



Australian Patient Safety Foundation -

Radiology Events Register

Progress Report –Second Phase

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The Australian Patient Safety Foundation

for the Quality Use in Diagnostic Imaging (QUDI) Program (an initiative sponsored by the Royal College of Australian and New Zealand Radiologists)

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1	Analysis	1
1.1	Purpose of the RaER Project.....	1
1.2	Introduction.....	1
1.3	Materials and Methods.....	1
1.4	What has been achieved so far.....	2
2	Interim Results	3
2.1	Principal Incident Type.....	3
2.1.1	Clinical Management Incidents.....	3
2.1.2	Documentation Incidents	9
2.1.3	Contributing Factors.....	10
3	Discussion.....	12
3.1	Publication potential	12
3.2	Risk to the project	12
3.3	Involving the Interventional Radiologists.....	13
3.4	Summary.....	13
4	References	14

1 Analysis

The main purpose of this report is to outline the results of a collection of data for the middle phase of the Radiology Events Register (RaER) project. The report will also outline how the data will be used and the next steps to be undertaken.

1.1 Purpose of the RaER Project

To develop a means of systematic data collection and analysis of adverse incidents and discrepancies in radiology to inform quality improvement and patient safety in radiology.

1.2 Introduction

RAER is a major Royal Australian and New Zealand College of Radiologists (RANZCR) sponsored initiative funded through the Quality Use of Diagnostic Imaging (QUDI) (<http://www.ranzcr.edu.au/qualityprograms/qudi/index.cfm>) program, initially involving the Australian Patient Safety Foundation (APSF) and several public and private radiology sites across Australia.

Little incident data has been collected by specialists in the diagnostic radiology speciality. The purpose of this project is to examine pilot options for the RANZCR members to report incidents into an incident monitoring system. Resulting data will provide the College with an indication of the nature of challenges faced by members in the delivery of care. The project will also identify risks in the radiology process and inform quality improvement and patient safety.

1.3 Materials and Methods

An incident is defined as “an **event** or **circumstance** which could have resulted, or did result, in unintended or unnecessary **harm** to a person and/or a **complaint, loss** or damage” (Runciman 2006).

The tool for data collection and analysis is the Advanced Incident Management System (AIMS), which is used extensively in the public hospital system and the anaesthetic speciality. Data collected and analysed using AIMS have been published in more than 150 peer-reviewed publications (APSF 2006).

Incidents were classified using Generic Reference Model (GRM) and Healthcare Incident Types (HITs) embedded in AIMS (Runciman 2007) (Figure 1). Classification was undertaken by a radiographer who was familiar with the AIMS system.

As part of data entry one or more HITs must be chosen, one of which must be the Principal Incident Type (the one which most directly caused or potentially caused an adverse outcome).

The Generic HITs cover the types of incidents that can occur across the spectrum of activities, behaviours, equipment and factors involved in the delivery of care, in both acute and non-acute environments. Each HIT is designed to elicit comprehensive information specifically related to that type of incident. In addition to the HIT specific questions, generic HITs also include a set of Common Questions that elicit information about human or general factors that span all incident types. Specialty HITs capture more specific detail, and plans are underway to develop these for all clinical specialties. The Radiology Specialty HIT was developed as part of this project

The project is protected by qualified privilege by virtue of the declaration of ‘Phase 2 – the Investigation and Analysis Phase of the Advanced Incident Management System (AIMS) under Part VC of the Health Insurance Act.’ This declaration took effect on June 9 2006 and will be valid for five years.

An electronic process for radiologists to register interest in the project and to enter incidents was set up. Radiologists were given a generic username and password to access the system, protecting the identification of the user.

