



ACGME International

**Advanced Specialty Program Requirements for
Graduate Medical Education in
Cardiovascular Disease
(Internal Medicine)**

Revised: 10 May 2024; Effective: 1 July 2025
Reformatted: 1 April 2022
Revised: 12 February 2015, Effective: 1 July 2016
Initial Approval: 2 October 2012

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Int. Introduction

Background and Intent: Programs must achieve and maintain Foundational Accreditation according to the ACGME-I Foundational Requirements prior to receiving Advanced Specialty Accreditation. The Advanced Specialty Requirements noted below complement the ACGME-I Foundational Requirements. For each section, the Advanced Specialty Requirements should be considered together with the Foundational Requirements.

Int. I. Definition and Scope of the Specialty

~~The adult medicine based specialty of cardiovascular disease concerns disorders of the heart, including prevention, diagnosis, and treatment of coronary artery disease, myocardial disease, heart failure, valvular heart disease, vascular disease, and arrhythmias.~~ Cardiovascular disease is the internal medicine subspecialty that focuses on prevention, diagnosis, and management of disorders of the cardiovascular system.

Int. II. Duration of Education

Int. II.A. The educational program in cardiovascular disease must be 36 or 48 months in length.

I. Institution

I.A. Sponsoring Institution

I.A.1. A fellowship in cardiovascular disease must function as an integral part of ACGME-I-accredited residency in internal medicine.

I.B. Participating Sites

See International Foundational Requirements, Section I.B.

II. Program Personnel and Resources

II.A. Program Director

See International Foundational Requirements, Section II.A.

II.B. Faculty

II.B.1. In addition to the program director, there must be at least three core faculty members.

II.C. Other Program Personnel

II.C.1. Fellows must have regular interaction with electrophysiologists and cardiac surgeons, such as at catheterization conferences and in patient

care planning.

II.C.2. The following personnel must be available to provide multidisciplinary patient care and fellow education:

- II.C.2.a) dietitians;
- II.C.2.b) language interpreters;
- II.C.2.c) nurses;
- II.C.2.d) occupational therapists;
- II.C.2.e) physical therapists; and,
- II.C.2.f) social workers.

II.D. Resources

II.D.1. ~~A cardiac intensive care unit~~ The following must be present at the primary clinical site or at a participating site that provides a required rotation;

- II.D.1.a) a cardiac intensive care unit; and,
- II.D.1.b) an active cardiac surgery program.

II.D.2. The following laboratory services should be present at the primary clinical site:

- II.D.2.a) cardiac catheterization laboratories, including cardiac hemodynamics and a full range of interventional cardiology;
- II.D.2.b) cardiac radiology laboratory, including magnetic resonance imaging (MRI) and computed tomography (CT);
- II.D.2.c) cardiac radionuclide laboratories;
- II.D.2.d) echocardiography laboratories, including Doppler and transesophageal echocardiography;
- II.D.2.e) electrocardiogram (ECG), ambulatory ECG, and exercise testing laboratories;
- II.D.2.f) electrophysiology laboratories; and,
- II.D.2.g) a non-invasive vascular laboratory.

III. Fellow Appointment

III.A. Eligibility Criteria

III.A.1. Prior to appointment in the program, fellows should have completed an ACGME-I-accredited residency program in internal medicine, or an

internal medicine residency program acceptable to the Sponsoring Institution's Graduate Medical Education Committee.

III.B. Number of Fellows

See International Foundational Requirements, Section III.B.

IV. Specialty-Specific Educational Program

IV.A. ACGME-I Competencies

IV.A.1. The program must integrate the following ACGME-I Competencies into the curriculum.

IV.A.1.a) Professionalism

IV.A.1.a).(1) Fellows must demonstrate a commitment to professionalism and an adherence to ethical principles.

IV.A.1.b) Patient Care and Procedural Skills

IV.A.1.b).(1) Fellows must provide patient care that is compassionate, appropriate, and effective for the treatment of health problems and the promotion of health. Fellows must demonstrate competence in managing care of patients:

IV.A.1.b).(1).(a) in a variety of health care settings, including inpatient and various ambulatory settings; ~~the practice of health promotion, disease prevention, diagnosis, care, and treatment of patients of each gender, from adolescence to old age, during health and all stages of illness;~~

IV.A.1.b).(1).(b) using critical thinking and evidence-based tools;

IV.A.1.b).(1).(c) using population-based data; and,

IV.A.1.b).(1).(d) with whom they have limited or no physical contact, through the use of telemedicine.

