



CLINICAL
EXCELLENCE
COMMISSION

PATIENT SAFETY REPORT

FROM REVIEW OF CLINICAL INCIDENT REPORTS

Fractured Hip Surgery in the Elderly

July 2011



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This report was prepared by the Clinical Excellence Commission (CEC) Patient Safety Team.

The information it contains has been de-identified and analysed in accordance with Incident Information Management System (IIMS) datasets and where relevant, the classification sets used by the CEC and the Root Cause Analysis Review Sub-committees.

It should be noted that all reviews of incident reports, including root cause analysis are retrospective and can reflect both hindsight and outcome bias. Such reviews are conducted to better understand the impact that patient, system and human factors may have on the provision of clinical care and to facilitate ongoing improvement across the health system.

This report is intended to provide a snapshot of issues identified and to make recommendation about system improvements to improve the safety and quality of clinical care.

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Foreword

The role of the Clinical Excellence Commission is to assist NSW Health staff to provide patients with the best possible care for their conditions.

This analysis of aggregated information from the NSW Incident Information Management System (IIMS) is one of the best tools at our disposal. We also evaluate root cause analyses conducted after serious clinical incidents. The information and solutions for the issues identified are validated by clinical staff, managers and the State Clinical Risk Review Committee.

This report is one of a series developed from this analysis process. Previous analyses and reports have triggered system-wide improvements, such as the Sepsis Kills Project, as well as raising awareness at the clinical level.

We greatly appreciate your interest in this report and look forward to your feedback.

A handwritten signature in black ink, which appears to read "Clifford Hughes".

Prof Clifford Hughes AO
Chief Executive Officer

January 2012

Background

A hip fracture is a significant injury for anyone, but for older people it can be catastrophic. Many of these patients never recover fully and some die as a consequence of the fracture. The first Australian study of hip fractures in elderly men (Diamond et al, 1997) showed that there was a significant decline in physical function after surgery, with many requiring a higher level of care or transfer to supported accommodation. Another study by Semple et al (2007) suggests that 20 – 25 per cent of elderly patients with a hip fracture will die within 12 months. “Apart from the personal cost of such an injury, the community cost is equally high” (Semple et al, 2007).

Data supplied by the NSW Health Episode Funding Unit indicates that in 2006/2007, the cost of treating a fractured femur ranged from just under \$3,000 to over \$33,000 with an average length of stay of four to 23 days.

Clinical incidents related to the management of elderly patients with hip fractures in NSW public hospitals are reported in the Incident Information Management System (IIMS). Some of these indicate that the patient has died. The death of a patient during or following hip surgery may also be reported through the NSW Ministerial Committees: - Collaborating Hospitals Audit of Surgical Mortality (CHASM) or the Special Committee for the Investigating Deaths under Anaesthesia (SCIDUA).

Incidents where the patient sustained serious harm (SAC1)¹ must be investigated by local health districts using root cause analysis (RCA). The findings of these investigations are sent to the Ministry of Health and then on to the Clinical Excellence Commission (CEC). Other incidents (SAC2-4) undergo the appropriate level of review, the findings of which are recorded in IIMS and can be viewed by the CEC. Cases reported and analysed under CHASM or SCIDUA processes added to the information available for this review. Following an initial review of all incident reports, it was agreed that the analysis would focus on those involving patients over the age of 65.



¹ The Severity Assessment Code (SAC) is used to rank the outcome for the patient when an incident occurs. SAC1 indicates a serious outcome, such as a procedure involving the wrong patient or an unexpected death. SAC4 indicates there was minimal or no harm and includes near-miss incidents.

Method

RCA reports related to the management of patients with a hip fracture were identified in the CEC database and collated for review on 9 February 2011. These had previously been reviewed and classified by the Clinical Management RCA Review Committee, a sub-committee of the NSW Clinical Risk Review Committee. On the same day, all SAC2 incidents notifications which contained information about the management of hip fractures were extracted from IIMS using the search term “hip” and/or “fracture”. One thousand similar SAC3 & 1,000 SAC4 incidents were also extracted for review. De-identified CHASM and SCIDUA reports related to hip fractures and which had been subject to a second level review (see appendix1) were extracted from the special committee database.

All incidents which met the review criteria underwent directed content analysis and further classification to articulate common underlying factors and themes. The classification sets used were those developed by the CEC Patient Safety Team and the RCA Review Committee. They included:

- IIMS clinical management sub-classifications
- highlighted clinical risk group (risks identified and monitored by the RCA Review Committee)
- underlying/contributing system factors
- underlying/contributing human factors
- types of recommendations made by RCA teams.

Identification of underlying issues and emerging trends was used to develop recommendations to improve the safety and the quality of care provided to patients with hip fractures. RCA recommendations were also reviewed to explore the types and frequency of suggested solutions for the issues identified. The final recommendations were developed and/or validated during discussion with relevant clinical groups, including ACI orthopaedic and geriatric streams.

Findings

As shown in Table 1, 2,429 incident reports were identified using the search criteria. Only 140 were included in the final analysis. Eight CHASM, 23 SCIDUA and 2,278 IIMS reports were excluded for one of more of the following reasons:

- the patient was not over the age of 65
- they were about an unrelated matter but hip fracture was included in the incident text
- there was insufficient information to enable further analysis (the most common reason).

