



ABIM invites diplomates to help develop the Interventional Cardiology MOC exam blueprint

Based on feedback from physicians that MOC assessments should better reflect what they see in practice, in 2016 the American Board of Internal Medicine (ABIM) invited all certified interventional cardiologists to provide ratings of the relative frequency and importance of blueprint topics in practice.

This review process, which resulted in a new MOC exam blueprint, will be used on a periodic basis to inform and update all MOC assessments created by ABIM. No matter what form ABIM's assessments ultimately take, they will need to be informed by front-line clinicians sharing their perspective on what is important to know.

A sample of over 275 interventional cardiologists, similar to the total invited population of interventional cardiologists in age, gender, time spent in direct patient care, and geographic region of practice, provided the blueprint topic ratings. The ABIM Cardiovascular Board Interventional Cardiology Exam Committee and Cardiovascular Board have used this feedback to update the blueprint for the MOC exam (beginning with the Fall 2017 administration).

To inform how exam content should be distributed across the major blueprint content categories, ABIM considered the average respondent ratings of topic frequency and importance in each of the content categories.

To determine prioritization of specific exam content within each major medical content category, ABIM used the respondent ratings of topic frequency and importance to set thresholds for these parameters in the exam assembly process (described further under *Detailed content outline* below).

Purpose of the Interventional Cardiology MOC exam

The MOC exam is designed to evaluate whether a certified interventional cardiologist has maintained competence and currency in the knowledge and judgment required for practice. The exam emphasizes diagnosis and management of prevalent conditions, particularly in areas where practice has changed in recent years. As a result of the blueprint review by ABIM diplomates, the MOC exams will place less emphasis on rare conditions and focus more on situations in which physician intervention can have important consequences for patients. For conditions that are usually managed by other specialists, the focus will be on recognition rather than on management.

Exam format

The exam is composed of 220 single-best-answer multiple-choice questions, of which 35 are new questions that do not count in the examinee's score (more information on how exams are developed can be found at abim.org/about/exam-information/exam-development.aspx). Most questions describe patient scenarios and ask about the work done (that is, tasks performed) by physicians in the course of practice:

- **Diagnosis:** making a diagnosis or identifying an underlying condition
- **Testing:** ordering tests for diagnosis, staging, or follow-up
- **Treatment/Care Decisions:** recommending treatment or other patient care
- **Risk Assessment/Prognosis/Epidemiology:** assessing risk, determining prognosis, and applying principles from epidemiologic studies
- **Pathophysiology/Basic Science:** understanding the pathophysiology of disease and basic science knowledge applicable to patient care

Some questions require interpretation of pictorial material, such as coronary angiograms, ventriculograms, intravascular ultrasound images, nuclear perfusion studies, computed tomograms, magnetic resonance images, electrocardiograms, echocardiograms, and peripheral vascular imaging studies. A tutorial, including examples of ABIM exam question format, can be found at abim.org/maintenance-of-certification/exam-information/interventional-cardiology/exam-tutorial.aspx.

Content distribution

Listed below are the major medical content categories that define the domain for the Interventional Cardiology MOC exam. The relative distribution of content is expressed as a percentage of the total exam. To determine the content distribution, ABIM considered the average respondent ratings of topic frequency and importance. Informed by these data, the Interventional Cardiology Exam Committee and Cardiovascular Board have determined the medical content category targets shown below.

| CONTENT CATEGORY | TARGET % |
|--|-------------|
| Case Selection and Management | 23% |
| Procedural Techniques | 22% |
| Complications of Coronary Intervention | 8% |
| Catheter-Based Management of Noncoronary Disease | 10% |
| Basic Science | 5% |
| Anatomy, Anatomic Variants, and Anatomic Pathology | 6% |
| Pharmacology | 14% |
| Cardiac Imaging and Assessment | 7% |
| Miscellaneous | 5% |
| Total | 100% |

How the blueprint ratings are used to assemble the MOC exam

Blueprint reviewers provided ratings of relative frequency in practice for each of the detailed content topics in the blueprint and provided ratings of the relative importance of the topics for each of the tasks described in *Exam format* above. In rating importance, reviewers were asked to consider factors such as the following:

- High risk of a significant adverse outcome
- Cost of care and stewardship of resources
- Common errors in diagnosis or management
- Effect on population health
- Effect on quality of life
- When failure to intervene by the physician deprives a patient of significant benefit

Frequency and importance were rated on a three-point scale corresponding to low, medium, or high. The median importance ratings are reflected in the *Detailed content outline* below. The Interventional Cardiology Exam Committee and Cardiovascular Board, in partnership with the physician community, have set the following parameters for selecting MOC exam questions according to the blueprint review ratings:


- At least 75% of exam questions will address high-importance content (indicated in green)
- No more than 25% of exam questions will address medium-importance content (indicated in yellow)
- No exam questions will address low-importance content (indicated in red)


Independent of the importance and task ratings, no more than 15% of exam questions will address low-frequency content (indicated by “LF” following the topic description).