Contributing Factors and Hazards

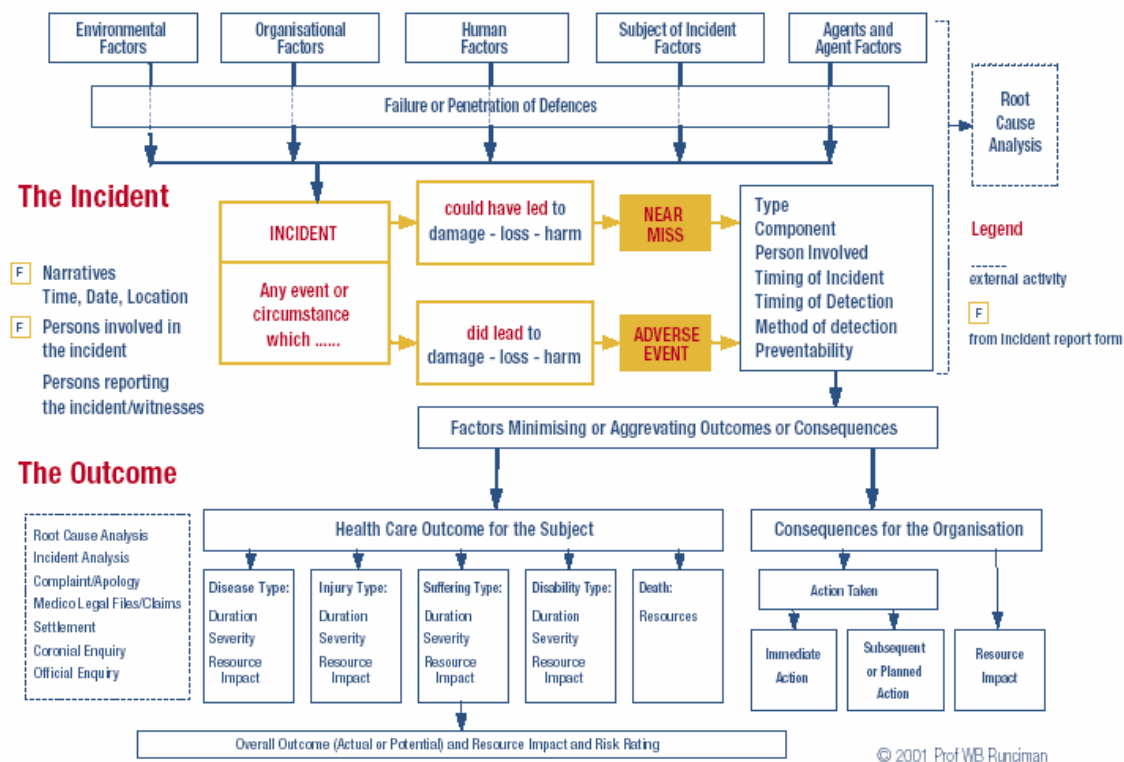


Figure 1: The Generic Reference Model

1.4 What has been achieved so far

The secure web-based tool, based on the internationally recognised incident management system AIMS, was set up in June 2006. Hardware (such as a dedicated server) and associated software and security requirements were purchased or leased, set up and configured to host AIMS. Extensive testing was also undertaken to ensure that all systems were ready for deployment. Our team is experienced in setting up deployments of this size and all these processes were achieved on time and budget. A website (www.RaER.org) that outlines key features of the project was also developed and links were provided from it to the secure AIMS webpage.

Two specialised data sets for radiology were developed and integrated into AIMS: a data collection form and the classification structure that supplements the extensive generic classification already developed and deployed within AIMS.

Two radiology departments in Australia agreed to provide data for the pilot part of the project. One of the departments also supplied extracts from their clinical reviews. Other departments and leaders in Australia were asked to participate, and the website has been available for radiologists to register. Interest in the project has been minor with twenty departments or individuals registering.

Medical Defence Organisations (MDOs) were identified, contacted and requests were made for claims data. So far, one MDO has supplied data and another has agreed to supply data and is currently running the necessary internal queries. The project is still in negotiations with two others and we are reasonably confident that at least one of these will agree to supply data to the project.

We have also written to the insurers of the public hospital system asking for access to their claims in a de-identified fashion; however, we are still awaiting responses.

A number of presentations have been undertaken by QUDI and project personnel to inform RANZCR and its members of the project and its achievements thus far. Preliminary discussions have taken place with the Interventional Radiology Society of Australasia (IRSA) to share complications data from their audit system.

2 Interim Results

There were 658 incidents collected, entered, classified and analysed using the AIMS database. Retrospective and prospective collection of incidents occurred from April 2003 to June 2008. Of these, 403 incidents (61%) were sourced from incident reports, 211 (32%) were sourced from medico-legal cases, and there were 46 (7%) clinical reviews.

2.1 Principal Incident Type

Table 1 shows the Principal Incident Type (PIT) for the 658 recorded incidents. More than one incident type can be recorded against an incident, however, the PIT is defined as the incident type most proximal to the harm (or potential harm) caused.

Clinical Management incidents account for just over three-quarters of the incidents recorded. Incident reports are a more diverse set of incidents than medico-legal incidents or clinical reviews with ten incident types represented and five and two in medico-legal and clinical reviews, respectively.