Report Type	Date range	Number identified in initial search	Number used in analysis
IIMS incident reports			
SAC1 (RCA reports)	January 2010 – December 2010	26	26
SAC2	April 2003 - December 2010	337	}
SAC3	January 2010 - January 2011	1,000	
SAC4	April 2010 - January 2011	1,000	
CHASM summary reports	2007 - 2010	23	15
SCIDUA summary reports	2005 - 2011	43	20
		2,429	140

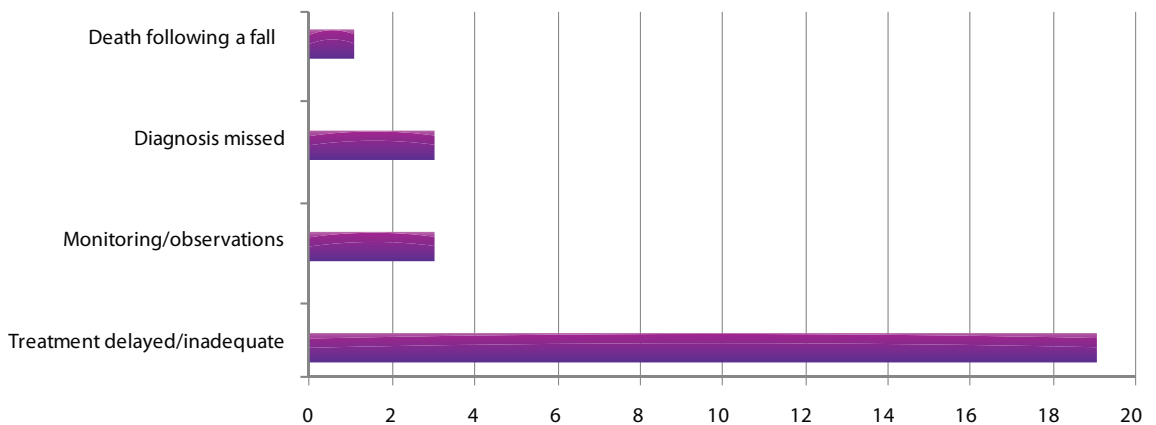
Findings are presented under sub-headings to assist the reader.

Root Cause Analysis Reports

1.1 IIMS clinical management sub-classifications (RCAs)

The IIMS clinical management sub-classifications agreed by the RCA Review Committee are shown in Figure 1. Only one clinical management sub-classification is applied to each RCA report.

Figure 1: Clinical management sub-classifications assigned by the RCA Review Committee



Delayed or inadequate treatment was the most common clinical management sub-classification applied. The following cases demonstrate clinical situations where treatment of patients with hip fractures was delayed or inadequate, including where it was poorly co-ordinated.



CASE 1

An elderly female patient was admitted to a district hospital for management of an exacerbation of chronic obstructive pulmonary disease, anaemia and chronic renal failure. She fell during admission and fractured her hip. She was transferred to another facility for orthopaedic management.

On arrival the patient was reviewed by the emergency department (ED) and orthopaedic registrar. Blood tests revealed low haemoglobin, which was treated with a two-unit blood transfusion. A chest x-ray showed left-sided consolidation and effusion. There is no evidence that this was followed up. The senior clinician on call was contacted and the patient was transferred to a ward to await surgery the next day. The ED registrar documented that a review by the medical registrar was required because of the patient's comorbidities and high surgical risk category. This review did not occur.

The next day the patient was noted to have a decreased urinary output and she was reviewed by the surgical intern. Conservative management was planned. The planned surgery was postponed (other cases being assessed as more urgent) and the patient was encouraged to take oral fluids. The surgical and orthopaedic registrars were not informed of the pre-operative reviews until the verbal handover at the end of their shift. The orthopaedic registrar reviewed the patient. There is however, no evidence that her poor renal function was reviewed or communicated to the orthopaedic surgeon (consultant). A pre-anaesthetic review occurred the same evening. Documentation did not reflect the patient assessment or any discussion with the anaesthetist about possible anaesthetic risks. The next day a different anaesthetic registrar was allocated to the case. There was no review of the patient on the morning of surgery because she had been assessed the night before.

The patient underwent a surgical fixation of the fractured hip under spinal anaesthesia and sedation. The procedure was uneventful, although it was noted that she experienced hypotension both intra-operatively and in recovery. This is a recognised side effect of spinal anaesthesia and was managed by a senior anaesthetist. Once stable, the patient was transferred to an orthopaedic ward. A few hours after transfer to the ward the patient had no urinary output despite IV fluids. Fluid boluses were given. The patient became unresponsive for a short time and was reviewed by the anaesthetist and intern. Blood tests indicated a possible cardiac event. It was also noted that since return to the ward she had experienced significant hypotension. Although medical reviews occurred there was no evidence of escalation to a senior clinician. The patient died.

The RCA team found that in spite of a documented pre-operative referral for medical review, this did not occur. The patient was inadequately prepared for surgery (not "optimised") and there was no consideration of high dependency care after surgery. Concerns about her clinical deterioration were not escalated to the senior clinician.

The RCA team made the following recommendations.

1. The hospital executive is to oversee the immediate re-implementation of the previously developed fractured neck of femur management pathway and continue to monitor its efficacy and development through a continued practice improvement framework. An audit of completion of the pathway to be conducted at regular intervals with the first being conducted within three months.
2. A formal procedure be developed for handover between after-hour medical teams including handover of newly admitted patients to the after-hours admitting VMO.
3. A review be conducted into after-hours rostering of junior medical officers (JMOs). This review is to consider but not be limited to:
 - additional advice required by JMOs reviewing complex patients when rostered registrars are unavailable.
 - VMO support and involvement with patient review, admission and management in the after-hours setting.

The RCA Review Committee agreed that the patient received inadequate treatment. There was a failure to recognise and respond appropriately when her condition was deteriorating. This included not seeking senior clinician input when it appeared to be clinically indicated at several points in the patient's journey. Overall, the report identified system failures in relation to care planning and co-ordination for this frail elderly patient.