The content selection priorities below are applicable beginning with the Fall 2017 MOC exam and are subject to change in response to future blueprint review.

Note: The same topic may appear in more than one medical content category.

Detailed content outline for the Interventional Cardiology MOC exam

 – **High Importance:** At least 75% of exam questions will address topics and tasks with this designation.



















































 – **Medium Importance:** No more than 25% of exam questions will address topics and tasks with this designation.

 – **Low Importance:** No exam questions will address topics and tasks with this designation.

LF – Low Frequency: No more than 15% of exam questions will address topics with this designation, regardless of task or importance.

| CASE SELECTION AND MANAGEMENT (23% of exam) | Diagnosis | Testing | Treatment/ Care Decisions | Risk Assessment/ Prognosis/ Epidemiology | Pathophysiology/ Basic Science |
|---|------------------|----------------|--------------------------------------|---|---|
|---|------------------|----------------|--------------------------------------|---|---|

CHRONIC ISCHEMIC HEART DISEASE (7% of exam)

| | | | | | |
|---|---|---|---|---|---|
| Clinical characteristics (demographics and comorbidities) |  |  |  |  |  |
| Laboratory abnormalities and cardiac catheterization (hematology, coagulation, and chemistry) |  |  |  |  |  |
| Renal insufficiency and cardiac catheterization |  |  |  |  |  |
| Noninvasive testing before diagnostic catheterization |  |  |  |  |  |
| Selection of treatment modality |  |  |  |  |  |
| Interventional therapy |  |  |  |  |  |
| Surgical therapy |  |  |  |  |  |
| Medical therapy |  |  |  |  |  |
| Preoperative cardiac evaluation for noncardiac surgery |  |  |  |  |  |
| Preoperative revascularization before noncardiac surgery |  |  |  |  |  |

UNSTABLE ANGINA AND NON-ST-SEGMENT ELEVATION MYOCARDIAL INFARCTION (UA AND NSTEMI) (6% of exam)

| | | | | | |
|---|---|---|---|---|---|
| Evaluation and risk stratification of the UA and NSTEMI |  |  |  |  |  |
| UA/NSTEMI – pharmacologic management |  |  |  |  |  |
| UA/NSTEMI – timing of cardiac catheterization |  |  |  |  |  |
| UA/STEMI – percutaneous coronary intervention (PCI) |  |  |  |  |  |

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| CASE SELECTION AND MANAGEMENT <i>continued...</i> (23% of exam) | Diagnosis | Testing | Treatment/ Care Decisions | Risk Assessment/ Prognosis/ Epidemiology | Pathophysiology/ Basic Science |
|---|-----------|---------|------------------------------|--|-----------------------------------|
|---|-----------|---------|------------------------------|--|-----------------------------------|

ST-SEGMENT ELEVATION MYOCARDIAL INFARCTION (STEMI) (6% of exam)

| | | | | | |
|--|----|---|---|---|---|
| STEMI systems of care | ✔ | ✔ | ✔ | ✔ | ✔ |
| Primary PCI – procedure | ✔ | ✔ | ✔ | ✔ | ✔ |
| Primary PCI – stents | ✔ | ✔ | ✔ | ✔ | ✔ |
| Primary PCI – thrombectomy | ⚡ | ⚡ | ⚡ | ⚡ | ⚡ |
| Primary PCI – outcomes | ✔ | ✔ | ✔ | ✔ | ✔ |
| Right ventricular infarction | LF | ✔ | ✔ | ✔ | ⚡ |
| Multivessel PCI | ✔ | ✔ | ✔ | ✔ | ✔ |
| Primary PCI following cardiopulmonary arrest | ✔ | ✔ | ✔ | ✔ | ⚡ |
| STEMI – differential diagnosis | ✔ | ✔ | ✔ | ✔ | ✔ |
| Acute aortic dissection | LF | ✔ | ✔ | ✔ | ⚡ |
| Therapeutic hypothermia | ⚡ | ⚡ | ✔ | ⚡ | ⚡ |
| Fibrinolytic therapy | LF | ✔ | ⚡ | ⚡ | ⚡ |
| Transfer for PCI | ✔ | ✔ | ✔ | ✔ | ⚡ |
| Rescue PCI | LF | ✔ | ✔ | ✔ | ✔ |
| Surgical therapy in STEMI | LF | ✔ | ⚡ | ✔ | ⚡ |
| Medical management after STEMI | ✔ | ✔ | ✔ | ✔ | ✔ |

