National data elements for the clinical management of acute coronary syndromes

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ABSTRACT

- Patients with acute coronary syndromes represent a clinically diverse group and their care remains heterogeneous. These patients account for a significant burden of morbidity and mortality in Australia.
- Optimal patient outcomes depend on rapid diagnosis, accurate risk stratification and the effective implementation of proven therapies, as advocated by clinical guidelines. The challenge is in effectively applying evidence in clinical practice.
- Objectivity and standardised quantification of clinical practice are essential in understanding the evidence–practice gap.
- Observational registries are key to understanding the link between evidence-based medicine, clinical practice and patient outcome.
- Data elements for monitoring clinical management of patients with acute coronary syndromes have been adapted from internationally accepted definitions and incorporated into the National Health Data Dictionary, the national standard for health data definitions in Australia.
- Widespread use of these data elements will assist in the local development of "quality-of-care" initiatives and performance indicators, facilitate collaboration in cardiovascular outcomes research, and aid in the development of electronic data collection methods.

MJA 2005; 182: S1–S16

Acute coronary syndromes (ACS) represent a broad spectrum of clinical presentations, spanning ST elevation myocardial infarction through to an accelerated angina without evidence of myonecrosis. Nevertheless, this diverse clinical syndrome is bound by a common pathophysiology: coronary inflammation; epicardial plaque rupture or erosion; and coronary thrombosis and distal embolisation leading to myocardial ischaemia and/or infarction.[1,2] Acute coronary syndromes account for more than 25 000 deaths per year in Australia,[3] coupled with an enormous burden of acute in-hospital clinical care and morbidity.[3] Optimal patient outcomes depend on rapid diagnosis, accurate risk stratification, and effective implementation of proven therapies and treatment strategies among specifically defined "at-risk" groups. Fortunately, clinical data informing the management of ACS are plentiful and include rigorous controlled international clinical trials. These data have been formulated into national and international clinical practice guidelines.[4,5]

The real challenge is in effectively applying this evidence to clinical practice. A divide between outcomes in clinical trials and in clinical practice persists.[6-10] Such a gulf is not surprising, given the heterogeneity of our clinical environments. Objectivity and standardised quantification of clinical practice are key in understanding this evidence–practice gap.[11,12] Registries are essential to quality improvement initiatives, and are valuable in validating the effectiveness of costly interventions and therapies.[13] A national standard for the data elements used in monitoring the clinical management of patients with ACS would facilitate these efforts.

Why collect data in acute coronary syndromes?

Questions frequently asked by clinical and public health decision makers include:

- What are the rates of death and recurrent myocardial infarction among my patients, and how do these compare with other local and international outcomes?
- Are all my patients receiving guideline-advocated care and, if not, why not?
- What happens to patients who are not well represented in clinical trials, such as the elderly, and those with renal disease?
- To what degree are my rural and remote patients disadvantaged?
- What effect do these therapies have outside randomised clinical trials?
- Which therapies provide the greatest cost-effectiveness for the limited resources available?

To address these questions, many individuals and institutions have recognised the need to acquire local data among patients presenting with ACS. Such initiatives would be facilitated by standardised definitions at the point of care and beyond. This in turn may allow for effective comparisons with international clinical trials and registries, as well as encourage collaboration between institutions with similar interests and research or audit questions. Box 1 lists the goals of promoting a national data standard.

The specific needs for data are diverse and vary among institutions. This set of data elements does not seek to be all things to all people. Instead, we envisage that users will select smaller sets of elements from the proposed master set to meet the specific local interest or need. It is important to understand that we do not propose a national database or similar infrastructure. The collection and quality of clinical and epidemiological data remain the responsibility of the interested individuals or institutions. It is hoped that with this nationally standardised set of data elements, people with a need or interest in these data can converse in the same language.

