[HOSPITAL / HEALTH AUTHORITY NAME]

ACUTE CHEST PAIN AND SUSPECTED ACUTE CORONARY SYNDROME PATHWAY

Protocol 13: Rapid Recognition, Risk Stratification, Reperfusion, Observation, and Safe Disposition

DRAFT FOR CARDIOLOGY, EMERGENCY MEDICINE, NURSING, LABORATORY, PHARMACY, TRANSFER, AND CLINICAL-GOVERNANCE REVIEW

Time-critical rule: Obtain and interpret a 12-lead ECG within 10 minutes of arrival. A suspected coronary occlusion is a reperfusion emergency and must not wait for troponin results, chest radiography, registration completion, payment arrangements, or routine consultation queues.

Document control	Details
Document owner	Emergency Department / Medical Services / Cardiology or Internal Medicine / Nursing Services
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Effective date	[To be completed after approval]
Review date	[Normally 12-24 months after approval, or sooner after a missed ACS event, transfer failure, formulary change, assay change, or guideline update]
Approved by	[Clinical Governance Committee / Executive Management / Medical Director]
Related protocols	Protocols 1-12; resuscitation; triage; investigations and critical results; medication safety; monitoring; consultation; admission; interfacility transfer; safe discharge; cardiac arrest; acute aortic syndrome; pulmonary embolism; pregnancy; safeguarding
Applies to	All ED, ambulance, medical, nursing, laboratory, radiology, pharmacy, cardiology/internal-medicine, transfer, and support staff involved in adults with chest pain or possible anginal equivalents
Clinical population	Adults and post-pubertal adolescents managed under the adult service. A separate paediatric chest-pain pathway is required.
Supersedes	[Insert previous policy or “New protocol”]

1. Purpose

To provide a standardized, time-sensitive, and auditable pathway for adults presenting with acute chest pain or possible anginal equivalents, from first contact through exclusion of immediately life-threatening conditions, diagnosis and initial management of acute coronary syndrome (ACS), reperfusion or transfer, observation, admission, or safe discharge.

2. Scope

This protocol applies to patients with chest discomfort, pressure, tightness, heaviness, burning, or pain; discomfort in the arms, shoulders, back, neck, jaw, or upper abdomen; or unexplained dyspnoea, diaphoresis, nausea, syncope, profound weakness, or fatigue when myocardial ischaemia is clinically possible. It applies from pre-arrival notification and triage through final disposition. It does not replace separate resuscitation, cardiac-arrest, acute aortic syndrome, pulmonary embolism, myocarditis/pericarditis, or toxicology protocols.

3. Core policy statements

- Chest pain shall be treated as a time-sensitive syndrome until ACS and other immediately life-threatening diagnoses have been actively considered.
- Administrative registration, payment, bed assignment, routine imaging, or laboratory delay shall not postpone the initial ECG, stabilization, or reperfusion decision.
- A 12-lead ECG shall be acquired and reviewed for STEMI or another occlusion pattern within 10 minutes of arrival; repeat ECGs and additional leads shall be obtained when symptoms persist, recur, or the initial ECG is nondiagnostic.
- High-sensitivity cardiac troponin (hs-cTn) is preferred where available. The department shall use one locally approved, assay-specific sampling and interpretation pathway; thresholds from another assay shall never be substituted.
- A normal initial ECG or troponin does not by itself exclude ACS. Clinical trajectory, symptom timing, serial testing, and alternative diagnoses must be considered.
- Patients with suspected STEMI or an equivalent coronary-occlusion pattern shall enter the reperfusion pathway immediately without waiting for biomarker confirmation.
- Primary PCI is preferred when PCI-mediated reperfusion can be achieved within the locally validated guideline window. When this is not feasible and fibrinolysis is indicated, treatment shall be delivered without avoidable delay and followed by immediate transfer to a PCI-capable centre.
- Aspirin, anticoagulation, P2Y12 therapy, nitrates, opioids, and fibrinolysis shall only be used after relevant contraindications and competing diagnoses have been assessed.
- Routine oxygen is not indicated when oxygen saturation is above 90% and there is no other clinical indication.
- Low-risk discharge requires an approved clinical decision pathway, nonischaemic ECG, appropriate negative troponin testing, symptom and vital-sign reassessment, exclusion of important alternatives, clear follow-up, and documented return precautions.
- The terms “atypical chest pain” and “noncardiac pain” should not be used as substitutes for clinical reasoning. The record shall state the working diagnosis, residual uncertainty, and why the chosen disposition is safe.
- Diagnostic and treatment performance shall be audited, including ECG timing, reperfusion delays, troponin turnaround, missed ACS, and safe discharge outcomes.

4. Definitions

Term	Operational definition
Acute coronary syndrome (ACS)	The clinical spectrum of unstable angina, non-ST-elevation myocardial infarction (NSTEMI), and ST-elevation myocardial infarction (STEMI) caused by acute myocardial ischaemia, usually from coronary thrombosis.
Anginal equivalent	A symptom other than central chest pain that may represent myocardial ischaemia, including dyspnoea, arm/jaw/back/epigastric discomfort, diaphoresis, nausea, unexplained fatigue, weakness, or syncope.

Term	Operational definition
STEMI / coronary-occlusion pattern	An ECG and clinical presentation indicating an acutely occluded or critically compromised coronary artery requiring immediate reperfusion assessment. This includes classic STEMI and selected equivalent or posterior/right-ventricular patterns.
NSTE-ACS	ACS without persistent diagnostic ST elevation; includes NSTEMI and unstable angina.
Myocardial injury	Cardiac troponin above the assay 99th-percentile upper reference limit. It may be ischaemic or nonischaemic and must not automatically be labelled myocardial infarction.
Myocardial infarction	Acute myocardial injury with clinical evidence of acute myocardial ischaemia, such as symptoms, ischaemic ECG changes, imaging evidence, or coronary thrombus.
Clinical decision pathway (CDP)	A validated and locally approved protocol integrating history, ECG, troponin values and change, timing, and sometimes a risk score to classify acute chest-pain patients.
Low risk	An estimated less than 1% 30-day risk of death or major adverse cardiac events using an approved pathway, together with clinical suitability for discharge.
First medical contact (FMC)	The time a qualified healthcare professional first assesses the patient and can initiate the ACS pathway.
Primary PCI (PPCI)	Urgent coronary angiography and PCI as the initial reperfusion strategy without preceding fibrinolysis.
Pharmacoinvasive strategy	Immediate fibrinolysis when timely PPCI is not feasible, followed by prompt transfer to a PCI-capable centre for angiography and PCI as indicated.
Rescue PCI	Urgent PCI after failed fibrinolysis, ongoing ischaemia, haemodynamic instability, electrical instability, or re-occlusion.
Door-to-ECG time	Time from ED arrival to acquisition of the first diagnostic-quality 12-lead ECG.
Diagnosis-to-treatment time	Time from ECG-based STEMI diagnosis to reperfusion treatment or activation of the definitive transfer pathway.