STEMI COMPLICATIONS (4% of exam)

| | | | | | |
|--|----------------|---|---|---|----------------|
| Shock | ✔ | ✔ | ✔ | ✔ | ✔ |
| Electrophysiologic complications | ✔ | ✔ | ✔ | ⚡ | ⚡ |
| Emergency pacing | LF | ✔ | ✔ | ⚡ | ⚡ |
| Acute respiratory distress | ✔ | ✔ | ✔ | ✔ | ⚡ |
| Mechanical complications (mitral regurgitation [MR], ventricular septal defect [VSD], rupture, pseudoaneurysm) | LF | ✔ | ✔ | ✔ | ⚡ |
| Advanced Cardiovascular Life Support (ACLS) | Not Applicable | | ✔ | ✔ | Not Applicable |

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| PROCEDURAL TECHNIQUES (22% of exam) | Diagnosis | Testing | Treatment/ Care Decisions | Risk Assessment/ Prognosis/ Epidemiology | Pathophysiology/ Basic Science |
|---|------------------|----------------|--------------------------------------|---|---|
|---|------------------|----------------|--------------------------------------|---|---|

PLANNING AND EXECUTION OF INVASIVE AND INTERVENTIONAL PROCEDURES (6% of exam)

| | | | | | |
|--|---|---|---|---|---|
| General decision-making | ✔ | ✔ | ✔ | ✔ | ✔ |
| Access-site selection | ✔ | ✔ | ✔ | ✔ | ✔ |
| Radial access | ✔ | ✔ | ✔ | ✔ | ⚠ |
| Femoral access | ✔ | ✔ | ✔ | ✔ | ✔ |
| Other access (ulnar, brachial) LF | ⚠ | ⚠ | ⚠ | ✘ | ✘ |
| Vascular access closure devices | ✔ | ✔ | ✔ | ✔ | ✔ |
| Pericardiocentesis LF | ✔ | ✔ | ✔ | ✔ | ✔ |
| Right heart catheterization | ✔ | ✔ | ✔ | ✔ | ✔ |
| Right ventricular biopsy LF | ⚠ | ⚠ | ⚠ | ✘ | ⚠ |

LESION SUBSETS (6% of exam)

| | | | | | |
|---|---|---|---|---|---|
| Ostial | ✔ | ✔ | ✔ | ✔ | ⚠ |
| Bifurcation | ✔ | ✔ | ✔ | ✔ | ✔ |
| Long | ✔ | ✔ | ✔ | ✔ | ✔ |
| Tortuous | ✔ | ✔ | ✔ | ✔ | ⚠ |
| Calcified | ✔ | ✔ | ✔ | ✔ | ⚠ |
| Restenosis | ✔ | ✔ | ✔ | ✔ | ✔ |
| Complex single-vessel disease | ✔ | ✔ | ✔ | ✔ | ✔ |
| Multivessel disease | ✔ | ✔ | ✔ | ✔ | ✔ |
| Saphenous vein graft disease | ✔ | ✔ | ✔ | ✔ | ⚠ |
| Coronary artery bridge LF | ⚠ | ⚠ | ⚠ | ⚠ | ⚠ |
| PCI in the anomalous coronary LF | ⚠ | ⚠ | ⚠ | ⚠ | ⚠ |
| Left main | ✔ | ✔ | ✔ | ✔ | ✔ |
| Chronic total occlusion | ✔ | ✔ | ✔ | ✔ | ⚠ |

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| PROCEDURAL TECHNIQUES <i>continued...</i> (22% of exam) | Diagnosis | Testing | Treatment/ Care Decisions | Risk Assessment/ Prognosis/ Epidemiology | Pathophysiology/ Basic Science |
|--|-----------|---------|------------------------------|--|-----------------------------------|
|--|-----------|---------|------------------------------|--|-----------------------------------|

SELECTION AND USE OF EQUIPMENT (6% of exam)

| | | | | | |
|--|----|---|---|---|---|
| Guide catheters | ✔ | ✔ | ✔ | ✔ | ⚡ |
| Guidewires | ✔ | ✔ | ✔ | ✔ | ✔ |
| Balloon catheters | ✔ | ✔ | ✔ | ✔ | ⚡ |
| Bare metal stents | ⚡ | ⚡ | ✔ | ⚡ | ⚡ |
| Drug-eluting stents | ✔ | ✔ | ✔ | ✔ | ✔ |
| Rotational atherectomy | LF | ⚡ | ✔ | ✔ | ⚡ |
| Embolic protection devices | ✔ | ⚡ | ✔ | ✔ | ⚡ |
| Intraaortic balloon pump counterpulsation | ✔ | ✔ | ✔ | ✔ | ✔ |
| Impella | LF | ⚡ | ⚡ | ⚡ | ⚡ |
| TandemHeart PTVA | LF | ✘ | ✘ | ✘ | ✘ |
| Extracorporeal membrane oxygenation (ECMO) | LF | ✘ | ✘ | ⚡ | ✘ |

