

Interventional Cardiology

Maintenance of Certification Examination Blueprint

Purpose of the exam

The exam is designed to evaluate the knowledge, diagnostic reasoning, and clinical judgment skills expected of the certified interventional cardiologist in the broad domain of the discipline. The ability to make appropriate diagnostic and management decisions that have important consequences for patients will be assessed. The exam may require recognition of common as well as rare clinical problems for which patients may consult a certified interventional cardiologist.

Exam content

Exam content is determined by a pre-established blueprint, or table of specifications. The blueprint is developed by ABIM and is reviewed annually and updated as needed for currency. Trainees, training program directors, and certified practitioners in the discipline are surveyed periodically to provide feedback and inform the blueprinting process.

The primary medical content categories of the blueprint are shown below, with the percentage assigned to each for a typical exam:

Medical Content Category	% of Exam
Case Selection and Management	20%
Procedural Techniques	20%
Complications of Coronary Intervention	8%
Catheter-Based Management of Noncoronary Disease	13%
Basic Science	6%
Anatomy, Anatomic variants, Anatomic pathology	6%
Pharmacology	12%
Cardiac Imaging and Assessment	9%
Miscellaneous	6%
	100%

Exam questions in the content areas above may also address topics requiring the understanding and integration of results of significant clinical trials.

Exam format

The exam is composed of multiple-choice questions with a single best answer, predominantly describing patient scenarios. Questions ask about the work done (that is, tasks performed) by physicians in the course of practice:

- Making a diagnosis
- Ordering and interpreting results of tests
- Recommending treatment or other patient care
- Assessing risk, determining prognosis, and applying principles from epidemiologic studies
- Understanding the underlying 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 <http://www.abim.org/maintenance-of-certification/exam-information/interventional-cardiology/exam-tutorial.aspx>.

The blueprint can be expanded for additional detail as shown below. Each of the medical content categories is listed there, and below each major category are the content subsections and specific topics that *may* appear in the exam. Please note: actual exam content may vary.

Case Selection and Management	20% of Exam
Chronic ischemic heart disease	6%
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)	4%
Evaluation and risk stratification of the UA and NSTEMI patient	
UA/NSTEMI—pharmacologic management	
UA/NSTEMI—timing of cardiac catheterization	
UA/NSTEMI—percutaneous coronary intervention (PCI)	
ST-segment elevation myocardial infarction (STEMI)	6%
STEMI systems of care	
Primary PCI—procedure	
Primary PCI— stents	
Primary PCI—thrombectomy	
Primary PCI—outcomes	
Right ventricular infarction	
Multivessel PCI	
Primary PCI following cardiopulmonary arrest	
STEMI—differential diagnosis	
Acute aortic dissection	
Therapeutic hypothermia	
Thrombolytic therapy	
Transfer for PCI	
Rescue PCI	
Surgical therapy in STEMI	
Medical management after STEMI	
STEMI complications	4%
Shock	
Electrophysiologic complications	
Emergency pacing	
Acute respiratory distress	
Mechanical complications (mitral regurgitation [MR], ventricular septal defect [VSD], rupture, pseudoaneurysm)	
Advanced Cardiovascular Life Support (ACLS)	

Procedural Techniques	20% of Exam
Planning and execution of interventional procedures	5%
General decision-making	

Access-site selection	
Radial access	
Femoral access	
Other access sites (ulnar, brachial)	
Vascular access closure devices	
Pericardiocentesis	
Right heart catheterization	
Right ventricular biopsy	
Lesion subsets	6%
Ostial	
Bifurcation	
Long	
Tortuous	
Calcified	
Restenosis	
Complex single-vessel disease	
Multivessel disease	
Saphenous vein graft disease	
Coronary artery bridge	
PCI in the anomalous coronary	
Left main	
Chronic total occlusion	
Selection and use of equipment	6%
Guide catheters	
Guidewires	
Balloon catheters	
Bare metal stents	
Drug-eluting stents	
Rotational atherectomy	
Embolic protection devices	
Intra-aortic balloon pump counterpulsation	
Impella [®]	
TandemHeart PTVA [®]	
Extracorporeal membrane oxygenation (ECMO)	
PCI technical troubleshooting and problem solving	3%
Failure to engage guide catheter	
Failure to cross lesion with guidewire	
Failure to cross lesion with device	
Failure to dilate lesion	