5. Roles and accountability

Role	Minimum accountability
Triage / receiving nurse	Recognizes chest pain and anginal equivalents, assigns appropriate acuity, starts the chest-pain clock, obtains immediate observations and ECG, activates Red criteria, and does not allow registration to delay care.
ECG-acquiring staff	Obtains a technically adequate ECG within target, labels it correctly, immediately presents it to an authorized interpreter, and repeats it when directed or symptoms recur.
ED clinician	Performs rapid assessment, excludes immediate threats, interprets ECGs and troponin in context, orders treatment, activates reperfusion or consultation, reassesses response, and documents the disposition rationale.
Senior ED clinician / physician in charge	Reviews high-risk, unclear, recurrent, or discordant cases; resolves diagnostic uncertainty; authorizes fibrinolysis where applicable; and escalates transfer delays.

Role	Minimum accountability
Cardiology / internal medicine consultant	Provides timely specialist advice, supports ECG interpretation and reperfusion strategy, accepts admission or transfer responsibility, and advises antithrombotic treatment where needed.
Nurse assigned to patient	Administers approved therapy, monitors symptoms and physiology, recognizes deterioration, repeats observations and ECGs, and documents treatment response.
Laboratory	Prioritizes troponin specimens, maintains assay-specific reference and delta information, communicates critical results, and promptly reports analyser failure or delay.
Pharmacy	Maintains immediate access to aspirin, nitrates, anticoagulants, fibrinolytics where approved, reversal/support medicines, and current dosing/contraindication references.
Transfer coordinator / ambulance service	Activates the receiving centre and transport pathway, records acceptance and timelines, confirms escort/equipment, and escalates barriers without delaying clinical care.
Clinical governance / quality lead	Maintains the local chest-pain pathway, troponin algorithm, fibrinolysis checklist, receiving-centre agreements, training, audit, and review of missed or delayed ACS cases.

6. Pathway activation and triage

The pathway shall be activated for any adult with acute chest pain or a possible anginal equivalent when ACS cannot be confidently excluded at first contact. Staff shall not rely on age, sex, apparent anxiety, pain quality, reproducibility, or a single normal observation to withhold the pathway.

- Red / immediate assessment: airway or breathing compromise; shock; severe ongoing pain with diaphoresis or distress; syncope with instability; sustained ventricular arrhythmia; cardiac arrest; acute pulmonary oedema; suspected STEMI/occlusion; major haemorrhage; or another immediately life-threatening diagnosis.
- Yellow / urgent assessment: possible ACS without current instability, recurrent symptoms, abnormal ECG not meeting immediate reperfusion criteria, elevated or unknown troponin, significant cardiovascular disease, or concerning anginal equivalents.
- Green classification should be exceptional at first contact when acute coronary ischaemia remains possible. A low-risk disposition is a post-assessment conclusion, not a triage assumption.
- Patients arriving by ambulance with a prehospital ECG suggestive of STEMI shall be taken directly to the resuscitation or designated high-acuity area and the reperfusion pathway activated before repeat administrative processes.
- An ECG obtained before arrival should be reviewed but does not remove the requirement for immediate clinical reassessment and repeat ECG when indicated.

7. The first 10 minutes

Target	Required action
0-2 minutes	Immediate visual assessment; confirm responsiveness, airway, breathing, circulation, major distress, shock, cardiac arrest, and need for resuscitation. Place in high-acuity area if unstable.
0-5 minutes	Record arrival/FMC time, two identifiers, symptom-onset time or last-known well, vital signs, oxygen saturation, pain score, glucose when indicated, allergies, current antithrombotics, and key contraindications.

Target	Required action
Within 10 minutes	Acquire and interpret a diagnostic-quality 12-lead ECG. Attach time and interpreter. Activate STEMI/occlusion pathway immediately if criteria or strong clinical concern are present.
Concurrent	Establish monitoring and IV access appropriate to acuity; draw troponin and other indicated bloods without delaying reperfusion; provide aspirin when ACS is suspected and contraindications/competing diagnoses have been considered.
By 10 minutes	Document working risk category, immediate differential, initial plan, repeat-ECG trigger, and named responsible clinician.

A normal or nondiagnostic first ECG does not end the pathway. Repeat the ECG during symptoms, after clinical change, and at locally approved intervals when suspicion remains.

8. Immediate stabilization and monitoring

- Use the ABCDE approach and Protocol 3 for any instability. Attach continuous ECG monitoring, pulse oximetry, and non-invasive blood-pressure monitoring for high-risk patients.
- Position for comfort while maintaining haemodynamic safety. Patients with shock, acute heart failure, arrhythmia, or ongoing severe pain require continuous observation in a resuscitation-capable area.
- Establish IV access. Obtain blood samples during access where possible but do not delay ECG interpretation, reperfusion activation, cardioversion, pacing, or other immediate treatment.
- Apply defibrillator pads early when malignant arrhythmia, severe ischaemia, cardiogenic shock, or recurrent syncope is present.
- Correct hypoglycaemia, severe hypoxaemia, dangerous arrhythmia, major anaemia/bleeding, or other immediately reversible contributors while the coronary assessment continues.
- Reassess pain, vital signs, mental status, perfusion, ECG, and response after every significant intervention and whenever symptoms change.