IV.A.1.b).(2). Fellows must demonstrate competence in prevention, evaluation, and management of:

IV.A.1.b).(2).(a) acute myocardial infarction and other acute ischemic coronary syndromes;

IV.A.1.b).(2).(b) adult congenital heart disease;

IV.A.1.b).(2).(c) arrhythmias;

IV.A.1.b).(2).(d) cardiomyopathy;

IV.A.1.b).(2).(e) cardiovascular evaluation of patients undergoing non-

	cardiac surgery;
IV.A.1.b).(2).(f)	congestive heart failure;
IV.A.1.b).(2).(g)	coronary heart disease, including:
IV.A.1.b).(2).(g).(i)	acute coronary syndromes; and,
IV.A.1.b).(2).(g).(ii)	chronic coronary heart - <u>artery</u> disease.
IV.A.1.b).(2).(h)	diseases of the aorta;
IV.A.1.b).(2).(i)	heart disease in pregnancy;
IV.A.1.b).(2).(j)	hypertension;
IV.A.1.b).(2).(k)	infectious and inflammatory heart disease;
IV.A.1.b).(2).(l)	lipid disorders and metabolic syndrome;
IV.A.1.b).(2).(m)	need for end-of-life (palliative) care;
IV.A.1.b).(2).(n)	pericardial disease;
IV.A.1.b).(2).(o)	peripheral vascular disease;
IV.A.1.b).(2).(p)	pulmonary hypertension;
IV.A.1.b).(2).(q)	thromboembolic disorders; and,
IV.A.1.b).(2).(r)	valvular heart disease.
IV.A.1.b).(3).	<u>Fellows must be able to perform all medical, diagnostic, and surgical procedures considered essential for the area of practice including</u>
IV.A.1. b).(3).(a)	<u>performing diagnostic and therapeutic procedures relevant to their specific career path including;</u>
IV.A.1. b).(3).(a).(i)	conscious sedation;
IV.A.1.b).(3).(a).(ii)	direct cardioversion or defibrillation;
IV.A.1.b).(3).(a).(iii)	echocardiography;
IV.A.1.b).(3).(a).(iv)	exercise stress testing (ECG tests);
IV.A.1.b).(3).(a).(v)	right and left heart catheterization, including coronary arteriography;
IV.A.1.b).(3).(a).(vi)	placement and management of temporary pacemakers, including transvenous and transcutaneous; and,

- IV.A.1.b).(3).(a).(vii) programming and follow-up surveillance of permanent pacemakers and implantable cardioverter defibrillators (ICD).
- IV.A.1. b).(3).(b) treating their patient's conditions with practices that are patient-centered, safe, scientifically based, effective, timely and cost-effective; and,
- IV.A.1. b).(3).(c) using diagnostic and/or imaging studies relevant to the care of the patient including interpretation of
- IV.A.1.b).(3).(c).(i) ambulatory ECG recordings;
- IV.A.1.b).(3).(c).(ii) chest x-rays;
- IV.A.1.b).(3).(c).(iii) electrocardiograms; and,
- IV.A.1.b).(3).(c).(iv) nuclear cardiology, including single-photon emission computerized tomography (SPECT) myocardial perfusion imaging and ventriculograms.
- IV.A.1.c) Medical Knowledge
- IV.A.1.c).(1) Fellows must demonstrate knowledge of established and evolving biomedical clinical, epidemiological, and social-behavioral sciences, as well as the application of this knowledge to patient care. Fellows must demonstrate knowledge of:
- IV.A.1.c).(1).(a) the scientific method of problem solving and evidence-based decision making;
- IV.A.1.c).(1).(b) indications, contraindications, and techniques for, and limitations, complications, and interpretation of results of those diagnostic and therapeutic procedures integral to the discipline, including the appropriate indications for and use of screening tests and procedures;
- IV.A.1.c).(1).(c) the following content areas of basic science:
- IV.A.1.c).(1).(c).(i) cardiovascular anatomy;
- IV.A.1.c).(1).(c).(ii) cardiovascular metabolism;
- IV.A.1.c).(1).(c).(iii) cardiovascular pathology;
- IV.A.1.c).(1).(c).(iv) cardiovascular pharmacology, including drug metabolism, adverse effects, indications, the effects on aging, relative costs of therapy, and the effects of non- cardiovascular drugs on cardiovascular function;

