Through its Proven Imaging Project, Intermountain Healthcare has developed a suite of standardized care process models (CPMs) for the use of advanced imaging procedures in eight priority clinical areas. These evidence-based guidelines are intended to be widely implemented in order to improve patient safety, improve outcomes, and reduce unnecessary medical spending for the Medicare population and the U.S. health system overall.

**Why Focus ON PROVEN IMAGING?**

Advanced imaging procedures, including MRI, CT, PET, and nuclear medicine, facilitate rapid and accurate detection and/or diagnosis of disease. The volume of advanced imaging procedures prescribed to patients in the U.S. increased three- to four-fold from 1996–2010 as the technologies became widely available. The inflating costs of advanced imaging outstripped that of any other medical service. These inflating costs resulted in up to $20–30 billion in unnecessary advanced imaging spending each year. Inflating costs resulted in up to $20–30 billion in unnecessary advanced imaging spending each year.

- **High cost.** Although the spending growth in advanced imaging dropped off after the early 2000s, 2014 costs to Medicare Part B for advanced imaging exceeded $2.4 billion for common conditions alone.
- **Limited effectiveness.** Multiple studies suggest that up to a third of advanced imaging procedures fail to contribute to diagnosis or are clinically inappropriate.
- **Patient safety.** Advanced diagnostic imaging often exposes the patient to ionizing radiation and/or contrast media, posing additional medical risks that must be weighed against the potential benefits of the imaging procedure.
- **Overdiagnosis and overtreatment.** There is an unrecognized risk of overdiagnosis and subsequent overtreatment that carries associated risks (e.g., drug reactions or unnecessary surgical interventions) if advanced imaging is performed in patients with low pretest probability. The Proven Imaging approach seeks to avoid these risks.

**GOALS AND MEASURES**

This CPM was developed by Intermountain clinical experts to outline appropriate use criteria (AUC) for advanced imaging for known or suspected coronary artery disease (CAD). These guidelines, together with those for other priority clinical areas, will improve the quality of care provided to patients by:

- Increasing adherence to evidence-based AUC for the use of advanced imaging
- Reducing imaging tests that do not conform to AUC or for which there are no guidelines
- Decreasing system-wide spending on unnecessary advanced imaging services
- Reducing the risk of harm from unwarranted radiation exposure
- Documenting the incidence of a significant positive on advanced imaging tests and aligning with downstream care

---

**PROVEN IMAGING:**

**Known or Suspected**

**Coronary Artery Disease (CAD)**

---

**WHAT’S INSIDE?**

| OVERVIEW: PROVEN IMAGING AUC CONTENT | 2 |
| CORONARY ARTERY DISEASE (CAD) CARE PATHWAYS: ALGORITHMS | 5 |
| Known or suspected CAD (ambulatory or inpatient care setting) | 5 |
| Known or suspected CAD (ED or urgent care setting) | 7 |
| POINT-OF-ORDER CHECKLIST | 9 |
| TABLE 2: CARDIAC IMAGING CONSIDERATIONS | 10 |
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OVERVIEW: PROVEN IMAGING AUC CONTENT

Intermountain Proven Imaging Appropriate Use Criteria (AUC) support clinicians in providing evidence-based care to the patients they serve. Although appropriate use of Proven Imaging fulfills compliance requirements under PAMA, patients only fully benefit from their use as they are deployed within the framework of a locally driven quality improvement program. To learn more about Intermountain’s process for developing and maintaining AUC, visit: https://intermountainhealthcare.org/services/imaging-services/proven-imaging/.

The care process model approach
Designed as Care Process Models (CPMs), the Proven Imaging AUC content is a blueprint that logically guides the delivery of evidence-based care via an algorithmic visual presentation (see pages 5 through 8). Although these Proven Imaging CPMs specifically focus on the appropriate use of advanced imaging, they can be viewed as portions of broader CPMs that guide not only diagnostic but therapeutic interventions for a specific disease or condition.