9. Exclude other immediately life-threatening causes

Diagnosis	Features and immediate implication
Acute aortic syndrome	Abrupt severe chest/back pain, ripping/tearing quality, pulse/BP differential, new aortic regurgitation murmur, focal neurology, syncope, known aneurysm/connective-tissue disorder. Withhold fibrinolysis and avoid reflex antithrombotic escalation until assessed.
Pulmonary embolism	Sudden dyspnoea or pleuritic pain, hypoxaemia, tachycardia, syncope, haemoptysis, unilateral leg findings, recent surgery/immobility, pregnancy/postpartum, cancer, or prior VTE. Follow the approved PE pathway.
Tension pneumothorax	Acute respiratory distress, unilateral absent breath sounds, hypotension, distended neck veins, tracheal shift or ventilatory deterioration. Treat clinically without waiting for imaging when unstable.
Cardiac tamponade	Hypotension, raised venous pressure, muffled heart sounds, pulsus paradoxus, electrical alternans, pericardial disease or trauma. Use focused ultrasound and urgent specialist support.
Oesophageal rupture	Severe chest pain after forceful vomiting/procedure, subcutaneous emphysema, sepsis, pleural signs. Urgent surgical/imaging pathway.

Diagnosis	Features and immediate implication
Acute severe valvular / aortic disease	New murmur with shock, pulmonary oedema, syncope, or ischaemic symptoms. Urgent echocardiography and specialist escalation.
Other dangerous mimics	Myocarditis/pericarditis, severe pneumonia/sepsis, upper GI haemorrhage, perforated viscus, pancreatitis, sickle crisis, and toxicologic syndromes according to context.

10. Focused clinical assessment

10.1 History

- Exact onset, duration, progression, recurrence, current status, and precipitating/relieving factors; record symptom onset separately from ED arrival.
- Location, character, radiation, severity, exertional or rest onset, and associated dyspnoea, diaphoresis, nausea/vomiting, palpitations, syncope, weakness, or neurological symptoms.
- Known coronary disease, prior MI/PCI/CABG, heart failure, stroke, peripheral arterial disease, aortic disease, venous thromboembolism, renal disease, diabetes, hypertension, dyslipidaemia, and smoking.
- Current medicines, adherence, aspirin/antiplatelet/anticoagulant use, nitrate use, phosphodiesterase-5 inhibitor exposure, cocaine/stimulant use, and relevant allergies or prior bleeding.
- Previous ECGs, troponin pattern, coronary imaging, stress testing, echocardiography, and prior similar episodes when records are available.
- Pregnancy/postpartum status where relevant and family history of premature coronary disease or sudden death.
- Bleeding history, recent surgery/trauma, previous intracranial haemorrhage or stroke, uncontrolled hypertension, and other potential fibrinolysis contraindications when STEMI is possible.

10.2 Examination

- Repeat complete vital signs and assess general appearance, distress, diaphoresis, pallor, cyanosis, mental status, perfusion, and volume status.
- Cardiovascular examination: pulses, bilateral blood pressure when acute aortic syndrome is suspected, heart sounds, new murmurs, friction rub, venous pressure, oedema, and signs of shock.
- Respiratory examination: work of breathing, breath sounds, crackles, unilateral findings, pleural signs, and oxygen requirement.
- Focused neurological and vascular examination when dissection, embolism, stroke, or syncope is possible.
- Chest wall, abdominal, and calf examination as clinically indicated. Reproducible tenderness may support a musculoskeletal source but does not alone exclude ACS.
- Assess frailty, cognition, functional baseline, social support, and ability to follow discharge instructions when disposition is being considered.

11. Electrocardiography

- The first ECG shall be acquired and interpreted within 10 minutes. Record the acquisition time, interpretation time, and name/role of interpreter.
- Compare with prior ECGs when available, but do not delay action while searching for them.
- Repeat the ECG immediately for recurrent or persistent symptoms, haemodynamic change, arrhythmia, or evolving clinical concern. Serial ECGs should also be obtained according to the local chest-pain order set.
- Obtain posterior leads V7-V9 when there is ST depression or dominant R waves in V1-V3 or suspicion of posterior infarction.

- Obtain right-sided leads, especially V3R-V4R, in inferior STEMI or when right-ventricular infarction is suspected; this affects nitrate and fluid decisions.
- New left bundle branch block alone is not automatically diagnostic of STEMI. Apply accepted occlusion criteria, clinical context, senior review, and urgent specialist consultation.
- Diffuse ST depression with ST elevation in aVR, dynamic ST-T changes, Wellens-type patterns, hyperacute T waves, posterior changes, and ongoing symptoms require urgent senior review even when classic STEMI thresholds are absent.
- Computer interpretation may assist but shall not replace clinician review. Uncertain ECGs shall be escalated immediately and electronically transmitted to a qualified specialist where available.

12. Investigations

Investigation	Operational standard
High-sensitivity troponin	Preferred biomarker. Use the hospital's named assay, sex-specific or approved reference limits where provided, and validated 0/1-h, 0/2-h, or other local pathway. Record values, units, timing, and delta.
Conventional troponin	When hs-cTn is unavailable, use the laboratory's approved longer serial-sampling pathway. Do not apply hs-cTn timings or thresholds.
Complete blood count	Assess anaemia, infection, and platelet count; urgent when bleeding, anticoagulation, or fibrinolysis is considered.
Renal function / electrolytes / glucose	Support medication dosing, contrast planning, arrhythmia assessment, and identification of alternative contributors.
Coagulation tests	Indicated with anticoagulant use, bleeding, liver disease, fibrinolysis consideration, or according to local reperfusion protocol; do not delay urgent reperfusion solely for routine results unless clinically necessary.
Chest radiograph	Not routine before reperfusion. Use when pulmonary, aortic, infectious, heart-failure, or alternative thoracic disease is suspected, provided it does not delay time-critical treatment.
Focused or formal echocardiography	Useful for shock, heart failure, murmur, suspected mechanical complication, pericardial effusion, right-heart strain, or diagnostic uncertainty. It must not delay reperfusion in a clear STEMI.
Other imaging	CT aorta, CTPA, coronary CT, or stress testing according to the competing diagnosis, risk category, stability, renal function, pregnancy, and local availability.
Additional tests	Pregnancy test, toxicology, D-dimer, lipase, inflammatory markers, blood gases, BNP/NT-proBNP, or others only when clinically indicated.