Table 1: % of incidents by Principal Incident Type

Principal incident type	Clinical review	Incident report	Medico-legal	Grand Total
Clinical Management	85	65	86	78
Documentation	15	10	2	9
Medications/IV fluids	0	3	5	2
Behaviour/human performance	0	5	1	2
Organisation Management/Services	0	5	0	2
Medical Devices/Equipment/Property	0	5	0	2
Accidents/Occupational Health and Safety	0	4	0	1
Health Care Associated Infection/Infestation	0	0	5	2
Falls	0	1	0	0
Aggression – Victim	0	2	1	1
Grand Total	100	100	100	100

2.1.1 Clinical Management Incidents

Incidents coded as Clinical Management are analysed and presented separately in this section. Over half of Clinical Management incidents were related to either X-ray or CT scan, and a further 14% were associated with ultrasound. Angiography is more commonly associated with incident reports; Fluoroscopy and MRI are more commonly associated with clinical reviews; and ultrasound and mammography with medicolegal incidents.

Table 2: Reported Modality associated with incidents (%)

Imaging modality	Clinical review	Incident report	Medico-legal	Grand Total
X-ray	35	34	24	31
CT scan	22	28	27	26
Ultrasound	5	11	25	14
Angiography intervention	8	13	0	7
Fluoroscopy	11	5	5	7
MRI	16	3	5	8
Mammography	0	2	11	4
Nuclear medicine	3	3	3	3
Other	0	1	0	<1
Grand Total	100	100	100	100

The following two tables indicate when the incident occurred and when it was detected. The main stages that the incidents occurred were interpretation of images (39%), patient preparation (22%) and technical performance of a procedure (20%). The different data sources were associated with incidents occurring in different stages: nearly half the incident reports occurred in the patient preparation stage and most of the medicolegal incidents occurred in the interpretation of images stage. Interpretation of images also accounted for over one quarter of the clinical reviews.

Table 3: Stage when the incident occurred (%)

The stage during the radiological procedure when the incident occurred	Clinical review	Incident report	Medico-legal	Grand Total
Formulation of clinical question	0	1	0	0
Request for radiological consultation	6	14	2	9
Patient preparation	19	45	1	22
Technical performance of procedure	19	24	20	20
Interpretation of images	35	2	70	39
Perception of study/information	3	1	0	1
Presentation of study/results	0	1	3	2
Communication of diagnosis	10	11	4	7
Clinical action/resulting	6	1	0	1
Grand Total	100	100	100	100

Table 4: Stage when the incident was detected (%)

The stage during the radiological procedure when the incident was detected	Clinical review	Incident report	Medico-legal	Grand Total
Request for radiological consultation	5	7	0	5
Patient preparation	5	51	5	36
Technical performance of procedure	24	24	35	26
Interpretation of images	14	5	0	6
Presentation of study/results	0	0	0	0
Communication of diagnosis	0	8	5	6
Clinical action/resulting	52	5	55	20
Grand Total	100	100	100	100

The Clinical Management Healthcare incident type has two subsets to allow further classification of the type of problem to which the incident related. These subsets are Clinical administration/logistic/communication processes and Clinical Processes/procedures and are shown in Table 5. Administration and logistical problems are not well represented in the clinical reviews and medicolegal incidents (note that an incident can have elements of both of these categories and can be coded as both).

Table 5: Type of Clinical Management problem

What the problem was associated with	Clinical review	Incident report	Medico-legal	Grand Total
Clinical administration/logistic/communication process	3	106	2	111
Clinical process/treatment/procedure	39	215	182	436
Grand Total	42	321	184	547

Clinical administration/logistic/communication processes

The main clinical administration processes reported were transport/transfer/retrieval/escort (58/106 incidents) and handover/handoff (29/106 incidents). The number of incidents and type of problem are found in Tables 6 and 7.

Table 6: Transport/transfer/retrieval/escort

Problem cited	Number of incidents
Inadequate/inappropriate process or response	31
Not performed/used/provided when indicated	15
Incorrectly performed/followed/used/provided	6
Excessive risk for patient	6
Total	58

Table 7: Handover/handoff

Problem cited	Number of incidents
Inadequate/inappropriate process or response	15
Not performed/used/provided when indicated	10
Incorrectly performed/followed/used/provided	2
Excessive risk for patient	2
Total	29

The main types of incidents associated with transport were: Nurses unavailable to transport sick patients; patients transported without nurses; patients sent with inappropriate equipment (eg wheelchairs for patients who cannot stand/transfer); orderlies late or unavailable; inappropriate staff members transferring with patients (eg an EN for patients with a PCA); and patients being left in the medical imaging department by themselves with medical imaging staff not being informed of their arrival.