Ideally, Proven Imaging CPMs are engaged early in the patient encounter and guide the various considerations that lead to the ultimate decision regarding ordering of an imaging study. For providers who engage at the point of ordering, point-of-order checklists are also included (beginning on page 9). These checklist-based guidelines are logically equivalent to the algorithms from which they are derived.

Knowing that local factors will invariably impact decisions about selecting the most appropriate exam, Proven Imaging CPMs specify the generally preferred exam but also provide alternative choices that may be appropriate in certain clinical settings.

Relative imaging cost and radiation risk rankings
To further aid providers, each algorithm includes a ranking of relative costs and radiation risk for each advanced imaging test recommended. The cost scale is derived using global non-facility RVUs published by CMS as a surrogate for cost. The radiation risk is derived from data published in 2010 by the Health Physics Society.

Evidentiary review and ranking
Intermountain used the following two conceptual frameworks for evidentiary review of relevant literature:
1. The 2011 revision of the Oxford Centre for Evidence-Based Medicine (OCEMB) 2011 Levels of Evidence standard. This standard includes categorical levelling grades relevant to diagnostic studies and rates individual sources of evidence (published papers or other research data) on a five-point scale.
2. The extensively used Fryback and Thornbury conceptual framework, which uses six levels for assessing the efficacy of diagnostic imaging.

Each algorithmic presentation provides both rankings for the decision node (pairing of AUC and recommended/alternative tests).

Using the algorithms and checklists
Under “Care Pathway” on page 3, there is an annotated algorithmic sample for a typical clinical scenario found in this CPM. Under “Point-of-Order Checklist” on page 4, there is an annotated sample of a typical point-of-order checklist for an imaging procedure recommended within the above sample algorithm.

Abbreviations used in this CPM

- AAA = abdominal aortic aneurysm
- ACS = acute coronary syndrome
- ASCVD = atherosclerotic cardiovascular disease
- AF = atrial fibrillation
- AV = atriointercular
- BPM = beats per minute
- CABG = coronary artery bypass
- CAC = coronary artery calcium
- CAD = coronary artery disease
- CCTA = cardiac CT angiography
- CPG = clinical practice guideline
- CPM = care process model
- CT = computed tomography
- cTni = cardiac Troponin-I
- ECG = electrocardiogram
- ECHO = echocardiography
- FDG = fluorodeoxyglucose
- FFR = fractional flow reserve
- GFR = glomerular filtration rate
- HTN = hypertension
- ICD = implantable cardioverter defibrillator
- LBBB = left bundle branch block
- LHC = left heart catheterization
- LVEF = left ventricular ejection fraction
- MRI = magnetic resonance imaging
- mSv = millisievert
- NSTEMI = non-ST-elevation myocardial infarction
- PAD = peripheral artery disease
- PCP = primary care provider
- PET = positron emission tomography
- PPM = permanent pacemaker
- PVC = premature ventricular contractions
- SPECT = single-photon emission computed tomography
- STEMI = ST-elevation myocardial infarction
- VT = ventricular tachycardia
**Care pathways**

For each clinical scenario (e.g., known or suspected coronary artery disease (CAD) in ambulatory or inpatient care setting), there is an algorithmic presentation of the care pathway context for the imaging decisions made. This pathway contains not only the appropriate use criteria (AUC) and evidence-based advanced imaging recommendations but also what constitutes significant positive imaging results and downstream care recommendations. Note the elements of this presentation below and key information provided in each test recommendation box as shown bottom center. There is also a legend at the bottom of each care pathway page.

The decision node box encompasses recommended advanced imaging based on the presence of evidence-based appropriate use criteria (AUC) or expert consensus (where evidence does not exist).

This symbol indicates a common clinical scenario.

Underlining indicates a hyperlink to another document or to a page within the same document, as appropriate.

Cost rankings are indicated based on a range developed from the CMS Global Relative Value Units (RVUs) as follows: $ = 0 – 5 RVUs, $ = 5 – 10 RVUs, $ = 10 – 15 RVUs, $ = 15 + RVUs.

The Arabic number in the green box indicates an evidence ranking derived from the OCEBM scale. For this scale, the lower the number, the stronger the evidence ranking.

