Grampians Region

Acute Cardiac Care Framework 2016

A guide for clinicians in health services

VICTORIA State Government | Health and Human Services

Acknowledgements

The Grampians Region Acute cardiac care framework has been developed by a working group (see appendix 1) made up of representatives from health services throughout the Grampians Region, Ambulance Victoria combined with the expert resources of the Victorian Cardiac Clinical Network. Consultation also occurred with specialist medical practitioners.

The Grampians Region would like to gratefully acknowledge the time and effort of those involved in the formulation and refinement of this Framework

This framework aims to maintain currency in best practice. If it is identified that any areas require amendment please inform the contact below.

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Introduction

The National Heart Foundation of Australia offers guidelines for the management of Acute Coronary Syndromes (ACS) http://heartfoundation.org.au/for-professionals/clinical-information/acute-coronary-syndromes. These guidelines include interventional and non interventional treatment options. Historically in the Grampians Region (Region) interventional therapy has been limited, but with the opening of the cardiac catheter laboratory at Ballarat Health Services (BHS) in 2012, and the expansion of this service in 2016, the opportunities for enhanced treatment options has increased.

This Acute Cardiac Care Framework (Framework) has been developed in response to the expanded capacity for interventional treatment options particularly for the time critical ST elevation myocardial infarction (STEMI) patient and to a lesser extent, the Non ST elevation myocardial infarction (NSTEMI) patient. The Australian Resuscitation Council also acknowledges the importance of the facilitation of a regional strategy for the delivery of timely revascularisation[1].

Despite well-developed guidelines for managing ACS, recent research has found that not all patients receive appropriate treatment, particularly invasive management. The *Heart health: improved services and better outcomes for Victorians*[2] released in 2014, has four strategic heart health directions. Direction 2: Better, faster access to time critical care identifies that people living in rural and regional Victoria are often disadvantaged and that cardiac care needs to be responsive and based on agreed best practice guidelines.

This Framework takes into account the capabilities of health services in delivering evidenced based care through the use of the National Heart Foundation of Australia acute coronary syndromes capability framework[3]

With the release of the *Design, service and infrastructure plan for Victoria's cardiac system*[4] on May 2016 a number of priorities for system reform have been identified including

- People experiencing an acute event receive the right care as quickly as possible.
- Patients needing specialist care are transferred at the right time based on clinical need.
- Health services recognise roles and responsibilities within a coordinated system of care.

Using the priorities for system reform outlined in the *Design, service and infrastructure plan for Victoria's cardiac system* forward planning for the Region will include

- Each local hospital will be linked to a regional health service that will coordinate care for all patients from that region.
- Each regional health service will be formally linked to a defined tertiary centre or designated specialist cardiac centre.
- The defined specialist centre will be required to provide advice and consultation to all patients from its associated regional health services, and will accept all patients referred to it by that regional service, subject to clinical assessment, within the prescribed timeframe.
- The regional health service and local hospital will agree to accept patients back from the specialist centre within the prescribed timeframe.
- No centre will refuse a patient requiring advice or admission for a higher level of care based on bed availability. This principle will be a vital element to removing the existing delays that often occur. All patients and organisations should benefit from the improved flow that this will generate.[4]

Objectives

The objectives of the Framework reflect the importance of a collaborative approach across the Region

- To provide guidance to health services on the initial presentation of a patient with acute cardiac chest pain
- To provide a Regional, system based approach to enable timely reperfusion of a STEMI at a local level
- To provide direction for the timely transfer of STEMI and NSTEMI patients
- To provide advice on the initial and ongoing management of ACS patients
- To link the Framework with the Australian Commission on Safety and Quality in Health Care (ACSQHC) Acute Coronary Syndromes Clinical Care Standard[5].

Expected outcomes

By developing the Framework the following outcomes can be expected

- Early identification and intervention of acute cardiac chest pain
- Timely and appropriate transfer of ACS patients
- Decreased morbidity and mortality of ACS patients
- Application of best practice management of ACS pain
- Active involvement by patient and/or carer in their care and treatment

Demographics

The Grampians Region is part of the Department of Health and Human Services rural West Division and covers the area from Bacchus Marsh in the east to the South Australian border in the west, and from Patchewollock in the north to Lake Bolac in the south. The Region covers an area of 48,112 square kilometres of geographically, economically and culturally diverse sections.

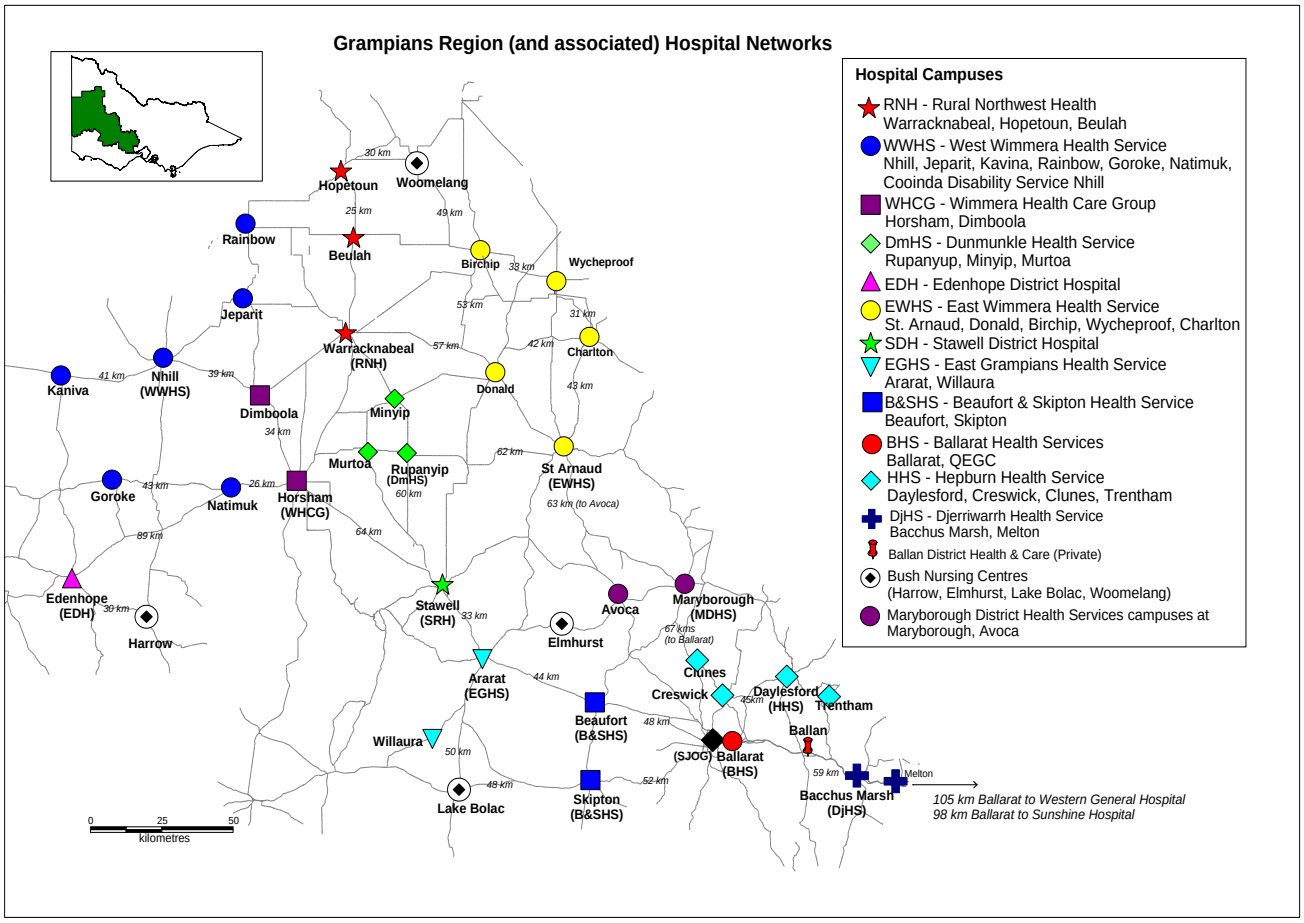
There are two major public hospitals located in the Region, Ballarat Health Services (BHS) and Wimmera Health Care Group (WHCG) (Horsham). Both of these hospitals have an emergency department with specialist nursing and medical staff available at all times to triage, assess, investigate and provide treatment for all categories of emergency and critical care presentations. BHS also provides cardiac services including cardiac catheter laboratory, intensive care unit (ICU), coronary care unit (CCU) and high dependency unit (HDU). WHCG provides critical care services including ICU, CCU and HDU.

The other health service sites (see Map 1) within the Region have an emergency area or room referred to as an Urgent Care Centre (UCC). With the exception of Djerriwarrh Health Service (DjHS) Bacchus Marsh, these UCC do not have dedicated nursing or medical staff. They offer triage and treatment by a registered nurse and/or General Practitioner (GP) who respond to each presentation as required.

The Region also has a large private facility – St John of God Health Care (SJOG) in Ballarat which offers an emergency department with specialist staff. SJOG also offers interventional cardiac facilities similar to BHS along with an ICU and CCU capacity.

Map 1 Grampians Region Health Services

Note - Stawell District Health is now Stawell Regional Health (SRH)



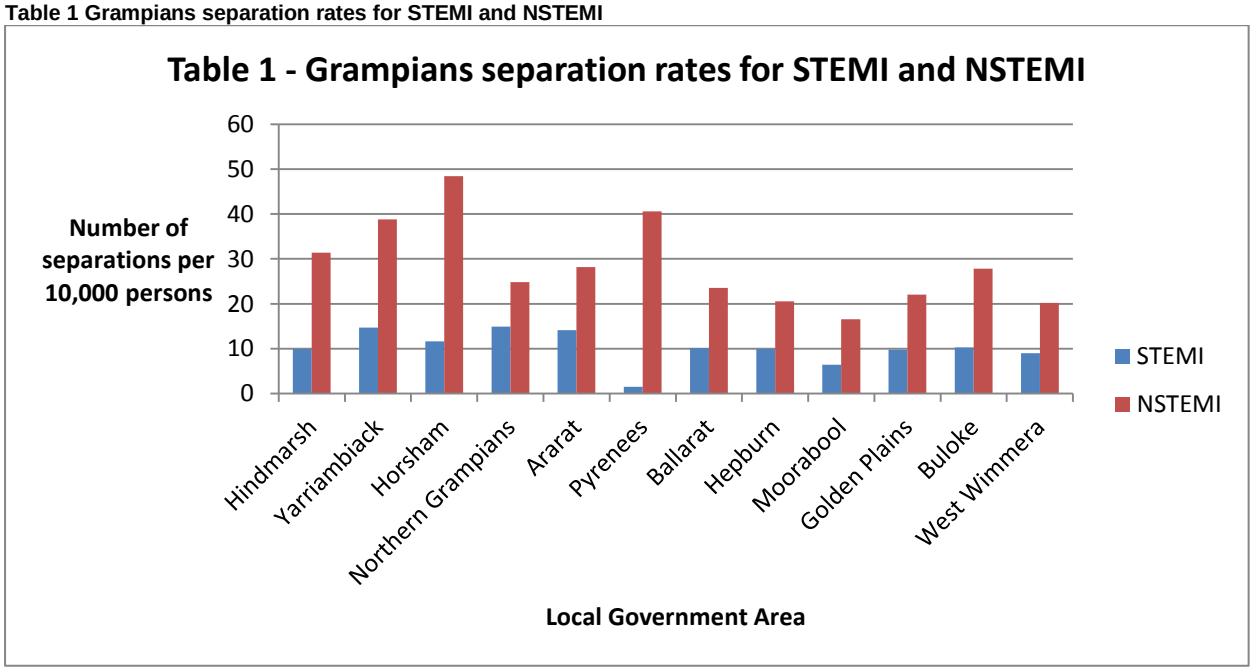
Burden of disease

Cardiovascular disease (CVD) remains a leading cause of death and a major contributor to the illness burden of Victorians. In 2013 coronary heart disease and related conditions was the underlying cause of death for almost 7,500 Victorians, which equates to 21 per cent of all deaths. This actually represents a decrease in the proportion of deaths over the past 10 years from 24 per cent (7,852) in 2004. In addition to being a leading underlying cause of death, heart disease is also a contributing factor in deaths from other causes. From 1997 to 2007, heart disease was a leading contributory cause for all Australian deaths involving selected chronic diseases, including 47 per cent of deaths involving diabetes and 39 per cent involving chronic and unspecified kidney failure.[4]

There remains disparity across Victoria in both rates of potentially avoidable coronary heart disease and mortality from heart disease, with significantly higher rates in rural and regional areas compared with metropolitan areas. This is demonstrated through the Victorian Heart Maps, developed by the National Heart Foundation in partnership with the Victorian cardiac clinical network. These show that the highest rates for heart attack and cardiac arrest are in regional areas.