A summary of the handover/handoff incidents are as follows:

- No escorts for sick patients / patients known to fit (5 incidents)
- MRSA information not handed over to the Radiology Department (4)
- Medical handover not disclosing that patients have TB (2)
- Patients escorted with IV infusions running against hospital policy (2)
- Sick patients not verbally handed over to the Radiology Department by ward staff (2)
- No documentation / observations / procedure information was noted for patients who had undergone interventional procedures (2)
- Lack of medical admission / status in the notes prior to transfer to the Radiology Department
- Staff not notified of patient arrived in the Radiology Department
- Unsafe, sick patient left in the Radiology Department due to radiology wanting to go home for 5pm
- Registrar discussed with a minor information contrary to that discussed with mother
- Radiology staff leaving messages about patients on an administrative phone answer machine that is not manned on the weekend
- Amended ultrasound report did not reach referring GP for 3 weeks
- On weekend, patient delivered to an almost empty Radiology Department, and left alone without anyone being told of their presence

Within the Clinical administration/logistic/communication processes incident subset, there were also ten incidents associated with inadequate or inappropriate admissions, 7 of those related to appointments and 3 incidents related to consent/informed decision making.

Clinical Process Incidents

Over two-thirds of the main problems cited with the clinical process were performance of the procedure. Other problems cited were ordering or choosing the procedure, preparation of the patient prior to the procedure, and post-procedural disorders/complications. Over 95% of the medicolegal incidents were related to procedure performance or post-procedural disorders/complications, while 22% of incident reports were related to ordering/choosing a procedure.

Table 8: Problems associated with Clinical Process incidents

Problem cited	Number
Performance	273
Ordering/choosing	47
Preparation	29
Post-procedural disorder/complication	23
Excessive risk for patient	23
Total	395

Procedure Preparation

The problems with preparation are dependent on the type of procedure and include: No bed availability post procedure; no IVC in situ; creatinine results not being performed; pre-hydration not undertaken; no consent signed; warfarin not withheld; skin marks in the wrong area (facet joint injections); assessments inadequate; patients on metformin; and no trachea dilators with the patient.

Table 9: Problems with preparation of the procedure

Preparation category	Number of times classified
Inadequate/incorrect preparation	21
Patient not prepared	6
Staff not ready	4
Facility not prepared	2
Equipment related	3
Delay in preparation of patient	1
No/inadequate vascular access	1
Medication related	1
Patient related	3
Patient unnecessarily prepared	1
Wrong patient prepared	1
Patient not properly informed/educated	1
Total	45

Some of the incidents related to inadequate or incorrect preparation of the procedure have been paraphrased and summarised below:

- Renal function not assessed prior to presentation for CT Scan – last recorded level (5 months previously) was elevated
- Ward did not give the patient adequate and timely pain relief for an MRI
- Patient with a history of unstable postural drop sent to radiology in a wheelchair
- Nuclear Medicine identified, post procedure, that consent form not signed

- Patient sent to x-ray dept without required patient care equipment
- Scheduled observations not undertaken during or post procedure. No consent form signed. Vascular surgery team not aware of admission
- Patient very unwell – decision made to use non-tunnelled catheter as patient unable to lie supine. Required catheter not available - 25 mins+ delay in obtaining catheter. Patient arrested and required intubation
- Patient had cardio-pulmonary arrest and was transferred to ICU
- 1 hour plus delay to procedure whilst patient's fitness for procedure was discussed
- An elective inpatient admission for contrast media examination presented on metformin and procedure was cancelled
- Pre-hydration prior to angiography not undertaken resulting in procedure being cancelled
- CT Contrast order form not completed - awaiting results of creatinine levels test
- Inadequate patient preparation prior to CT Pulmonary Angiogram – no cannula in situ in cubital fossa
- Patient on warfarin had INR checked prior to procedure. INR level high (normal INR = 1.0). Procedure was cancelled and rebooked
- No pathology results available prior to booking. Warfarin not withheld and pre-hydration not undertaken pre-procedure resulting in a cancelled procedure
- No bed available for overnight admission resulting in a cancelled procedure. Also, renal function had not been checked

Performance of the Procedure

There were 273 incidents related to the performance of the procedure, however performance was classified as a secondary problem in a further 63 of the Clinical Process incidents, bringing the total to 336. The data source for "Failure/delay in detecting the problem" (105/134 incidents) and "Failure to synthesise/act on available information" (40/72) were predominantly medicolegal. There was much overlap between these two incidents (52 incidents shared these codes).