13. Troponin interpretation and the local clinical decision pathway

- Troponin is interpreted as a continuous value and trend, not simply "positive" or "negative." The clinical question is whether there is acute myocardial injury and whether that injury is due to ischaemia.
- The local protocol shall specify assay name, units, limit of detection/quantification, 99th-percentile upper reference limit, approved low/very-low thresholds, delta criteria, and required sampling times.
- Do not mix troponin I and T assays, point-of-care and central-laboratory thresholds, or results from different analytical platforms without laboratory advice.
- A single very-low hs-cTn may support rule-out only when the approved assay pathway permits it, the ECG is nonischaemic, symptoms began sufficiently before sampling, and the patient otherwise meets low-risk criteria.

- Persistent or recurrent symptoms, ischaemic ECG changes, haemodynamic instability, or high clinical concern override an apparently low initial troponin and require continued evaluation.
- Elevated troponin may result from heart failure, tachyarrhythmia, myocarditis, pulmonary embolism, sepsis, renal disease, stroke, critical illness, or other myocardial injury. Document the likely mechanism and do not assume type 1 MI.
- Chronic elevation is suggested by stable serial values in a compatible context; a significant rise or fall suggests acute injury. Assay-specific change criteria must be used.
- Every ordered troponin shall have a named clinician responsible for review and action, including results returning after handover, transfer, admission, or discharge.

The local troponin algorithm must be configured with the laboratory. Generic internet cut-offs shall not be copied into clinical use.

14. Risk stratification

Category	Minimum operational definition and action
Immediate / very high risk	STEMI or occlusion pattern; haemodynamic instability or shock; cardiac arrest; recurrent/refractory chest pain; life-threatening arrhythmia; acute heart failure due to ongoing ischaemia; mechanical complication; recurrent dynamic ST changes. Immediate senior, cardiology, and reperfusion/transfer action.
High risk	Confirmed NSTEMI; dynamic ST-T changes; substantial troponin rise/fall; known significant CAD with worsening symptoms; high validated risk score; diabetes/CKD/frailty with concerning presentation; recurrent symptoms despite initial treatment. Admit or transfer for specialist-directed invasive strategy.
Intermediate risk	No immediate high-risk feature but ACS not ruled out; equivocal symptoms, ECG, or troponin; significant comorbidity; unreliable timing; recurrent pain; or inability to complete a validated rule-out pathway. Observation, serial ECG/troponin, reassessment, and further testing.
Low risk	Clinically stable, symptoms resolved or clearly controlled, nonischaemic ECG, ACS ruled out by the approved assay-specific CDP, estimated <1% 30-day death/MACE, no dangerous alternative, and safe follow-up/discharge conditions.

15. Initial treatment for suspected ACS

Treatment	Safety standard
Aspirin	Give 162-325 mg chewed as soon as possible when ACS is suspected, unless already adequately administered or there is true severe allergy, active major bleeding, or a competing diagnosis such as acute aortic syndrome where harm may outweigh benefit. Document dose and time.
Oxygen	Give when oxygen saturation is below 90%, or for respiratory failure, shock, or another clinical indication. Do not give routinely to normoxic patients.
Nitrate	Consider sublingual glyceryl trinitrate/nitroglycerin for ongoing ischaemic discomfort or hypertension only after checking blood pressure, right-ventricular infarction, severe aortic stenosis, recent phosphodiesterase-5 inhibitor use, and other contraindications. Reassess after each dose.

Treatment	Safety standard
Analgesia	Treat severe persistent pain after diagnosis and haemodynamics are assessed. Opioids may be used cautiously when necessary, with monitoring; they may delay absorption of oral antiplatelet agents and can worsen hypotension or nausea.
P2Y12 inhibitor	Do not apply a blanket pre-treatment rule. Choice and timing depend on STEMI vs NSTE-ACS, fibrinolysis vs PCI, bleeding risk, age, anticoagulation, and anticipated angiography. Use the locally approved cardiology/reperfusion algorithm.
Anticoagulation	Use only after clinician assessment and according to the selected ACS/reperfusion strategy, renal function, body weight, bleeding risk, and local formulary. Avoid duplicate anticoagulation during transfers.
High-intensity statin	Start early in confirmed ACS unless contraindicated, according to formulary and specialist plan. Document intolerance and alternatives.
Beta-blocker / other therapy	Not an automatic triage action. Consider only after evaluating shock risk, acute heart failure, bradycardia, conduction disease, bronchospasm, stimulant exposure, and other contraindications.
Defibrillation / pacing / vasoactive support	Follow Protocol 3 and current resuscitation algorithms for malignant arrhythmia, bradycardia, shock, or cardiac arrest.

16. STEMI and coronary-occlusion pathway

1. Confirm the ECG-based working diagnosis rapidly. Obtain senior/remote specialist review when uncertain, but do not create avoidable delay when the clinical and ECG diagnosis is clear.
2. Record symptom-onset time, ECG diagnosis time, activation time, receiving-centre contact time, acceptance time, treatment time, and departure time.
3. Activate the designated PCI centre and transport system immediately. Do not wait for troponin, chest radiograph, routine laboratory results, or ward admission.
4. Use primary PCI when PCI-mediated reperfusion is expected within 120 minutes of ECG diagnosis under the locally approved transfer agreement.
5. If timely PPCI is not feasible, symptom onset is generally within 12 hours, and there are no contraindications, initiate the approved fibrinolytic strategy immediately; the operational target is treatment within 10 minutes of STEMI diagnosis.
6. After fibrinolysis, transfer the patient immediately to a PCI-capable centre without waiting in the ED for proof of reperfusion. Continue monitoring and adjunctive therapy according to the approved pharmacoinvasive pathway.
7. Assess reperfusion clinically and with repeat ECG at the locally specified time, generally 60-90 minutes. Persistent pain, haemodynamic/electrical instability, or inadequate ST resolution requires immediate rescue-PCI escalation.
8. For presentation more than 12 hours after symptom onset, ongoing ischaemia, shock, heart failure, malignant arrhythmia, or mechanical complication, obtain urgent specialist advice and prioritize PCI rather than late fibrinolysis.
9. Document any reason reperfusion was not delivered, including contraindication, patient refusal, delayed presentation, diagnostic uncertainty, or system barrier, and escalate preventable delay as a patient-safety incident.

Small-island rule: “Transfer requested” is not a treatment endpoint. The patient remains on an active reperfusion, monitoring, medication, and deterioration plan until responsibility is accepted and transport departs.