CASE 2

An elderly man, with a history of recent acute coronary syndrome and chronic obstructive airways disease, was taken to an emergency department following a fall from a chair. On presentation, he underwent an assessment and was ordered chest and pelvic x-rays. The intern identified a fractured femur and arrangements were made to transfer the patient for orthopaedic management. There was no evidence that the intern reviewed the patient's chest x-ray, which showed a pneumothorax. After transfer, the patient was seen promptly by the orthopaedic registrar, who confirmed he required a hemiarthroplasty. Although the chest x-ray was reviewed at this time, the pneumothorax was not identified. Anaesthetic and medical reviews were requested, because the patient was taking anticoagulant medication. A discussion with the anaesthetist, during which it was agreed that the patient would have a general anaesthetic, was documented in the medical record. There was no evidence that the patient was actually seen by the anaesthetist.

A member of the medical team, suggested that a cardiology review may be warranted. Advice was obtained from the cardiology registrar regarding the patient's anticoagulant medication.

The primary team appear to have been unaware of the pneumothorax. The RCA team found that the patient's chest x-ray was not checked by the anaesthetist who may not have known that it had been done. Surgery proceeded and was reported to have been uneventful.

The patient progressed poorly following surgery with episodes of low blood pressure. His anti-hypertensive medication was withheld post-operatively but the reason was not documented. Three days after surgery, he was found pale, clammy and breathless. His respiratory rate was 24 with oxygen saturations of 80 per cent. A rapid response call was made. Fluid overload was suspected and an urgent x-ray and cardiac echogram were ordered. A tension pneumothorax was identified and immediately treated. A review by the respiratory team was requested. A senior orthopaedic clinician also reviewed the patient and suggested that he sit out of bed to assist with his respiratory effort and treatment of the pneumothorax. A senior ICU clinician was present when a second rapid response call was made due to poor bilateral air entry. Acute pulmonary oedema and/or heart failure was suspected. Despite maximum efforts to manage the complications, the patient died five days after his hip surgery.

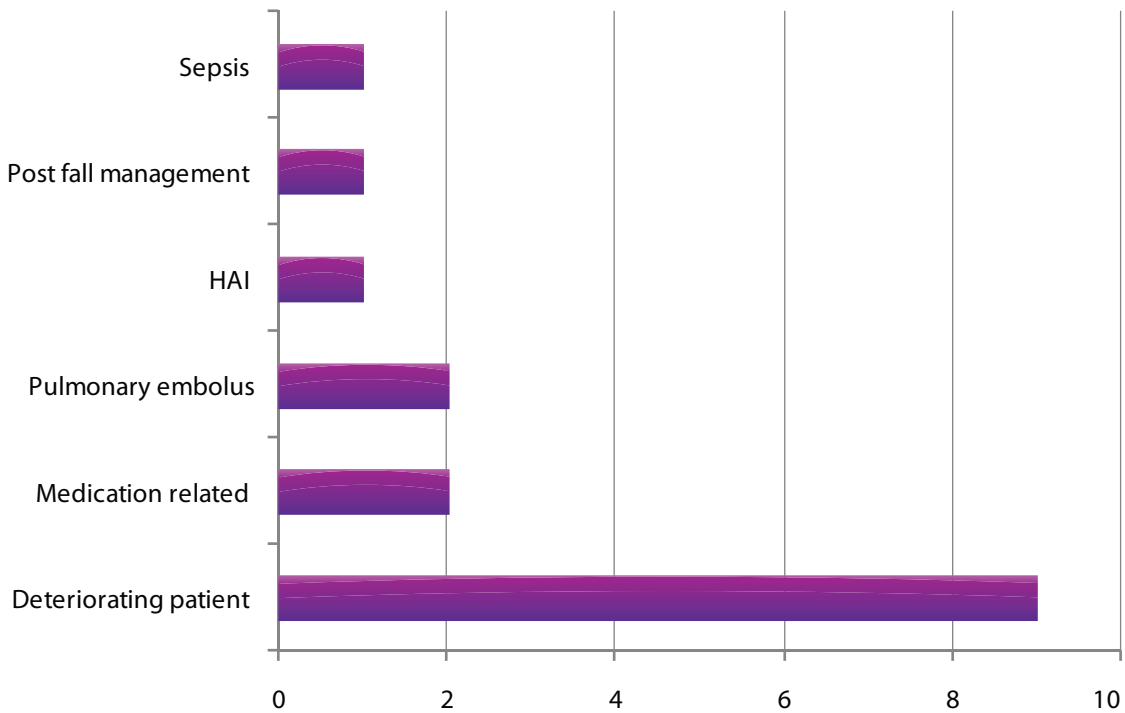
The RCA team found that recognition of the pneumothorax on x-ray was outside the expertise of the orthopaedic team. This meant that it was not treated prior to surgery. This may have led to the development of a tension pneumothorax post-operatively with severe respiratory compromise. It possibly led to the subsequent myocardial infarction.

The RCA Review Committee agreed that the RCA report gave a sense of poorly co-ordinated, fragmented care. The patient was very elderly with significant comorbidities. There is no evidence in the report that he was reviewed by any senior doctor prior to or immediately after surgery. Such involvement may have improved his outcome.

The RCA report also raises concerns about systems for notification of unexpected findings in diagnostic tests (in this case, pneumothorax).