The Roman numeral in the orange box indicates an evidence ranking derived from the Fryback & Thornbury scale. For this scale, the higher the number, the stronger the evidence ranking.

Radiation risk rankings use the scale developed by the American College of Radiology. This rating framework offers the following six levels for adult effective dose range risk:

- **R0** = 0 mSv
- **R1** = 0.1 mSv
- **R2** = 0.1 – 1 mSv
- **R3** = 1 – 10 mSv
- **R4** = 10 – 30 mSv
- **R5** = 30 – 100 mSv

See abbreviations on page 2.
Point-of-order checklist

Advanced cardiovascular imaging testing (e.g., MRI and CT) is determined by availability and the patient's condition. The checklist in this CPM compiles all of the appropriate use indications from each clinical scenario.

Table 1 on page 9 indicates appropriate use criteria in a checklist format, allowing the provider to select the appropriate scenario. The provider will then choose the appropriate test based on the criteria listed in Table 2: Cardiac Imaging Considerations starting on page 10.

---

**TABLE 1. Appropriate use indications for known or suspected CAD**

<table>
<thead>
<tr>
<th>Arrhythmia or abnormal ECG</th>
<th>Angina syndrome</th>
<th>Known heart disease</th>
<th>Preoperative risk stratification</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Abnormal ECG, likely ischemia</td>
<td>□ Angina syndrome, assess ischemia</td>
<td>□ Known heart CAD with new or worsening angina equivalents</td>
<td>□ Planned vascular surgery with poor functional capacity, heart failure, hypertension/kidney disease</td>
<td>□ Unexplained elevated troponin and concern for impending infarctions, without ACS</td>
</tr>
<tr>
<td>□ New onset AF</td>
<td>□ Angina syndrome with diabetes, CAD, AAA, or PAD</td>
<td>□ New onset heart failure</td>
<td>□ Intermediate to high-risk surgery with poor functional capacity, heart failure, hypertension/kidney disease</td>
<td>□ Previous equivocal, borderline cardiac stress test result, when CAD remains a concern</td>
</tr>
<tr>
<td>□ Frequent PVCs</td>
<td>□ Angina syndrome with 3 or more coronary heart disease risk factors*</td>
<td>□ Hemodynamic valve disease</td>
<td>□ Pre non-cardiac transplant evaluation (e.g., liver, kidney, bone marrow transplant, etc.)</td>
<td>□ Syncope with coronary heart disease risk equivalent or moderate to high coronary heart disease event risk</td>
</tr>
<tr>
<td>□ Non-sustained VT</td>
<td>□ Angina equivalent such as exertional dyspnea, jaw pain, premature ventricular contractions or arm pain</td>
<td>□ CAC &gt; 400, peripheral arterial disease, or abdominal aortic aneurysm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Exercise-induced VT</td>
<td>□ Coronary stenosis (LHC, CTA) of uncertain significance</td>
<td>□ Coronary stenosis (LHC, CTA) of uncertain significance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Sustained VT, not due to a transient or reversible cause</td>
<td>□ Prior incomplete coronary occlusion revascularization where additional revascularization is feasible</td>
<td>□ Viability assessment in patients who are eligible for coronary revascularization</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

See abbreviations on page 2.
**CORONARY ARTERY DISEASE (CAD) CARE PATHWAY ALGORITHMS**

### Decision Node 1

**Known or suspected CAD in (ambulatory or inpatient care setting)**

- **NSTEMI or STEMI?**
  - yes
    - Patient is unstable
    - BYPASS DECISION SUPPORT*
  - no

- **AUC met?**
  - yes
    - SELECT most appropriate imaging test based on patient-specific factors (see table 2 on pages 10–11)**
  - no

**CONSIDER:**
- Exercise electrocardiogram (ECG)
- Resting echocardiogram
- Coronary artery calcium (CAC) testing (if pooled cohort equation ASCVD 10-yr risk is ≥ 5%)
- Cardiology consult
- No further testing

**Significant positive result?**
- yes
  - Coronary artery disease (intermediate to high)
  - CONSIDER referral to cardiology for further recommendations
- no

**CONTINUE** conservative measures

**AUC met?**
- yes
- no

**CONSIDER** coronary artery calcium (CAC) testing (if pooled cohort equation ASCVD 10-yr risk is ≥ 5%)

---

*AUC decision support is required before imaging unless the patient requires emergency treatment.

