



# CLINICAL CARDIAC ELECTROPHYSIOLOGY Blueprint

For traditional, 10-year Maintenance of Certification (MOC) exam

## ABIM invites diplomates to help develop the Clinical Cardiac Electrophysiology 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 electrophysiologists 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 an ongoing 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 160 electrophysiologists, similar to the total invited population of electrophysiologists in age, gender, time spent in direct patient care, and geographic region of practice, provided the blueprint topic ratings. ABIM used this feedback to update the blueprint for the MOC assessment (beginning with the Fall 2017 administration).

To inform how assessment 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 assessment 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 Clinical Cardiac Electrophysiology MOC Assessment

The MOC assessment is designed to evaluate whether a certified electrophysiologist has maintained competence and currency in the knowledge and judgment required for practice. The assessment 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 assessment places less emphasis on rare conditions and focuses 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.

## Assessment format

The assessment contains up to 190 single-best-answer multiple-choice questions, of which up to 45 are new questions that do not count in the examinee's score. Examinees taking the traditional, 10-year MOC exam will have access to an external resource (i.e., UpToDate®) for the entire exam. More information on how assessments are developed can be found at [abim.org/about/exam-information/exam-development.aspx](http://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

ABIM is committed to working toward health equity and believes that board-certified physicians should have an understanding of health care disparities. Therefore, health equity content that is clinically important to each discipline will be included in assessments, and the use of gender, race, and ethnicity identifiers will be re-evaluated.

Clinical scenarios presented take place in outpatient or inpatient settings as appropriate to a typical electrophysiology practice. Clinical information may include pictorial material, radiographs, electrocardiograms, echocardiograms, venograms, fluoroscopy images, and other media to illustrate relevant patient findings.

A tutorial, including examples of ABIM assessment question format, can be found at [abim.org/maintenance-of-certification/exam-information/clinical-cardiac-electrophysiology/exam-tutorial.aspx](http://abim.org/maintenance-of-certification/exam-information/clinical-cardiac-electrophysiology/exam-tutorial.aspx).

## Content distribution

Listed below are the major medical content categories that define the domain for the Clinical Cardiac Electrophysiology traditional, 10-year MOC exam. The relative distribution of content is expressed as a percentage of the total assessment. To determine the content distribution, ABIM considered the average respondent ratings of topic frequency and importance. Informed by these data, the Clinical Cardiac Electrophysiology Approval Committee and Cardiovascular Board have determined the medical content category targets shown below.

CONTENT CATEGORY	TARGET %
Basic Physiology, Anatomy, Pharmacology, and Genetics	10%
Clinical Arrhythmias: Core Concepts	6%
Clinical Arrhythmias: Bradycardias	6%
Clinical Arrhythmias: Atrial	14%
Clinical Arrhythmias: Supraventricular Tachycardias	17%
Clinical Arrhythmias: Ventricular	17%
Devices	22%
Clinical Scenarios and Syndromes	8%
<b>Total</b>	<b>100%</b>

## How the blueprint ratings are used to assemble the MOC assessment

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 *Assessment 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 Clinical Cardiac Electrophysiology Approval Committee and Cardiovascular Board, in partnership with the physician community, have set the following parameters for selecting MOC assessment questions according to the blueprint review ratings:

- At least 75% of questions will address high-importance content (indicated in green)
- No more than 25% of 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 20% of 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 traditional, 10-year 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 Clinical Cardiac Electrophysiology traditional, 10-year MOC exam

<p>✔ – <b>High Importance:</b> At least 75% of questions will address topics and tasks with this designation.</p>	<p>⚡ – <b>Medium Importance:</b> No more than 25% of questions will address topics and tasks with this designation.</p>	<p>✘ – <b>Low Importance:</b> No questions will address topics and tasks with this designation.</p>
<p><b>LF – Low Frequency:</b> No more than 20% of questions will address topics with this designation, regardless of task or importance.</p>		

BASIC PHYSIOLOGY, ANATOMY, PHARMACOLOGY, AND GENETICS (10% of exam)	Diagnosis	Testing	Treatment/ Care Decisions	Risk Assessment/ Prognosis/ Epidemiology	Pathophysiology/ Basic Science
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### CELLULAR ELECTROPHYSIOLOGY (<2% of exam)