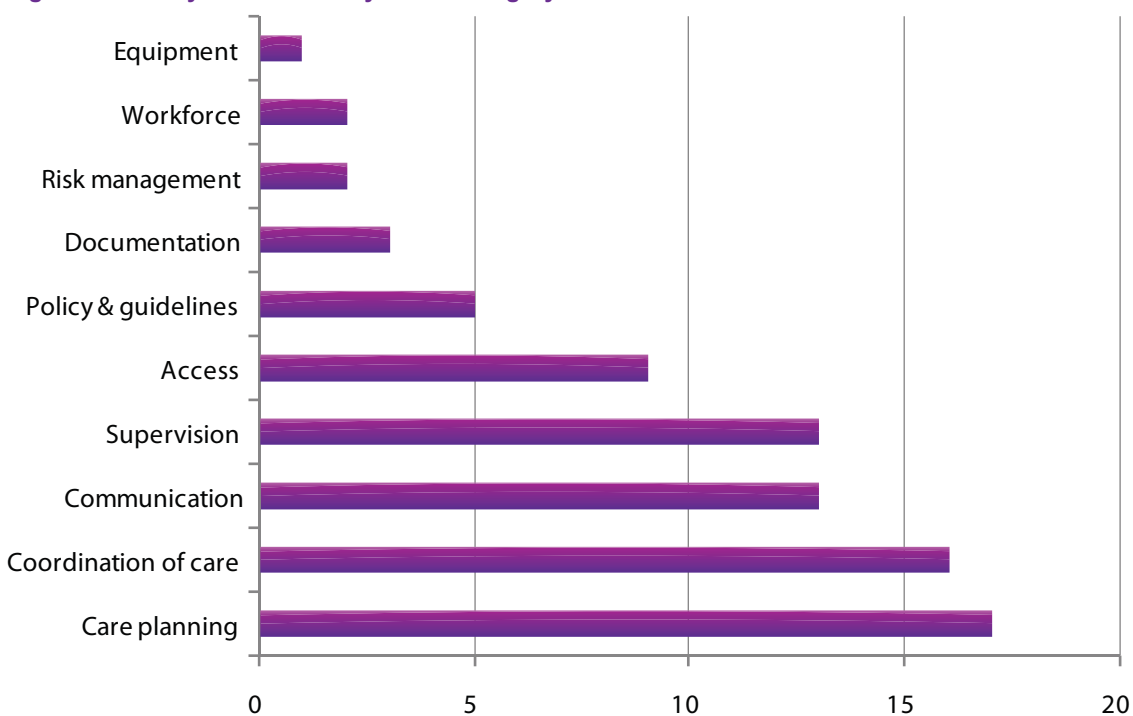
1.2 Highlighted clinical risk group classifications (RCAs)

This is a grouping used by the RCA Review Committee and is based on common themes found in RCAs. Many of the incidents reviewed fitted one or more of the categories in this classification set. This type of grouping has proved over time to be a rich source of information in terms of clinical risks. Figure 2 shows the highlighted clinical risk group identified in the 26 RCA reports reviewed. Nine reflected issues related to a failure to recognise and/or respond to a patient whose clinical condition was deteriorating.

Figure 2: Highlighted clinical risk group

1.3 System Factors which may have contributed to Incidents (RCAs)

Each RCA report is reviewed to identify system factors, which may have contributed to the incident. More than one may be identified in each RCA report. Figure 3 shows those identified during review.

Figure 3: RCA system factors by broad category

Inadequate care planning and co-ordination were the most common system issues identified. These related to:

1. The care plan was not developed, documented and/or communicated appropriately or it was inadequate for the patient's complex needs
2. Care coordination was: poor or fragmented between specialties, teams and/or clinicians; unclear in regard to which clinician had primary responsibility for overseeing the patient's care; or there was no evidence of effective teamwork, including lack of involvement of a senior clinician/consultant.

These situations pose serious risks to elderly patients who frequently have significant comorbidities. Elements of this problem were reflected in Cases 1 and 2 above.

1.4 Human factors which may have contributed to Incidents (RCAs)

This category reflects behaviours, interactions, lapses and other human factors where they can be identified from RCA reports. Investigations, such as RCA, are not always able to identify how the interaction between people and complex health systems may have contributed to actions, decisions and ultimately to incidents. The following human factors were identified in the 26 RCAs reviewed.

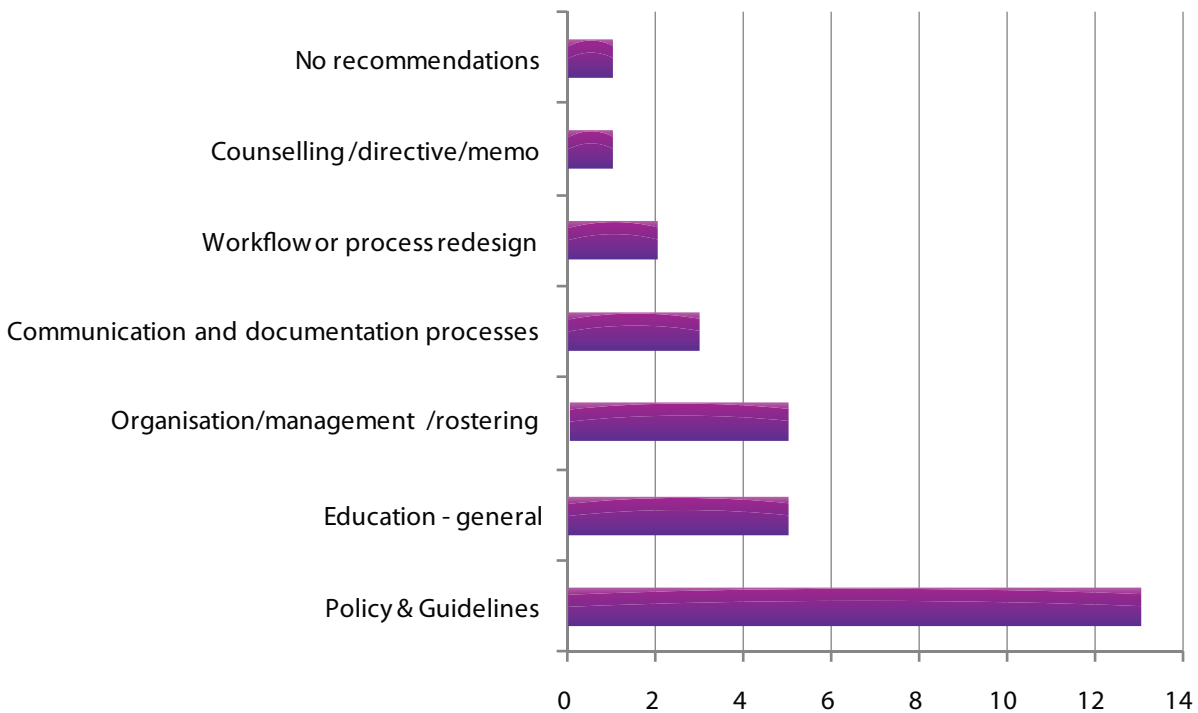
Table 2: Human Factors identified in the 26 RCAs reviewed

