



CLINICAL
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CLINICAL FOCUS REPORT

FROM REVIEW OF ROOT CAUSE ANALYSIS AND/OR INCIDENT
INFORMATION MANAGEMENT SYSTEM (IIMS) DATA

SECOND REVIEW OF ACUTE CORONARY SYNDROME INCIDENTS



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

The information contained has been de-identified and analysed in accordance with the Incident Information Management System (IIMS) datasets and where relevant, the agreed root cause analysis (RCA) report classification sets used by the RCA Review Committees which it supports.

It should be noted that all reviews of incident data, including root cause analysis, are retrospective and can reflect both hindsight and outcome bias. Such reviews are conducted to better understand the impact which 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 to be further explored. It has been prepared by the Patient Safety Team, including Dr Tony Burrell and Bronwyn Shumack, in consultation with Health Service and Department (now Ministry) of Health staff. It was first released within the NSW Health system in 2009.

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Background

This is the second aggregated review of root cause analysis (RCA) reports related to patients who were identified as having one of the following conditions classified as Acute Coronary Syndrome (ACS):

- ST segment elevation myocardial infarction (STEMI)
- Non-ST segment elevation acute coronary syndrome (NSTEMI) and
- Unstable angina pectoris (UAP).

NSW Health used the findings of the first review of ACS incidents to inform the Redesign Project associated with diagnosis and management of these patients, including clinical management guidelines. This report is intended to provide further information to this project and maintain awareness on this issue.

Method

Sixteen SAC1¹ RCAs were included, compared with 26 in the previous 12-month review undertaken by NSW Health Quality and Safety Branch. Although the periods overlap, RCAs reviewed in the September 2007 report were excluded from the current data. Some analysis of IIMS data (SAC2-4 incidents) was also undertaken.

The information contained within each of these RCA reports was reviewed to identify common risk factors for patients presenting with conditions included in the ACS category. These are detailed in the findings of the analysis and include:

- Patient factors which may impact on timely diagnosis and treatment
- System/service factors
- Time of presentation
- Use of guidelines
- Use and availability of electrocardiograph (ECG)

Findings from Review of RCAs

Location of incident

The majority of incidents reported occurred in regional or rural facilities, primarily in emergency departments.

Table 1: Location of Incident by Peer Group Hospital Classification

Hospital group	Tertiary	Regional or smaller metro.	Base or rural	Smaller rural
SAC 1s reported	4	2	5	5
Deaths reported	4	2	5	5

Table 2: Location of Patient at the Time of Incident Notification

Location of patient	Ward or clinical unit	Emergency department
First review 2007	11	15
Second review 2008	3	13

Most RCA reports contained information about the time of patient presentation and the skill mix/staffing in the emergency department at the time. This is summarised in Table 3.

Of the 15 presentations to emergency departments where management of ACS was identified as a SAC1 incident, 13 occurred after hours, eight of them on a weekend. Three incidents occurred on Wednesday evening/night.

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.

Table 3: Further breakdown of Incidents reported from Emergency Departments (15)

Size of hospital	Time/day of presentation	Staffing Mix (if stated in RCA)
Base	1142 Friday	ED CMO, physician, nursing staff assumed
Tertiary	1439 Tuesday	ED registrar, aged care and rehabilitation registrar, M1, nursing staff assumed
Regional	1000 Saturday	Not listed
Regional transferred from district	2210 Thursday (at regional)	ED MO, nursing staff
Tertiary	1718 Tuesday	Nursing staff, ambulance staff, unsure of specific medical staff
Smaller metropolitan	2055 Sunday	ED RMO, ED registrar in the morning
Base	0720 Saturday	MO, triage1 nurse
Base	1555 Sunday	MO, nursing staff assumed
District	0640 Sunday	registered nurse, enrolled nurse
Smaller	2220 Wednesday	ED MO, triage nurse
District	2310 Wednesday	registered nurse, on-call MO
Tertiary	2025 Saturday	triage nurse, NART2 bed nurse
Base	1852 Wednesday	ED MO
Base	1850 Sunday	MO
Tertiary	2123 Sunday	triage nurse, ED registrar

Age of patients involved in reported incidents

Reported incidents were more likely to involve older patients, in line with the overall incidence of ACS.

Table 4: Age of Patients Involved in ACS Incidents

Age of patient	30-39	40-49	50-59	60-69	70-79	80 or older	unknown
First review 2007	2	2	3	4	6	6	2
Second review 2008	1	1	1	2	6	5	0

Table 5: Patient Triage Categories

The Australian Triage Scale category (see footnote 2) was recorded in half the RCAs reviewed. The majority of patients were allocated ATS ratings of 3 or 4. A number of presentations to smaller hospitals do not indicate allocation of a triage category as the patient appears to have been seen immediately.

ED triage category	1	2	3	4	5	Not applicable or not stated
Count	0	1	4	3	0	8

Classification of the SAC 1 incidents

The RCA teams' findings were classified in accordance with the clinical management minimum data set (IIMS) under categories listed in Table 6.