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1 Goals of the standardised national data elements for acute coronary syndromes

- Facilitate quality assurance and improvement initiatives through standardised assessment of risk, risk adjustment, clinical process and outcome.
- Develop performance measures that are relevant to our region to aid in identifying suboptimal utilisation of therapies and resources, assist in identifying gaps between the evidence base and actual clinical care, and assist in making decisions on resource allocation at the population level.
- Promote collaboration in outcomes research, for a greater capacity to explore clinical heterogeneity and clinical outcome. Consistency with clinical trial and international registry definitions allows for direct comparison of local, national and international outcomes.
- Assist in developing electronic clinical management tools, including electronic medical records and decision support applets.

Source of data elements

Data elements for the clinical description of ACS and its management have been proposed by the American College of Cardiology (ACC) and the American Heart Association (AHA), and their definitions have been internationally endorsed by the European Society of Cardiology (ESC), the National Heart Foundation of Australia (NHFA) and the Cardiac Society of Australia and New Zealand.[14] They include basic demographic and clinical definitions pertaining to ACS diagnosis and management. Many of these definitions mirror those used in clinical trials, and some of the outcome elements have been validated within ongoing clinical registries. Some of these elements may be combined to provide risk scores that assist in clinical decision-making.

Given the robust rationale supporting these elements, we do not propose a new set of elements, but have modified some of these elements to suit our local context. In addition, the definitions and responses have been structured to facilitate their inclusion in prospective electronic data collection systems. Modifications include the description and coding of ethnicity, diabetes, and chronic lung disease, and the addition of an element for obstructive sleep apnoea. We have also developed a risk strata element for patients presenting with ACS, in line with current NHFA guidelines.[5] In general, these modifications have been made to:

- bring the elements in line with definitions in the National Health Data Dictionary (NHDD), the national standard for collecting health data in Australia;
- meet the principal goals of the initiative; and
- add to the element set, given emerging evidence.

The subset of elements accepted into the NHDD is available at the Australian Institute of Health and Welfare website (www.aihw.gov.au). Our development process is summarised in Box 2.

Structure of the element set

Considering the large number of data elements required to completely describe an episode of ACS, the elements have been classified into three domains:

1. diagnosis and clinical outcome;
2. care processes; and
3. clinical factors necessary for the refinement of risk stratification.

To facilitate incorporation into the NHDD, these elements have also been divided into "core" and "non-core" elements. The core data elements are selected for submission to the Health Data Standards Committee (formerly the National Health Data Committee). These elements focus on the correlation between diagnosis and delivery of clinical care (eg, the diagnosis of ST elevation myocardial infarction and the administration of reperfusion therapy). Our delineation into core and non-core elements should not be interpreted as reflecting the relative importance or utility of any data elements, nor the level of scientific evidence supporting their validity. Furthermore, it is unlikely that the core data elements alone will provide adequate information for accurate risk adjustment, and inclusion of many non-core data elements would be recommended to satisfy the purposes of outcomes research.

Despite these structural divisions, we recommend that the set of data elements should be considered as a whole, from which specific elements can be selected to meet local requirements. Furthermore, elements that can be derived from other elements, such as estimated creatinine clearance and thrombolysis in myocardial infarction (TIMI) risk score, have been omitted.[15,16] Lastly, although we envisage that these elements should provide adequate representation of a clinical episode for most outcomes-based research, elements reflecting emerging technologies such as novel biomarkers have not been included.[17] As clinical risk stratification and care of patients with ACS evolves, these data elements will be updated.

Specific considerations

The Acute Coronary Syndrome Stratum data element

Given the priority of matching of risk with clinical care, we have produced a data element reflecting the risk strata described in the NHFA guidelines.[5] These risk strata are separated into ST-segment elevation myocardial infarction, and non-ST elevation acute coro-

2 Development of the National Acute Coronary Syndromes data elements

This set of data elements was developed through a consultative process, under the auspices of the National Heart Foundation of Australia and the Cardiac Society of Australia and New Zealand. The working group included representatives from:

- National Heart Foundation of Australia
- Cardiac Society of Australia and New Zealand
- Australasian College for Emergency Medicine
- Australian Institute of Health and Welfare
- Australasian Society of Cardiac and Thoracic Surgeons
- Royal Australasian College of Physicians
- Towards a Safer Culture
- National Centre for Classification in Health
- Aboriginal Health and Medical Research Council of NSW
- The George Institute of International Health