Action potentials	LF	Not Applicable		⚡	⚡
Ion channels and currents	LF	⚡	Not Applicable		⚡
Receptors	LF	Not Applicable			⚡
Gap junctions		Not Applicable			✘

### CARDIAC ANATOMY (<2% of exam)

Cardiac anatomy	Not Applicable			✔
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### CARDIAC TISSUE PHYSIOLOGY (5% of exam)

Refractory periods	Not Applicable			⚡	
Neuronal control – sympathetic nervous system and catecholamines	Not Applicable			⚡	
Atrioventricular (AV) and ventriculoatrial (VA) conduction delay and block	✔	Not Applicable	✔	Not Applicable	✔
Mechanisms of arrhythmias	✔	Not Applicable		✔	
Electrical and structural remodeling	Not Applicable			⚡	
Repolarization – dispersion and reserve	Not Applicable			⚡	
Other physiologic phenomena (retrograde block, ACE inhibitors, fractionated electrograms, pseudonormalization)	⚡	Not Applicable		⚡	

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<b>BASIC PHYSIOLOGY, ANATOMY, PHARMACOLOGY, AND GENETICS</b> <i>continued...</i> (10% of exam)	Diagnosis	Testing	Treatment/ Care Decisions	Risk Assessment/ Prognosis/ Epidemiology	Pathophysiology/ Basic Science
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**PHARMACOLOGY** (3% of exam)

Pharmacokinetics	⚠	Not Applicable	✔	Not Applicable	⚠
Use and reverse use dependence	⚠	Not Applicable			⚠
Properties of antiarrhythmic agents	✔	Not Applicable	✔	Not Applicable	✔

**GENETICS** (<2% of exam)

Ion channels	Not Applicable				⚠
Non-ion channels	⚠	⚠	Not Applicable		⚠

<b>CLINICAL ARRHYTHMIAS: CORE CONCEPTS</b> (6% of exam)	Diagnosis	Testing	Treatment/ Care Decisions	Risk Assessment/ Prognosis/ Epidemiology	Pathophysiology/ Basic Science
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**RECOGNITION OF ARTIFACT** (<2% of exam)

Recognition of artifact	✔	✔	✔	Not Applicable	
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**PACING, SIGNAL RECORDING, AND MAPPING SYSTEMS (ELECTROPHYSIOLOGY LABORATORY)** (<2% of exam)

Pacing, signal recording, and mapping systems (electrophysiology laboratory)	Not Applicable	✔	Not Applicable		
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**NONINVASIVE TESTING** (2% of exam)

Indications	✔	Not Applicable	✔	✔	Not Applicable
Tilt-table testing	⚠	Not Applicable			
Interpretation of wide QRS tachycardias	✔	Not Applicable	✔	Not Applicable	✔
Ambulatory electrocardiographic monitoring	✔	Not Applicable			

**INVASIVE ELECTROPHYSIOLOGIC TESTING** (2% of exam)

Indications	✔	Not Applicable	✔	✔	Not Applicable
Interpretations	✔	✔	✔	✔	✔

**BIOPHYSICS OF ABLATION** (<2% of exam)

Biophysics of ablation	Not Applicable	⚠	Not Applicable		
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<b>CLINICAL ARRHYTHMIAS: CORE CONCEPTS</b> <i>continued...</i> (6% of exam)	Diagnosis	Testing	Treatment/ Care Decisions	Risk Assessment/ Prognosis/ Epidemiology	Pathophysiology/ Basic Science
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**TRANSEPTAL CATHETERIZATION AND PERICARDIAL ACCESS (<2% of exam)**

Transseptal catheterization and pericardial access	Not Applicable	✔	✔	Not Applicable	
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**CARDIAC AND INTRACARDIAC IMAGING (<2% of exam)**

Cardiac and intracardiac imaging	✔	Not Applicable	✔	Not Applicable	
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<b>CLINICAL ARRHYTHMIAS: BRADYCARDIAS</b> (6% of exam)	Diagnosis	Testing	Treatment/ Care Decisions	Risk Assessment/ Prognosis/ Epidemiology	Pathophysiology/ Basic Science
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**SINUS NODE DYSFUNCTION (<2% of exam)**

Sinus node dysfunction	✔	Not Applicable	✔	Not Applicable	✔
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**AV BLOCK (4% of exam)**