**If indicated, the imaging test should be customized for the patient based on the information in this CPM.

---

**Legend**

- Clinical Scenario
- Urgent or Emergency Situation
- OCEBM Level of Evidence
- Fryback & Thornbury Level of Evidence
- Intermountain Measure
- \( R^0 \) (0 mSv) \( R^3 \) (1–10 mSv) \( R^4 \) (10–30 mSv) See page 2–3 for explanation.
- \$ (0–5 RVUs) \$\$ (5–10 RVUs) \$\$\$ (10–15 RVUs) \$\$\$\$ (15+ RVUs)

---

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Proven Imaging for Known or Suspected Coronary Artery Disease (CAD)

Key Evidence: Decision Node #1


(For a list of references for all decision nodes, see the complete bibliography on page 14.)
PROVEN IMAGING FOR Known or Suspected Coronary Artery Disease (CAD)

Known or suspected CAD (ED or urgent care setting)

DECISION NODE 2

STEMI? yes → Patient is unstable BYPASS DECISION SUPPORT* no → Evidence of acute myocardial injury? (See table 4 on page 12)

yes → AUC met? Indications per table 1 AND EITHER:
- Intermediate risk determined** (See table 3 on page 12)
- Elevated baseline cTnI

no → SELECT most appropriate imaging test based on patient-specific factors (see table 2 on pages 10–11)***

yes → Significant positive result? (Coronary artery disease (intermediate to high))

no → LOW risk** HIGH risk**

yes → CONSIDER: • Cardiac risk stratification with appropriate imaging if patient meets appropriate use indications as described in table 1 (page 9) AND/OR • Referral to PCP or cardiology for further testing

no → CONSIDER cardiology RECOMMEND early invasive strategy (URGENT)

CONSULT cardiology RECOMMEND early invasive strategy (URGENT)

CONSULT cardiology RECOMMEND early invasive strategy (URGENT)

CONSIDER referral to cardiology for further recommendations

CONTINUE conservative measures

* AUC decision support is required before imaging unless the patient requires emergency treatment.
** Determine risk using validated risk stratification algorithms such as those listed in table 3 on page 12.
*** If indicated, the imaging test should be customized for the patient based on the information in this CPM.

See abbreviations on page 2.
KEY EVIDENCE: DECISION NODE #2


(For a list of references for all decision nodes, see the complete bibliography on page 14.)
### TABLE 1. Appropriate use indications for known or suspected CAD

<table>
<thead>
<tr>
<th>Arrhythmia or abnormal ECG</th>
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</tr>
<tr>
<td>□ Frequent PVCs</td>
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</tr>
<tr>
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<td>□ Prior incomplete coronary occlusion revascularization where additional revascularization is feasible</td>
<td>□ Prior incomplete coronary occlusion revascularization where additional revascularization is feasible</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>□ Viability assessment in patients who are eligible for coronary revascularization</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*CHD Risk Factors (moderate = 3 risk factors, high ≥4 risk factors):

- Age (men > 45 years, women > 55 years)
- Cigarette smoking and/or hypertension (BP > 140/90 mmHg or antihypertension medications)
- Impaired fasting glucose (101 – 125 mg/dL)
- Family history of premature coronary heart disease (CHD) (CHD in male first-degree relative < 55 years, female first-degree relative < 65 years)
## TABLE 2. Cardiac imaging considerations