17. Fibrinolysis safety

Fibrinolysis shall be administered only by an authorized clinician using the current locally approved agent, weight/age-adjusted dose, adjunctive antithrombotic regimen, and a completed contraindication checklist. When doubt exists, obtain urgent senior and receiving-centre advice without avoidable delay.

- Confirm a compatible STEMI/occlusion diagnosis and symptom timeline. Fibrinolysis is not used for isolated ST depression, NSTEMI, unstable angina, pericarditis, or suspected acute aortic syndrome.
- Record exact body weight, blood pressure, neurological history, anticoagulant exposure, bleeding history, recent surgery/trauma, pregnancy/postpartum status, and prior intracranial disease.
- Control severe hypertension according to the approved algorithm before treatment when feasible.
- Perform and document a focused neurological examination before treatment.
- Ensure resuscitation capacity, IV access, continuous monitoring, appropriate adjunctive antithrombotic orders, and immediate transport activation.
- Recognize and treat intracranial, gastrointestinal, access-site, or other major bleeding immediately; stop relevant infusions and activate reversal/support protocols.
- Use age-adjusted dosing where required by the selected fibrinolytic protocol and verify dose independently.

18. NSTE-ACS pathway

- Patients with shock, recurrent/refractory pain, malignant arrhythmia, cardiac arrest, acute heart failure from ongoing ischaemia, mechanical complication, or recurrent dynamic ST elevation require immediate invasive-strategy discussion and transfer.
- Confirmed NSTEMI and intermediate/high-risk NSTE-ACS require admission or transfer for specialist assessment and an invasive strategy during hospitalization according to risk, bleeding risk, comorbidities, patient goals, and local capability.
- Continue serial ECGs and troponins, symptom and haemodynamic monitoring, and treatment-response reassessment. Escalate immediately for deterioration or recurrent ischaemia.
- Do not give fibrinolysis for NSTE-ACS.
- Avoid routine P2Y12 pre-treatment when an early invasive strategy is anticipated and coronary anatomy is unknown unless the approved local specialist pathway indicates otherwise. When angiography will be delayed, individualize therapy with cardiology advice.
- Assess bleeding risk, renal function, body weight, concurrent anticoagulation, anaemia, thrombocytopenia, and need for urgent surgery before antithrombotic escalation.
- Document the proposed invasive timing, receiving clinician, monitoring location, and contingency if symptoms recur.

19. Observation and intermediate-risk management

- Place the patient in a monitored observation or treatment area appropriate to risk; a waiting-room chair is not an observation plan.
- Document the diagnostic questions still unresolved and the tests or time needed to resolve them.
- Use the approved serial ECG and troponin schedule. Repeat testing sooner for recurrent symptoms or clinical change.
- Reassess history, pain, vital signs, examination, and ECG after treatment and before each disposition decision.
- Consider echocardiography for wall-motion abnormality, ventricular/valvular function, or pericardial disease and further anatomic or functional testing according to local availability and the 2021 chest-pain guideline.
- A normal prior stress test or coronary study reduces but does not eliminate current risk; incorporate test quality, timing, and whether symptoms have changed.

- Prolonged observation without a named clinician, defined endpoint, and escalation plan is unsafe. Boarded patients remain under active monitoring and review.

20. Low-risk discharge

Discharge is reasonable only after the patient has met the approved low-risk pathway and the clinician has addressed both coronary and important noncoronary causes.

- Stable observations and no ongoing or recurrent ischaemic symptoms.
- Nonischaemic ECG, with repeat ECG completed when symptoms recurred or suspicion remained.
- ACS ruled out using the hospital's approved assay-specific CDP and all ordered relevant results reviewed.
- Estimated 30-day death/MACE risk below 1% or equivalent locally approved low-risk definition.
- No concerning alternative diagnosis, exertional syncope, significant arrhythmia, acute heart failure, major anaemia/bleeding, or unexplained physiological abnormality.
- Patient understands the working diagnosis, residual uncertainty, medicines, activity advice, follow-up, and specific reasons to return immediately.
- Reliable means of communication, transport, supervision where needed, and ability to obtain prescribed medicines and follow-up.
- Outstanding results have a named owner and documented communication plan.
- Follow-up arranged according to clinical need; urgent testing is not automatically required for patients genuinely classified as low risk.
- Final vital signs, pain status, reassessment, and disposition reasoning documented.

21. Special populations and diagnostic equity

Population	Required consideration
Women	Symptoms and ECG/troponin abnormalities may be under-recognized. Treat dyspnoea, fatigue, nausea, back/jaw/arm discomfort, and other possible anginal equivalents seriously; avoid dismissive labels.
Older adults / frailty	May present with dyspnoea, syncope, confusion, weakness, falls, or functional decline. Balance invasive benefit, bleeding risk, cognition, baseline function, goals, and transfer burden without withholding indicated acute care solely due to age.
Diabetes / CKD	Symptoms may be muted. Troponin may be chronically elevated in CKD; serial change and clinical context are essential. Adjust antithrombotic and contrast plans for renal function.
Pregnancy / postpartum	Consider ACS, spontaneous coronary artery dissection, aortic disease, and PE. ECG and troponin remain appropriate. Involve obstetric and cardiology teams early and individualize radiation and medication decisions.
Known CAD / prior PCI or CABG	New or worsening symptoms require careful assessment even with a previously abnormal ECG or chronic troponin elevation. Obtain prior records without delaying acute treatment.
Stimulant-associated pain	Consider ACS, aortic disease, arrhythmia, and hyperthermia. Follow the approved toxicology and ACS pathways; treatment must be individualized to haemodynamics and drug exposure.
Bleeding or anticoagulation	Verify indication, agent, dose, last administration, renal function, INR where relevant, and bleeding history before antithrombotic or fibrinolytic treatment.
Mental-health or anxiety symptoms	Anxiety may coexist with ACS. Do not attribute chest pain to panic until time-sensitive organic causes have been assessed.

Population	Required consideration
Communication disability / language barrier	Use an interpreter or accessible communication method; do not rely on a minor child except in an immediate emergency.