The Victorian Heart Maps show the rate of hospitalisation in Victoria for Heart Attack (STEMI and NSTEMI), Heart Failure, out of hospital cardiac arrest and Unstable Angina by local government area. The data looks at a five-year period, from 2007-08 to 2012-13. Hospital data is linked to the local government area where the patient lives, not the local government area where hospital treatment was provided. Table 1 shows the separation rates for STEMI and NSTEMI in the Region

Table 1 Grampians separation rates for STEMI and NSTEMI



Source: National Heart Foundation, Victorian Heart maps - http://heartfoundation.org.au/programs/victorian-heart-maps

Pre hospital care – Ambulance Victoria

Ambulance Victoria (AV) operational staff operate under clinical practice guidelines (CPG) authorised by the AV Medical Advisory Committee. These guidelines can accessed at
http://ambulance.vic.gov.au/paramedics/clinical-practice-guidelines/
(Acute Coronary Syndromes Clinical Care Standard Quality statement 1[5])

There are a number of levels within AV operational staff. Those that have direct clinical responsibility for the care and transport of acute coronary syndrome patients include

- Advanced Life Support (ALS) paramedic unit consists of a 2 person ALS crew or ALS with an Ambulance Community Officer (ACO). ALS units have capacity to transport in a stretcher vehicle, cardiac monitor in 3 leads, treat cardiac chest pain with sub-lingual or transdermal Glyceryl Trinitrate (GTN), Aspirin, IN Fentanyl, IV Fentanyl or Morphine If cardiac arrest occurs ALS paramedics can insert laryngeal mask airway, administer IV adrenaline and defibrillate. Refer to appendix 2 for the AV pain relief CPG.

- Mobile Intensive Care Ambulance (MICA) unit consists of two MICA paramedics with the capacity to transport in an intensive care equipped stretcher ambulance vehicle. In addition to the ALS paramedic skills the MICA paramedic is able to undertake advanced airway management including intubation, to undertake synchronised cardioversion and chemically treat other cardiac arrhythmias. The MICA paramedic also has the capacity to perform and transmit 12 lead ECGs. They also carry and can administer thrombolytic in the pre-hospital setting.

- A MICA Single Responder Unit (SRU) consists of one MICA paramedic in an intensive care equipped sedan requiring ALS paramedic stretcher unit to transport.

The STEMI management CPG, states that following administration of thrombolysis the patient should be transported to the closest emergency department, or if stable to a PCI centre in an appropriate timeframe. Refer to appendix 3

It is intended that by 2016 all ALS teams will have 12 lead capacity and transmission capability. As with the MICA units, this will allow hospitals to view the 12 lead ECG in conjunction with the pre-hospital notification process and prepare for the patients arrival.

Other AV operational crews include

- Ambulance Community Officers (ACOs) are employed on a casual basis to provide advanced first aid in more remote rural communities either in support of ALS paramedics or at stand-alone ACO teams. ACOs will respond in a stretcher vehicle.

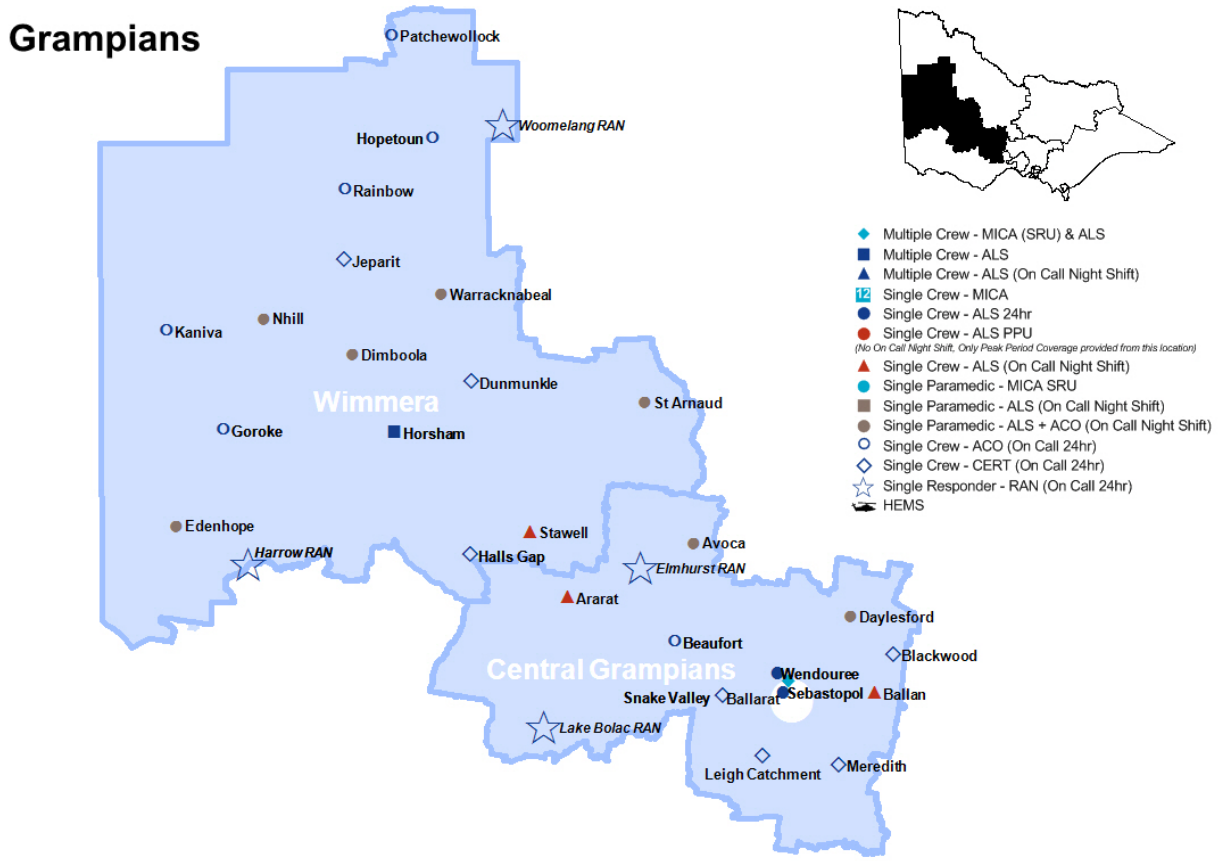
- Community Emergency Response Teams (CERTs) consist of ambulance volunteers who function as ‘first responders’ within communities where the nearest ambulance station is at a distance. CERT respond in a sedan.

Both the ACO and CERT have advanced first aid capacity including defibrillation with an automated external defibrillator (AED). They are able to give GTN, aspirin and non-opioid analgesia such as Methoxyflurane.

All AV crews have the capacity to consult with the AV rural clinician (MICA trained paramedic) located at the Emergency Services Telecommunications Authority (ESTA) Ballarat State Emergency Communication Centre (BalSECC).

Within the Grampians Region there is a MICA branch and SRU branch located in Ballarat and a MICA SRU branch located in Horsham. The remaining branches across the Region are staffed by ALS paramedics and ACO CERT teams.

Map 2 - Ambulance Victoria Grampians Regional Crewing Capacity



AV can also assist with organisation of urgent secondary transfer of ACS patients. This may involve the AV clinician, Air Ambulance Victoria (AAV) and/or Adult Retrieval Victoria (ARV). Discussions with the AV clinician should occur as early as possible to ensure appropriate consultation and prompt coordination of resources. To consult with an AV clinician call 1300 113 312. If the patient is time critical, consultation with ARV may also aid in patient care guidance and early transfer.

Further information on Ambulance Victoria is available via the website - http://www.ambulance.vic.gov.au/index.html

Regional capacity

Table 2 - Grampians Region ACS capacity

Grampians Region Health Services	Pathology availability (Troponin)	Fibrinolysis	Continuous cardiac monitoring	Cardiac catheter laboratory	MICA availability	Cardiac rehabilitation
Ballarat Health Services **Category C service (without cardiac surgery)*	Onsite 24/7	24/7	24/7 ICU, CCU and telemetry	Yes M to F 24/24	YES SRU & MPU	YES
Wimmera Health Care Group – Horsham *Category B service	On site 24/7	24/7	24/7 ICU, CCU and telemetry	No	YES SRU	YES
Beaufort and Skipton Health Service **Category A service*	Onsite point of care	24/7	No	No	From Ballarat	NO
Djerriwarrh Health Service – Bacchus Marsh **Category A service*	Onsite point of care	24/7	No	No	From Ballarat and/or Melb	NO
East Grampians Health Service – Ararat **Category A service*	On site point of care	24/7	Limited	No	From Ballarat	YES
East Wimmera Health Service – St Arnaud **Category A service*	On site point of care	24/7	No	No	No	NO
Edenhope & District Health Service **Category A service*	On site point of care	24/7	No	No	From Horsham	YES Via telehealth link with WHCG
Hepburn Health Service – Daylesford **Category A service*	Onsite point of care	24/7	No	No	From Ballarat	NO
Rural Northwest Health – Warracknabeal **Category A service*	Onsite point of care	24/7	No	No	From Horsham	YES Via telehealth link with WHCG
Stawell Regional Health **Category A service*	Onsite point of care	24/7	Limited	No	From Horsham	YES
West Wimmera Health Service – Nhill **Category A service*	Onsite point of care	24/7	Limited	No	From Horsham	YES Via telehealth link with WHCG
St John of God Health Care – Ballarat (Private) **Category C service (without cardiac surgery)*	On site 24/7	24/7	24/7	Yes M to F 24/24	YES SRU & MPU	YES

Legend

ICU – Intensive Care Unit | CCU – Coronary Care Unit | HDU – High Dependency Unit
MICA – Mobile Intensive Care Ambulance | SRU – Single Responder Unit | MPU – MICA Paramedic Unit

*Refers to the National heart Foundation of Australia, Acute coronary syndromes capability framework 2015[4]
https://heartfoundation.org.au/images/uploads/publications/ACS_framework.pdf

Limited - capacity to undertake continuous cardiac monitoring in an acute ward for stable ACS patients for a short period of time.

