. *Archives of Emergency Medicine* **5**, 101–9