PCI TECHNICAL TROUBLESHOOTING AND PROBLEM SOLVING (4% of exam)

| | | | | | |
|--|----|---|---|---|---|
| Failure to engage guide catheter | ✔ | ✔ | ✔ | ✔ | ⚡ |
| Failure to cross lesion with guidewire | LF | ✔ | ✔ | ✔ | ✔ |
| Failure to cross lesion with device | LF | ✔ | ✔ | ✔ | ⚡ |
| Failure to dilate lesion | LF | ✔ | ⚡ | ✔ | ⚡ |

| COMPLICATIONS OF CORONARY INTERVENTION (8% of exam) | Diagnosis | Testing | Treatment/ Care Decisions | Risk Assessment/ Prognosis/ Epidemiology | Pathophysiology/ Basic Science |
|---|-----------|---------|------------------------------|--|-----------------------------------|
|---|-----------|---------|------------------------------|--|-----------------------------------|

CARDIAC (5% of exam)

| | | | | | |
|-----------------------------------|----|---|---|---|---|
| Coronary dissection | ✔ | ✔ | ✔ | ✔ | ⚡ |
| Abrupt closure of coronary artery | LF | ✔ | ✔ | ✔ | ⚡ |
| Stent thrombosis | LF | ✔ | ✔ | ✔ | ✔ |
| Coronary thromboembolism | LF | ✔ | ✔ | ✔ | ⚡ |
| Air embolism | LF | ✔ | ✔ | ✔ | ⚡ |

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| COMPLICATIONS OF CORONARY INTERVENTION <i>continued...</i> (8% of exam) | | Diagnosis | Testing | Treatment/ Care Decisions | Risk Assessment/ Prognosis/ Epidemiology | Pathophysiology/ Basic Science |
|--|--|------------------|----------------|--------------------------------------|---|---|
|--|--|------------------|----------------|--------------------------------------|---|---|

CARDIAC *continued...* (5% of exam)

| | | | | | | |
|--------------------------------------|----|---|---|---|---|---|
| No reflow | LF | ✔ | ✔ | ✔ | ✔ | ✔ |
| Periprocedural myocardial infarction | LF | ✔ | ✔ | ✔ | ✔ | ⚡ |
| Perforation | LF | ✔ | ✔ | ✔ | ✔ | ✔ |
| Tamponade | LF | ✔ | ✔ | ✔ | ✔ | ✔ |

NONCARDIAC (3% of exam)

| | | | | | | |
|---|----|---|---|---|---|---|
| Systemic thromboembolism | LF | ✔ | ✔ | ✔ | ⚡ | ⚡ |
| Cerebrovascular complications | LF | ✔ | ✔ | ✔ | ✔ | ✔ |
| Bleeding and hemorrhage | | ✔ | ✔ | ✔ | ✔ | ✔ |
| Vascular access and major vessel dissection | LF | ✔ | ✔ | ✔ | ✔ | ✔ |
| Aortic dissection (due to PCI) | LF | ✔ | ✔ | ✔ | ✔ | ⚡ |
| Acute limb ischemia | LF | ✔ | ✔ | ✔ | ✔ | ⚡ |

| CATHETER-BASED MANAGEMENT OF NONCORONARY DISEASE (10% of exam) | | Diagnosis | Testing | Treatment/ Care Decisions | Risk Assessment/ Prognosis/ Epidemiology | Pathophysiology/ Basic Science |
|--|--|------------------|----------------|--------------------------------------|---|---|
|--|--|------------------|----------------|--------------------------------------|---|---|

HEMODYNAMICS (2% of exam)

| | | | | | | |
|------------------------------|----|---|---|---|---|---|
| Arterial pressure evaluation | | ✔ | ✔ | ✔ | ✔ | ⚡ |
| Right heart catheterization | | ✔ | ✔ | ✔ | ✔ | ⚡ |
| Valvular stenosis | | ✔ | ✔ | ✔ | ✔ | ✔ |
| Valvular regurgitation | | ✔ | ✔ | ✔ | ✔ | ✔ |
| Shunt quantification | LF | ✔ | ⚡ | ✔ | ⚡ | ⚡ |