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Cardiac molecular imaging</th>
<th>Computed tomography (CT) Imaging</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cardiac PET</td>
<td>SPECT</td>
</tr>
<tr>
<td>Sensitivity Specificity</td>
<td>93%</td>
<td>92%</td>
</tr>
<tr>
<td></td>
<td>82% to 91%</td>
<td>70% to 90%</td>
</tr>
<tr>
<td>Radiation</td>
<td>R4</td>
<td>R3</td>
</tr>
<tr>
<td>Cost</td>
<td>$$$$</td>
<td>$$ ($$$ if multiple studies)</td>
</tr>
<tr>
<td>Levels of evidence</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Available</td>
<td>Available</td>
</tr>
<tr>
<td>When to consider</td>
<td>Obese patient</td>
<td>Abnormal ECG, including LBBB</td>
</tr>
<tr>
<td></td>
<td>Abnormal ECG (pharmacologic)</td>
<td>PPM/ICD patients (pharmacologic)</td>
</tr>
<tr>
<td></td>
<td>Need for functional capacity assessment (treadmill SPECT)</td>
<td>Need for concomitant thoracic tomographic imaging (i.e., aorta, relationship of structures to sternum, etc.)</td>
</tr>
<tr>
<td>Value</td>
<td>Compared to SPECT, PET offers:</td>
<td>Compared to PET, SPECT is:</td>
</tr>
<tr>
<td></td>
<td>– Higher spatial and temporal resolution</td>
<td>– Widely available</td>
</tr>
<tr>
<td></td>
<td>– Better attenuation correction</td>
<td>– Offers ability to perform functional capacity assessment (treadmill SPECT)</td>
</tr>
<tr>
<td></td>
<td>– Quantification of myocardial blood flow</td>
<td>– Concomitant CAC and/or CCTA may be available to enhance diagnostic accuracy</td>
</tr>
<tr>
<td></td>
<td>– Shorter testing time</td>
<td></td>
</tr>
<tr>
<td></td>
<td>– Concomitant CAC and/or CCTA may be available to enhance diagnostic accuracy</td>
<td></td>
</tr>
<tr>
<td>Limitations</td>
<td>Limited availability in some regions</td>
<td>Decreased sensitivity in ventricular pacing and LBBB with exercise SPECT</td>
</tr>
<tr>
<td></td>
<td>No functional capacity assessment (pharmacologic stress)</td>
<td>Pharmacologic preferred</td>
</tr>
<tr>
<td></td>
<td>Unable to perform in patients with epilepsy and/or high AV block</td>
<td>Unable to perform pharmacologic SPECT in patients with epilepsy and/or high-AV block</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Decreased sensitivity in patients with significant coronary artery calcifications</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No functional capacity assessment</td>
</tr>
</tbody>
</table>

---

**Legend**

- Clinical Scenario
- Urgent or Emergency Situation
- OCEBM Level of Evidence
- Fryback & Thornbury Level of Evidence
- Intermountain Measure
- RO (0 mSv) $ (0 – 5 RVUs)
- R3 (1 – 10 mSv) $ $ (5 – 10 RVUs)
- R4 (10 – 30 mSv) $ $ $ (10 – 15 RVUs)
- $ $ $ $ (15+ RVUs)

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### TABLE 2. Cardiac imaging considerations, continued