AV nodal block	✔	✔	✔	✔	✔
Infranodal AV block	✔	✔	✔	✔	✔

**ESCAPE AND ACCELERATED RHYTHMS (<2% of exam)**

Escape and accelerated rhythms	✔	Not Applicable	✔	Not Applicable	
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<b>CLINICAL ARRHYTHMIAS: ATRIAL</b> (14% of exam)	Diagnosis	Testing	Treatment/ Care Decisions	Risk Assessment/ Prognosis/ Epidemiology	Pathophysiology/ Basic Science
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**ATRIAL FIBRILLATION (6% of exam)**

Mechanism and etiology	Not Applicable				✔
ECG monitors and remote monitoring	✔	Not Applicable	✔	Not Applicable	
Pharmacologic treatment	Not Applicable		✔	Not Applicable	
Postoperative atrial fibrillation	Not Applicable		✔	✔	Not Applicable
Stroke prevention	Not Applicable		✔	✔	Not Applicable

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**ATRIAL FIBRILLATION** *continued...* (6% of exam)

Cardioversion	Not Applicable		✔	✔	Not Applicable
Catheter ablation	✔	✔	✔	Not Applicable	✔
Surgical ablation	Not Applicable		⚠	Not Applicable	
AV junction ablation	Not Applicable		✔	Not Applicable	

**ATRIAL FLUTTER** (4% of exam)

ECG monitors and remote monitoring	✔	Not Applicable			✔
Pharmacologic treatment	Not Applicable		✔	Not Applicable	
Stroke prevention	Not Applicable		✔	✔	Not Applicable
Cardioversion	Not Applicable		✔	✔	Not Applicable
Cavotricuspid isthmus (CTI) dependent atrial flutter	✔	Not Applicable	✔	Not Applicable	✔
Atypical right atrial flutter	✔	Not Applicable	✔	Not Applicable	
Atypical left atrial flutter	✔	✔	✔	Not Applicable	✔

**FOCAL ATRIAL TACHYCARDIAS** (4% of exam)

ECG monitors and remote monitoring	✔	Not Applicable	✔	Not Applicable	✔
Pharmacologic treatment	Not Applicable		✔	Not Applicable	
Catheter ablation	✔	Not Applicable	✔	✔	Not Applicable

<b>CLINICAL ARRHYTHMIAS: SUPRAVENTRICULAR TACHYCARDIAS</b> (17% of exam)	Diagnosis	Testing	Treatment/ Care Decisions	Risk Assessment/ Prognosis/ Epidemiology	Pathophysiology/ Basic Science
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**ACCESSORY PATHWAY SYNDROMES** (11% of exam)

ECG monitors and remote monitoring	✔	Not Applicable	✔	✔	✔
Pharmacologic treatment	Not Applicable		✔	Not Applicable	
Electrophysiologic studies in ventricular preexcitation	✔	Not Applicable		✔	✔
Electrophysiologic studies in orthodromic AVRT (typical and atypical pathways)	✔	✔	✔	✔	✔

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CLINICAL ARRHYTHMIAS: SUPRAVENTRICULAR TACHYCARDIAS <i>continued...</i> (17% of exam)	Diagnosis	Testing	Treatment/ Care Decisions	Risk Assessment/ Prognosis/ Epidemiology	Pathophysiology/ Basic Science
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**ACCESSORY PATHWAY SYNDROMES** *continued...* (11% of exam)

Electrophysiologic studies in antidromic AVRT (typical and atypical pathways)	✔	✔	✔	<i>Not Applicable</i>	✔
Ablation of accessory pathways	✔	<i>Not Applicable</i>	✔	✔	✔
Fasciculoventricular pathways <b>LF</b>	⚠	<i>Not Applicable</i>			
Multiple pathways <b>LF</b>	✔	<i>Not Applicable</i>			

**AV NODAL REENTRY TACHYCARDIA (AVNRT)** (5% of exam)

Typical AVNRT (ECGs, pharmacologic treatment, intracardiac recordings, and ablation)	✔	✔	✔	✔	✔
Atypical AVNRT (ECGs, pharmacologic treatment, intracardiac recordings, and ablation)	✔	✔	✔	✔	✔