Table 6: Clinical management PIT² sub-classifications

Classification	Number
Diagnosis – missed	6
Diagnosis – delayed	2
Investigations – results not reviewed	1
Investigations – results not followed-up	1
Investigations – delayed	1
Treatment – delayed	0
Treatment – inadequate	1
Treatment – wrong	0
Observations – not performed	2
Observations – failure to recognise significance	0
Observations – delay/failure to respond	1
Non-preventable death	1

The diagnosis of ACS was missed or delayed in eight (50%) of the SAC1 incidents reported. Five of these patients re-presented to an emergency department and died from an acute cardiac event between nine hours and six days after their initial hospital presentation. All had previously been seen in ED with symptoms which, with the benefit of hindsight, should have been considered to represent ACS, but had been discharged for non-urgent follow-up or had the 'provisional' diagnosis discounted.

Findings of the RCA teams regarding causation

RCA teams are able to select more than one category for each causation statement. Communication remains an issue however the most common factor identified in this group of incidents was the knowledge/skills/competence of staff in relation to ACS.

Table 7: Categories assigned to Causation Statements

Root cause/contributing factor	2006-2007 review of ACS RCAs (%)	2007-2008 review of ACS RCAs (%)
Communication	27	19
Policies and procedures	23	18
Knowledge, skills & competence *	20	26
Work environment/scheduling	11	13
Safety mechanisms	7	11
Equipment	5	3
Patient factors	7	10

*Two area health services³ have added a category of "practice" (five instances). For the purposes of this report, these have been included under the "knowledge, skills, competence" classification.

² Principal Incident Type (PIT) is a classification selected to help describe the incident. More information can be found in Incident Management in the NSW Public Health System July-December 2008

³ Now Local Health Districts (LHDs)

Compliance with ACS Clinical Pathways

The application or existence of clinical pathways was not always clearly identified in RCA reports, however the following was able to be ascertained:

- Fourteen RCAs identified that ACS pathways were not considered or fully applied.
- In seven of the RCAs reviewed, ACS was not considered as a working diagnosis within a reasonable period following presentation with symptoms. Consequently these patients did not commence on any ACS diagnostic or treatment pathways.
- In a further six cases, ACS was considered, but the pathway was only partially applied.

Table 8: Use of ACS Clinical Pathways

Hospital	Pathways available?	Pathways followed?	Further Notes
Tertiary	Yes	No	ECG and Troponin done on arrival, but no mention of pathway
District	Yes	Partially	Troponin taken on presentation. ECG done. Plan to manage via pathway, but not fully implemented
Regional	Yes	No	Guidelines for another 'provisional diagnosis' used
Tertiary	Yes	Partially	No ECG performed
Smaller metro	Yes	Partially	ECG completed
Base	Not stated	n/k	No information about pathway
Smaller rural	Not stated	No	ACS not considered. ECG was taken in ED but not followed-up after transfer to clinical unit
Base	Yes	No	Pathway 'not fully implemented'
District	Not stated	No	Atypical presentation, ECG done and read as normal. ACS not considered
Smaller rural	Yes	Partially	Cardiac pathway commenced. Appropriate initial management, but discharged prior to Troponin result
District	No	No	ACS not considered
Tertiary	Not stated	No	No evidence that ACS (pathway) was considered
Base	Yes	Partially	Partial compliance with pathway - pathway documents not utilised
Base	Not stated	No	ACS not considered
Tertiary	Yes	Yes – delayed.	Initial focus was to exclude other acute condition. Delayed commencement of pathway
District	Not stated	No	Troponin done, but results not noted until day 2. ECG not done. Provisional diagnosis not ACS

Other factors identified in relation to Patient Assessment

Review of the RCAs indicated that at least one ECG was performed in 13 of the 16 cases. Non-availability of ECG machines was not identified as an issue in any of this group of incidents.

It was not possible to identify the types of ECG machines used in this group of RCAs. Variation was noted in regard to which member of the clinical team reviewed the ECG reading, as would be expected across a range of facilities. The majority were seen by emergency department medical staff.