EVALUATION AND CASE SELECTION IN STRUCTURAL AND VALVULAR HEART DISEASE (4% of exam)

| | | | | | | |
|--------------------------|----|---|---|---|---|---|
| Structural heart disease | | ✔ | ✔ | ✔ | ✔ | ⚡ |
| Mitral valve | | ✔ | ✔ | ✔ | ✔ | ⚡ |
| Aortic valve | | ✔ | ✔ | ✔ | ✔ | ✔ |
| Pulmonic valve | LF | ⚡ | ⚡ | ⚡ | ✘ | ✘ |

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| CATHETER-BASED MANAGEMENT OF NONCORONARY DISEASE <i>continued...</i> (10% of exam) | | Diagnosis | Testing | Treatment/ Care Decisions | Risk Assessment/ Prognosis/ Epidemiology | Pathophysiology/ Basic Science |
|---|--|-----------|---------|------------------------------|--|-----------------------------------|
|---|--|-----------|---------|------------------------------|--|-----------------------------------|

EVALUATION AND CASE SELECTION IN STRUCTURAL AND VALVULAR HEART DISEASE *continued...* (4% of exam)

| | | | | | | |
|-----------------------------|----|---|---|---|---|---|
| Tricuspid valve | | ⚡ | ⚡ | ⚡ | ⚡ | ⚡ |
| Hypertrophic cardiomyopathy | LF | ✔ | ✔ | ✔ | ✔ | ⚡ |
| Patent foramen ovale | | ⚡ | ⚡ | ⚡ | ⚡ | ⚡ |
| Atrial septal defect | LF | ⚡ | ⚡ | ⚡ | ⚡ | ⚡ |
| Coarctation | LF | ⚡ | ⚡ | ⚡ | ⚡ | ✘ |
| Ventricular septal defect | LF | ⚡ | ⚡ | ⚡ | ⚡ | ⚡ |

EVALUATION AND CASE SELECTION IN NONCARDIAC VASCULAR DISEASE (4% of exam)

| | | | | | | |
|------------------------------------|----|---|---|---|---|---|
| Carotid disease | | ✔ | ✔ | ✔ | ✔ | ⚡ |
| Subclavian disease | LF | ⚡ | ⚡ | ⚡ | ⚡ | ⚡ |
| Aortic disease | | ⚡ | ⚡ | ✔ | ⚡ | ⚡ |
| Chronic aortic dissection | LF | ⚡ | ⚡ | ⚡ | ⚡ | ⚡ |
| Renal artery stenosis | | ⚡ | ⚡ | ⚡ | ⚡ | ⚡ |
| Iliac and femoral arterial disease | | ✔ | ✔ | ✔ | ✔ | ⚡ |
| Peripheral interventional therapy | | ✔ | ✔ | ✔ | ✔ | ⚡ |
| Ankle-brachial index | | ✔ | ✔ | ✔ | ✔ | ⚡ |

| BASIC SCIENCE (5% of exam) | | Diagnosis | Testing | Treatment/ Care Decisions | Risk Assessment/ Prognosis/ Epidemiology | Pathophysiology/ Basic Science |
|--------------------------------------|--|-----------|---------|------------------------------|--|-----------------------------------|
|--------------------------------------|--|-----------|---------|------------------------------|--|-----------------------------------|

VASCULAR BIOLOGY (3% of exam)

| | | | | | | |
|-------------------------|----|---|---|---|---|---|
| Normal vascular biology | LF | ⚡ | ⚡ | ⚡ | ⚡ | ⚡ |
| Atherosclerosis | | ✔ | ✔ | ✔ | ✔ | ⚡ |
| Atherosclerotic plaque | | ✔ | ✔ | ✔ | ✔ | ✔ |
| Vascular injury | | ⚡ | ⚡ | ✔ | ⚡ | ⚡ |
| Vasoreactivity | | ⚡ | ⚡ | ⚡ | ⚡ | ⚡ |
| Reperfusion injury | | ⚡ | ⚡ | ⚡ | ⚡ | ⚡ |

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| BASIC SCIENCE <i>continued...</i> (5% of exam) | Diagnosis | Testing | Treatment/ Care Decisions | Risk Assessment/ Prognosis/ Epidemiology | Pathophysiology/ Basic Science |
|---|-----------|---------|------------------------------|--|-----------------------------------|
|---|-----------|---------|------------------------------|--|-----------------------------------|

VASCULAR BIOLOGY *continued...* (3% of exam)

| | | | | | |
|--|---|---|---|---|---|
| Effects of diabetes mellitus | ✔ | ✔ | ✔ | ✔ | ⚠ |
| Restenosis after balloon percutaneous transluminal coronary angioplasty (PTCA) | ✔ | ✔ | ✔ | ⚠ | ⚠ |
| Restenosis after stent PCI | ✔ | ✔ | ✔ | ✔ | ⚠ |
| Vascular remodeling | ⚠ | ⚠ | ⚠ | ⚠ | ⚠ |
| Microvascular dysfunction | ⚠ | ⚠ | ⚠ | ⚠ | ⚠ |