Category A service[3] – Hospital with an emergency service. Key roles include initiate assessment and treatment, activate reperfusion pathway for STEMI and activate safe and timely transfer for patients with STEMI or suspected non ST elevation myocardial infarction – acute coronary syndrome or non STEACS (NSTEACS)

Category B service[3] - Hospital with an emergency department. Key roles include activating reperfusion pathway for patients with STEMI, risk stratify patients with suspected NSTEMI, activate safe and timely transfer for patients with STEMI and NSTEACS assessed as intermediate or high risk and provide patients recovering from treatment of ACS with an individualised care plan

Category C service[3] – Tertiary cardiac centre. Key roles include those of a Category B service as well as providing interventional cardiac services and ensure timely access to emergency cardiac surgery.

Table 3 - Grampians Region neighbouring regions health services ACS capacity

Neighbouring Regions Health Services	Pathology availability (Troponin)	Fibrinolysis	Continuous cardiac monitoring	Cardiac catheter laboratory	MICA availability	Cardiac Rehabilitation
Bendigo Health Care Group (Loddon Mallee Region)	On site 24/7	24/7	24/7	Elective PCI 9am to 5pm Mondays, Wednesdays & every 2nd Friday	YES SRU & MPU	YES
Maryborough District Health (Loddon Mallee Region)	Onsite point of care	24/7	Limited	No	From Ballarat or Bendigo	NO
Swan Hill District Hospital (Loddon Mallee Region)	On site 24/7	24/7	24/7	No	MPU	YES
Western District Health Service, Hamilton (Barwon South West Region)	On site 24/7	24/7	24/7	No	No	YES
Barwon Health (Barwon South West Region)	On site 24/7	24/7	24/7	Yes	YES SRU & MPU	YES

Legend
ICU – Intensive Care Unit
CCU – Coronary Care Unit
HDU – High Dependency Unit
MICA – Mobile Intensive Care Ambulance
SRU – Single Responder Unit
MPU – MICA Paramedic Unit
Limited - capacity to undertake continuous cardiac monitoring in an acute ward for stable ACS patients for a short period of time.

Acute Coronary Syndrome (ACS)

Definition

The term ACS includes ST elevation myocardial infarction (STEMI), non ST elevation myocardial infarction (NSTEMI) and unstable angina pectoris. The term non ST elevation myocardial infarction – acute coronary syndrome or non STEACS (NSTEACS) has also been introduced to cover both NSTEMI and unstable angina pectoris because the differential diagnosis is dependent on biomarkers that may not be available at the time of the initial assessment and treatment. The term covers the suspected diagnosis based on the clinical signs and symptoms and ECG on presentation[6].

NSTEACS applies to patients with suspected ACS in the absence of other plausible causes of Troponin elevation (e.g. sepsis, pulmonary embolus).

For purpose of this Framework, and to provide clarity and consistency, the terms unstable angina, non ST elevation myocardial infarction (NSTEMI) and ST elevation myocardial infarction (STEMI) will be used.

Acute care ACS

Triage

Acute cardiac chest pain should be treated as a medical emergency. All providers of care should develop and implement protocols/guidelines for the emergency management of acute cardiac chest pain, including rapid transfer of STEMI and NSTEMI patients to enhance patient outcomes.

Time to treatment is critical therefore an early response to the presentation is essential. The time from symptom onset and likely outcome is shown in Table 4

Table 4 - The time from symptom onset and likely outcome *Source National Heart Foundation*[7]

Less than 1 hour	Aborted heart attack or only little heart muscle damage
1 to 2 hours	Minor muscle damage only
2 to 4 hours	Some heart muscle damage with moderate heart muscle salvage
4 to 6 hours	Significant heart muscle damage with only minor heart muscle salvage
6 to 12 hours	No heart muscle salvage (permanent loss) with potential infarct healing benefit
Greater than 12 hours	Reperfusion not routinely recommended if the patient is asymptomatic and haemodynamically stable

How the 'at risk' patient is identified and managed ultimately affects the patient's morbidity and mortality. Early recognition of the 'at risk' patient and detection of deterioration with appropriate intervention can influence the outcome for the patient[7].

The development of triage processes which facilitate fast tracking of patients to electrocardiography (ECG) should be adopted *(Acute coronary syndromes clinical care standard, Quality statement 2[5]).* In view of this, acute cardiac chest pain should be allocated an Australasian Triage Scale (ATS) 2, refer to appendix 4. Health services that are supported by GPs off site should have protocols for rapid treatment commencement. If onsite diagnosis of the ECG is not possible the ECG should be faxed to a Regional facility with this capacity for consultation and diagnosis. Refer to appendix 5 for BHS protocol – Faxing ECGs.

Assessment

If resources allow, the initial assessment should be undertaken while an ECG is being performed to streamline the time to diagnosis.
Initial assessment should include

- Airway – patency.
- Breathing – respiratory rate. Identify and report hypoxia. If $SpO_2 \leq 93\%$, patient breathless, has signs of heart failure or shock or diagnosis is uncertain - administer oxygen.
- Circulation – heart rate (including strength, and regularity), blood pressure (on both arms) and ECG. Identify and report ST elevation, arrhythmias and hypotension. Further information on arrhythmias can be found at http://www.grhc.org.au/emergency-care/resources
- Disability – Glasgow Coma Scale (GCS).
- Blood glucose level - identify and report hyperglycaemia.
- Other – temperature, identify and report hyperthermia.
- History including -
    - Time pain started
    - Where the pain is (central chest, jaw, arm, neck, back, shoulder, epigastric)
    - What the pain feels like (stabbing, crushing, pressure, aching, tightness, heaviness)
    - If the pain radiates
    - Does anything make the pain better or worse (sitting forward, taking a deep breath)
    - Associated symptoms (nausea, dizziness, shortness of breath, diaphoresis)
    - Risk factors (obesity, hypertension, diabetes, hyperlipidaemia, smoking)
    - Current medication history (aspirin, anticoagulant, allergies)

(Acute coronary syndromes clinical care standard, Quality statement 1[5])

Women may present with different symptomatology to men. Women with ACS are more likely to have an absence of chest pain. Women are also more likely than men to have middle or upper back pain, neck pain, jaw pain, shortness of breath, paroxysmal nocturnal dyspnea, nausea or vomiting, indigestion, loss of appetite, weakness or fatigue, cough, dizziness, and palpitations

Risk stratification - non ST elevation ACS (NSTEACS)

There are a number of factors that can assist to risk stratify patients in the presence of suspected ACS in the absence of other plausible causes of troponin elevation (e.g. sepsis, pulmonary embolus, renal impairement). Consideration should be given to the Australian indigenous population as well as the Maori and Pacific Islander populations as they are at high risk for ischaemic heart disease and tend to present younger and with more advanced disease[8].

Risk stratification – NSTEACS check list is available, refer to appendix 6. There is also a number of risk scores developed to assist in risk stratification. One that has been validated is the Thrombolysis in Myocardial Infarction (TIMI) score, refer to appendix 7. (*Acute coronary syndromes clinical care standard Quality statement 4[5)]*

Diagnosis

ACS is a broad spectrum of clinical presentations spanning STEMI to angina. A critical factor to timely treatment of ACS is the recognition of the symptoms and signs[9]. All patients with chest pain should have an ECG completed within 10 minutes of arrival at the health service. The initial changes to look for are ST elevation.

Signs and symptoms should not be used alone to diagnose ACS. Diagnosis should be made using a combination of information such as biomarkers, risk factors, ECG, patient history and other diagnostic tests. However, the ECG alone is the primary tool used to diagnose a STEMI. The groups of ECG leads showing the ST elevation demonstrate the possible affected coronary artery. This can then provide the infarction distribution and possible consequences. Refer to appendix 8

All patients presenting with symptoms suspicious of cardiac ischaemia should be evaluated with cardiac biomarkers as part of the initial evaluation. Cardiac specific troponins (I or T) are the preferred biomarker[7]. Because these biomarkers may be initially negative on presentation, it is recommended paired biomarker testing be performed during 6 and 12 hours post symptom onset to reliably exclude myocardial necrosis[8].

Consider differential diagnosis

- Aortic dissection
- Pneumothorax
- Pulmonary embolism
- Arrhythmia
- Myocarditis
- Pericarditis
- Oesophageal rupture or spasm
- Gastro/oesophageal reflux
- Intercostal muscle strain
- Chostochondritis

Initial treatment

Remember **DEIVA**

D – Doctor notified within 10 minutes of arrival
E – ECG 12 lead within 10 minutes of arrival
I – IV cannulation
V – Vital signs and cardiac monitoring
A – Aspirin 300mg

- Do ECG – consider right sided and posterior leads especially when symptoms ongoing and there are no baseline ECG changes
- Give Acetylsalicylic acid (Aspirin) 150milligrams to 300milligrams if not already given by AV or self administrated
- Treat pain –
    - Glyceryl Trinitrate (GTN) *Note – use caution when giving GTN if patient has taken phosphodiesterase-5-inhibitors e.g. sildenafil (Viagra), vardenafil (Levitra) in the last 24 hours or tadalafil (Cialis) in the last 48 hours.*
    - Morphine
- Intra-venous cannulation(s)
- Take pathology (where able)–
    - Troponin, Electrolytes and Blood glucose level
- Commence on fluid balance chart
- Early notification and request for advice and transfer

Refer to Table 5 on the following page for a guide to a decision making time frame

Table 5 - A guide to decision making time frame (*Acute coronary syndromes clinical care standard Quality statement 1*[5])

5 mins	10 mins	20 mins	30 mins	60 mins
Triage ATS cat 2	**ECG** Nursing history Vital signs Cardiac monitor **Consult with medical practitioner** ECG analysis (either onsite or sent for urgent analysis to another site)	**Initial diagnosis and treatment plan** **Transfer decision** Contact ARV if emergency (STEMI) IV cannula Bloods Aspirin Analgesia **Reassess** Chest pain Vital signs Cardiac monitoring ECG	Reperfusion therapy (if appropriate) 2 IVs **Reassess** Chest pain Vital signs Cardiac monitoring ECG	Transfer process in place Continue to report any changes in patients condition **Reassess** Chest pain Vital signs Cardiac monitoring ECG

Acute Coronary Syndrome (Unstable Angina)

The unstable angina group of patients present with clinical features consistent with ACS without intermediate or high risk features, for example – one of the following

- Onset of anginal symptoms within the last month
- Worsening of severity or frequency of angina
- Lowering in anginal threshold

This group of patients require observation and medication review prior to discharge with urgent (within two weeks) cardiac follow up. For this group of patients contact should be made direct to BHS or SJOG cardiology services prior to patient discharge to ensure appropriate and timely follow up is arranged.

This group of patients on discharge are

- Pain free **and**
- Have no ECG changes **and**
- Bedside Troponin negative

On discharge patients should have an appropriate medication regimen (including aspirin and GTN), advice on any lifestyle changes that will reduce the risk of further coronary heart disease, a written action plan for chest pain and a referral to a cardiologist for exercise ECG.