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Magnetic resonance imaging (MRI)</th>
<th>Echocardiography (alternative)</th>
<th>Electrocardiogram (alternative)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Stress cardiac MRI</td>
<td>Treadmill echocardiography</td>
<td>Dobutamine echocardiography</td>
</tr>
<tr>
<td>Sensitivity</td>
<td>• 83% to 91%</td>
<td>• 70% to 85%</td>
<td>• 85% to 90%</td>
</tr>
<tr>
<td>Specificity</td>
<td>• 81% to 86%</td>
<td>• 77% to 89%</td>
<td>• 79% to 90%</td>
</tr>
<tr>
<td>Radiation</td>
<td>R0</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Cost</td>
<td>$$$</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>When to consider</td>
<td>• Availability</td>
<td>• Able to exercise</td>
<td>• Normal baseline ECG in patient who can exercise and achieve an adequate HR and cardiac workload</td>
</tr>
<tr>
<td></td>
<td>• Patient has poor functional capacity</td>
<td>• Need for cardiac function</td>
<td>• Need for functional capacity assessment</td>
</tr>
<tr>
<td></td>
<td>• Need for viability / tissue characterization</td>
<td>• Need for valvular assessment</td>
<td>• Need for valvular assessment, i.e. paradoxical low flow, low gradient aortic stenosis (low dose protocol)</td>
</tr>
<tr>
<td></td>
<td>• Need for cardiac anatomic assessment</td>
<td>• No radiation</td>
<td>• Assessment of arrhythmias, hemodynamic issues, or symptoms related to heart rate or exertion</td>
</tr>
<tr>
<td></td>
<td>• Need for cardiac function quantification</td>
<td>• Provides hemodynamic assessment to exertion</td>
<td></td>
</tr>
<tr>
<td>Value</td>
<td>• Concomitant viability / tissue characterization</td>
<td>• Widely available</td>
<td>• Concomitant valvular assessment</td>
</tr>
<tr>
<td></td>
<td>• Gold standard for LVEF assessment</td>
<td>• Offers functional capacity assessment (prognostic value)</td>
<td>• No radiation</td>
</tr>
<tr>
<td></td>
<td>• Concomitant valvular assessment</td>
<td>• Concomitant valvular assessment</td>
<td>• Viability assessment</td>
</tr>
<tr>
<td></td>
<td>• No radiation</td>
<td>• No radiation</td>
<td>•</td>
</tr>
<tr>
<td>Limitations</td>
<td>• Availability</td>
<td>• Technically challenging</td>
<td>• Not appropriate if unable to sufficiently exercise</td>
</tr>
<tr>
<td></td>
<td>• Claustrophobia</td>
<td>• Limited assessment in LBBB patients</td>
<td>• Not appropriate if resting ECG changes (LBBB, ST-T wave changes, paced-rhythm, pre-excitation changes)</td>
</tr>
<tr>
<td></td>
<td>• Need to hold breath</td>
<td>• Limited assessment in PPM/ICD patients</td>
<td>• Not appropriate in unstable patients, severe valvular stenosis, uncontrolled heart failure, uncontrolled arrhythmias</td>
</tr>
<tr>
<td></td>
<td>• Length of study</td>
<td>• Contraindicated in sustained or frequent ventricular or atrial arrhythmias</td>
<td>• Decreased sensitivity in females</td>
</tr>
<tr>
<td></td>
<td>• No functional assessment (limited availability of exercise cardiac MRI)</td>
<td>• Hypertrophic cardiomyopathy with left ventricular outflow obstruction</td>
<td>• Does not provide information on cardiac structure and function</td>
</tr>
<tr>
<td></td>
<td>• Use of gadolinium-based contrast (need GFR &gt; 30)</td>
<td>• Severe hypertension</td>
<td>• Limited localization of ischemia</td>
</tr>
<tr>
<td></td>
<td>• Limited assessment in PPM / ICD patients</td>
<td></td>
<td>• Decreased sensitivity / specificity compared to stress-imaging testing</td>
</tr>
</tbody>
</table>

**See abbreviations on page 2.**

**LEGEND**

- **Clinical Scenario**
- **Urgent or Emergency Situation**
- **OCEBM Level of Evidence**
- **Fryback & Thornbury Level of Evidence**
- **Intermountain Measure**
- **RO (0 mSv)**
- **R3 (1 – 10 mSv)**
- **R4 (10 – 30 mSv)**
- **$ (0 – 5 RVUs)**
- **$$ (5 – 10 RVUs)**
- **$$$(10 – 15 RVUs)**
- **$$$$ (15+ RVUs)**
**TABLE 3. Validated cardiovascular (CV) risk stratification tools**

**Framingham Risk Score**
A general, 10-year CV risk profile based on age, gender, and comorbidities

**HEART Score**
Calculates short-term CV risk in the ED setting
www.heartscore.nl/score/

**TIMI (Thrombolysis in Myocardial Infarction)**
Calculates short-term CV risk for unstable angina or NSTEMI
timi.org/index.php?page=calculators (UA/NSTEMI)

**NOTE:** According to the ACR/ACC/AHA, the term “risk” refers to the likelihood that acute coronary syndrome (ACS) is present, based on the evaluation of symptoms, initial ECG, and initial biomarkers. Multiple scoring systems have been developed and validated in a population of patients with a definitive diagnosis of ACS. Whether or not these tools are predictive in lower-risk ED patients with suspected ACS is not well validated.