Human Factor	Description	Count
Cognitive error	Failure to understand/synthesise/act appropriately on available information, including following wrong clinical pathway or not seeking appropriate assistance	7
	Mindset/narrow thinking or confined to rule-based thinking	
Skill-based error	Errors of omission or commission during diagnosis, planning, treatment or general care, due to the operator not completing a particular task in line with his/her attained skill	1
	Lapse of attention or memory	
Violation (of protocol)	Risky or reckless behaviour - including: - intentionally exceeding scope of practice - acting outside widely accepted and known standards (or policy) - intentionally deviating from intended use (equipment, medication)	2
Personal conditions	Physically fatigued or unwell	0
	Mentally fatigued, distracted or unwell	

1.5 Recommendations made by RCA teams

RCA teams investigating incidents are required to make recommendations on how to prevent a similar incident occurring again. As shown in Figure 4, development or review of policy and provision of education are common recommendations in RCA reports.

Figure 4: Recommendations made by RCA teams



Some recommendations made by RCA teams may have State-wide applicability, as shown below.

One RCA described a patient who required emergency orthopaedic surgery. Although medically stable, he had several comorbidities and was recognised as high risk for surgery. The procedure was delayed for nearly 36 hours, during which there was no further medical review. There was no handover to the weekend medical officer because it was assumed that the patient had already been for surgery. This made it less likely that any change in the patient's medical condition would be recognised and managed promptly.

The team made four recommendations:

1. A system be put in place to review the management of high risk patients (e.g. ASA 4-5)² when surgery is delayed.
2. Review the system of non-elective pre-operative management. Clearly define and allocate responsibilities for checking all preoperative investigations.

ASA is a physical status classification system used for assessing the fitness of patients for/before surgery. The six classifications are:

1. A normal healthy patient.
2. A patient with mild systemic disease.
3. A patient with severe systemic disease.
4. A patient with severe systemic disease that is a constant threat to life.
5. A moribund patient who is not expected to survive without the operation.
6. A declared brain-dead patient whose organs are being removed for donor purposes.

Ref: The American Society of Anaesthesiologists

3. Review the adequacy of the current handover process of patients under the orthopaedic service for weekend review when surgery is delayed.
4. A clinical pathway/algorithm be developed and implemented for emergency patients presenting with hip fractures which require surgical intervention. This should include patients having regular medical review while awaiting surgery. In addition, it should include an escalation process for patients waiting longer than 24 hours. Use of the pathway/algorithm will be mandated as a KPI for the Department of Orthopaedics. The practice will be audited against the clinical pathway/algorithm and reported quarterly at the departmental Morbidity & Mortality Committee.

2. 'Other' Incidents

(IIMS SAC2-4, CHASM & SCIDUA reports)

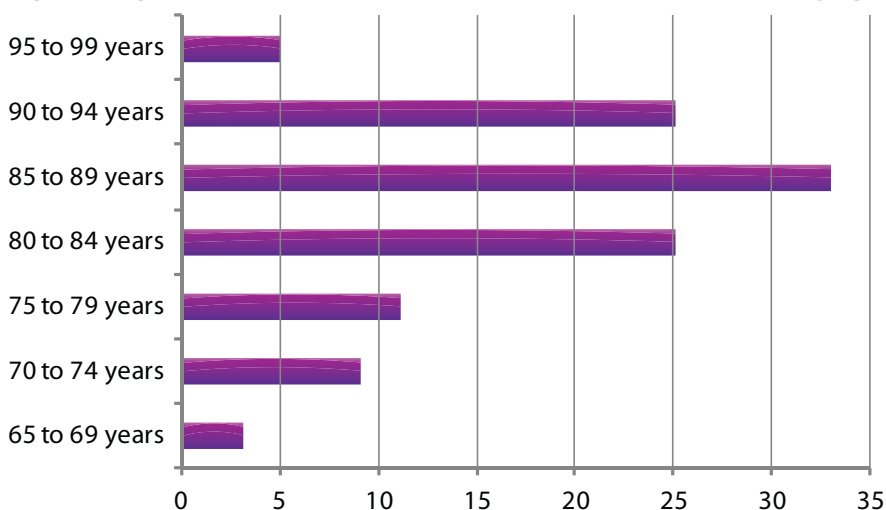
- Thirty-five SAC2, 44 SAC3 & SAC4 IIMS incidents, 15 CHASM and 20 SCIDU reports were also reviewed. The incidents were considered in terms of:
 - age of the patient (age band)**
 - primary problem identified by the notifier (IIMS incidents only)
 - clinical management sub-classification
 - system factors.

This level of analysis was limited by the varying amount of information required and/or contained in the IIMS notifications and special committee reports. IIMS notifications, including manager's reviews, often reflected the immediate clinical management of the patient at the time of the incident, rather than analysis of contributing factors. Some incidents had no information about review. Some however, reflect a thoughtful investigation with clear identification of the system failures and most importantly, possible solutions. CHASM and SCIDUA reports provide only summary of the incident.

2.1 Age of Patients (by age band)

Figure 5 shows the patients involved in the incidents reviewed (all over 65) by age band. Note SAC1 incidents are not included.