Refer to appendix 8 Grampians Region – Assessment and management of chest pain - Small Rural health Service (*Acute coronary syndromes clinical care standard Quality statement 1and 2*[5])

Acute Coronary Syndrome (NSTEMI)

The non ST elevation (NSTEMI) group of patients have clinical features consistent with ACS including -

- Ongoing pain lasting >10 minutes **or**
- Recurrent pain **or**
- Typical symptoms and diabetic or eGFR <60 **or**
- Coronary artery bypass grafts (CABG) at anytime or Percutaneous Coronary Intervention (PCI) in last 6 months **or**
- ECG changes – new ST depression or T wave inversion **or**
- Bedside Troponin positive

This group of patients requires continuous cardiac monitoring in a coronary care unit or other high dependency unit and urgent referral for angiography. Consultation with a cardiologist should occur as soon as possible.

Early coronary angiography (within 48 hours) is recommended in NSTEMI patients with high risk features. Refer to appendix 6 for Risk stratification – NSTEACS. Contact should be made direct to BHS or SJOG

cardiology services for consultation and advice on the urgency of transfer. (*Acute coronary syndromes clinical care standard Quality statement 4 and 5*[5])

If transferring to **Ballarat Health Services:**

- Contact the switchboard on 5320 4000
    - During business hours (8am to 5pm Monday to Friday) for cardiac referral ask for Cardiology Registrar
    - Out of hours and weekends for cardiac referral ask for Medical Registrar
- Once patient has been accepted for transfer by medical staff at BHS, the transferring hospital needs to contact the Patient Flow Coordinator at BHS on 0403 394 471 to arrange a bed and day and time of transfer.
    - Refer to BHS protocol – Faxing ECG, appendix 5 (*Acute coronary syndromes clinical care standard Quality statement 2*[5])

If transferring to **St John of God Health Care - Ballarat**

- During business hours (8am to 5pm Monday to Friday) contact Nathan Williams, Critical Care Services Manager on 5320 2851 or 0411 608 694
- After hours contact the Emergency Department Admitting Officer 24 hours 5320 2127. The SJOG ED fax number is 5320 2960

If transferring to **Wimmera Health Care Group – Horsham** as an interim, prior to interventional transfer

- Contact the switchboard on 5381 9111 and ask for the Emergency Department Registrar 24 hours a day, 7 days a week

Refer to appendix 9 Grampians Region – Assessment and management of chest pain – Small Rural Health Services (*Acute coronary syndromes clinical care standard Quality statement 1and 2*[5])

Acute Coronary Syndrome (STEMI)

Patients with a STEMI usually have a completely occluded coronary artery with thrombus at the site of a ruptured plaque. Restoring coronary patency as quickly as possible is a key factor in both the short and long term outcomes of these patients[10]. (*Acute coronary syndromes clinical care standard Quality statement 3*[5])

The criteria for ECG diagnosis of a STEMI is

- Persistent ST elevation ≥1mm in 2 contiguous limb leads **or**
- 2mm in ≥ 2 contiguous chest leads **or**
- New left bundle branch block (LBBB)

An early response is critical for these patients. Implementation of a reperfusion management/care plan should be undertaken for those patients presenting within 12 hours of onset of ischaemic symptoms consistent with ACS. Within the Region both BHS and SJOG have the responsibility to accept the STEMI patient for interventional care as a matter of urgency. Bed availability should not delay the patients interventional care.

Direct and early contact with Adult Retrieval Victoria (ARV) is vital in these cases. Contact is made by phoning 1300 36 86 61. ARV is able to assist with diagnosis and treatment options, bed finding and sourcing the transport platform. Fax number for ARV is 1300 367 882.

Refer to appendix 10 Grampians Region, Non interventional cardiac facility STEMI Management Plan.

Reperfusion Therapy

The choice of reperfusion therapy will depend on a number of factors including

- Time delay to Percutaneous Coronary Intervention (PCI)
- Time from symptom onset to first medical contact
- Time to hospital fibrinolysis
- Contraindications to fibrinolysis
- Location and size of infarction
- Presence of cardiogenic shock; and
- Special circumstances

The major factors determining the choice of reperfusion strategy is time, including time since symptom onset, time delay for transportation and time delay for PCI[10].

Percutaneous Coronary Intervention

In general, Primary Percutaneous Coronary Intervention (PPCI) is the treatment of choice for STEMI patients. This is providing that it can be performed promptly by a qualified interventional cardiologist in an appropriate facility. If PPCI is not readily available or there is a major delay (greater than 90 minutes) in the patient being transferred to a PPCI facility then fibrinolysis should be considered. (*Acute coronary syndromes clinical care standard Quality statement 3*[5]*)*

The Cardiac Society of Australia and New Zealand recommends in general, the maximum acceptable delay from presentation to balloon inflation is

- 60 minutes if a patient presents within 1 hour of symptoms onset; or
- 90 minutes if a patient presents later[1].

Within the Grampians Region, BHS and SJOG have PPCI capacity from 0800hours Monday through to 0800hours Saturday. Weekend availability is subject to resources available at the time.

There are a number of strategies which can enhance the system to reduce any time delays. These include pre hospital 12 lead ECG to facilitate earlier diagnosis and advanced notification of patient arrival, early notification from a transferring health service and the transmission of ECG for diagnosis confirmation and activation of the catheter laboratory. Transport of patients requiring hospital care should be to the most appropriate facility capable of meeting the patient's needs. At times this will mean bypassing a local facility for an appropriate specialist centre based on agreed guidelines.

Rescue Percutaneous Coronary Intervention (PCI) is reasonable in patients who have failed fibrinolysis according to clinical signs and insufficient ST segment resolution. Patients with successful fibrinolysis should be encouraged to transfer for angiography and eventually PCI 6 to 24 hours after fibrinolysis. In the small health services, this should be initiated at the same time as the consultation for the fibrinolysis. (*Acute coronary syndromes clinical care standard Quality statement 5*[5]*)*

Fibrinolysis

Fibrinolysis is the administration of a pharmacological agent to break down blood clots in the coronary vessels to restore blood flow to the heart muscle. Fibrinolytic therapy is a widely accepted treatment that is beneficial to a wide range of patients who may not have access to PCI. Fibrinolysis therapy can be safely given by appropriately trained paramedics, registered nurses or medical practitioners using established protocols and support from specialist consultation[1].

There are a number of absolute and relative contraindications for fibrinolysis, refer to appendix 11. In addition to these contraindications, the older person has a higher absolute risk of death from their STEMI, an increased absolute benefit from fibrinolysis but the risk of intracranial haemorrhage is higher[1]. Discuss with ARV for advice and other treatment options.

There are also fewer benefits from fibrinolytic therapy when the area affected by the STEMI is in an area other than anterior. The efficacy of fibrinolytic therapy is at its greatest in the first 3 hours of the onset of symptoms.

Second-generation fibrin-specific fibrinolytic agents that are available as a bolus are the fibrinolytics of choice[10.] In the Grampians Region BHS, WHCG and SJOG use Tenecteplase as the fibrinolysis reperfusion therapy. For consistency of practice and the sharing of clinical pathways and protocols, it is recommended that consideration be given by all Grampians health services to use Tenecteplase. Refer to appendix 12 Grampians Region, Non interventional cardiac facility STEMI Management Plan - Tenecteplase administration guidelines.

Requirements for health services to safely administer fibrinolysis

- Dedicated RN capacity
- Cardiac monitoring and ECG capacity
- Resuscitation capacity including defibrillation (Automatic External Defibrillator)

Management post fibrinolysis prior to transfer[11]

- Maintain direct observation of patient
- Maintain continuous cardiac monitoring. As vessels re-open there may be reperfusion arrhythmias (these are generally self-limiting)
- Clinical observations 15 minutely
- Ongoing pain management
- Manage haemodynamic stability
- Avoid intramuscular injections or other invasive procedures
- Take regular ECGs, every 30 minutes and if pain returns
- Prepare for transfer
- Keep rest in bed until transfer
- Keep patient nil by mouth

Interhospital Transfer

STEMI patient

Transfer of STEMI patients for PPCI from small health services is reasonable for those presenting more than 3 hours but less than 12 hours following the onset of symptoms, provided that the transfer can be achieved rapidly (<2 hours). The risk of death, re-infarction and stroke is reduced if patients with STEMI are transferred promptly[1].

Patients who have received fibrinolysis should be transferred urgently to a level of service with PCI facilities. The optimum time for transfer is between 3 and 24 hours post fibrinolysis.

Transfer of the STEMI patient (either pre or post fibrinolysis) should be arranged through ARV on 1300 36 86 61. Activation of ARV should be made as early as possible once the diagnosis is made. Consultation and advice can be provided whilst transport and bed availability are being sourced.

NSTEMI patient

Early transfer should be considered in all NSTEMI patients but particularly those with

- ongoing pain
- a large area of myocardium at risk
- known poor left ventricular function
- renal impairment.

All NSTEMI patients should be referred as soon as possible for coronary angiography and assessment of the need for revascularisation. If urgent transfer to a PCI centre is not possible then urgent transfer to a coronary care/high dependency unit should occur as a short term interim measure. There is evidence this type of transfer will reduce symptomatic angina and re-admission[10].

To transfer patients to BHS for urgent PCI

- Contact the switchboard on 5320 4000
  - During business hours (8am – 5pm Monday to Friday) for cardiac referral ask for Cardiology Registrar
  - Out of hours and weekends for cardiac referral ask for Medical Registrar
- Once patient has been accepted for transfer by medical staff at BHS, the transferring hospital needs to contact the Patient Flow Coordinator at BHS on 0403 394 471 to arrange a bed and day and time of transfer.

To transfer patients to SJOG for urgent PCI

- During business hours (8am to 5pm Monday to Friday) contact Nathan Williams, Critical Care Services Manager on 5320 2851 or 0411 608 694
- After hours contact the Emergency Department Admitting Officer 24 hours 5320 2127. The SJOG ED fax number is 5320 2960

Repatriation back to local service

The original local transferring health service has a responsibility to receive the patient back from the specialist service as early as possible.

The patient should return to the original service once specialist cardiac care has been fully utilised. In some instances, sub-acute rehabilitation services may be accessed prior to transferring back. This will be dependent on the level of sub-acute rehabilitation required and what is available at the original service.

An ongoing plan of care should be developed in consultation with the patient and original local service and should accompany the patient. The care plan should incorporate lifestyle modifications, psychosocial needs and referral to appropriate cardiac rehabilitation. (*Acute coronary syndromes clinical care standard Quality statement 6*[5])

Consideration should be given to:

- Patient care needs
- Patient (and carer) wishes
- Resources available to meet the patient care needs
- Bed capacity at both health services

Planned non-emergency nursing advice is available through the cardiac catheter laboratory at BHS during business hours (0900 to 1700) Monday to Friday. Telephone the team leader on 0417 696 580.

Rehabilitation

There is strong evidence that secondary prevention reduces hospital readmission and death within the first year after a coronary event by as much as 45% and 25% respectively [12 & 13]

Phase 1 inpatient rehabilitation should commence as soon as possible after admission with supportive counselling, both for the patient and their family/carer, a mobilisation strategy and discharge planning.