Table 10: Problems with performance of the procedure

Performance	Times classified
Failure/delay in detecting problem	140
Failure to synthesise/act on available information	74
Delay in performing	28
Difficulty in performing	18
Cancellation/postponement of process/treatment/procedure	16
Complication during procedure/process	14
Wrong person	10
Wrong body part/side/site	8
Unintended safety compromise	6
Repeated attempts	6
Inadequately/inappropriately performed	6
Prolonged procedure/treatment/intervention	5
Unsuccessful attempt/failed procedure	5
Total	336

Given the amount of overlap in the two most frequent codes, we have combined the incidents for analytical purposes. The most frequent four modalities comprising 92% of incidents associated with these two codes are shown in Table 11.

Table 11: Modalities associated with Failure/delay in detecting the problem and Failure to synthesise/act on available information

Modality	Number
X-ray	36
Ultrasound	25
CT scan	19
Mammography	12

24 of the incidents related to x-rays were missed or delayed diagnosis of fractures (including seven foot/toe fractures, three greater tuberosities/glenoid, three NOFs, and a shattered head of a THR prosthesis), and musculoskeletal problems (e.g. elbow dislocations, slipped femoral epiphysis). There were five incidents of missed or delayed diagnosis of cancer (four lung and one shoulder giant cell tumour), as well as a pneumonia, a retained distal end of a PICC line, and a Morgagni hernia.

Ten incidents associated with ultrasound were related to missed or delayed diagnosis of foetal abnormalities, and another was related to a falsely reported foetal demise which was a typing error – this incident was detected by the mother saying that she had noticed a heartbeat. Three incidents were related to obstetric issues such as misdiagnosing an ectopic pregnancy, bi-cornuate uterus, and a fully dilated cervix with a bulging membrane. There was another incident related to a diagnosis of a blighted ovum that was normal. Two incidents related to misdiagnosing suspected breast malignancies.

The missed and delayed diagnoses related to CT were varied with two subdural haemorrhages, two normal kidneys diagnosed as carcinomas, and two pancreatic cancers.

Ordering and choosing a procedure

There were 47 incidents related to ordering/choosing a procedure. Most of the incidents related to ordered/chosen by wrong/inappropriate staff member were nurse-initiated from emergency department. There were two medico-legal incidents related to a physiotherapist ordering a CT; and a disregarded protocol (that stated that paediatrics can only refer children for CTs) resulting in a three year old boy receiving a head CT.

Table 12: Problems with ordering or choosing of the procedure

What was the ordering or choosing related problem	Number
Inadequately/inappropriately ordered/chosen	15
Wrong body part/site/site	13
Wrong person	11
Not ordered/chosen when indicated	6
Wrong time	3
Contraindicated for the diagnosis	3
Wrong frequency	1
Total	52

Table 13 shows the breakdown of the responses to inadequately ordered/chosen from Table 12.

Table 13: Problems with inadequately/inappropriately ordered/chosen procedures

What was the problem ordered chosen	Number
Ordered/chosen by wrong/inappropriate staff member	9
Wrong/inappropriate technique ordered/chosen	5
Wrong/inappropriate equipment or device ordered/chosen	1
Total	15

Post-procedural disorder/complication

Over half of the 36 incidents coded as post-procedural disorder/complications were associated with CT scans (13) and angiography (6). All angiography incidents were sourced from incident reports and all but one of the CT scan incidents were from medicolegal incidents (the exception being a clinical review). The angiography complications were haemorrhages / haematomas (3) with cardiac arrest (1) and tachycardia. There is also a pulmonary oedema however it is not clear whether the pulmonary oedema was present prior to the procedure being performed.

Most of the CT scans complications relate to the associated biopsies and injections: Two incidents of lumbar facet joint injections resulting in pneumothorax; haemorrhages (3); nerve symptoms associated with cervical and lumbar nerve root blocks (2); and cervical facet joint injections (1). One incident resulted in extravasation of contrast, and a cranial CT with IV contrast was associated with neural symptoms in the left upper limb.