PHYSIOLOGY (2% of exam)

| | | | | | |
|--|---|---|---|---|---|
| Clotting cascade | ⚠ | ⚠ | ⚠ | ⚠ | ⚠ |
| Platelet function | ⚠ | ⚠ | ⚠ | ⚠ | ⚠ |
| Thrombosis and thrombolysis | ✔ | ⚠ | ⚠ | ⚠ | ⚠ |
| Lipid metabolism and lipid abnormalities | ✔ | ✔ | ✔ | ✔ | ⚠ |

| ANATOMY, ANOMIC VARIANTS, AND ANOMIC PATHOLOGY (6% of exam) | Diagnosis | Testing | Treatment/ Care Decisions | Risk Assessment/ Prognosis/ Epidemiology | Pathophysiology/ Basic Science |
|---|-----------|---------|------------------------------|--|-----------------------------------|
|---|-----------|---------|------------------------------|--|-----------------------------------|

CARDIAC (5% of exam)

| | | | | | |
|--|----|---|---|---|---|
| Normal coronary anatomy, dominance | ✔ | ✔ | ✔ | ✔ | ⚠ |
| Anomalous left circumflex | LF | ✔ | ⚠ | ⚠ | ⚠ |
| Anomalous left coronary | LF | ✔ | ⚠ | ⚠ | ⚠ |
| Anomalous right coronary | LF | ✔ | ⚠ | ⚠ | ⚠ |
| Indications for surgery for coronary anomalies | LF | ✔ | ⚠ | ✔ | ⚠ |
| Collateral vessels | ✔ | ⚠ | ⚠ | ⚠ | ⚠ |
| Coronary fistulas | LF | ⚠ | ⚠ | ⚠ | ⚠ |
| Coronary ectasia and aneurysm | | ⚠ | ⚠ | ⚠ | ⚠ |
| Other anatomic abnormalities | LF | ⚠ | ⚠ | ⚠ | ✘ |

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|--|------------------|----------------|--------------------------------------|---|---|
|--|------------------|----------------|--------------------------------------|---|---|

CARDIAC *continued...* (5% of exam)

| | | | | | |
|--|---|---|---|---|---|
| Angiographic assessment of coronary flow (Thrombolysis in Myocardial Infarction Trial [TIMI] flow grade, TIMI frame count) | ✔ | ✔ | ✔ | ✔ | ⚠ |
| Angiographic assessment of microcirculation (TIMI myocardial perfusion grade) | ⚠ | ⚠ | ⚠ | ⚠ | ⚠ |
| Flow and perfusion effects of arterial spasm, or microembolization | ⚠ | ⚠ | ⚠ | ⚠ | ⚠ |
| Left ventriculography | ✔ | ✔ | ✔ | ✔ | ⚠ |
| Left ventricular dysfunction – stunning and hibernation | ✔ | ✔ | ✔ | ✔ | ⚠ |
| Takotsubo syndrome | ✔ | ✔ | ✔ | ✔ | ⚠ |
| Surgical shunts and baffles LF | ✘ | ⚠ | ✘ | ✘ | ✘ |

EXTRACARDIAC (<2% of exam)

| | | | | | |
|--|---|---|---|---|---|
| Aortic arch anatomy and variants LF | ⚠ | ⚠ | ⚠ | ⚠ | ⚠ |
| Arterial anatomy of the cerebral vessels LF | ⚠ | ⚠ | ⚠ | ✘ | ✘ |
| Arterial anatomy of the upper extremities and variants | ⚠ | ⚠ | ⚠ | ⚠ | ⚠ |
| Arterial anatomy of the abdominal vessels LF | ⚠ | ⚠ | ⚠ | ⚠ | ⚠ |
| Arterial anatomy of the lower extremities and variants | ⚠ | ⚠ | ⚠ | ⚠ | ⚠ |
| Superior vena cava (SVC) and inferior vena cava (IVC) anatomy and variants LF | ⚠ | ⚠ | ⚠ | ✘ | ✘ |

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| PHARMACOLOGY (14% of exam) | Diagnosis | Testing | Treatment/ Care Decisions | Risk Assessment/ Prognosis/ Epidemiology | Pathophysiology/ Basic Science |
|--------------------------------------|------------------|----------------|--------------------------------------|---|---|
|--------------------------------------|------------------|----------------|--------------------------------------|---|---|

