American Board of Internal Medicine®

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 up to 220 single-best-answer multiple-choice questions, of which approximately 35 are new questions that do not count in the examinee's score. Most questions describe patient scenarios and 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. Learn more information on how exams are developed.

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

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

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

Vascular biology 4%

- 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%

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

Anatomy, Anatomic variants, Anatomic pathology	**6%** of Exam

Cardiac 5%

- 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
Bivalirudi

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	

January 2023