2.1.2 Documentation Incidents

A total of 37 (9 %) incidents were classified as having a principal incident type as documentation, however, there were a total of 81 incidents classified as documentation. A total of 84% of the problems were classified as problems with content, or documents unavailable or absent.

Table 14: Problems associated with 81 documentation incidents (combining principal and healthcare incident types)

Problem	%
Problem with the content	51
Document(s) unavailable or absent	33
Wrong patient's document(s) used	9
Problem with labelling	5
Entering/filing/storing problem	2

The main problems with content were inadequate documentation information or the content was incorrect. The main problems with unavailable or absent documents were lost or missing documents or documents not sent.

2.1.3 Contributing Factors

Contributing Factors to incidents have been classified into staff, subject (or patient), organisational and environmental factors. The number of incidents classified into these categories are shown below in Figure 2 and show that staff factors for both incident types are the most frequently cited.

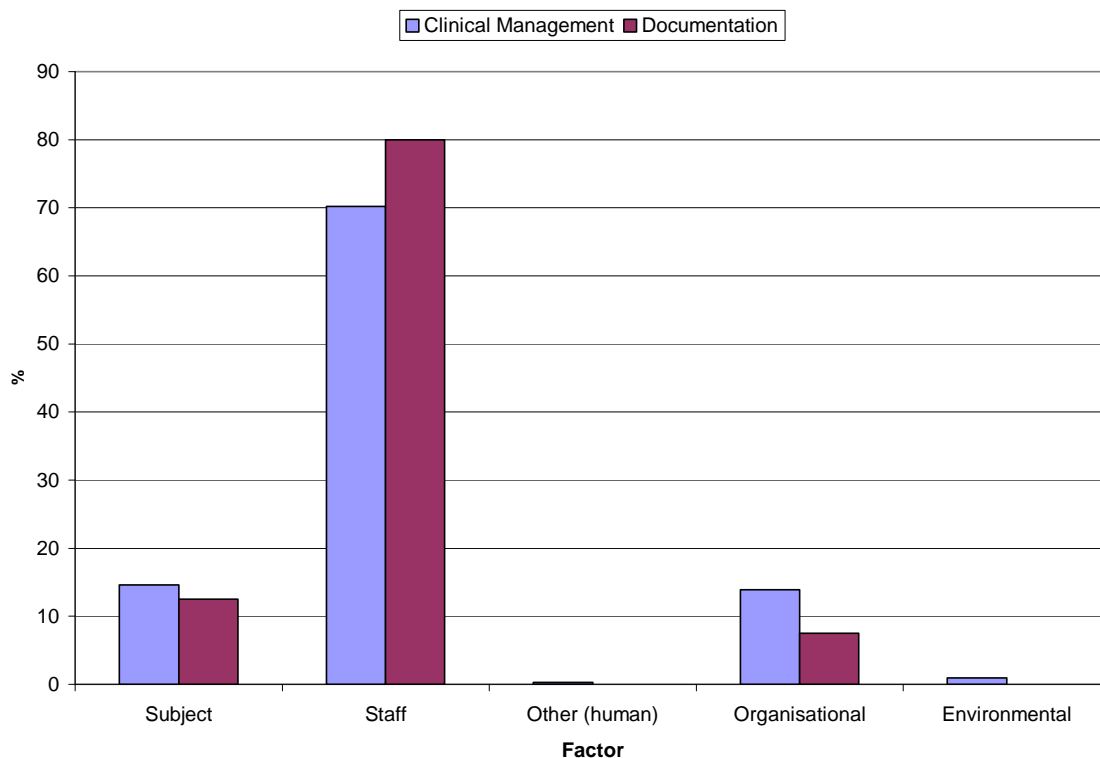


Figure 2 Number of contributing factors by incident types: clinical management and documentation

Staff Factors

In the clinical management incidents, the cognitive problems included a failure to follow protocols or procedures in 99 incidents and in a further five incidents there was a failure to follow safe practice. There was a failure to synthesise/act on available information in 34 incidents. Inadequate knowledge was found in 14 incidents, inexperience in 10 incidents, an error caused by misreading was found in 64 incidents, and a physical technical error in execution in 11 incidents. Haste/multitasking was noted in eight incidents.

Staff communication was cited as a contributing factor in 89 incidents with the main problem being failure to orientate/inform when indicated/required. The occasions of providing instructions (39 incidents), and routine handovers (29) were the commonly cited occasions of communication problems. Information was classified as absent or completely inadequate 47 times, misleading or contradictory eleven times, incomplete eleven times and unclear or ambiguous two times.