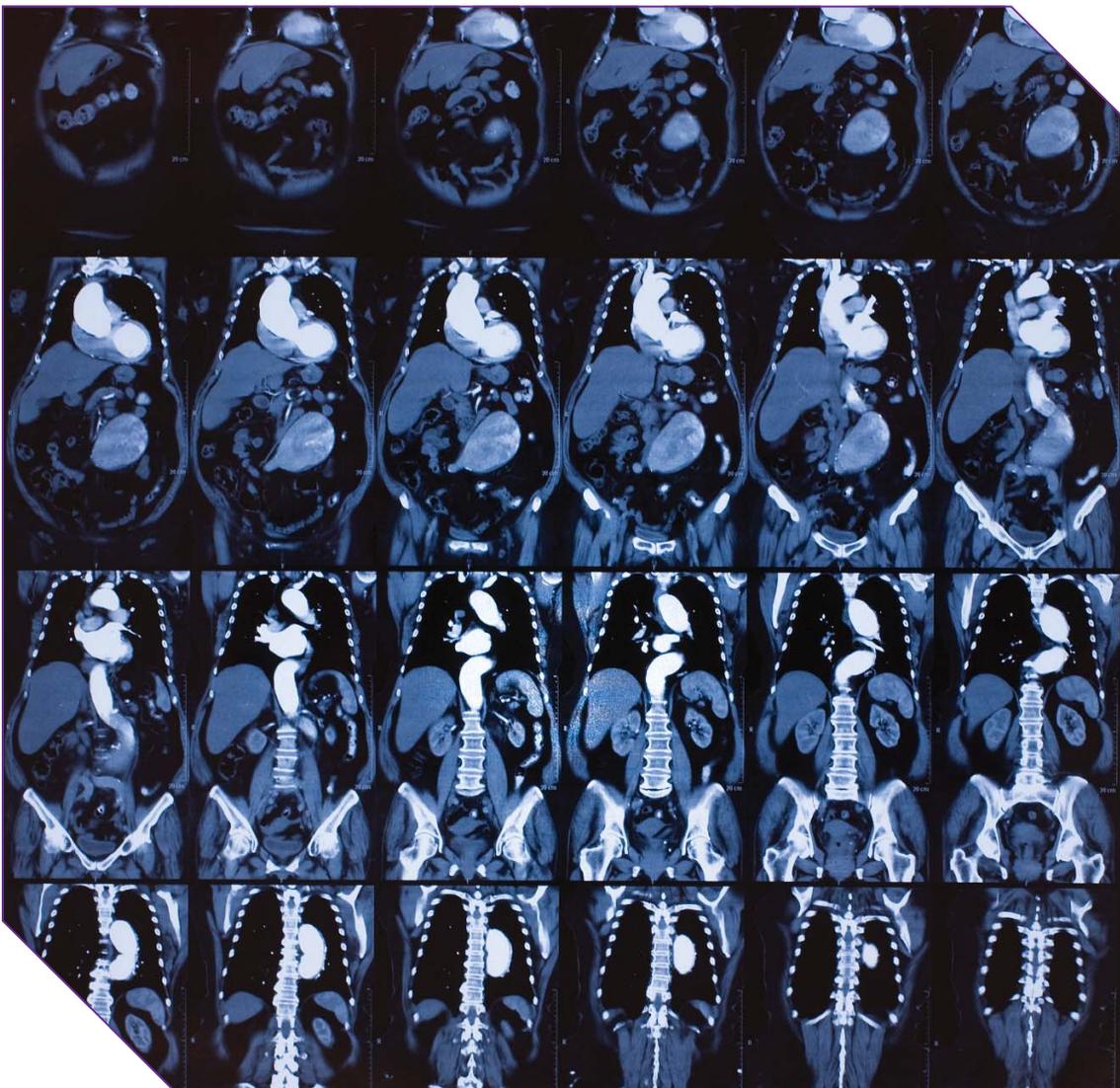
Recommendations for new guidelines were made in several RCAs, however, these were generally in the broader context of conducting comprehensive initial assessment, patient observations or ensuring review of ECGs by an appropriately skilled staff member.

Several RCAs identified that the patient's presentation was 'atypical', but in retrospect all were able to identify elements which should have triggered further investigation of the patient in relation to ACS.

Findings from Review of IIMS Data (SAC2 - SAC4)

A further 11 incidents with SAC ratings of 2-4 were identified from a review of the IIMS data from March – October 2008 (looking for actions taken in response to abnormal results). Nine of these were analysed in detail. The findings reflected the issues identified during the previous analysis of RCAs. These included:

- Patients with chronic conditions/comorbidities were more likely to have a delay in ACS being considered as the reason for presentation to an acute care facility
- Serial ECGs and Troponin tests were not always conducted. A finding of “no abnormality detected” (NAD) on initial tests often determined the treatment plan
- Adherence to clinical pathways was variable
- Incidents occurred at all levels of facility across the state (small rural to tertiary facilities)
- The severity assessment code applied to these incidents was on occasion under-rated.



Conclusion

Although this is a smaller number of incidents than included in the previous 12-month review, it represents a significant number of unexpected deaths of patients presenting with symptoms of Acute Coronary Syndrome. In summary the review found:

- The largest proportion of ACS incidents (63%) occurred at smaller rural facilities (base hospital or smaller)
- Of the 15 presentations to Emergency Departments where management of ACS was subsequently identified as a SAC1 incident, 13 occurred after-hours, eight of them on a weekend
- Seven of the eight RCAs where the triage category was reported, indicated that the patients were assigned category 3 or 4
- The diagnosis of ACS was missed or delayed in eight (50%) of the SAC1 incidents reported
- The issues of conducting comprehensive clinical assessment, monitoring/observations was common to a number of these RCAs and was often attributed to staffing, skill mix and workload issues
- The most common factor identified by RCA teams was the knowledge/skills/competence of staff involved in care of these patients. The challenges of maintaining current knowledge and skills in rural settings may be a factor in this group of incidents
- ECG machines were reported as being available in all but one of the RCAs.

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