The data elements were also posted on the National Heart Foundation and Cardiac Society websites for public comment. Heads of cardiology departments, other specialist professional bodies and regional key opinion leaders in the field of acute coronary syndromes were also consulted. Recommendations from the National Health Data Standards Committee, as the custodians of the National Health Data Dictionary, were considered in the final drafting of the data elements. A process of ongoing consultation is anticipated, as clinical care evolves.

nary syndromes of high, intermediate and low risk. This approach differs from the ACC/AHA definitions, which focus more on the traditional diagnostic classifications.[14]

The rationale underlying our approach is twofold. First, these classifications reflect possible decision nodes in the care of patients with ACS. The use of risk strata offers clinical application for monitoring the use of treatment strategies and therapies. Second is the recognition that the diagnostic classification of patients often evolves during the hospital admission when further clinical data or recurrent events, such as in-hospital MI, emerge. Our risk strata approach focuses on the characteristics early in the admission that drive the choice of time-emergent treatments. Nevertheless, the clinical utility of diagnostic labels is recognised, particularly for communicating with patients and for clinical coding. Final diagnostic classifications are particularly useful at the time of discharge. Diagnostic definitions have been included in the non-core elements, and the risk strata element has been included in the core elements.

Diagnosis of myocardial infarction

As a pathological entity, myocardial infarction represents a continuum of risk, proportional to the extent of myonecrosis.[18] Clinically, the term "myocardial infarction" is used as a diagnosis and an outcome. Complexity arises when the term is used to satisfy both purposes, as reflected in the several definitions of myocardial infarction included in the ACC dataset.

For diagnostic purposes, a sensitive definition is desirable to facilitate the application of risk modifying therapies, such as antiplatelet and lipid-lowering therapies. With the evolution of troponin T or I assays, myocardial infarction is now diagnosed with greater sensitivity and therefore greater incidence, as reflected in the consensus ACC/ESC definition.[19-22] However, myocardial infarction is also an outcome. Its definition should impart prognostic implications, not only at a clinical level (expressed as the risk of heart failure and death), but also at the social level (employment, licensure, insurance), and at a public health level (specifically epidemiological studies). The current data elements have partially avoided this debate by focusing on risk stratification rather than diagnosis in the initial assessment, while maintaining the established definitions of myocardial infarction contained in the ACC document.[14] Nevertheless, further work correlating degrees of myocardial damage and clinical, social and economic outcomes is needed.

Adding to the complexity of the new definition for myocardial infarction is the limited precision of current troponin assays. The ACS working group recommends using assay-specific thresholds for defining myocardial infarction, set at the concentration which the specific assay is able to determine with a precision of $< 10\%$ coefficient of variation.[23]

Medications

Data elements capturing all medications cannot be included because of the large number of elements required to optimally describe prescribing activity. This we have left to the audit activities of individual institutions. We have included the prescribing of key therapies strongly supported by clinical guidelines (fibrinolysis, β-blockers, angiotensin-converting enzyme inhibitors, aspirin, lipid-lowering therapies and clopidogrel), as well as a means of identifying reasons for not prescribing when this is the case. When collected at a single time point, we envisage that these elements will reflect the status at discharge, with the exception of fibrinolysis, although they could be used to record the status of these therapies at any time point.

People seeking more comprehensive medication information may record the medications at three time points: before presentation; commenced within 24 hours of admission; and at discharge.

No attempt has been made to differentiate between therapies prescribed and those actually administered. Likewise, no attempt has been made to record actual doses.

Concluding comments

The challenge that remains is to incorporate these elements into electronic clinical management tools, thus allowing data collection to shadow clinical care. Although the electronic collection of ACS data remains outside the scope of this initiative, this standardised set of definitions is an essential step in the development of any such system. Nevertheless, it is hoped that these elements prove useful within our current clinical environment, by aiding in the standardised characterisation of ACS clinical care. Use of these elements will facilitate initiatives aimed at improving the quality of care and, therefore, clinical outcomes among this high-risk and heterogeneously served population of patients.