Effective recovery and transition from hospital back to the community relies on successful planning and rehabilitation. A component of the rehabilitation process is patient education. Each patient should be provided information on:

- Their diagnosis and procedure
- Relevant risk factors
- The importance of cardiac rehabilitation, their nearest service and a referral provided
- Medication dosage, side effects and how to take
- Warning signs of heart attack
- The importance of follow up with their doctor

There are a number of resources available from the National Heart Foundation that will assist with patient education including *My heart, my life* patient booklet. This can be provided to each patient on diagnosis and used to document the patient's recovery. https://heartfoundation.org.au/your-heart/living-with-heart-disease/looking-after-yourself

Evidence based phase 2 rehabilitation programs should include medication management, how to avoid complications including disease progression and ultimately reduce readmission and maximise quality of life. The programs need to be patient centred and flexible to meet the needs of the individual patient.

The Heart Foundation and the Australian Cardiovascular Health and Rehabilitation Association's *Recommended framework for cardiac rehabilitation* http://www.acra.net.au/ is the accepted best practice underpinning the design and delivery of cardiac rehabilitation services[14]. Cardiac rehabilitation is an organised approach to achieving these aims and should be integrated into the routine management of all patients. Cardiac rehabilitation includes, and complements, the support and individual medical care given by specialists and general practitioners.

Services should include physical activity, health education, counselling, behaviour modification strategies and support for self-management. They should be tailored to meet the individual and cultural needs of the patient and their family. Cardiac rehabilitation services are available across a continuum that includes

inpatient, outpatient and ongoing prevention approaches. However, participation in cardiac rehabilitation is not necessarily sequential. People may access services at different stages and entry points[14].

All patients with ACS should be given a written chest pain action plan and referred to a comprehensive ongoing prevention and cardiac rehabilitation services on discharge. In the Grampians region the following health services provide a cardiac rehabilitation program

- Ballarat Health Services
- Edenhope & District Memorial Hospital (via telehealth link with WHCG)
- East Wimmera Health Services – St Arnaud, Donald and Birchip
- East Grampians Health Service – Ararat
- Rural Northwest Health (via telehealth link with WHCG)
- Stawell Regional Health
- St John of God Health Care - Ballarat
- Wimmera Health Care Group (WHCG) – Horsham
- West Wimmera Health Services (via telehealth link with WHCG)

Further information on the cardiac rehabilitation directory can be found at http://www.acra.net.au/cr-services/cr-directory/

Patients require ongoing care and support through local service providers once they have completed a phase 2 program.

There are a number of other supportive resources that may be of assistance to patients such as

- Getting back on track after heart attack or surgery – the ups and downs of emotional recovery https://www.australianhearthealth.org.au/research/the-cardiac-blues-project

Appendix 1

Grampians Region, Acute cardiac care framework – Working Group 2016

NAME	POSITION	ORGANISATION
Grant Hocking	Clinical Manager	Ambulance Victoria - Grampians
Tania Harrison	Nurse Manager – Cardiology Suite	Ballarat Health Services
Sarah Jamison-Jones	Associate Nurse Manager – Cardiology Suite	Ballarat Health Services
Marg O'Neil	Nursing Director Patient Flow	Ballarat Health Services
Andrew Thomas	Nurse Manager ICU/CCU	Ballarat Health Services
Eileen Thompson	Manager, Cardiac Clinical Network	Department of Health and Human Services
Pat Standen	Emergency & Critical Care Coordinator	Department of Health and Human Services-Grampians
Di Dixon	Associate Nurse Manager - Emergency	Djerriwarrh Health Services – Bacchus Marsh
Lorine Paterson	Manager Acute Services	East Grampians Health Service
Natalie Ladner	Campus Manager	Rural Northwest Health - Hopetoun
Scott Silcock	Nurse Manager	Rural Northwest Health - Warracknabeal
Nathan Williams	Critical Care Services Manager	St John of God Health Care - Ballarat
Betty Meumann	Nurse Manager (up until Feb 2016)	Stawell Regional Health
Jarrod Hunter	Nurse Manager (from Feb 2016)	Stawell Regional Health
Anne Russell	Associate Nurse Unit Manager – ICU/CCU	Wimmera Health Care Group - Horsham
Trish Heinrich	Nurse Manager	West Wimmera Health Service - Nhill

Consultation with

- Ernesto Oqueli – Head of Cardiology, Ballarat Health Services
- Chris Hengel - Director, Cardiac Catheter Laboratory, St John of God Health Care - Ballarat

Appendix 2

Ambulance Victoria Pain Relief Clinical Practice Guideline 1 of 2

Pain Relief — Version 9 - 03.06.15 Page 1 of 3 — **CPG A0501**

Special Notes

- **Morphine** is contraindicated in patients with a history of hypersensitivity or allergy or with known renal impairment / failure.
- Specific indications for **Fentanyl:**
  - Contraindication to morphine (see above)
  - Short duration of action desirable (e.g. dislocations)
  - Hypotension
  - Nausea and / or vomiting
  - Severe headache (refer to **CPG A0502 Headache**)
- Studies have found no significant difference between the efficacy of **Morphine** and **Fentanyl**. For the above indications, the pharmacological and pharmacokinetic properties of **Fentanyl** are preferred over **Morphine**.
- Be cautious of administering **Fentanyl** and **Morphine** to the same patient.
- If respiratory depression occurs due to opioid administration manage as per **CPG A0707 Overdose**.
- ALS Paramedics must consult prior to exceeding the maximum doses of **Morphine** or **Fentanyl** and administer according to patient need or the onset of adverse side effects.

Special Notes

- The preferred choice for non IV therapy in moderate to severe pain is **Fentanyl IN**.
- The analgesic effects of **Morphine IM** are slow and variable. This route must be used as a last resort and strictly within indicated CPGs.
- Opioid pain relief **should not be administered** during **late second stage of labour**. If opioids have been administered, **Naloxone** should not be administered to the newborn.
- **Ketamine** can be particularly effective in the patient requiring procedures that are likely to cause extreme pain (e.g. extrication, splinting significant fractures). In these patients, treat early with **Ketamine** in combination with either **Morphine** or **Fentanyl**.
- Emergence reactions, hallucinations or other behavioural disturbances associated with **Ketamine** administration may be managed with **Midazolam 0.5 - 1mg IV**.
- The maximum dose of **Methoxyflurane** is 6 mL per 24 hour period.

Pain Relief — Version 9 - 03.06.15 Page 2 of 3 — **CPG A0501**

Status
- Complaint of pain

Assess
- Reported level of pain (using pain scale)
- Physical signs of discomfort (and document)
- Acute vs. chronic pain
- Analgesia already taken
- Opioid tolerance
- Co-morbidities

All patients
Action
- Consider non-pharmacological management options as appropriate e.g. splinting, cold / heat therapy

Mild pain
Action
- If Pt requests analgesia consider **Paracetamol 1000 mg oral** if not already administered within past 4 hours
  - If elderly or frail, weight ≤ 60kg, malnourished or liver disease:
  - **Paracetamol 500 mg oral**
- If pain not controlled or rapid pain relief required, consider treating as per Moderate pain

- Paracetamol should not be used to treat chest pain in suspected acute coronary syndrome

Moderate pain
Action

IV access available:
- **Morphine IV** OR **Fentanyl IV** as per Severe Pain

If IV access not required, delayed or unsuccessful:
Fentanyl IN
- If elderly or frail or weight ≤ 60 kg:
  Fentanyl 100 mcg IN
  - Repeat up to **Fentanyl 50 mcg IN at 5 minute intervals** titrated to pain or side effects (**max. dose 200 mcg IN**)
- All other adults:
  Fentanyl 200 mcg IN
  - Repeat up to **Fentanyl 50 mcg IN at 5 minute intervals** titrated to pain or side effects (**max. dose 400 mcg IN**)

If unable to administer **Fentanyl IN**
- **Methoxyflurane 3 mL inhaled**
  - Repeat **3 mL** if required (**max. 6mL**)

Severe pain
Action

IV access available:
- **Morphine** (consider contraindications) up to **5 mg IV**
  - Repeat up to **5 mg at 5 minute intervals** (**max. 20 mg**)

OR
- **Fentanyl** (if specifically indicated in Special Notes) up to **50 mcg IV**
  - Repeat up **to 50 mcg at 5 minute intervals** (**max. 200 mcg**)
- Titrate to pain or side effects

If IV access delayed or unsuccessful:
- **Fentanyl IN** or **Methoxyflurane** as per Moderate Pain
- Consider **Morphine IM** as last resort
  - If elderly or frail or weight ≤ 60 kg:
    Morphine 0.1 mg/kg IM (single dose only)
  - All other adults:
    Morphine 10 mg IM
    - Repeat **Morphine 5 mg IM** after **15 minutes** if required (once only)

Pain remains uncontrolled:
- Continue **Morphine IV** or **Fentanyl IV** as above – no max. dose
- For extreme traumatic pain consider **Ketamine 10 - 20 mg IV at 5 - 10 minute intervals** titrated to pain or side effects
- For uncontrolled extreme pain, consider ETT as per **CPG A0302 Endotracheal Intubation**

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Status | Stop | Assess | Consider | Action | MICA Action

Ambulance Victoria Pain Relief Clinical Practice Guideline 2 of 2

Pain Relief Chronic Pain

CPG A0501

Special Notes

- Patients who suffer from chronic pain conditions are not likely to seek emergency help unless their usual pain management plan has failed and they are unable to cope with their current level of pain.
- Common aetiologies of chronic pain include low back pain, headache / migraine, joint pain, and neuropathic pain (e.g. Parkinson's disease, Multiple Sclerosis, post-stroke pain).
- Chronic pain can be difficult to assess (may not present with usual signs of pain such as tachycardia and agitation) and complex to manage as the response to pain management may vary significantly between patients.
- Patients with chronic pain may be on a pain management plan that includes a balance between drug therapy, cognitive therapy, and behavioural interventions. Breakthrough pain is common, even in patients with controlled chronic pain under a care plan.

Special Notes

Please consider the following principles when attending patients who present with severe pain and a history of chronic pain:

- The presentation may not be related to the chronic painful condition. A search for the cause of the pain should include the standard clinical approach and assessment techniques to exclude a new aetiology.
- If the patient has a chronic pain management plan, ensure they have followed this plan.
- If possible, consult with their regular health care provider.
- Appropriate analgesic therapy within the AV setting is challenging, and it may be that reassurance and organising a medical review are the best options.
- Unless there is definitive evidence of addiction, chronic pain patients should not be assumed to be "drug seekers".
- Partial relief is a more realistic goal than complete relief of pain.
- The patient in severe breakthrough pain is likely to require medical attention.

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Appendix 3

Ambulance Victoria STEMI management Clinical Practice Guideline 1 of 4

STEMI Management — Version 2 - 04.06.14 Page 1 of 7 — **CPG A0408**

Status
- Confirm STEMI with onset < 6 hours

Stop
- Symptom onset > 6 hours, notify ARV via the Clinician and Rx as per **CPG A0401 Acute Coronary Syndromes**

Assess
- Inclusion criteria
- Exclusion criteria
- Precautions

Stop
- If Pt does not meet inclusion criteria or does meet exclusion criteria, Rx as per Urgent transport
- If Pt meets any relative contraindications, consult with ARV prior to thrombolysis as dose may be adjusted (see Special Notes).