There was no or limited supervision of patients in 17 incidents. Team factors were cited 32 times including: Staff not providing adequate assistance (9); poor teamwork during the task (5); poor coordination of staff on a shift (3); and team members not available (3).

A comparison between the high level profiles of the clinical management and documentation incidents are shown in Figure 3. Cognitive factors and communication are the most important staff contributing factors.

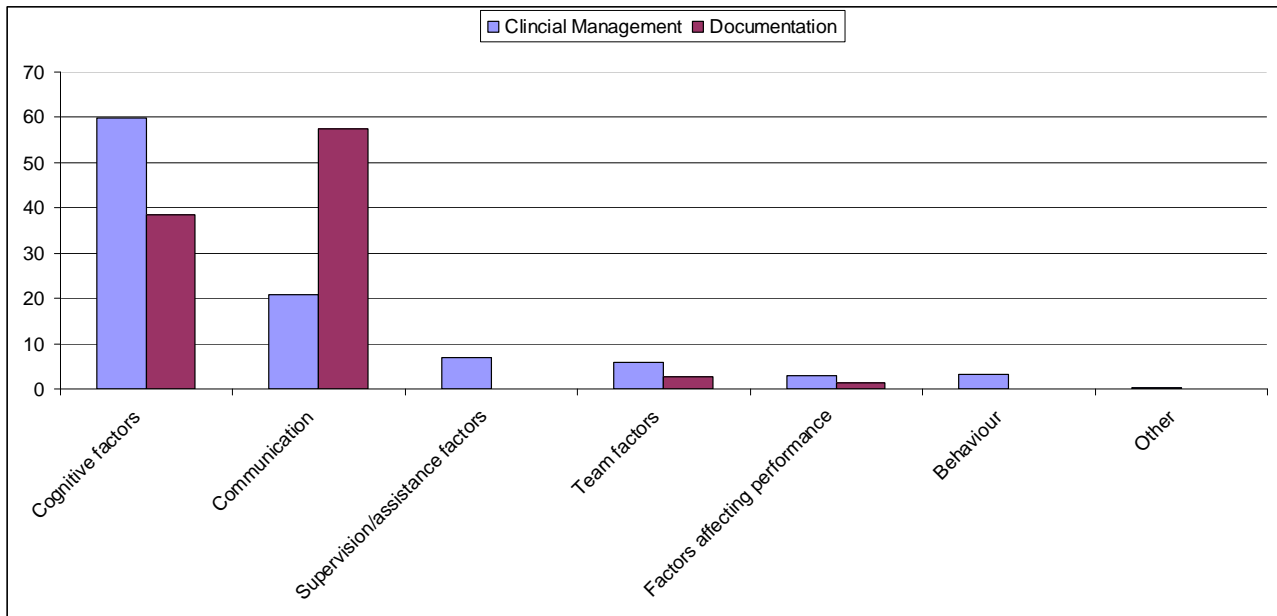


Figure 3: Types of Staff Factors by Incident Type

3 Discussion

The data within RaER has been collected using the web-based data collection form and paper-based incident reports, clinical reviews, and medicolegal reports. The richness of the information in the analysis in Section 2 demonstrates the usefulness of the AIMS classification tool using radiology data. The tool has also been validated using anaesthetic (Webb et al 1993, Runciman et al 1995) and other specialist data (Vinen et al 2000) in general hospital environments (Benveniste et al 2005) and aged care.

For many categories of the problems identified in Section 2, the RaER database currently does not contain sufficient numbers of incidents to enable the incidents to be adequately characterised and a systematic development of clinically relevant corrective strategies to be undertaken. The categories which do have enough incidents such as transport and handover are quite common and are not specific to radiology.

3.1 Publication potential

However, the amount of information contained in RaER is sufficient for a high level publication that outlines the process of setting up the system and the types of incidents that have been collected. We felt it was important that, within this report, we demonstrated that this detailed level of information does exist within the project that would allow a publication to be produced. Even more detail is available for the production of a report. For a publication to be submitted, a radiologist is required to interpret and screen the information within the results section of this report so a clinically useful paper is produced.