Data elements for acute coronary syndromes (ACS)

Demographics

Domain	Dataset	Element	Description
D/O	C	Person identifier	Person identifier unique within an establishment or agency.
D/O	C	Sex	Where there is inconsistency between anatomical and chromosomal characteristics, use anatomical characteristics.
RS	C	Date of birth	
RS	C	Country of birth	
RS	NC	Ethnicity	"Race" in American College of Cardiology terminology.
RS	C	Indigenous status	Whether a person identifies as being of Aboriginal or Torres Strait Islander origin.
CP	NC	Hospital insurance status	Whether a person is a public patient, privately insured or insured by the Department of Veterans' Affairs (Australian adaptation).
CP	NC	Establishment identifier	Hospital unique identifier.
CP	NC	Establishment type	Type of establishment (defined in terms of legislative approval, service provided and patients treated) for each separately administered establishment.

Risk factor status

Domain	Dataset	Element	Description
RS	C	Total cholesterol: measured	The person's measured total cholesterol level. Note: Date should be recorded.
RS	C	HDL-C: measured	The person's measured high-density lipoprotein cholesterol (HDL-C) level. Note: Date should be recorded.
RS	C	LDL-C: calculated	The person's calculated low-density lipoprotein cholesterol (LDL-C) level. Note: Date should be recorded.
RS	C	Triglycerides: measured	The person's measured triglycerides level. Note: Date should be recorded.
RS	NC	Dyslipidaemia	Dyslipidaemia, documented by history of dyslipidaemia diagnosed and treated with medication, diet, and/or exercise; or current use of lipid-lowering agents.
RS	C	Tobacco smoking status	The person's current and past smoking behaviour.
RS	NC	Hypertension	Hypertension, documented by history of hypertension diagnosed and treated with medication, diet and/or exercise; blood pressure greater than 140 mmHg systolic or 90 mmHg diastolic on at least two occasions; or current use of antihypertensive pharmacological therapy.
RS	C	Diabetes status	Identifies a person with or at risk of diabetes.
RS	NC	Glycosylated haemoglobin (HbA_{1c}): measured	The person's measured glycosylated haemoglobin (HbA_{1c}) level.
RS	NC	Diabetes therapy type	The type of diabetes therapy the person is currently receiving.
RS	C	Myocardial infarction history	Whether the person has had previous myocardial infarction.
RS	C	Premature cardiovascular disease family history status	Identifies whether the person has a first-degree relative (father, mother or sibling) who has had a vascular event or condition diagnosed before the age of 60 years.
RS	C	Vascular history	Describes the vascular history of the person.
RS	NC	Creatinine, serum: measured	The person's measured serum creatinine level. Note: Date should be recorded.
RS	NC	C-reactive protein: measured	The person's measured C-reactive protein level. Note: Date and time should be recorded.
RS	C	Concurrent clinical conditions on presentation	Concurrent medical conditions which are pertinent to the risk stratification and treatment of ACS that a person has or has undergone before presentation: angina for more than past 2 weeks, angina only in the past 2 weeks, chronic lung disease, heart failure, hypertension, ischaemic: non-haemorrhagic cerebral infarction, haemorrhagic: intracerebral haemorrhage, peripheral artery disease, aortic aneurysm, renal artery stenosis, sleep apnoea, not stated, inadequately described.
RS	C	Clinical evidence status	Indicator of the status of evidence for a pre-existing clinical condition.
RS	NC	Date of the most recent stroke	The date of the most recent documented stroke or cerebrovascular accident.

Domain: D/O = Diagnosis/Outcome, CP = Clinical Process, RS = Risk Stratification. Dataset: C = Core, NC = Non-core.