Urgent transport
- Symptom onset < 1 hour and PCI or Thrombolysis facility ≤ 30 minutes
- Symptom onset 1 - 6 hours and PCI facility ≤ 1 hour, or if not available, Thrombolysis facility ≤ 30 minutes

Action
- No thrombolysis
- Refer to **CPG A0401 Acute Coronary Syndromes**
- Tx with hospital notification
- Transmit 12 lead ECG to receiving hospital
- Notify ARV via Clinician where secondary transfer may be required

Urgent thrombolysis
- Symptom onset < 1 hour and PCI or Thrombolysis facility > 30 minutes
- Symptom onset 1 – 6 hours and PCI facility > 1 hour and Thrombolysis facility > 30 minutes

Action
- **IV access x 2; Normal Saline TKVO**
- Analgesia and **Aspirin** as per **CPG A0401 Acute Coronary Syndromes**
- **Complete checklist and gain Pt consent**
- **Enoxaparin 30mg IV** followed 15 minutes later by **Enoxoparin 1 mg/kg SC** (SC dose should not exceed 100 mg)
- **Tenecteplase IV bolus** (see table in Special Notes)
- Tx with hospital notification
- Notify ARV via Clinician where secondary transfer may be required

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STEMI Management — Version 2 - 04.06.14 Page 2 of 7 — **CPG A0408**

Thrombolysis inclusion criteria
Patient MUST have ALL of the following to be considered for Thrombolysis
- Symptoms started less than 6 hours ago
- 12 lead ECG shows ST Elevation ≥ 1mm in two contiguous limb leads (I, II, III, aVR, aVL, AVF) or ST Elevation ≥ 2mm in two contiguous chest leads (V1, V2, V3, V4, V5, V6); or new LBBB pattern
- Able to give informed consent

Thrombolysis exclusion criteria
Patient CANNOT be given Thrombolysis if ANY of the following exclusion criteria apply:
- Blood pressure: Systolic >180 mmHg; or Diastolic ≥110 mmHg
- Known allergy or hypersensitivity to Tenecteplase or Gentamicin
- Anticoagulant therapy e.g. Warfarin, Heparin, Dabigatran, Rivaroxaban, Apixaban
- Glycoprotein IIb/IIIa inhibitors e.g. Abciximab, Eptifibatide, Tirofiban
- Active bleeding or bleeding tendency (excluding menses)
- GI bleeding within the last month
- Active peptic ulcer
- Acute pancreatitis
- Suspected aortic dissection
- Non compressible vascular puncture
- Recent major surgery (< 3 weeks)

Thrombolysis exclusion criteria (continued)
- Traumatic or prolonged (>10 minutes) CPR
- Acute pericarditis
- Subacute bacterial endocarditis
- History of CNS damage e.g. neoplasm, aneurysm, spinal surgery
- New neurological symptoms
- Significant closed head or facial trauma in past 3/12

Relative contraindications
If the patient has any of the following risk factors, consult with ARV Coordinator:
- Age ≥ 75 years*
- Renal impairment
- History of stroke or TIA
- Heart failure
- Pregnancy
- Anaemia
- Low body weight
- Dementia
- Diabetes
- Tachycardia
- Within 1 week post-partum
- Advanced liver disease
- Blood pressure between 160 – 180 mmHg systolic
- History of bleeding or known prolonged INR
- Peripheral vascular disease
- Administration of Enoxaparin 48 hours prior
- Recent invasive procedures associated with bleeding such as femoral artery puncture, right heart catheterisation

*If thrombolysis proceeds following consultation, note altered dose regimen for patients ≥75 years in special notes

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Ambulance Victoria STEMI Clinical Practice Guideline 2 of 4

STEMI Management

STEMI management care objective:
Deliver timely and safe clinical and systems care which aim to restore coronary reperfusion.

Patient destination

- Following pre-hospital thrombolysis, transport patient to the closest emergency department, or if the patient is stable, transport to a PCI centre where travel time is no greater than 90 minutes.
- Where a patient is transported to the local emergency department or urgent care centre, notify ARV via the Clinician as soon as possible to ensure optimal opportunity to coordinate secondary transfer for potential PCI.
- ARV is available to coordinate destination services, cardiology advice, and direct admissions to cardiology units on behalf of treating Paramedics.

Special Notes

- Thrombolysis considerations are complex, especially where precautions exist or physiological parameters are deranged. In these cases and where there are any clinical concern, consult with the ARV Co-ordinator via the Clinician.
- Close monitoring is required in thrombolysis aftercare. This includes: frequent vital signs; serial ECGs; and monitoring of obvious and obscure sites of potential bleeding e.g. cannulation sites, PR, GI and mucous membranes (oral and conjunctival).
- Hypertensive patients can be reassessed following nitrate therapy and pain management as per **CPG A0401 Acute Coronary Syndromes**. If blood pressure subsequently falls within the relative contraindication criteria range (160 - 180 mmHg systolic), eligibility may be reassessed.
- STEMI patients who have: failed thrombolysis; or who suffer complications; or who have pain onset > 6 hours, should be managed symptomatically as per the relevant CPGs. Urgent ARV consult via the Clinician is also indicated to facilitate cardiology services.
- A paraphrase of the consent statement is **not** permissible. The full statement must be read to every patient and signed where thrombolysis is indicated.

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STEMI Management

Tenecteplase body weight based dose table

< 60 kg	IV 30 mg - 6000 units (6 mL)
60 - 69 kg	IV 35 mg - 7000 units (7 mL)
70 - 79 kg	IV 40 mg - 8000 units (8 mL)
80 - 89 kg	IV 45 mg - 9000 units (9 mL)
≥ 90 kg	IV 50 mg - 10,000 units (10 mL)

Age adjusted doses

- Following consultation for patients ≥ 75 years
  - **Tenecteplase dose should be halved**
  - **IV Enoxaparin** should be omitted and only **0.75 mg/kg SC** with a **maximum of 75 mg SC Enoxaparin** administered

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STEMI Management – Additional resources

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CPG A040

Ambulance Victoria Pre-Hospital Thrombolysis Checklist

This checklist and consent must be completed for all patients diagnosed with STEMI (NB. If the patient is excluded from thrombolysis, consent for medical record access is still required.)

Exclusion Criteria Checklist Patient CANNOT be given Thrombolysis if ANY of the following exclusion criteria apply	YES	NO
Is the patient's Blood Pressure **>180 mmHg systolic**, or ≥**110 mmHg diastolic**?	☐	☐
Is the patient **allergic** to Tenecteplase or Gentamicin?	☐	☐
Is the patient currently being treated with any of the following **anticoagulants**: Warfarin, Heparin, Dabigatran, Rivaroxaban, Apixaban?	☐	☐
Is the patient currently being treated with **Glycoprotein IIb/IIIa inhibitors** e.g. Abciximab, Eptifibatide, Tirofiban?	☐	☐
Does the patient have any **active bleeding** or a **bleeding tendency** (excluding menses)?	☐	☐
Has the patient had a **GI bleed** within the last month?	☐	☐
Does the patient have a known **active peptic ulcer**?	☐	☐
Does the patient have **acute pancreatitis**?	☐	☐
Does the patient display any signs or symptoms of a **suspected aortic dissection**?	☐	☐
Does the patient have a **non-compressible vascular puncture**?	☐	☐
Has the patient undergone any **recent major surgery** (< 3/52)?	☐	☐
In this presentation, has the patient received **traumatic or prolonged (> 10 min) CPR**?	☐	☐
Does the patient have **acute pericarditis**?	☐	☐
Does the patient have **subacute bacterial endocarditis**?	☐	☐
Does the patient have a history of **CNS damage** (e.g. neoplasm, aneurysm, spinal surgery)?	☐	☐
Does the patient display any new **neurological symptoms** such as decreased GCS, slurred speech, limb weakness, or severe headache?	☐	☐
Has the patient experienced a **significant closed head or facial trauma** in past **3 months**?	☐	☐
If the patient answered "**yes**" to ANY Exclusion Criteria, **do not give Thrombolysis**		

Inclusion Criteria Checklist Patient can ONLY be given Thrombolysis if ALL of the following inclusion criteria apply	YES	NO
Did the symptoms start **less than 6 hours** ago?	☐	☐
Does the 12 Lead ECG show **ST Elevation ≥ 1 mm in two contiguous limb leads** (I, II, III, aVR, aVL, AVF) or **ST Elevation ≥ 2 mm in two contiguous chest leads** (V1, V2, V3, V4, V5, V6); or a **new LBBB**?	☐	☐
Is the patient able to give **informed consent**?	☐	☐
If the patient answered "**no**" to ANY Inclusion Criteria, **do not give Thrombolysis**		

I, _____ *(service number)* _____ *I have completed the above checklist*

Signature _____ *Date / Time* _____ *AV Case number* _____

STEMI Management – Additional resources

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CPG A0408

Consent for Procedure

This consent statement must be read to all patients, then signed prior to thrombolysis management

"It is likely that you are having a heart attack and the best treatment available to you right now is a clot-dissolving drug called Tenecteplase. The sooner you receive this medication, the lower the risks of severe heart damage. Treatment at this stage saves the lives of about 1 in every 25 patients treated, however, these medications can cause serious side effects in a small minority of patients including serious bleeding. The biggest risk is stroke which affects about 1 patient in every 100 treated. Some patients also have allergic reactions and other effects that do not usually cause any major problems. The level of risk does vary from person to person depending on individual factors including past and current health issues, but the risks attached to this treatment are very much less than the likely benefit. Would you like me to give you the medication or have you decided not to have the medication but receive all other usual care?"

I, _____ *hereby consent to thrombolysis treatment.*

Signature _____ *Date / Time* _____ *Witness* _____

Consent for Medical Record Access

We wish to follow your progress for quality improvement purposes and therefore request your permission to access your hospital record for information relating to this procedure. We may also contact you. Your information will be kept strictly confidential.

I, _____ *hereby consent to Ambulance Victoria accessing my hospital record for information relating to this procedure and I agree to be contacted. I understand that I can withdraw this permission at any time.*

Signature _____ *Date / Time* _____ *Witness* _____

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STEMI Management – References

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Drug notes information sourced from Australian Medicines Handbook and MIMS Online.

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Appendix 4

Australasian Triage Scale

The philosophy underpinning the use of the Australasian Triage Scale (ATS) is based on the values of justice and efficiency in health service delivery. The ATS has been designed to provide a timely assessment and medical intervention for all people who present to an emergency/urgent care service.

The application of the ATS is underpinned by the formulation of a chief complaint, which is identified from a brief history of the presenting signs and symptoms of an illness or injury. Triage decisions using the scale are made on the basis of observation of general appearance focused clinical history and physiological data.

The collection of physiological parameters at triage requires the clinician to differentiate predictors of poor outcome from other data collected. The aim is to identify patients who have evidence of, or are at high risk of, physical instability. The primary survey approach is recommended to identify and correct life-threatening conditions at triage.

The time to treatment criteria attached to the ATS categories describe the ideal maximum time a patient can safely wait for medical assessment and treatment.

