

Interventional Cardiology

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/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	
Fibrinolytic 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%

Coronary dissection
Abrupt closure of coronary artery

- Stent thrombosis
- Coronary thromboembolism
- Air embolism
- No reflow
- Periprocedural myocardial infarction
- Perforation
- Tamponade

Noncardiac 3%

- 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%

- Arterial pressure evaluation
- Right heart catheterization
- Valvular stenosis
- Valvular regurgitation
- Shunt quantification

Evaluation and case selection in structural and valvular heart disease 6%

- 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%

- 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

General

3%

Vasopressors

Inotropes

Vasodilators

Moderate sedation

Reversal agents

Local anesthetic agents

Drug-eluting stent (DES) compounds

Fibrinolytic agents

Anti-arrhythmic agents

Anti-anginal agents

Anti-lipid agents

Intravenous antiplatelet agents

2%

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
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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