Data elements for acute coronary syndromes (ACS) (*continued*)

Presentation and triage

Domain	Dataset	Element	Description
D/O	NC	Time of onset of ACS symptoms	The time of the onset of cardiac ischaemic symptoms that prompted the patient to seek medical attention related to this acute event. With stuttering symptoms, onset is the time at which symptoms became constant in quality or intensity.
D/O	NC	Date of onset of ACS symptoms	The date of the onset of cardiac ischaemic symptoms related to this acute event that prompted the patient to seek medical attention.
D/O	C	Date patient presented	The day on which the patient presented for the delivery of a service.
D/O	C	Time patient presented	The time at which the patient presented for the delivery of a service.
CP	NC	Emergency department arrival mode: transport	The mode of transport by which the person arrived at the emergency department.
CP	C	Date of triage	The day on which the patient was triaged.
CP	C	Time of triage	The time at which the patient was triaged.
CP	C	Triage category	The urgency of the patient's need for medical and nursing care.

Clinical presentation

Domain	Dataset	Element	Description
D/O	C	Chest pain pattern category	Describes the person's chest pain pattern.
RS	NC	Number of episodes of angina in past 24 hours	Number of distinct episodes of anginal pain that occurred in the 24 hours before hospital presentation.
RS	NC	Secondary cause of angina	Identifies the secondary factor such as fever, anaemia, hypoxaemia, tachycardia, thyrotoxicosis, or severe valvular disease.
RS	C	Heart rate	The heart rate recorded in beats per minute (at presentation).
RS	C	Blood pressure: diastolic, measured	The person's measured diastolic blood pressure.
RS	C	Blood pressure: systolic, measured	The person's measured systolic blood pressure.
RS	C	Height: self report	The person's self-reported height.
RS	C	Weight: self report	The person's self-reported weight (body mass).
RS	C	Killip classification code	Identifies the Killip class, as a measure of haemodynamic compromise, of the person at the time of presentation.

Electrocardiography

Domain	Dataset	Element	Description
CP	NC	Date of first 12-lead ECG: acute episode	The date the first 12-lead electrocardiogram (ECG) was recorded for this acute episode (whether in a prehospital setting, emergency department, or inpatient unit).
CP	NC	Time of first 12-lead ECG: acute episode	The time the first 12-lead ECG was recorded for this acute episode.
RS	C	Heart rhythm type	The type of heart rhythm, as determined from the ECG.
RS	NC	Bundle-branch block: status	Describes the bundle-branch block as new, old or of uncertain timing.
RS	NC	Bundle-branch block: type	Describes the type of bundle-branch block present.
RS	C	ECG abnormalities: location	Describes the area in which the main abnormalities are located on the 12-lead ECG.
RS	C	ECG abnormalities: type	Describes the type of abnormalities seen on the ECG.
RS	NC	ST elevation in lead V4R of the ECG	The presence of ST-segment elevation greater than or equal to 1 mm (0.1 mV) in lead V4R when right-sided precordial leads are recorded.
RS	NC	Follow-up ECG: new Q waves	The presence of new Q waves in a follow-up ECG recorded at least 6 hours after the initial ECG. The new Q waves are greater than or equal to 0.03 seconds in width, in at least two contiguous leads, and greater than or equal to 1 mm (0.1 mV) in depth and not seen on initial ECG.

Domain: D/O = Diagnosis/Outcome, CP = Clinical Process, RS = Risk Stratification. Dataset: C = Core, NC = Non-core.

Data elements for acute coronary syndromes (ACS) (*continued*)

Biomarkers

Domain	Dataset	Element	Description
D/O	C	CK-MB isoenzyme units	The units used to measure the creatine kinase MB (CK-MB).
D/O	C	CK-MB isoenzyme: upper limit of normal	Laboratory standard for the value of CK-MB that is the upper boundary of the normal reference.
D/O	C	CK-MB isoenzyme: measured	The person's measured CK-MB isoenzyme. Note: CK-MB Date and Time data elements should also be recorded and have been listed as core elements.
D/O	NC	CK units	The units used for measuring creatine kinase (CK).
D/O	NC	CK: upper limit of normal range	The upper limit of normal of total CK, as defined by individual hospital laboratory standards.
D/O	NC	CK: measured	The person's measured CK. Note: Date and Time should be recorded.
D/O	C	Troponin assay type	Identifies the type of troponin assay (T or I) used.
D/O	NC	Troponin testing product	Identifies the troponin testing product used to measure troponin T or I.
D/O	NC	Troponin units	The units used for measuring troponin (eg, ng/dL).
D/O	C	Troponin assay: upper limit of normal range	The upper limit of normal for troponin T or I, as defined by individual hospital laboratory standards or normal reference range.
D/O	C	Troponin measured	The person's measured troponin. Note: Troponin Date and Time data elements should also be recorded and have been listed as core elements.