22. Disposition and transfer of responsibility

- High-risk ACS: admit to an appropriately monitored setting or transfer to a capable centre with explicit acceptance, continuous monitoring, medication/infusion continuity, and structured handover.
- STEMI after fibrinolysis: transfer immediately to a PCI-capable centre even when symptoms and ST elevation improve.
- Observation: identify the responsible clinician, observation intensity, next ECG/troponin time, permitted oral intake/activity, and endpoint for decision.
- Discharge: complete Protocol 9, medication reconciliation, pending-result ownership, written instructions, teach-back, follow-up, and return precautions.
- At every transition, state the working diagnosis, ECG findings, troponin values and times, treatments and response, bleeding risk, outstanding tasks, and exact trigger for escalation.
- ED responsibility continues until a named receiving clinician/team has accepted the patient and a safe handover has occurred.

23. Documentation requirements

Domain	Minimum documentation
Timelines	Arrival/FMC; symptom onset; ECG acquisition and interpretation; pathway activation; aspirin; specialist contact; acceptance; fibrinolysis or PCI decision; departure; troponin collection and result times.
Clinical assessment	Symptoms/anginal equivalents, risk factors, relevant history, examination, immediate differential, and reasons for concern or reassurance.
ECG	Clinician interpretation, comparison, serial changes, additional leads, and who reviewed uncertain findings.
Troponin / investigations	Assay, value, units, sampling time, delta, interpretation, other results, and named owner of pending results.
Treatment	Drug, dose, route, time, contraindication checks, response, adverse effects, and reason for withholding indicated treatment.
Risk and disposition	Risk category/CDP result, residual uncertainty, senior review, specialist advice, admission/transfer acceptance, or low-risk discharge criteria.
Communication	Patient/caregiver explanation, interpreter, consent/refusal, transfer discussion, follow-up, return precautions, and teach-back.
System delay	Nature, duration, escalation, mitigation, clinical impact, and incident-report reference for avoidable ECG, laboratory, consultation, transport, or reperfusion delay.

24. Quality indicators

Indicator	Suggested measure
Door-to-ECG	Percentage of eligible patients with ECG acquired and interpreted within 10 minutes.

Indicator	Suggested measure
Repeat ECG reliability	Percentage with recurrent/persistent symptoms who receive a documented repeat ECG.
Troponin turnaround	Median collection-to-result and arrival-to-result times; percentage meeting local target.
Assay-pathway compliance	Percentage managed using the current approved assay-specific CDP with values and times documented.
STEMI activation	Time from diagnostic ECG to reperfusion-centre activation and specialist contact.
Reperfusion strategy	Percentage with documented PPCI-vs-fibrinolysis decision and expected PCI time.
Fibrinolysis timeliness	Percentage of eligible patients treated within the local target, including diagnosis-to-bolus within 10 minutes.
Transfer timeliness	Diagnosis-to-acceptance and diagnosis-to-departure times for STEMI/NSTEMI transfers.
Aspirin	Percentage of suspected/confirmed ACS patients receiving aspirin promptly or with a documented contraindication.
Oxygen stewardship	Percentage of normoxic ACS patients who avoid routine oxygen without another indication.
Safe discharge	Percentage of discharged chest-pain patients meeting documented low-risk criteria and receiving written safety-netting.
Clinical outcomes	72-hour and 30-day returns, missed MI/ACS, cardiac arrest, major bleeding, stroke after fibrinolysis, mortality, and incident themes.
Equity	Compare ECG and treatment delays by sex, age, disability, language, arrival mode, and time of day.

25. Training, competency, and implementation

- All triage and ED clinical staff shall receive orientation to chest-pain recognition, anginal equivalents, ECG timing, escalation, and the local troponin pathway.
- Clinicians expected to interpret ECGs shall demonstrate competency in STEMI, posterior and right-ventricular infarction, dynamic ischaemia, major mimics, and appropriate escalation of uncertain tracings.
- Staff authorized to administer fibrinolysis shall complete competency assessment covering indications, contraindications, dosing, adjunctive therapy, bleeding response, reperfusion assessment, and transfer.
- The laboratory shall provide written assay education before implementation or change of troponin platform. Old algorithms and reference cards shall be removed at changeover.
- Simulation should test off-hours STEMI transfer, failed fibrinolysis, cardiogenic shock, ECG transmission failure, transport delay, and acute aortic syndrome mistaken for ACS.
- The department shall maintain a current cardiology/receiving-centre contact list, transfer agreement, fibrinolytic stock, weight-based dosing guide, contraindication checklist, and ECG-transmission backup.
- Every missed ACS, inappropriate discharge, major bleeding, reperfusion delay, or transfer failure shall trigger multidisciplinary review and system repair.

26. References and evidence base

1. Rao SV, O'Donoghue ML, Ruel M, et al. 2025 ACC/AHA/ACEP/NAEMSP/SCAI Guideline for the Management of Patients With Acute Coronary Syndromes. Circulation. Published online February 27, 2025. doi:10.1161/CIR.0000000000001309.

2. Gulati M, Levy PD, Mukherjee D, et al. 2021 AHA/ACC/ASE/CHEST/SAEM/SCCT/SCMR Guideline for the Evaluation and Diagnosis of Chest Pain. Circulation. 2021;144:e368-e454. doi:10.1161/CIR.0000000000001029.

3. Byrne RA, Rossello X, Coughlan JJ, et al. 2023 ESC Guidelines for the management of acute coronary syndromes. European Heart Journal. 2023;44:3720-3826. doi:10.1093/eurheartj/ehad191.

4. World Health Organization. Emergency Care Toolkit and Basic Emergency Care approach. WHO; current online edition.

5. American Heart Association. 2025 Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care: adult cardiac arrest, bradycardia, tachycardia, and post-cardiac-arrest algorithms.

Local clinical use requires verification against the current hospital formulary, laboratory troponin assay, cardiology advice, transfer agreements, national law, and available receiving-centre capability.