ATS category	Treatment acuity	Maximum waiting time
Category 1	Immediately life threatening	Immediate
Category 2	Imminently life threatening	<10 minutes
Category 3	Potentially life threatening or important time critical treatment or severe pain	<30 minutes
Category 4	Potentially life-serious or situational urgency or significant complexity	<60 minutes
Category 5	Less-urgent	<120 minutes

The ATS has been endorsed by the Australasian College for Emergency Medicine, further information can be found at https://www.acem.org.au/Standards-Publications/Policies-Guidelines.aspx

The Emergency Triage Education Kit (ETEK) is a teaching resource that aims to provide a consistent approach to the educational preparation of Australian emergency clinicians for the triage role. In particular the ETEK has been designed to promote the correct use of the ATS. Further information can be accessed at - http://health.gov.au/internet/main/publishing.nsf/Content/casemix-ED-Triage+Review+Fact+Sheet+Documents

Appendix 5

BHS protocol – Faxing ECGs page 1 of 2

Ballarat Health Services

PROTOCOL

ECG TRANSMISSION TO BHS EMERGENCY DEPARTMENT FROM EXTERNAL SOURCE

SCOPE (Area):	Acute
SCOPE (Staff):	Nursing and Medical

BACKGROUND

January 2012, saw the introduction of 12 lead ECG transmission from MICA units in the field directly to the Ballarat Base Hospital Emergency Department. As the major referral centre for health care in the Grampians Region, BHS staff are also required to provide support to medical and nursing colleagues in the clinical setting, from smaller health care facilities within the region.

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RATIONALE/PURPOSE

To provide a standardised approach to the process of referring and transmitting 12 lead ECGs to BHS Emergency Department, that will serve to achieve the following:

- The timely initiation and delivery of appropriate care to patients being referred to BHS for further management, and patients whose condition are able to be managed at their current location, or who require referral to a metropolitan health service
- Timely notification and preparation for patients undergoing potential transfer to BHS or another health care facility
- A process that supports the recommendations for care from the Cardiac Society of Australian and New Zealand for patients experiencing Acute Coronary Syndrome that reflects best practice
- Promotes effective and efficient working relationships between BHS and other health care facilities/providers
- Provide support to clinicians in smaller regional hospitals, on occasions when advice is required, but not locally accessible

EXPECTED OUTCOME

Emergency Department senior medical clinicians are able to provide advice regarding 12 Lead ECG interpretation for critically ill patients outside the organisation.

Timely advice about diagnosis and management of patients where it is believed there has been a cardiac event in either an out-of-hospital or remote hospital location is provided to the treating clinician so that appropriate treatment can be commenced.

BHS protocol – Faxing ECGs page 2 of 2

STAFF INVOLVEMENT

- Ballarat Health Service Emergency Department medical staff
- Medical and nursing clinicians from regional health facilities
- Ambulance Victoria MICA paramedic staff

THE TRANSMISSION PROCESS

To ensure the timely delivery and receipt of the ECG, & necessary feedback/advice, the sending clinician should:

1. Send the ECG by fax to 5320 6620 and/or by email to 12lead.ballarat@bhs.org.au, *then*
2. **Phone the Emergency Department Admitting Officer at BHS on 5320 4801 to advise of the intention to transmit an ECG and discuss interpretation and appropriate plan of care**
3. The referring clinician should document in the patient's notes whom they spoke with and what was discussed.

To access an ECG transmitted by email, the BHS Admitting Officer should:

a) Log onto their BHS email account
b) Select 'public folders' (at the bottom of the screen)
c) Select 12 Lead ECG folder

DETECTION OF SYSTEM FAULTS BETWEEN AMBULANCE VICTORIA AND BHS EMERGENCY DEPARTMENT

In the event that there is perceived to be a fault with the transmission system, the staff member detecting the fault should promptly:

1. Contact BHS IT Helpdesk to report the issue
2. Contact Nigel Newby, MICA Clinical Support Officer-Grampians Region on 0419 383921 or email at nigel.newby@ambulance.vic.gov.au to advise of a potential issue with the AV part of the process

Ambulance Victoria will run a test ECG transmission through both fax and email delivery modes on the first day of each month. The test transmission will be followed with a phone call to the Admitting Officer, to ensure the test has been received.

RELATED DOCUMENTS

Guidelines for the Management of Acute Coronary Syndromes 2006 – National Heart Foundation and The Cardiac Society of Australia and New Zealand

Management Pathway & Worksheet for STEMI Admissions – ED to CVS, February 2012 (in progress)

Patient Flow – Inter Hospital Transfer Protocol (PROPO49)

Appendix 6

Risk stratification – non ST elevation ACS NSTEACS checklist

High Risk

Presentation with clinical features consistent with ACS and any of –

- ☐ Repetitive or prolonged (>10 minutes) ongoing chest pain or discomfort
- ☐ Elevated level of at least one cardiac biomarker
- ☐ Persistent or dynamic ECG changes of ST segment depression ≥ 0.5 mm or new T wave inversion ≥ 2mm
- ☐ Transient ST segment elevation (≥ 0.5mm) in more than 2 contiguous leads
- ☐ Haemodynamic compromise – systolic blood pressure 90 mmHg, cool peripheries, diaphoresis, Killip Class* >1 and/or new onset mitral regurgitation
- ☐ Sustained ventricular tachycardia
- ☐ Syncope
- ☐ Left ventricular systolic dysfunction (left ventricular ejection fraction <0.40)
- ☐ Prior percutaneous coronary intervention within 6 months or prior coronary artery bypass surgery
- ☐ Presence of known diabetes (with atypical symptoms of ACS) or
- ☐ Chronic kidney disease (estimated glomerular filtration rate < 60 mL/minute) (with atypical symptoms of ACS)

Intermediate risk

Presentation with clinical features consistent with ACS and any of –

- ☐ Chest pain or discomfort within the past 48 hours that occurred at rest, or was repetitive or prolonged (but currently resolved)
- ☐ Age >65 years
- ☐ Known coronary heart disease – prior myocardial infarction with left ventricular ejection fraction ≥ 0.40, or known coronary lesion more than 50% stenosed
- ☐ No high risk changes on ECG
- ☐ Two or more of the following risk factors, known hypertension, family history, active smoking or hyperlipidaemia
- ☐ Presence of known diabetes (with atypical symptoms of ACS)
- ☐ Chronic kidney disease (estimated glomerular filtration rate < 60 mL/minute) (with atypical symptoms of ACS), or
- ☐ Prior aspirin use

Low risk factors

- ☐ Presentation with clinical features consistent with ACS **without** intermediate or high risk features, for example – one of the following
  - Onset of anginal symptoms within the last month
  - Worsening of severity or frequency of angina
  - Lowering in anginal threshold

*The Killip classification is a system used in individuals with an acute myocardial infarction (heart attack), in order to risk stratify them. Individuals with a low Killip class are less likely to die within the first 30 days after their myocardial infarction than individuals with a high Killip class. http://en.wikipedia.org/wiki/Killip_class

Reference
National Heart Foundation - Acute coronary syndromes treatment algorithm
http://heartfoundation.org.au/images/uploads/publications/ACS_therapy_algorithm-printable.pdf

Appendix 7

Thrombolysis in Myocardial Infarction (TIMI) score

Predictor Variable	***Point Value of Variable***
Age > 65 years	1
≥ 3 risk factors for CAD	1
Risk factors	
• ***Family history of CAD***	
• ***Hypertension***	
• ***Hypercholesterolemia***	
• ***Diabetes***	
• ***Current smoker***	
Aspirin use in last 7 days	1
Recent severe symptoms of angina	1
• ***≥ 2 angina events in last 24 hours***	
Elevated cardiac markers	1
• ***CK MB or cardiac specific troponin level***	
ST elevation ≥ 0.5 mm	1
Prior coronary artery stenosis ≥ 50%	1

Calculated TIMI risk score

Risk Status	***Risk of ≥ 1 Primary End Point* in ≥14 days***
0 or 1	5% Low
2	8% Low
3	13% Intermediate
4	20% Intermediate
5	26% High

*Primary end points

- Death
- New or recurrent MI or
- Need for urgent revascularisation

Reference –
Australian Resuscitation Council 2016 Guideline 14.1, Acute Coronary Syndromes: Presentation with ACS http://www.resus.org.au/

Appendix 8

Infarction distribution with ST segment elevation myocardial infarction and consequences

ST elevation	Affected coronary artery	Area of damage	Possible consequences
V1 through V4	Left coronary artery: left anterior descending	• Anterolateral heart wall • Septum • Left ventricle • His bundle • Bundle branches	• Left ventricular dysfunction: decreased carbon dioxide, congestive heart failure • Left bundle branch block • Right bundle branch block • Left posterior fascicular block • Infranodal block 2nd or 3rd degree
V5 through V6, lead 1 & aVL	Left coronary artery: left circumflex branch	Left lateral heart wall	• Left ventricular dysfunction: decreased carbon dioxide, • Infranodal block 2nd or 3rd degree
Leads II, III, aVF , V4R	Right coronary artery: posterior descending branch	• Inferior heart wall • Right ventricle	• Hypotension (particularly with nitro-glycerine and morphine, which can decrease preload) • Supranodal 1st degree heart block • Atrial fibrillation/flutter, premature atrial contractions • Infranodal block 2nd or 3rd degree • Papillary muscle rupture (murmur)
V8 V9 or ST depression in V1 and V2	90% right coronary artery: posterior descending branch 10% left coronary artery: left circumflex branch (will see elevations in V5 and V6)	Posterior heart wall	• Hypotension • Supranodal first degree heart block • Infranodal block 2nd or 3rd degree • Atrial fibrillation/flutter, premature atrial contractions • Papillary muscle rupture (murmur)

Reference
Kosowsky Joshua M. and Yiadom Maame Yaa A.B. 2009 The diagnosis and treatment of STEMI in the emergency department: Emergency Medicine Practice Vol 11, Number 6.
http://www.ebmedicine.net/topics.php?paction=showTopic&topic_id=192

Appendix 9

Assessment and management of chest pain – small rural health services

Grampians Region
ASSESSMENT and MANAGEMENT of CHEST PAIN - Small Rural Health Services

PATIENT PRESENTS TO HOSPITAL WITH SYMPTOMS THAT COULD POSSIBLY BE DUE TO ACUTE CORONARY SYNDROME
(Remember atypical presentations such as back, neck, arm or epigastric pain, dyspnoea, and diaphoresis)

- □ **D Doctor notified within 10 minutes of arrival**
- □ **E 12 Lead ECG within 10 minutes of arrival**
- □ **I IV cannula, bedside troponin and other blood tests**
- □ **V Vital signs and cardiac monitoring**
- □ **A Aspirin 300mg**

Not necessarily in this order

Consider: oxygen if saturation ≤ 93% & ongoing pain management ± Clopidogrel

Advice

ARV 1300 36 86 61

12 Lead ECG Transmission

ARV Fax	1300 367 882
BHS ED Fax:	*5320 6620*
BHS ED Phone:	*5320 4801*
SJOG ED Fax:	*5320 2960*
SJOG ED Phone:	*5320 2127*

□ Onset of anginal symptoms within the last month
□ Worsening in severity or frequency of angina
□ Lowering in anginal threshold

UNSTABLE ANGINA Management

ADMIT TO MONITORED BED
ABILITY TO CARDIAC MONITOR
NO ***YES***

Ring 000 to arrange transfer to BHS, WHCG or SJOG Emergency Departments

If Chest Pain returns
* Sublingual GTN PRN — YES
* Repeat ECG — NO

At 4 hrs since arrival & at least 8 hrs since pain onset — +ve
* Repeat ECG
* Repeat Troponin — NO