Clinical diagnosis at admission

Domain	Dataset	Element	Description
D/O	C	Acute coronary syndrome stratum	Risk stratum of the patient presenting with clinical features consistent with an ACS (chest pain or overwhelming shortness of breath), defined by accompanying clinical, ECG and biochemical features.

Pharmacological therapy

Domain	Dataset	Element	Description
CP	C	Aspirin therapy status	Identifies if aspirin therapy administered.
CP	C	Lipid-lowering therapy status	Identifies if lipid-lowering therapy administered.
CP	C	β-Blocker therapy status	Identifies if β-blocker therapy administered.
CP	NC	Intravenous β-blocker therapy	Identifies the intravenous β-blocker therapy the patient has received.
CP	NC	Calcium-channel blocker therapy	Identifies the calcium channel blocker therapy that the patient has received.
CP	C	ACE inhibitors therapy status	Identifies if angiotensin-converting enzyme (ACE) inhibitor therapy has been administered.
CP	NC	Angiotensin II receptor blockers therapy	Identifies the angiotensin II receptor blocker therapy the patient has received.
CP	NC	Antithrombin therapy	Identifies the antithrombin therapy the patient has received.
CP	C	Clopidogrel therapy status	Identifies if clopidogrel therapy administered.
CP	NC	Ticlopidine therapy status	Identifies whether the patient has received ticlopidine.
CP	NC	Other antiplatelet agents therapy	Identifies if other antiplatelet therapy has been given.
CP	C	Glycoprotein IIb/IIIa receptor antagonist therapy status	Identifies if glycoprotein IIb/IIIa receptor antagonist therapy has been administered.
CP	NC	Glycoprotein IIb/IIIa receptor antagonist administered	Identifies the glycoprotein IIb/IIIa receptor antagonist given.
CP	NC	Antiarrhythmic therapy status	Identifies whether the patient has received antiarrhythmic therapy.
CP	NC	Digitalis therapy	Identifies the digitalis therapy the patient has received.
CP	NC	Nitrates administration route	The route by which the patient received the nitrates.
CP	NC	Diuretic therapy	Identifies the diuretic therapy the patient has received.
CP	NC	Warfarin therapy status	Identifies whether the patient received warfarin.
CP	NC	Female hormone replacement therapy status	Identifies whether the patient has received female hormone replacement therapy.
CP	NC	Nicotine replacement therapy status	Identifies whether the patient has received nicotine replacement therapy.

Domain: D/O = Diagnosis/Outcome, CP = Clinical Process, RS = Risk Stratification. Dataset: C = Core, NC = Non-core.

Data elements for acute coronary syndromes (ACS) (*continued*)

Reperfusion therapy

Domain	Dataset	Element	Description
CP	C	Fibrinolytic therapy status	Identifies the person's fibrinolytic therapy status.
CP	C	Date of intravenous fibrinolytic therapy	The date intravenous fibrinolytic therapy was administered or initiated.
CP	C	Time of intravenous fibrinolytic therapy	The time intravenous fibrinolytic therapy was administered.
CP	C	Fibrinolytic drug used	Identifies the fibrinolytic drug used.
CP	C	Date of the first angioplasty balloon inflation or stenting	The date of the first angioplasty balloon inflation or stent placement.
CP	C	Time of first angioplasty balloon inflation or stenting	The time of the first angioplasty balloon inflation or stent placement.