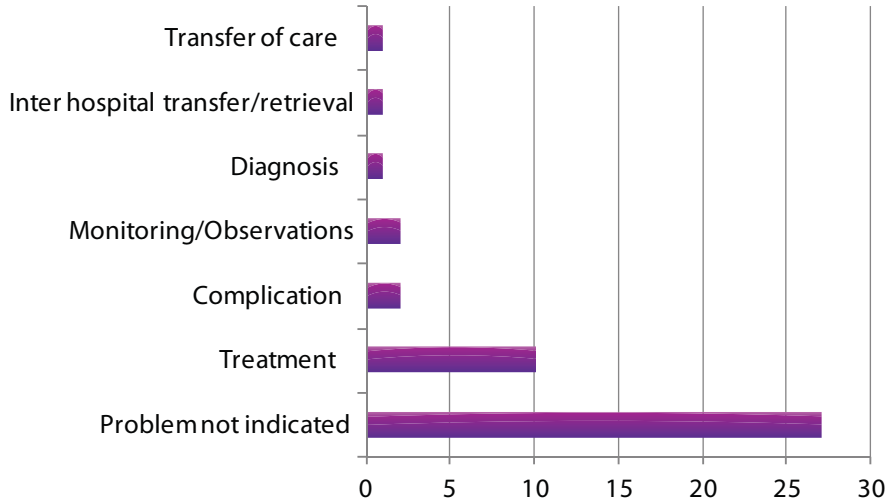
Figure 5: Age of patients involved in incidents related to hip fracture (by age band)



2.2 Primary problem identified by the notifier (IIMS SAC2-4 incidents only)

Staff notifying incidents in IIMS are asked to indicate what they believed to be the problem. While this is not mandatory, when completed it adds additional insight to the notifications. Figure 6 shows that the primary problem was frequently not documented.

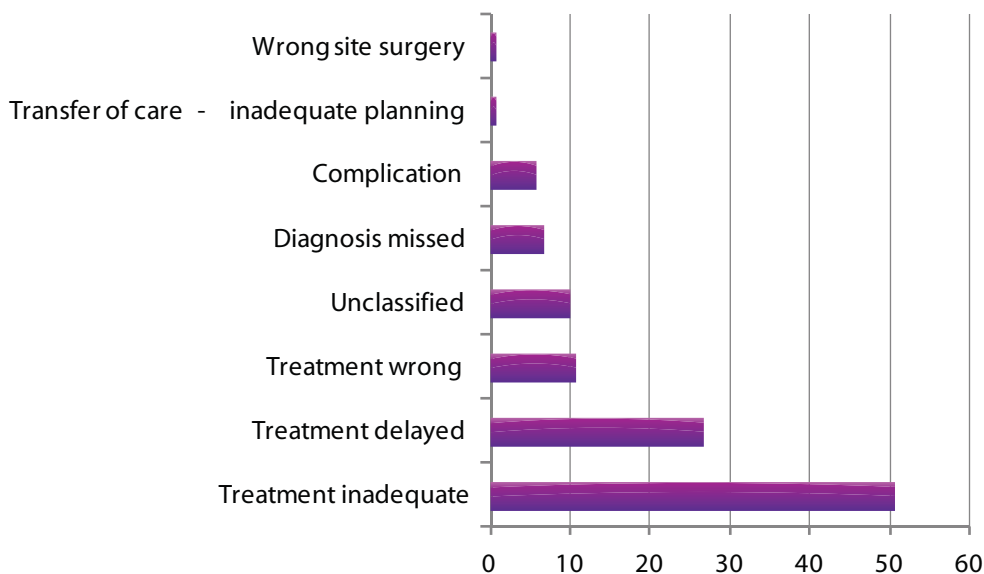
Figure 6: IIMS incidents by primary problem as identified by the notifier



2.3. Clinical management sub-classification of 'other' incidents

The incidents were reviewed using the same clinical management sub-classification as the RCAs. A classification was assigned wherever it could be determined from the incident detail, as shown in Figure 7.

Figure 7: Other incidents by clinical management sub-classification



Ten incidents were not able to be classified, however, because they contained relevant information about system factors, they were retained in the review.

2.4 System factors identified in “other” Incidents

System factors identified in the SAC2 incidents clearly show a number of system vulnerabilities, as seen in Figure 8.

Figure 8: System factors identified in “other” incidents



The review found that care planning/coordination and communication were the most common factors identified in this group of incidents (more than one system factor may be identified in each



Case Examples

CASE 3

An elderly man was transferred from a small hospital for renal dialysis and surgical management of a fractured femur. He had a history of ischaemic heart disease and end-stage renal failure. Admission assessment did not include an ECG. The patient was seen by one of the anaesthetic team, who postponed surgery until after the patient had undergone renal dialysis. An ECG was then requested, but was not done until two days after admission. It showed widespread ST elevation, consistent with an acute myocardial infarction. There was no evidence that the ECG was reviewed before the patient underwent internal fixation of the hip fracture. The ECG changes were noted by an after-hours medical officer who was reviewing the patient (due to symptoms of confusion) the day after surgery. A retrospective analysis for Troponin T was requested and confirmed myocardial infarction.

Issues identified:

- the patient was anaesthetised by a different anaesthetist from the one who did the pre-operative assessment and there was no communication or handover between them
- ordered tests (ECG) were not followed up
- care planning was inadequate
- care co-ordination was inadequate (i.e. no-one was in control of the patient's management)
- the patient was placed at significant risk.

Simple et al (2007) stress the need for early pre-operative anaesthetic assessment to define peri-operative risk and optimise pre-existing medical conditions. This allows for early referral to specialist medical services if required and minimises delays in operative management. "Medical and surgical co-management improves optimisation of patients and reduces time to surgery and length of stay" - an approach supported in much of the recent medical literature.