**JUNCTIONAL TACHYCARDIAS** (<2% of exam)

ECG monitors and remote monitoring	✔	<i>Not Applicable</i>			
Pharmacologic treatment <b>LF</b>	<i>Not Applicable</i>		⚠	<i>Not Applicable</i>	
Interpretation of electrophysiology recordings	⚠	<i>Not Applicable</i>		⚠	<i>Not Applicable</i>
Ablation <b>LF</b>	<i>Not Applicable</i>		⚠	<i>Not Applicable</i>	

**MULTIPLE SVT MECHANISMS** (<2% of exam)

ECG monitors and remote monitoring	✔	<i>Not Applicable</i>			
Pharmacologic treatment	<i>Not Applicable</i>		✔	<i>Not Applicable</i>	
Interpretation of electrophysiology recordings	✔	<i>Not Applicable</i>			
Ablation	<i>Not Applicable</i>		✔	<i>Not Applicable</i>	

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CLINICAL ARRHYTHMIAS: VENTRICULAR (17% of exam)	Diagnosis	Testing	Treatment/ Care Decisions	Risk Assessment/ Prognosis/ Epidemiology	Pathophysiology/ Basic Science
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#### ECGS AND AMBULATORY MONITORING (4% of exam)

Ambulatory monitor recordings	✔	Not Applicable			
ECG localization – premature ventricular complexes (PVC) and VT	✔	Not Applicable	✔	Not Applicable	⚡

#### CORE CONCEPTS (5.5% of exam)

Indications for invasive electrophysiologic studies	✔	Not Applicable	✔	✔	⚡
Interpretation of intracardiac recordings	✔	Not Applicable	✔	Not Applicable	
Pharmacologic treatment	Not Applicable	✔	✔	Not Applicable	
Principles of entrainment	✔	✔	✔	Not Applicable	✔

#### VENTRICULAR TACHYCARDIAS AND ISCHEMIC HEART DISEASE (2% of exam)

Physiology	Not Applicable				⚡
Endocardial ablation	✔	Not Applicable	✔	Not Applicable	✔
Epicardial ablation LF	⚡	Not Applicable	⚡	Not Applicable	
Arrhythmias in patients with a left ventricular assist device (LVAD)* LF	⚡	Not Applicable	⚡	Not Applicable	
Hemodynamic support during ablation* LF	⚡	Not Applicable	⚡	Not Applicable	

#### VENTRICULAR TACHYCARDIAS AND NONISCHEMIC CARDIOMYOPATHY (<2% of exam)

Physiology	Not Applicable				✔
Endocardial ablation	✔	Not Applicable	✔	Not Applicable	⚡
Epicardial ablation LF	⚡	Not Applicable	⚡	Not Applicable	⚡
Arrhythmias in patients with a left ventricular assist device (LVAD)* LF	⚡	Not Applicable	⚡	Not Applicable	
Hemodynamic support during ablation* LF	⚡	Not Applicable	⚡	Not Applicable	

#### VENTRICULAR TACHYCARDIAS AND PREMATURE VENTRICULAR COMPLEXES AND THE NORMAL HEART (3% of exam)

Physiology	✔	Not Applicable	✔	✔	⚡
Endocardial ablation	✔	Not Applicable	✔	Not Applicable	
Epicardial ablation LF	⚡	Not Applicable	⚡	Not Applicable	



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<b>CLINICAL ARRHYTHMIAS: VENTRICULAR</b> <i>continued...</i> (17% of exam)	Diagnosis	Testing	Treatment/ Care Decisions	Risk Assessment/ Prognosis/ Epidemiology	Pathophysiology/ Basic Science
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**VENTRICULAR FIBRILLATION AND POLYMORPHIC VENTRICULAR TACHYCARDIAS (<2% of exam)**

Physiology	Not Applicable				✔
ECG monitors and remote monitoring	✔	Not Applicable	✔	Not Applicable	
Pharmacologic treatment	Not Applicable		✔	Not Applicable	
Bradycardia-dependent	✔	Not Applicable	✔	Not Applicable	
Drug-induced	✔	Not Applicable	✔	Not Applicable	
Ischemic	✔	Not Applicable	✔	Not Applicable	
Indications for invasive electrophysiologic studies	✔	Not Applicable	✔	✔	Not Applicable
Ablation <b>LF</b>	⚡	Not Applicable	⚡	Not Applicable	

<b>DEVICES</b> (22% of exam)	Diagnosis	Testing	Treatment/ Care Decisions	Risk Assessment/ Prognosis/ Epidemiology	Pathophysiology/ Basic Science
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**GENERAL CONCEPTS (<2% of exam)**