Complications of Coronary Intervention	8% of Exam
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Cardiac	5%
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- Coronary dissection
- Abrupt closure of coronary artery
- Stent thrombosis
- Coronary thromboembolism
- Air embolism
- No reflow
- Periprocedural myocardial infarction
- Perforation
- Tamponade

Noncardiac	3%
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- Systemic thromboembolism
- Cerebrovascular complications
- Bleeding and hemorrhage
- Vascular access and major vessel dissection
- Aortic dissection (due to PCI)
- Acute limb ischemia

Catheter-Based Management of Noncoronary Disease	13% of Exam
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Hemodynamics	2%
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- Arterial pressure evaluation
- Right heart catheterization
- Valvular stenosis
- Valvular regurgitation
- Shunt quantification

Evaluation and case selection in structural and valvular heart disease	6%
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- Structural heart disease
- Mitral valve
- Aortic valve
- Pulmonic valve
- Tricuspid valve
- Hypertrophic cardiomyopathy
- Patent foramen ovale
- Atrial septal defect
- Coarctation
- Ventricular septal defect

Evaluation and case selection in noncardiac vascular disease	5%
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- Carotid disease

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

Basic Science	6% of Exam
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Vascular biology	4%
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Normal vascular biology
 Atherosclerosis
 Atherosclerotic plaque
 Vascular injury
 Vasoreactivity
 Reperfusion injury
 Effects of diabetes mellitus
 Restenosis after balloon percutaneous transluminal
 coronary angioplasty (PTCA)
 Restenosis after stent PCI
 Vascular remodeling
 Microvascular dysfunction

Physiology	2%
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Clotting cascade
 Platelet function
 Thrombosis and thrombolysis
 Lipid metabolism and lipid abnormalities

Anatomy, Anatomic variants, Anatomic pathology	6% of Exam
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Cardiac	5%
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Normal coronary anatomy, dominance
 Anomalous left circumflex
 Anomalous left coronary
 Anomalous right coronary
 Indications for surgery for coronary anomalies
 Collateral vessels
 Coronary fistulae
 Coronary ectasia and aneurysm
 Other anatomic abnormalities
 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

Extracardiac <2%

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

Pharmacology	12% of Exam
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General 3%

Vasopressors
 Inotropes
 Vasodilators
 Moderate sedation
 Reversal agents
 Local anesthetic agents
 Drug-eluting stent (DES) compounds
 Thrombolytic agents
 Anti-arrhythmic agents
 Anti-anginal agents
 Anti-lipid agents

Intravenous antiplatelet agents 2%

Abciximab
 Eptifibatide
 Tirofiban
 Cangrelor

Oral antiplatelet agents 2%

Aspirin
 Clopidogrel
 Prasugrel

Ticagrelor	
Cilostazol	
Vorapaxar	
Platelet function testing (genotype and phenotype)	
Intravenous anticoagulants	2%
Unfractionated heparin	
Low-molecular-weight heparins	
Bivalirudin	
Oral anticoagulants	<2%
Warfarin	
Novel oral anticoagulants	
Contrast agents	2%
Contrast physics	
Osmolality and other properties	
Contrast-induced nephropathy	
Contrast allergy and anaphylactoid reactions	

Cardiac Imaging and Assessment	9% of Exam
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General tests	2%
Stress testing	
Stress test imaging	
Transthoracic echocardiography	
Transesophageal echocardiography	
Intracardiac echocardiography	
Magnetic resonance imaging	
Computed tomography angiography (CTA)	
Structural cardiac imaging	
Diagnostic coronary imaging	5%
Catheter shapes and sizes	
Angiographic views and techniques	
Coronary lesion morphology (plaque, stenosis, 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)	
Vulnerable plaque imaging	
X-ray radiography	2%
Radiation physics and safety	
Radiographic imaging chain	

Radiation exposure parameters
Risks, injury, and methods of control
Equipment operation and imaging techniques

Miscellaneous	6% of Exam
Ethical and legal issues and risks	<2%
Patient consent	
Patient safety	
Ethics and professionalism	
Documentation requirements for operative and invasive procedures	
Procedure-related data	3%
Statistics and literature interpretation	
Epidemiology	
Cost, cost-effectiveness, and quality of life	
Quality of care and appropriateness	2%
Clinical quality measurement and performance improvement	
Appropriate use criteria (AUC)	
Adverse event reporting and device surveillance	

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