CASE 4

Handover from the morning shift and medical entry in the patient's medical record indicated that he was fasting for surgery. As he still had not been called for surgery by early evening, a call was made to the operating theatre regarding the expected time of surgery. The ward staff were advised that he was not on the operating list. The orthopaedic registrar was contacted. He confirmed that the patient who had been fasting since early morning was not for surgery.

Issues identified:

- the adequacy of care planning and coordination of care
- communication between the care team members.

CASE 5

An elderly woman requiring surgery for a fractured femur (deemed category 4 requiring surgery within 24 hours) had the surgery postponed twice. On the first occasion other emergencies took precedence. On the second, the elective lists took precedence as no surgeon was available. When the patient was finally booked for surgery, it was cancelled by the anaesthetist as she was assessed as no longer fit for surgery. A cardiology review was required before the surgery proceeded.

The notifier reported the effects (in this case) of managing waiting lists versus managing high-risk patients requiring emergency surgery.

Issues identified:

- high-risk patient had delayed access to operating theatre
- process of review while awaiting surgery
- (possibly) delayed recognition of deterioration.

The New Zealand Guidelines Group Best Practice Evidence-based Guideline for the acute management and immediate rehabilitation after hip fracture amongst elderly people aged 65 years and over (2003) states that: "Delay between admission and surgery, whether for medical stabilisation of the person's comorbidities or for administrative/logistical reasons may increase length of stay, and may also be associated with increased morbidity and mortality. Early operation (within 24 hours) is recommended for most people". This is also reflected in more recent similar guidelines.

Simunovic et al (2010) suggests that based on current evidence surgery within 24-72 hours is associated with lower mortality and a lower rate of certain postoperative complications. Novack et al (2007) concluded that delay in hip surgery is significantly associated with increased risk of mortality, even when controlling for patient characteristics and that the increased mortality extends beyond the hospital phase.

In a review of guidelines for the management of hip fractures in older persons, Mak et al (2010) state that "delay in surgery beyond 48 hours has been shown to be associated with more than twice the number of major complications, including bedsores, pneumonia, urinary tract infections, deep vein thrombosis and pulmonary embolism compared with surgery within 48 hours".

CASE 6

A patient with significant comorbidities, was persistently hypotensive before, during and after surgery and died soon after. The case raises similar issues to those previously discussed, including:

- the patient had significant comorbidities and was unstable, suggesting that surgery in a rural facility without an HDU or ICU may not have been in her best interest
- this high risk patient was not optimised prior to surgery
- the patient's overall management prior to, during and immediately following surgery did not include invasive blood pressure monitoring, medication management or other potential treatment. Resuscitation appeared to be delayed and less aggressive than it could have been.

It is acknowledged that all elderly patients have increased risks associated with major surgery such as fixation of hip fractures, regardless of their premorbid condition. A number of cases reflect that the patient had an ASA status of 4 or 5, however, review of the care provided suggests that consideration and management of these risk factors may have been less than optimal.

Semple et al (2007) suggest that there are few studies examining the role of invasive haemodynamic monitoring in the setting of hip fracture surgery. Those few studies however concluded "*that invasive arterial monitoring facilitates early detection and treatment of intra-operative and post-operative hypotension, and complications from arterial catheterization are uncommon. The intra-operative optimization of intravascular volume has also been shown to improve postoperative outcome*".

CASE 7

A very elderly woman returned to the surgical ward following hip fracture surgery. The nurse handing over the patient to the ward advised that the patient had low blood pressure in recovery and that an altered calling criterion of systolic blood pressure of below 80 was in place. The patient's blood pressure was just above 80 systolic prior to transfer. On arrival at the ward her blood pressure was 72/40. She required a rapid response call and resuscitation.

Issues identified:

- the appropriateness of transfer from recovery
- the risks associated with transfer of an unstable patient
- the adequacy or review while in recovery.

CASE 8

A male patient who had undergone a hip hemi-arthroplasty five days earlier was found to have a haemoglobin of 67 - requiring urgent treatment. No orthopaedic team member was available until late afternoon due to surgical commitments and staff shortages. Three medical officers on leave (including sick leave) had not been replaced.

Issues identified:

- availability of treating team
- delayed management
- no processes for review when the treating team is unavailable.

CASE 9

A male patient with significant comorbidities was admitted with a fractured femur. He underwent hip surgery and was returned to a surgical ward. The day after surgery, he was noted to have decreased urinary output which was treated with a fluid bolus. His condition did not improve. It was only later in the day that a rapid response call was made and active resuscitation occurred. The patient was transferred to ICU where he died.

Issues identified:

- pre-operative optimisation may not have occurred
- the patient was classified as ASA4, suggesting that transfer to a higher level of care may have been warranted. This would have allowed closer observation and monitoring
- there was a failure to recognise or respond appropriately to the patient's deteriorating condition following surgery
- **clinical supervision, care planning and communication between teams were identified as system factors.**

Marsland et al (2010) note that elderly patients have markedly less physiological reserve than younger patients with similar comorbidities. These elderly patients require a multidisciplinary approach to care. This includes input from a geriatrician and/or other medical specialities to ensure that the patients are optimally prepared for surgery. This also allows for post-operative care planning to maximise recovery. This may mean that high-risk patients are managed in a high dependency unit post-operatively, to facilitate close monitoring.

Case 9 demonstrates a situation where the patient's clinical condition was deteriorating. The response was inadequate until there was significant worsening of the patient's condition. Other cases suggest that not all patients are reviewed by a senior clinician post-operatively and the

ongoing care may be delegated to a junior team member. This may result in situations where there is poor coordination of care and response to the patient's changing condition, which may not be recognised or effectively communicated to the senior clinician.