**TABLE 4. Delta troponin testing for myocardial injury**

<table>
<thead>
<tr>
<th>Delta troponin change</th>
<th>0.1 to &lt;2.0 ng/mL</th>
<th>0.04 to &lt;0.1 ng/mL</th>
<th>&lt;0.04 ng/mL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase ≥20%</td>
<td>Increase ≥20%</td>
<td>Increase ≥50%</td>
<td>≥0.1 ng/mL</td>
</tr>
<tr>
<td>0.04 to &lt;0.1 ng/mL</td>
<td>Increase ≥50%</td>
<td>Increase &lt;50%</td>
<td>&lt;0.1 ng/mL</td>
</tr>
<tr>
<td>≥2.0 ng/mL</td>
<td></td>
<td></td>
<td>≤0.04 ng/mL</td>
</tr>
</tbody>
</table>

**Acute myocardial injury pattern**

**EARLY INVASIVE STRATEGY RECOMMENDED***

*Admit to hospital: Begin aspirin and enoxaparin therapy. CONSIDER: beta block, tirofiban (if ongoing chest pain) left heart catheterization

**MANAGE based on initial HEART score as outlined in Intermountain’s Acute Coronary Syndrome CPM or your system-approved CPG**
Intermountain provides educational materials designed to support providers in their efforts to care for, educate, and engage patients and their families.

**Intermountain’s patient education materials** complement and reinforce clinical team interventions by providing a means for patients to reflect and learn in another mode and at their own pace.

**Intermountain’s Care Process Models (CPMs)** outline evidence-based guidelines for patient care. In addition to the suite of Proven Imaging CPMs, Intermountain provides topical CPMs that have been developed by expert clinical teams. They can be accessed by navigating to intermountainphysician.org and selecting Care Process Models in the Tools and Resources drop down menu.

To access Intermountain’s Proven Imaging CPMs and supporting materials, visit: https://intermountainhealthcare.org/services/imaging-services/proven-imaging/.

**Fact sheets:**
- Cardiac Nuclear Perfusion Imaging
- Cardiac Stress Testing
- Cardiac MRI
- Cardiac Stress MRI

**Patient education:**
- Five Steps to Better Heart Health
- Heart Care Handbook

**Related Care Process Models (CPMs):**
- Management of High Blood Pressure CPM
- Cardiovascular Risk and Cholesterol CPM
- Atrial Fibrillation CPM
- Acute Coronary Syndrome CPM

**Fact sheets:**
- Coronary CT Angiogram
- Coronary Artery Calcium CT Scan
- Intravenous (IV) Contrast Material
- Electrocardiogram (ECG, EKG)
- Echocardiogram and Stress Echo
PROVEN IMAGING FOR Known or Suspected Coronary Artery Disease (CAD)

## BIBLIOGRAPHY

**NODES 1 AND 2**


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REFERENCES (from pages 1 through 3)


This CPM presents a model of best care based on the best available scientific evidence at the time of publication. It is not a prescription for every physician or every patient, nor does it replace clinical judgment. All statements, protocols, and recommendations herein are viewed as transitory and iterative. Although physicians are encouraged to follow the CPM to help focus on and measure quality, deviations are a means for discovering improvements in patient care and expanding the knowledge base. Send feedback to ProvenImaging@imail.org.

Proven Imaging Development Group
- Jordan Albritton, PhD
- Tom Belnap, MS
- Joseph Bledsoe, MD
- Jason Buckway, RN, MBA
- Jose Benuzillo, MA, MS
- Karen Conner, MD, MBA
- James Hellewell, MD
- Donald L. Lappé, MD
- David B. Min, MD
- J. Brent Muhlestein, MD Co-Director of Cardiology Research, Intermountain Heart Institute
- Jane Sims, BA (Medical Writer)