Cardiac investigations and procedure

Domain	Dataset	Element	Description
RS	NC	Ejection fraction determination method	Identifies whether the ejection fraction has been calculated or estimated. Note: Date should be recorded.
CP	C	Acute coronary syndrome procedure type	The type of procedure performed that is pertinent to the treatment of ACS: • diagnostic cardiac catheterisation, angiography, reperfusion fibrinolytic therapy, reperfusion primary percutaneous coronary intervention, rescue angioplasty, coronary artery bypass graft, coronary stenting (bare metal), coronary stenting (drug-eluting), or angioplasty; • vascular reconstruction, vascular bypass surgery, or percutaneous intervention to the extremities or for aortic aneurysm, amputation for arterial vascular insufficiency; or • insertion of pacemaker, implantable cardiac defibrillator, intra-aortic balloon pump, non-invasive ventilation (CPAP), invasive ventilation, defibrillation, blood transfusion; or • other, not stated, or inadequately described. Note: Date should be recorded. This data element may be used to document prior cardiac procedures.
CP	C	Clinical procedure timing status	An indicator of the timing of the provision of a clinical procedure (current admission or before current admission). This data element may be used to document prior cardiac procedures.
CP	NC	Pulmonary artery (Swan Ganz) catheter status	Whether a pulmonary artery (Swan Ganz) catheter was used during this hospitalisation.

Invasive management

Domain	Dataset	Element	Description
RS	NC	Culprit artery TIMI flow classification	Classifies the thrombolysis in myocardial infarction (TIMI) grade for flow in the culprit artery.
RS	NC	Maximum stenosis: LAD	Percentage stenosis at its maximal point in the left anterior descending artery (LAD).
RS	NC	Maximum stenosis: LCx	Percentage stenosis at its maximal point in the left circumflex artery (LCx).
RS	NC	Maximum stenosis: RCA	Percentage stenosis at its maximal point in the right coronary artery (RCA).
RS	NC	Maximum stenosis: LM	Percentage stenosis at its maximal point in the left main coronary artery (LM).
RS	NC	Maximum stenosis: bypass graft	Percentage stenosis at its maximal point in the bypass graft.
CP	NC	Date of PCI	The day the patient had a percutaneous cardiac intervention (PCI).
CP	NC	Number of coronary artery lesions attempted	Number of coronary artery lesions into which an attempt was made to pass a guide wire, whether successful or not.
CP	NC	Number of coronary artery lesions successfully dilated	Number of coronary artery lesions successfully dilated where residual post-intervention stenosis is less than 50% of the arterial luminal diameter, TIMI flow is 3, and the minimum decrease in stenosis is 20%.
CP	NC	Number of coronary artery stents	Number of stents placed in coronary artery lesions.
CP	NC	Date of CABG	The day the patient underwent coronary artery bypass grafting (CABG).

Domain: D/O = Diagnosis/Outcome, CP = Clinical Process, RS = Risk Stratification. Dataset: C = Core, NC = Non-core.

Data elements for acute coronary syndromes (ACS) (*continued*)

Functional testing

Domain	Dataset	Element	Description
CP	C	Functional ECG stress test element	Identifies the elements included in an electrocardiogram (ECG) stress test.
CP	NC	ECG stress test status	Indicates whether an exercise tolerance or pharmacological ECG stress test was performed during the hospital stay.
RS	NC	ECG stress test intensity	Describes the intensity of the ECG stress test.
RS	NC	ECG imaging stress test defect	Indicates the presences of a fixed defect on ECG stress test imaging. The presence of a fixed defect can indicate an old myocardial infarction.
RS	C	Functional ECG stress test ischaemic result	Indicates the result of the person's ECG stress test in terms of ischaemic outcome. Note: date should be recorded.

Rehabilitation and counselling

Domain	Dataset	Element	Description
CP	C	Date of referral to rehabilitation	The date on which the person was referred to a rehabilitation service.
CP	NC	Smoking cessation counselling	Advice or a pamphlet was given or a discussion was conducted with the patient (by physician, nurse, or other personnel) regarding the importance of stopping smoking.
CP	NC	Weight management counselling	Advice given or counselling conducted by a physician or nurse for patients greater than 120% of ideal weight for height.
CP	NC	Diet counselling	Advice given or counselling conducted by a physician or nurse regarding diet.
CP	NC	Exercise counselling	Advice given or discussion conducted by a physician or nurse encouraging at least 30–60 minutes of physical activity in at least five sessions per week.