Electromagnetic interference	✔	Not Applicable			
Biophysics and bioengineering <b>LF</b>	Not Applicable	⚡	⚡	Not Applicable	
Lead extraction	Not Applicable		✔	✔	Not Applicable
Infection	✔	Not Applicable	✔	✔	Not Applicable
Automatic external and wearable defibrillators	✔	⚡	⚡	⚡	Not Applicable

**PACEMAKERS (7% of exam)**

Indications	✔	Not Applicable	✔	✔	Not Applicable
Implantation techniques	Not Applicable		✔	Not Applicable	
Programming and follow-up	✔	Not Applicable	✔	Not Applicable	
Complications	✔	Not Applicable	✔	✔	Not Applicable
Leadless pacing* <b>LF</b>	⚡	Not Applicable	⚡	Not Applicable	

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<b>DEVICES</b> <i>continued...</i> (22% of exam)	<b>Diagnosis</b>	<b>Testing</b>	<b>Treatment/ Care Decisions</b>	<b>Risk Assessment/ Prognosis/ Epidemiology</b>	<b>Pathophysiology/ Basic Science</b>
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**IMPLANTABLE CARDIOVERTER-DEFIBRILLATOR (ICD) THERAPY (8% of exam)**

Indications	✔	Not Applicable	✔	✔	Not Applicable
Implantation techniques		Not Applicable	✔	Not Applicable	
ECG monitors and remote monitoring	✔	Not Applicable	✔	Not Applicable	
Programming	✔	Not Applicable	✔	Not Applicable	
Follow-up	✔	Not Applicable	✔	✔	✔
Complications	✔	Not Applicable	✔	✔	Not Applicable
Subcutaneous implantable defibrillator*	✔	Not Applicable	✔	Not Applicable	

**CARDIAC RESYNCHRONIZATION (5% of exam)**

Indications	✔	Not Applicable	✔	✔	Not Applicable
Implantation techniques	Not Applicable	✔	✔	Not Applicable	
ECG monitors and remote monitoring	✔	Not Applicable	✔	Not Applicable	
Programming	✔	Not Applicable	✔	Not Applicable	
Leads	✔	Not Applicable	✔	Not Applicable	
Follow-up	✔	Not Applicable	✔	✔	Not Applicable
Complications	✔	✔	✔	Not Applicable	

**INSERTABLE LOOP RECORDERS (<2% of exam)**

Insertable loop recorders	✔	Not Applicable	✔	Not Applicable	
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<b>CLINICAL SCENARIOS AND SYNDROMES</b> (8% of exam)	<b>Diagnosis</b>	<b>Testing</b>	<b>Treatment/ Care Decisions</b>	<b>Risk Assessment/ Prognosis/ Epidemiology</b>	<b>Pathophysiology/ Basic Science</b>
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**COMMON SCENARIOS** (2% of exam)

Syncope	✔	✔	✔	✔	Not Applicable
Palpitations	✔	✔	✔	✔	Not Applicable
Sudden cardiac death	✔	✔	✔	✔	Not Applicable
Ethics	Not Applicable		✔	⚠	Not Applicable
Manage advisories and recalls	Not Applicable	⚠	✔	✔	⚠

**SPECIFIC SYNDROMES** (6% of exam)

Long QT syndrome	LF	✔	✔	✔	✔	⚠
Brugada syndrome	LF	✔	✔	✔	✔	⚠
Catecholaminergic polymorphic VT	LF	✔	✔	✔	✔	⚠
Hypertrophic cardiomyopathy		✔	✔	✔	✔	⚠
Arrhythmogenic right ventricular cardiomyopathy	LF	✔	✔	✔	✔	⚠
Dilated cardiomyopathy		✔	Not Applicable	✔	✔	✔
Sarcoidosis	LF	✔	Not Applicable	✔	✔	⚠
Other arrhythmia substrates (musculoskeletal, short QT syndrome, early repolarization syndrome)	LF	⚠	⚠	⚠	⚠	⚠
Arrhythmias in pregnancy	LF	✔	⚠	✔	⚠	Not Applicable
Arrhythmias in athletes		✔	✔	✔	⚠	Not Applicable
Congenital heart disease	LF	⚠	⚠	⚠	⚠	Not Applicable