GENERAL (4% of exam)

| | | | | | |
|------------------------------------|------|---|---|---|---|
| Vasopressors | ✔ | ✔ | ✔ | ✔ | ✔ |
| Inotropes | ✔ | ✔ | ✔ | ✔ | ✔ |
| Vasodilators | ✔ | ✔ | ✔ | ✔ | ⚠ |
| Moderate sedation | ✔ | ⚠ | ✔ | ⚠ | ⚠ |
| Reversal agents | LF ✔ | ⚠ | ✔ | ⚠ | ⚠ |
| Local anesthetic agents | ⚠ | ⚠ | ⚠ | ⚠ | ⚠ |
| Drug-eluting stent (DES) compounds | ✔ | ✔ | ✔ | ✔ | ✔ |
| Fibrinolytic agents | LF ⚠ | ⚠ | ⚠ | ⚠ | ⚠ |
| Anti-arrhythmic agents | ✔ | ✔ | ✔ | ✔ | ✔ |
| Anti-anginal agents | ✔ | ✔ | ✔ | ✔ | ✔ |
| Anti-lipid agents | ✔ | ✔ | ✔ | ✔ | ✔ |

INTRAVENOUS ANTIPLATELET AGENTS (<2% of exam)

| | | | | | |
|--------------|------|---|---|---|---|
| Abciximab | LF ⚠ | ⚠ | ⚠ | ⚠ | ⚠ |
| Eptifibatide | ⚠ | ⚠ | ⚠ | ⚠ | ⚠ |
| Tirofiban | LF ⚠ | ⚠ | ⚠ | ⚠ | ⚠ |
| Cangrelor | LF ⚠ | ⚠ | ⚠ | ⚠ | ⚠ |

ORAL ANTIPLATELET AGENTS (3% of exam)

| | | | | | |
|--|------|---|---|---|---|
| Aspirin | ✔ | ✔ | ✔ | ✔ | ✔ |
| Clopidogrel | ✔ | ✔ | ✔ | ✔ | ✔ |
| Prasugrel | ✔ | ✔ | ✔ | ✔ | ✔ |
| Ticagrelor | ✔ | ✔ | ✔ | ✔ | ✔ |
| Cilostazol | LF ⚠ | ⚠ | ⚠ | ⚠ | ⚠ |
| Vorapaxar | LF ✘ | ✘ | ✘ | ✘ | ✘ |
| Platelet function testing (genotype and phenotype) | LF ⚠ | ⚠ | ⚠ | ✘ | ✘ |

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| PHARMACOLOGY <i>continued...</i> (14% of exam) | Diagnosis | Testing | Treatment/ Care Decisions | Risk Assessment/ Prognosis/ Epidemiology | Pathophysiology/ Basic Science |
|---|-----------|---------|------------------------------|--|-----------------------------------|
|---|-----------|---------|------------------------------|--|-----------------------------------|

INTRAVENOUS ANTICOAGULANTS (2% of exam)

| | | | | | |
|-------------------------------|---|---|---|---|---|
| Unfractionated heparin | ✔ | ✔ | ✔ | ✔ | ✔ |
| Low-molecular-weight heparins | ✔ | ✔ | ✔ | ✔ | ✔ |
| Bivalirudin | ✔ | ✔ | ✔ | ✔ | ✔ |

ORAL ANTICOAGULANTS (2% of exam)

| | | | | | |
|---------------------------|---|---|---|---|---|
| Warfarin | ✔ | ✔ | ✔ | ✔ | ✔ |
| Novel oral anticoagulants | ✔ | ✔ | ✔ | ✔ | ✔ |

CONTRAST AGENTS (2% of exam)

| | | | | | |
|--|------|---|---|---|---|
| Contrast physics | ⚠ | ⚠ | ⚠ | ⚠ | ⚠ |
| Osmolality and other properties | LF ⚠ | ⚠ | ⚠ | ⚠ | ⚠ |
| Contrast allergy and anaphylactoid reactions | LF ✔ | ✔ | ✔ | ✔ | ✔ |

| CARDIAC IMAGING AND ASSESSMENT (7% of exam) | Diagnosis | Testing | Treatment/ Care Decisions | Risk Assessment/ Prognosis/ Epidemiology | Pathophysiology/ Basic Science |
|---|-----------|---------|------------------------------|--|-----------------------------------|
|---|-----------|---------|------------------------------|--|-----------------------------------|

GENERAL TESTS (<2% of exam)

| | | | | | |
|---------------------------------------|------|---|---|---|---|
| Stress testing | ✔ | ✔ | ✔ | ✔ | ⚠ |
| Stress test imaging | ✔ | ✔ | ✔ | ✔ | ⚠ |
| Transthoracic echocardiography | ✔ | ✔ | ✔ | ✔ | ⚠ |
| Transesophageal echocardiography | ✔ | ✔ | ✔ | ✔ | ⚠ |
| Intracardiac echocardiography | LF ✘ | ✘ | ✘ | ✘ | ✘ |
| Magnetic resonance imaging | LF ⚠ | ⚠ | ⚠ | ✘ | ✘ |
| Computed tomography angiography (CTA) | ⚠ | ⚠ | ⚠ | ⚠ | ✘ |
| Structural cardiac imaging | LF ⚠ | ⚠ | ⚠ | ✘ | ✘ |