ANNEX A. One-page acute chest-pain workflow

Step	Action
1. Recognize	Chest pain or anginal equivalent → pathway active. Record symptom-onset and arrival/FMC times.
2. Stabilize	ABCDE; Red criteria to resuscitation; monitor, IV access, glucose when indicated, defibrillator readiness.
3. ECG ≤10 min	Acquire and interpret. If STEMI/occlusion → immediate reperfusion pathway; do not wait for troponin.
4. Immediate threats	Actively assess ACS, acute aortic syndrome, PE, tension pneumothorax, tamponade, oesophageal rupture, severe valvular disease.
5. Initial therapy	Aspirin if appropriate; oxygen only for hypoxaemia/other indication; nitrate/analgesia after contraindication check; other antithrombotics per approved strategy.
6. Troponin/CDP	Use named assay and approved serial pathway; repeat ECG and reassess with symptoms or change.
7. Stratify	Immediate/high risk → admit/transfer; intermediate → monitored observation and further testing; low risk → safe discharge checklist.
8. Reassess	Symptoms, observations, ECG, troponin trend, treatment response, alternative diagnosis, and safety of destination.
9. Transfer responsibility	Structured handover with timelines, ECGs, troponins, medicines, bleeding risk, pending work, and contingencies.
10. Audit	Capture ECG, troponin, activation, reperfusion, transfer, discharge, return, and outcome times.

ANNEX B. First-10-minute checklist

- ☐ Two identifiers and arrival/FMC time recorded
- ☐ Symptom-onset or last-known symptom-free time recorded
- ☐ ABCDE and instability screen completed
- ☐ Full vital signs, SpO2, pain score, and glucose if indicated
- ☐ 12-lead ECG acquired and interpreted within 10 minutes
- ☐ STEMI/occlusion pathway activated if indicated
- ☐ Continuous monitoring and IV access appropriate to risk
- ☐ Troponin and indicated bloods collected without delaying reperfusion

- □ Aspirin given or contraindication/competing diagnosis documented
- □ Repeat ECG trigger and responsible clinician documented

ANNEX C. ECG escalation and additional-lead card

Trigger	Action
Immediate reperfusion review	Diagnostic ST elevation in contiguous leads; posterior STEMI pattern; right-ventricular STEMI; convincing acute coronary occlusion pattern with ongoing symptoms; recurrent transient ST elevation.
Urgent senior/specialist review	Dynamic ST depression/T-wave inversion; hyperacute T waves; Wellens-type changes; diffuse ST depression with aVR elevation; new conduction disturbance with ischaemic symptoms; ventricular arrhythmia; uncertain computer interpretation.
Posterior leads V7-V9	Obtain with ST depression or tall R waves V1-V3, persistent pain, or suspected circumflex/posterior infarction.
Right-sided leads V3R-V4R	Obtain in inferior STEMI, hypotension, clear lungs with raised JVP, or suspected right-ventricular infarction.
Repeat ECG	Immediately with recurrent/persistent pain, instability, arrhythmia, syncope, treatment response change, or evolving suspicion; otherwise per local serial-ECG schedule.
Transmission failure	Use photographed/secure approved transmission, telephone interpretation, or direct senior review according to downtime procedure; document failure and workaround.

ANNEX D. Initial ACS medication safety card

Medicine	Minimum safety check
Aspirin	Suggested initial adult dose: 162-325 mg chewed. Check severe allergy, active major bleeding, and acute aortic syndrome concern. Record time.
Oxygen	Use for SpO2 <90%, respiratory failure, shock, or another indication. Target and device per clinical condition; avoid routine use when normoxic.
Sublingual nitrate	Use locally approved dose (commonly 0.3-0.4 mg) and repeat only after BP and symptom reassessment. Avoid hypotension, RV infarction, severe aortic stenosis, or recent PDE5 inhibitor exposure.
Opioid	Reserve for severe persistent pain when necessary. Titrate, monitor BP/respiration, anticipate nausea, and recognize delayed oral antiplatelet absorption.
P2Y12 / anticoagulant	Select according to STEMI vs NSTE-ACS, PPCI vs fibrinolysis, bleeding risk, age, renal function, body weight, anticoagulant exposure, and receiving-centre plan. Independent dose check.
Fibrinolytic	Only on authorized order after completed checklist, exact weight, BP/neurological review, contraindication screen, independent dose verification, and transfer activation.
Statin	High-intensity statin for confirmed ACS unless contraindicated, per formulary.

Medicine	Minimum safety check
Avoid automatic therapy	Do not give routine oxygen, fibrinolysis for NSTE-ACS, or reflex P2Y12/anticoagulation before evaluating major bleeding and aortic-dissection risk.

ANNEX E. STEMI reperfusion decision record

Field	Record
Symptom onset / last known well	_____
Diagnostic ECG time	_____
ECG diagnosis / territory / additional leads	_____
Haemodynamic status / shock / heart failure / arrhythmia	_____
PCI-capable centre contacted at	_____
Accepting clinician / centre	_____
Expected ECG diagnosis-to-wire time	_____ minutes
Can PPCI be achieved within 120 min?	→ Yes → immediate transfer for PPCI No assess fibrinolysis
Fibrinolysis eligible within symptom window?	☐ Yes ☐ No ☐ Uncertain / senior advice
Fibrinolytic agent / dose / bolus time	_____
Adjunctive antithrombotics	_____
Transfer activated / departure time	_____
Post-lysis ECG time / ST resolution / symptoms	_____
Rescue PCI indication present?	☐ No ☐ Yes → immediate escalation
Reason for any delay or no reperfusion	_____

ANNEX F. Fibrinolysis contraindication checklist - local approval required

This checklist is a safety prompt and must be reconciled with the current approved fibrinolytic monograph and cardiology protocol. Tick each item and document specialist discussion when risk is uncertain.

Category	Prompt
Absolute / generally prohibitive	Any prior intracranial haemorrhage; known intracranial vascular lesion or malignant neoplasm; recent ischaemic stroke within the interval specified by the current protocol; suspected acute aortic syndrome; active major bleeding or bleeding diathesis; significant closed head/facial trauma in the specified interval; recent intracranial/intraspinal surgery; severe uncontrolled hypertension not safely correctable; prior severe reaction to the selected agent where relevant.
Relative / individualized risk-benefit	Marked hypertension; prolonged or traumatic CPR; recent surgery or internal bleeding; pregnancy or early postpartum; active peptic ulcer; current anticoagulant therapy or elevated INR; advanced liver disease; infective endocarditis; noncompressible vascular puncture; prior ischaemic stroke outside the absolute interval; frailty or very low body weight; other major bleeding risk.