The generic lessons from the publication could be:

- How the system was set up and especially the requirement for development of specific data sets with clinically relevant categories.
- The importance of engaging clinicians
- The importance of qualified privilege and security
- How the RaER also collects incidents that are common to a hospital environment (e.g. transport and handover)
- The importance of disparate data sources – especially the rich information within clinical reviews

More specific radiology lessons could be:

- The broad nature of the problems with “failure to diagnose”, requiring a lot of incidents to make sense of problems.
- The importance of medicolegal data for the “failure to diagnose” problems
- The impact of preparation of the patient on resources through delays / cancellations
- The extent of issues related to documentation

3.2 Risk to the project

The main risk to the project continues to be lack of participation by radiologists, resulting in low numbers of incidents being collected and available for analysis. Collectively, when we set the project up, we probably under-estimated the challenge of getting radiologists to report incidents. We must acknowledge QUDI for their willingness to promote the project in their communications, extra flyers and events that they have held. However there doesn't seem to be a strong culture of reporting within the profession and the benefits of the methodology are not apparent to many radiologists. Changing this paradigm is difficult, and this problem is not unique to the project. Many similar systems are plagued by this reporting issue.

One of the primary ways that we can assist the reporting culture is to demonstrate the RaER results to the profession (such as the high level report proposed above). Demonstrating to the profession that the project has clinically relevant outputs that have the potential to impact on the work practices of the profession and that can provide rich research material is critical. To date, we have been constrained by lack of incidents to produce these outputs; however, we now do have enough for a general paper.

The use of the data for many purposes should be encouraged especially for teaching. The utility of the database will increase when it contains a critical number of incidents so radiologists with a particular interest will be able to request particular sets of incidents to produce papers and use in teaching. An excellent example of such an output is Dr Neil Jones' use of the communication / feedback incidents in teaching

material and for a conference abstract. As another example, one of the ways that the APSF has used our anaesthetic database is to reply via letters to case studies in the journals or bulletins. We often have several examples of problems described in case studies that illustrate that the incidents are not as isolated or rare as initially thought.

The linking of reporting incidents to RANZCR Continuing Professional Development points to encourage the use of RaER has good potential to assist in increasing the number of incidents reported. To achieve this, there will need to be an explicit link between a reporter's name and an incident. There are a number of technical / business rules options that can be set up – all of them involve an explicit link between a reporter's identity and particular incidents, which could be a significant disincentive to reporting. However, AIMS, of which RaER is an instance, was declared a Quality Assurance Activity in June 2006 by the Commonwealth Health Minister under Part VC of Section 124X of the Health Insurance Act 1973. The declaration is valid until June 2011. Protection under this legislation is intended to protect:

- The confidentiality of information that identifies information that becomes known solely as a result of the quality assurance activity; and
- People who participate in activities that involve the assessment or evaluation of the quality of health services provided by others.

Protection offered by Commonwealth legislation enables the information about the reporter to be protected from disclosure. If the RANZCR grants incident reporting CPD status, it will be very important to publicize to radiologists that the data is protected from disclosure under Commonwealth legislation to allay any fears that might arise. Furthermore, we need to emphasize that the data is being stored and managed at the APSF, not at the RANZCR.

3.3 Involving the Interventional Radiologists

The project team had a meeting with Dr James Burnes at the Monash Medical Centre. Dr Burnes is the President of the Interventional Radiology Society of Australasia and they have set up a web-based audit tool for their members (RAPID). RAPID has about 30,000 procedures entered from 125 registered users. Of these, there are about 300 complications thus far. We discussed whether RaER could be used to classify in detail the complications.

Given the relatively small number of complications (1% of procedures), we agreed that there is a poor business case for an integrated IT solution between RAPID and AIMS. A "manual" solution whereby the procedures with complications are e-sent to the APSF is preferred. They can then be classified by our experts – this minimises the burden of reporting on busy radiologists, something we are acutely aware of. Analysis can then be undertaken by the APSF in consultation with the interventional radiology community.

The retrospective complications already collected do not have narrative associated with them. For the AIMS classification system to be used effectively there needs to be access to narrative, so we may not be able to classify these incidents in a meaningful way. The most cost-effective solution is for narrative fields to be added to the RAPID database – we can provide advice on the names of the fields. These would be used as the "raw material" to allow incidents to be classified within AIMS.

Some changes to the RaER tool on the data entry side to accommodate the interventional data may be necessary to process this data; however we have not scoped this task.

3.4 Summary

In summary the issues for considerations in the short term are:

1. A high level RaER publication should be produced in the near future
2. College CPD program to be considered
3. Linking with the IRSA database, RAPID.

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