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| CARDIAC IMAGING AND ASSESSMENT <i>continued...</i> (7% of exam) | Diagnosis | Testing | Treatment/ Care Decisions | Risk Assessment/ Prognosis/ Epidemiology | Pathophysiology/ Basic Science |
|--|-----------|---------|------------------------------|--|-----------------------------------|
|--|-----------|---------|------------------------------|--|-----------------------------------|

DIAGNOSTIC CORONARY IMAGING (5% of exam)

| | | | | | |
|---|---|---|---|---|---|
| Catheter shapes and sizes | ✔ | ✔ | ✔ | ⚠ | ⚠ |
| Angiographic views and techniques | ✔ | ✔ | ✔ | ✔ | ⚠ |
| Coronary lesion morphology (plaque, stenosis, and thrombus) | ✔ | ✔ | ✔ | ✔ | ✔ |
| Fractional flow reserve (FFR), instantaneous wave-free ratio (iFR), volumetric flow rate (VFR), and coronary flow reserve (CFR) | ✔ | ✔ | ✔ | ✔ | ⚠ |
| Intravascular ultrasonography (IVUS) | ✔ | ✔ | ✔ | ⚠ | ⚠ |
| Optical coherence tomography (OCT) LF | ⚠ | ⚠ | ⚠ | ✘ | ✘ |
| Vulnerable plaque imaging LF | ✘ | ✘ | ✘ | ✘ | ✘ |

X-RAY RADIOGRAPHY (<2% of exam)

| | | | | | |
|--|----------------------------------|---|---|---|---|
| Radiation physics and safety | ⚠ | ⚠ | ⚠ | ⚠ | ⚠ |
| Radiographic imaging chain LF | ⚠ | ⚠ | ⚠ | ✘ | ✘ |
| Radiation exposure parameters | ⚠ | ⚠ | ⚠ | ⚠ | ⚠ |
| Risks, injury, and methods of control | ✔ – Task not otherwise specified | | | | |
| Equipment operation and imaging techniques | ⚠ | ⚠ | ⚠ | ⚠ | ⚠ |

| MISCELLANEOUS (5% of exam) | Diagnosis | Testing | Treatment/ Care Decisions | Risk Assessment/ Prognosis/ Epidemiology | Pathophysiology/ Basic Science |
|--------------------------------------|-----------|---------|------------------------------|--|-----------------------------------|
|--------------------------------------|-----------|---------|------------------------------|--|-----------------------------------|

ETHICAL AND LEGAL ISSUES AND RISKS (<2% of exam)

| | | | | | |
|--|----------------|---|---|---|----------------|
| Patient consent | ✔ | ✔ | ✔ | ✔ | Not Applicable |
| Patient safety | ✔ | ✔ | ✔ | ✔ | Not Applicable |
| Ethics and professionalism | ✔ | ✔ | ✔ | ⚠ | Not Applicable |
| Documentation requirements for operative and invasive procedures | Not Applicable | ✔ | ✔ | ✔ | Not Applicable |

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| MISCELLANEOUS <i>continued...</i> (5% of exam) | Diagnosis | Testing | Treatment/ Care Decisions | Risk Assessment/ Prognosis/ Epidemiology | Pathophysiology/ Basic Science |
|--|-----------|---------|------------------------------|--|-----------------------------------|
|--|-----------|---------|------------------------------|--|-----------------------------------|

PROCEDURE-RELATED DATA (2% of exam)

| | | | | | |
|---|---|---|---|---|-----------------------|
| Statistics and literature interpretation | ⚠ | ⚠ | ✔ | ✔ | <i>Not Applicable</i> |
| Epidemiology | ⚠ | ⚠ | ⚠ | ⚠ | ⚠ |
| Cost, cost-effectiveness, and quality of life | ⚠ | ✔ | ✔ | ⚠ | <i>Not Applicable</i> |

QUALITY OF CARE AND APPROPRIATENESS (2% of exam)

| | | | | | |
|---|---|---|---|---|-----------------------|
| Clinical quality measurement and performance improvement (<2% of exam) | ⚠ | ✔ | ✔ | ⚠ | <i>Not Applicable</i> |
| Appropriate Use Criteria (AUC) | ⚠ | ✔ | ✔ | ⚠ | <i>Not Applicable</i> |
| Adverse event reporting and device surveillance | ⚠ | ⚠ | ⚠ | ⚠ | <i>Not Applicable</i> |