The NSW Agency for Clinical Innovation in its document *Orthogeriatric Model of Care: Clinical Practice Guide 2010*, also promotes the concept of a collaborative approach to the management of elderly orthopaedic patients. These guidelines suggest that each patient should undergo a comprehensive medical and nursing assessment which focuses on their pre-morbid function, cognition, comorbidities and risks prior to surgery. Based on these assessments, post-operative management and rehabilitation can be carefully planned to maximise recovery.

The Scottish Intercollegiate Guidelines Network (2009) cites the British Orthopaedic Association Guideline which suggests that *"a high standard of medical management of older people with a hip fracture is best achieved by the employment of a consultant or staff grade physician to work full-time on the fracture ward providing daily medical care and advice in the perioperative management of elderly patients with hip fractures"*.

This supports the view that joint admission (orthopaedic & medical) providing a co-management approach to care with less delegation of responsibility to registrars, may have merit.



Conclusion

The findings confirm that elderly patients who sustain major fractures are a high-risk group because of the high incidence of comorbidities. These elderly patients would benefit from a co-admission process.

It is emphasised that elderly patients rapidly de-condition following major injury. They have increased risks associated with hip surgery, regardless of their premorbid condition. Optimisation prior to surgery provides them with the best possible chance of avoiding complications and achieving a good outcome. Providing appropriate care requires a multi-disciplinary team effort and includes good communication between care providers, patients and their families.

Issues

Based on the findings of the review the following issues are evident:

1. Access constraints mean that hip fracture surgery is often undertaken after hours and on emergency lists, reducing the availability of necessary support services.
2. Time to surgery (including access) is not standardised or monitored. The patient's state of readiness for surgery is not the deciding factor for when surgery occurs.
3. The responsibility for care co-ordination when multiple teams provide input to patient management following a hip fracture is not clearly articulated or defined. Care coordination is often delegated to a junior member of the surgical team. There seems to be a service-centred rather than patient-centred approach to care.
4. Optimisation of patients prior to hip surgery is a less than a robust process in some facilities. Co-management (joint responsibility) of high-risk patients is not evident.
5. Patients deemed ASA 4 or 5 are not always seen by a senior clinician prior to anaesthesia.
6. Although guidelines promoting an orthogeriatric model of care are available, they appear not to be widely known and/or applied.
7. Senior clinician input to post-operative care is less than optimal.
8. The appropriateness of high-risk elderly patients undergoing major hip surgery in facilities which have no ICU/HDU must be considered.

Broader issues

1. There is currently no State-wide data collection process for monitoring care of patients following hip fracture. This prevents identification of successful initiatives which may have broad application.
2. There is no standardised assessment tool for screening elderly patients with hip fractures prior to surgery.
3. Services, which would facilitate multidisciplinary care, including early rehabilitation and post-discharge care, may not be readily available in all orthopaedic/surgical units.
4. Many services appear unaware or unable to implement current best practice, including optimisation prior to surgery, early surgical intervention (within 36 hours) within normal theatre hours, HDU care for high-risk patients immediately following surgery, early mobilisation and oversight by both the surgical and geriatric services.
5. Services which could reduce the social impact of hip fractures may not be given the focus required.



Considerations/Recommendations

1. All elderly patients with hip fracture be admitted under a process with joint responsibility (e.g. orthogeriatrician, geriatrician, general physician and surgeon) identified and managed under an orthogeriatric model of care. Identification of responsibility for surgical and non-surgical components of care will be prospectively determined at a site specific level. This will facilitate orthogeriatric assessment, rapid optimisation prior to surgery and identification of rehabilitation goals, which will enable recovery of mobility and independence.
2. The ACI orthogeriatric model of care be revised to include specific care requirements including access to surgery within 48 hours (preferably 36 hours) of admission. Patients with hip fracture remain at relatively high risk of complications in the early postoperative phase. Patients deemed ASA 4 or 5 may require a prolonged period of monitoring including access to an HDU bed. All patients should receive regular surgical and medical review in the immediate post-operative phase to facilitate early identification and management of any post operative problems.
3. ACI Orthogeriatric Model of Care Clinical Practice Guide 2010 pre- and post-operative principles of care be implemented across NSW. Implementation will require the establishment of support structures at State and local health districts level, including changes to patient flow and admission processes, access to operating suite, and management of elective surgery waiting lists.
4. In consultation with orthopaedic services State wide key performance indicators be developed related to the care processes of elderly patients, who sustain hip fractures. This should include the establishment of state wide benchmarks for the management of hip fractures in both the metropolitan and rural sector.
5. A State wide process for the monitoring of these agreed key performance indicators be established. This should include monitoring of patient outcomes, variation in care and actions taken when non-compliance/variation occurs.
6. A full economic evaluation be conducted to identify the financial impact of the above recommendations.

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APPENDIX 1



CHASM

CHASM is a peer review audit of deaths of patients who were under the care of a surgeon at some time during their hospital stay in NSW regardless of whether an operation was performed. The audit process involves the submission of information about a patient's death to CHASM on a pre defined form. All identifiers are removed from the form and the form is then sent to an assessor for first line assessment. If no other information is required to complete the audit the case is coded and entered on a database. The notifying surgeon receives a confidential feedback from the CHASM committee about the findings of the review.

In cases where the notification has insufficient detail or where potential deficiencies in care are identified a medical record review is requested. Following a second level assessment the participating surgeon receives confidential and privileged feedback on the reported death from CHASM committee.



SCIDUA

This special committee's primary objective is to subject all deaths which occur while under, as a result of or within 24 hours after the administration of anaesthesia for procedures of a medical, surgical or, dental or investigative nature, to peer review to identify any area of clinical management where alternative methods could have led to a more favourable outcome. Specifically it reviews deaths that are reportable under the *Public Health Act* 1991.



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