Discharge and readmission

Domain	Dataset	Element	Description
CP	C	Separation date	Date on which an admitted patient completes an episode of care.
D/O	C	Mode of separation	Status at separation of the person (discharge/transfer/death) and place to which the person is released (where applicable). Australian adaptation used in the derivation of diagnostic groups.
D/O	C	Reason for readmission: ACS	Identifies the main reason for the admission, to any hospital, of a person within 28 days of discharge from an episode of admitted patient care for ACS.
D/O	NC	Days in intensive care	Total number of days spent in an intensive care bed at the index hospital only, either consecutively or intermittently.
D/O	NC	Discharge destination	Location the patient was discharged to upon leaving this hospital (eg, own home, hostel or nursing home).
D/O	NC	Final diagnosis of admission	The final diagnosis for the event that prompted the admission.

Domain: D/O = Diagnosis/Outcome, CP = Clinical Process, RS = Risk Stratification. Dataset: C = Core, NC = Non-core.

Data elements for acute coronary syndromes (ACS) (*continued*)

In-hospital clinical outcomes			
Domain	Dataset	Element	Description
D/O	C	Death	Patient died during hospitalisation. Contained within in the data element "Mode of separation".
D/O	NC	Cardiac rupture	Rupture of the ventricular myocardium, the ventricular septum, or frank papillary muscle rupture.
D/O	C	Myocardial infarction	To meet the criteria as a post-admission event, a myocardial infarction must be distinct from the index event at the time of admission.
D/O	NC	Cardiogenic shock	The patient experienced cardiogenic shock during hospitalisation.
D/O	NC	Recurrent rest angina with electrocardiogram changes	Whether the patient has experienced recurrent ischaemic pain occurring at rest believed to be cardiac in origin with associated ECG changes.
D/O	NC	Recurrent rest angina without electrocardiogram status	Whether the patient has experienced recurrent ischaemic pain occurring at rest believed to be cardiac in origin without associated ECG changes.
D/O	NC	Heart failure: new	New symptoms of heart failure (typically breathlessness or fatigue), either at rest or during exercise, and/or signs of pulmonary or peripheral congestion and objective evidence of cardiac dysfunction at rest.
D/O	C	Bleeding episode using TIMI criteria: status	The person's episode of bleeding as described by the thrombolysis in myocardial infarction (TIMI) criteria.
D/O	NC	Location of cardiac procedure bleeding	Identifies the location(s) of cardiac procedure bleeding.
D/O	NC	Number of units transfused	The number of units of either whole blood or packed red blood cells the patient received because of a haemorrhagic event.
D/O	NC	Thrombocytopenia	Whether the patient has thrombocytopenia, as determined by the platelet count: platelet count dropped either to < 50 10^9/L or to between 50 10^9/L and 100 10^9/L.
Late clinical outcomes			
Domain	Dataset	Element	Description
D/O	NC	Death	The patient died since the previous visit/contact. Includes all deaths regardless of the cause.
D/O	NC	Primary cause of death	Cardiovascular: indicates cause of death was sudden cardiac death, myocardial infarction, unstable angina, or other coronary artery disease; vascular death (eg, stroke, arterial embolism, pulmonary embolism, ruptured aortic aneurysm, or dissection); chronic heart failure; or cardiac arrhythmia. Non-cardiovascular: indicates cause of death was respiratory failure, pneumonia, cancer, trauma, suicide, or any other already defined cause (eg, liver disease or renal failure).
D/O	NC	Angina status	Canadian Cardiovascular Society classes of angina: I, II, III, or IV.
CP	NC	Medication use	Antiplatelet agent, angiotensin-converting enzyme inhibitor, β-blocker, lipid-lowering agent.

Domain: D/O = Diagnosis/Outcome, CP = Clinical Process, RS = Risk Stratification. Dataset: C = Core, NC = Non-core.

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