High risk patient:
* Age ≥ 65 years
* ≥ 2 CAD risk factors
* Known heart disease
* Diabetic — YES
* Estimated GFR < 60 ml/min
* Prior aspirin use — NO

Refer for urgent OPD Cardiology Review

Discuss with AO at BHS, WHCG or SJOG Emergency Department

Discharge patient after completion of checklist
- □ **No ongoing chest pain**
- □ **All ECG's & Troponins are negative**
- □ **Advised to call AV if pain returns**
- □ **Follow up with GP arranged**
- □ **Cardiac risk factor reduction advised**
- □ **Commence low dose aspirin daily**
- □ **Commence S/L GTN prn**

□ Ongoing pain lasting > 10 mins, **or**
□ Recurrent pain, **or**
□ Typical symptoms and diabetic or eGFR < 60, **or**
□ CABG at any time or PCI in last 6 months, **or**
□ ECG changes-new ST ↓ or T ↓, **or**
□ Bedside troponin positive

NSTEMI Management

TRANSFER

Contact BHS or SJOG on duty/on call cardiology registrar or consultant to refer patient for ongoing management and confirm timeframe around transfer. Ensure the following information is available:

- □ **Past history including risk factors**
- □ **Time of onset of chest pain**
- □ **Treatment received & outcomes**
- □ **ECG (s)**
- □ **Bedside troponin and other relevant test results**
- □ **Vital signs**

Ring 000 to arrange urgent transfer

□ Persistent ST elevation in ≥ 1 mm in 2 contiguous limb leads, **or**
□ 2 mm in ≥ 2 contiguous chest leads, **or**
□ New LBBB

ST Elevation (STEMI) Management

TRANSFER FOR PPCI OR THROMBOLYSE & TRANSFER

Ring ARV 1300 36 86 61 to arrange urgent transfer

Refer to STEMI Management Plan for Grampians Region health services non interventional cardiac facilities

Reference - Grampians Region acute cardiac working group – May 2016

Pre Transfer Checklist
- □ **Transfer requested and booked with AV/ARV**
- □ **Copy of notes accompanying the patient, including all ECG's**
- □ **NOK aware of transfer and contact details recorded in patient notes**
- □ **Handover to accepting clinical area if appropriate**
- □ **Handover to accepting clinical area at BHS/SJOG**

Appendix 10

STEMI management plan

Grampians Region Health Services
Non Interventional cardiac facilities

STEMI MANAGEMENT PLAN

Clinical pathways never replace clinical judgement. Care outlined in this plan must be altered to suit the clinical needs of the patient

NEED ADVICE ANALYSING THE ECG?
1. Fax ECG to ADULT RETRIEVAL VICTORIA on 1300 367 882
2. Phone ADULT RETRIEVAL VICTORIA on 1300 368 661 to discuss

Indications for Reperfusion Therapy
- □ Persistent ST elevation ≥ 1mm in 2 contiguous limb leads, *or*
- □ ST elevation in ≥ 2mm in 2 contiguous chest leads, *or*
- □ New left Bundle Branch Block

NO
Revert to overarching pathway for Unstable Angina or NSTEMI pending patient clinical condition, indications & assessment

YES
Meets the criteria for reperfusion therapy
URGENT TRANSFER REQUIRED

Call ARV on 1300 368 661 for consultation and notify need for IMMEDIATE transfer. Confirm time frame for transfer

The patient CAN get to BHS or SJOG within 90 mins from time of presentation *(including transfer times)*

Primary PCI

- □ Complete Transfer Checklist
- □ Follow Ongoing Management Checklist
- □ Notify ARV of any significant changes to patient condition immediately

TRANSFER CHECKLIST
- □ Transfer requested & booked as a clinical priority with ARV
- □ Copy of notes accompany patient & all ECG's
- □ NOK aware of transfer and contact details recorded in patient notes
- □ Handover to accepting clinical area at BHS/ SJOG

The patient CANNOT get to Ballarat Health Services/SJOG within 90 minutes from time of presentation *(including transfer times)*

Fibrinolysis

Does the patient have any contraindications to fibrinolysis?

YES Advise ARV of this

NO

Administer Tenecteplase as per manufacturers guidelines

Transfer for angiography and PCI

- □ Complete Transfer Checklist
- □ Follow Ongoing Management Checklist
- □ Notify ARV of any significant changes to patient condition immediately

If ARV notify that patient transfer destination is Ballarat Health Services:
- □ Fax 12 Lead ECG to Admitting Officer at BHS Emergency Department on 5320 6620
- □ Call Admitting Officer on 5320 4801 to advise of ECG transmission and pending urgent transfer
- □ *See BHS 12 Lead ECG Transmission Protocol*
- □ See BHS Patient Flow Interhospital Transfer Protocol

If ARV notify that patient transfer destination is St John of God Ballarat:
- □ Fax 12 lead ECG to Admitting Officer at SJOG Emergency Department on 5320 2960
- □ Call Admitting Officer on 5320 2127 to advise of ECG transmission and pending urgent transfer

ONGOING MANAGEMENT CHECKLIST (Referring facility whilst awaiting transfer)
- □ Continuous Cardiac Monitoring
- □ Vital signs every 15 minutes
- □ ECG every 30 minutes & if pain reoccurs
- □ Ongoing pain management
- □ Manage haemodynamic stability
- □ Preparation and facilitation of transfer
- □ Ensure contemporaneous and thorough documentation is undertaken

Reference - Grampians Region acute cardiac working group May 2016

Appendix 11

Fibrinolysis contraindications

Absolute contraindications are

- Active bleeding or bleeding diathesis (excluding menses)
- Significant closed head or facial trauma within 3 months
- Suspected aortic dissection
- Any prior intracranial haemorrhage
- Ischaemic stroke within 3 months
- Known structural cerebral vascular lesion
- Known malignant intracranial neoplasm

Relative contraindications are

- Current use of anticoagulants
- Non-compressible vascular punctures
- Recent major surgery (<3 weeks)
- Traumatic or prolonged (>10 minutes) cardio pulmonary resuscitation (CPR)
- Recent internal bleeding (within 4 weeks)
- Active peptic ulcer
- History of chronic, severe, poorly controlled hypertension
- Severe uncontrolled hypertension on presentation (systolic ≥180mmHg or diastolic ≥110mmHg)
- Ischaemic stroke > 3 months ago, dementia or unknown intracranial abnormality
- Pregnancy

Reference
National Heart Foundation - Acute coronary syndromes treatment algorithm
http://heartfoundation.org.au/images/uploads/publications/ACS_therapy_algorithm-printable.pdf

Appendix 12

Tenecteplase administration guideline example

CONTRAINDICATIONS TO FIBRINOLYSIS REPERFUSION THERAPY	
Absolute *(please tick box if appropriate)* □ **Active bleeding or bleeding diathesis (excluding menses)** □ **Significant closed head or facial trauma within 3 mths** □ **Suspected aortic dissection** □ **Any prior intracranial haemorrhage** □ **Ischemic stroke within 3 months** □ **Known structural cerebral vascular lesion** □ **Known malignant intracranial neoplasm** *Reference: National Heart Foundation ACS Algorithm*	**Relative** *(please tick box if appropriate)* □ **Current use of anticoagulants** □ **Non compressible vascular punctures** □ **Recent major surgery (< 3 weeks)** □ **Traumatic or prolonged (> 10 min) CPR** □ **Recent internal bleeding (within 4 weeks)** □ **Active peptic ulcer** □ **History of chronic, severe, poorly controlled hypertension** □ **Severe uncontrolled hypertension on presentation (systolic ≥ 180 mmHg or diastolic ≥ 110 mmHg)** □ **Ischemic stroke > 3 months ago, dementia or known intracranial abnormality (not covered in 'absolute contraindications')** □ **Pregnancy**

TENECTEPLASE ADMINISTRATION GUIDELINES

ALWAYS AIM FOR DOOR TO NEEDLE TIME OF 30 MINUTES

(As per Cardiac Society of Australia and New Zealand Guidelines)

Clinical Indications

□ Ischemic pain > 20 mins and < 12 hours since onset
□ Age < 75 years with anterior AMI, ***or***
□ Inferior AMI with hypotension or failure

ECG Indications

□ Persistent ST elevation ≥ 1mm in 2 contiguous limb leads, ***or***
□ ST elevation in ≥ 2mm in 2 contiguous chest leads, ***or***
□ New left Bundle Branch Block

WHERE DO YOU GIVE FIBRINOLYSIS

□ Where the patient can have continuous cardiac monitoring & resuscitation equipment is readily available

HOW DO YOU ADMINISTER TENECTEPLASE

□ Confirm with Medical Practioner that ECG is positive for AMI
□ Eliminate any contraindications to thrombolysis therapy (refer above)
□ Administer Aspirin 300 mg
□ Ensure patient has 2 intra venous cannulas insitu and patent
□ Heparin 5000 units IV bolus (4000 units if patient < 67kg)
□ Clopidogrel 600 mg orally loading dose – seek advice from cardiologist prior to administration
□ Administer SINGLE weight related dose Tenecteplase over 10 seconds (maximum dose of 50 mg or 10,000 IU)

Pts Body Weight in Kg	Tenecteplase IU	Tenecteplase mg	Volume of reconstitued solution in mls
< 60	6000	30	6
> 60 to < 70	7000	35	7
>70 to < 80	8000	40	8
> 80 to < 90	9000	45	9
> 90	10 000	50	10

□ Incompatible with glucose
□ DO NOT SHAKE – gently swirl
□ Reconstitute the entire volume then measure desired amount
□ Continuous cardiac and BP monitoring
□ Observations recorded every 15 minutes for the first hour post administration of Tenectaplase
□ Post Tenectaplase ECG

The above guideline is an example only of a recommended treatment option for STEMI presentations. This information does not superseed drug literature guidelines or recommendations.

Abbreviations & Acronyms

AAV	Air Ambulance Victoria
ACS	Acute Coronary Syndrome
ALS	Advanced Life Support
ARV	Adult Retrieval Victoria
ATS	Australasian Triage Scale
AV	Ambulance Victoria
BHS	Ballarat Health Service
CAD	Coronary Artery Disease
CCU	Coronary Care Unit
CERT	Community Emergency Response Team
CT	Computerised Tomography
DjHS	Djerriwarrh Health Service
ED	Emergency Department
EDMH	Edenhope & District Memorial Hospital
EGHS	East Grampians Health Service
ECG	Electrocardiography
GTN	Glyceryl Trinitrate
GP	General Practitioner
GCS	Glasgow Coma Scale
HDU	High Dependency Unit
ICU	Intensive care Unit
MICA	Mobile Intensive Care Ambulance
MPU	MICA Paramedic Unit
MRI	Magnetic Resonance Imaging
NOK	Next of Kin
NSTEMI	Non STEMI
NSTEACS	Non STEACS
PCI	Percutaneous Coronary Intervention
PPCI	Primary PCI
SRH	Stawell Regional Health
SRU	Single responder Unit
STEACS	ST elevation acute coronary syndrome
STEMI	ST elevation myocardial infarction
SJOG	St John of God Health Care
TIMI	Thrombolysis in Myocardial Infarction
UCC	Urgent Care Centre
VEMD	Victorian Emergency Minimum Dataset
VAED	Victorian Admitted Episode Dataset
WWHS	West Wimmera Health Service
WHCG	Wimmera Health Care Group

References

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