Category	Prompt
Mandatory pre-treatment record	Exact weight; baseline BP; focused neurological examination; anticoagulant/antiplatelet exposure; platelet count/coagulation results when clinically required and available; recent procedures/trauma; pregnancy status; consent discussion when feasible; independent dose check.
After administration	Continuous monitoring; bleeding surveillance; repeat ECG/reperfusion assessment; adjunctive therapy; immediate PCI-centre transfer; rescue-PCI trigger; adverse-event plan.

ANNEX G. Local troponin pathway configuration

Configuration item	Local entry
Assay manufacturer / platform	_____
Analyte	☐ hs-cTnI ☐ hs-cTnT ☐ conventional cTnI/T
Reporting units	_____
99th-percentile upper reference limit	Overall: _____ Female: _____ Male: _____
Limit of detection / quantification	_____
Approved serial pathway	☐ 0/1 h ☐ 0/2 h ☐ 0/3 h ☐ Other: _____
Rule-out thresholds / delta	_____
Observation-zone thresholds / delta	_____
Rule-in thresholds / delta	_____
Minimum symptom duration for single-sample pathway	_____
Conventional assay sampling times, if used	_____
Critical-result communication threshold	_____
Target laboratory turnaround	Collection to result: _____ min
Laboratory contact / downtime method	_____
Effective date / approved by	_____

ANNEX H. Chest-pain clinical decision record

Field	Record
Approved pathway used	☐ Assay-only hs-cTn pathway ☐ HEART Pathway ☐ EDACS ☐ Other: _____
History / symptom assessment	_____
ECG category	☐ Nonischaemic ☐ Nonspecific ☐ Ischaemic / high risk
Risk factors / known CAD	_____
Troponin values, units, times, deltas	_____
Symptom onset relative to sampling	_____
Risk category / estimated 30-day risk	☐ Low (<1%) ☐ Intermediate ☐ High ☐ Immediate

Field	Record
Important alternative diagnoses considered	_____
Senior review required / completed	_____
Disposition and rationale	_____

ANNEX I. NSTE-ACS escalation card

Priority	Action
Immediate invasive / transfer discussion	Shock or instability; recurrent/refractory pain; cardiac arrest or malignant arrhythmia; acute heart failure from ongoing ischaemia; mechanical complication; recurrent dynamic ST elevation.
High-risk admission / transfer	Confirmed NSTEMI; dynamic ST-T changes; substantial troponin rise/fall; high clinical/risk-score profile; recurrent symptoms; known significant CAD with worsening presentation.
Continue while awaiting	Monitoring, serial ECG/troponin, symptom control, aspirin if appropriate, individualized anticoagulation/P2Y12 plan, renal/bleeding assessment, and explicit deterioration triggers.
Do not do	No fibrinolysis. Do not discharge on one normal ECG or one insufficiently timed troponin. Do not leave pending consultation or results without an owner.

ANNEX J. Safe-discharge checklist for acute chest pain

- ☐ Stable final vital signs and no recurrent or ongoing concerning symptoms
- ☐ Final ECG reviewed; repeat ECG performed if symptoms recurred or concern remained
- ☐ Approved troponin/CDP completed and all relevant results reviewed
- ☐ Low-risk classification documented (<1% 30-day death/MACE or local equivalent)
- ☐ Dangerous alternative diagnoses considered and reasonably excluded
- ☐ Final working diagnosis and uncertainty explained in plain language
- ☐ Medication reconciliation and prescriptions completed
- ☐ Follow-up arranged or clearly instructed
- ☐ Outstanding-result owner and contact plan documented
- ☐ Written return precautions: recurrent/worsening pain, dyspnoea, syncope, sweating, weakness, palpitations, neurological symptoms, or any concern
- ☐ Teach-back documented; interpreter/accessibility needs addressed
- ☐ Safe transport, destination, and support confirmed

ANNEX K. Chest-pain pathway audit tool

Audit item	Finding
Patient ID / date / arrival mode	_____
Eligible symptom / anginal equivalent recognized	☐ Yes ☐ No
Arrival-to-ECG ≤10 min	Time: _____ min ☐ Met ☐ Not met

Audit item	Finding
ECG interpreted and documented	☐ Yes ☐ No
Repeat ECG when indicated	☐ Yes ☐ No ☐ N/A
Troponin assay pathway compliant	☐ Yes ☐ No ☐ N/A
Aspirin timely or contraindication documented	☐ Yes ☐ No ☐ N/A
Routine oxygen avoided when normoxic	☐ Yes ☐ No ☐ N/A
STEMI reperfusion decision documented	☐ Yes ☐ No ☐ N/A
Diagnosis-to-activation / bolus / departure	_____ / _____ / _____ minutes
Low-risk discharge criteria documented	☐ Yes ☐ No ☐ N/A
Written safety-netting and follow-up	☐ Yes ☐ No
Return / missed ACS / adverse event	_____
System issue and action owner	_____

ANNEX L. Local configuration table

Local decision	Approved configuration
Designated PCI-capable receiving centre(s)	_____
24/7 cardiology / internal-medicine contact	_____
ECG transmission method and backup	_____
Primary transport / aeromedical provider	_____
Target diagnosis-to-acceptance time	_____
Target diagnosis-to-departure time	_____
Expected PCI time threshold	120 min unless locally amended by approved specialist policy
Approved fibrinolytic agent and location	_____
Authorized fibrinolysis clinicians	_____
Approved antiplatelet/anticoagulation algorithms	_____
Troponin assay and CDP version	_____
Serial ECG schedule	_____
Observation-unit criteria and location	_____
Low-risk follow-up route	_____
Incident escalation contacts	_____
Audit owner / reporting frequency	_____

ANNEX M. Approval and sign-off

Approver	Sign-off
Emergency Department Clinical Lead	Name: _____ Signature: _____ Date: _____
Cardiology / Internal Medicine Lead	Name: _____ Signature: _____ Date: _____
ED Nurse Manager	Name: _____ Signature: _____ Date: _____
Laboratory Lead	Name: _____ Signature: _____ Date: _____
Pharmacy Lead	Name: _____ Signature: _____ Date: _____
Ambulance / Transfer Lead	Name: _____ Signature: _____ Date: _____
Clinical Governance Chair	Name: _____ Signature: _____ Date: _____
Executive Approval	Name: _____ Signature: _____ Date: _____