- IV.A.1.c).(1).(c).(v) cardiovascular physiology;
- IV.A.1.c).(1).(c).(vi) genetic causes of cardiovascular disease; and,
- IV.A.1.c).(1).(c).(vii) molecular biology of the cardiovascular system.
- IV.A.1.c).(1).(d) primary and secondary prevention of cardiovascular disease, including:
 - IV.A.1.c).(1).(d).(i) biostatistics;
 - IV.A.1.c).(1).(d).(ii) cardiac rehabilitation;
 - IV.A.1.c).(1).(d).(iii) cerebrovascular disease;
 - IV.A.1.c).(1).(d).(iv) clinical epidemiology; and,
 - IV.A.1.c).(1).(d).(v) current and emerging risk factors.
- IV.A.1.c).(1).(e) evaluation and management of patients with:
 - IV.A.1.c).(1).(e).(i) adult congenital heart disease;
 - IV.A.1.c).(1).(e).(ii) cardiac trauma;
 - IV.A.1.c).(1).(e).(iii) cardiac tumors;
 - IV.A.1.c).(1).(e).(iv) cerebrovascular disease; and,
 - IV.A.1.c).(1).(e).(v) geriatric cardiology.

IV.A.1.c).(2) Fellows must demonstrate sufficient knowledge specific to the subspecialty of cardiology including application of technology appropriate for the clinical context, including evolving technologies.

IV.A.1.d) Practice-based Learning and Improvement

IV.A.1.d).(1) Fellows must demonstrate the ability to investigate and evaluate their care of patients, to appraise and assimilate scientific evidence, and to continuously improve patient care based on constant self-evaluation and lifelong learning.

IV.A.1.e) Interpersonal and Communication Skills

IV.A.1.e).(1) Fellows must demonstrate interpersonal and communication skills that result in the effective exchange of information and collaboration with patients, their families, and health professionals.

IV.A.1.f) Systems-based Practice

IV.A.1.f).(1) Fellows must demonstrate an awareness of and responsiveness to the larger context and system of health care, including the social determinates of health, as well as the ability to call effectively on other resources in the system to produce optimal care.

IV.B. Regularly Scheduled Educational Activities

IV.B.1. The educational program must include didactic instruction based upon the core knowledge content in cardiovascular disease.

IV.B.1.a) The program must ensure that fellows have an opportunity to review all knowledge content from conferences that they could not attend.

IV.B.2. Fellows must have a sufficient number of didactic sessions to ensure fellow-fellow and fellow-and-faculty interaction.

IV.C. Clinical Experiences

IV.C.1. Assignment of rotations must be structured to minimize the frequency of rotational transitions, and rotations must be of sufficient length to provide a quality educational experience, defined by continuity of patient care, ongoing supervision, longitudinal relationships with faculty members, and meaningful assessment and feedback.

IV.C.2. Rotations must be structured to allow fellows to function as a part of an effective interprofessional team that works together toward the shared goals of patient safety and quality improvement.

IV.C.3. Rotations must be structured to minimize conflicting inpatient and outpatient responsibilities.

IV.C.4. Fellows must have at least 24 months of clinical experience, including inpatient and special experiences, to include:

IV.C.4.a) at least four months in the cardiac catheterization laboratory;

IV.C.4.b) at least six months in non-invasive cardiac evaluations, consisting of:

IV.C.4.b).(1) at least three months of echocardiography and Doppler;

IV.C.4.b).(2) at least two months of nuclear cardiology, to include each fellow's active participation in a minimum of 80 hours of daily nuclear cardiology study interpretation during the rotation;

IV.C.4.b).(3) at least one month of experiences in other non-invasive cardiac evaluations, to include exercise stress testing, ECG

- interpretation, and ambulatory ECG monitoring (continuous and event recording). These rotations may be done concurrently with other rotations; and,
- IV.C.4.b).(4) experience in cardiac tomography, positron emission tomography (PET), cardiac magnetic resonance imaging (CMRI), and peripheral vascular imaging. These rotations may be done concurrently with other rotations.
- IV.C.4.c) at least two months devoted to electrophysiology; and,
- IV.C.4.d) at least nine months of non-laboratory clinical practice activities, including consultations, cardiac care units, post-operative care, and experience in congenital heart disease, preventive cardiology, and vascular medicine.
- IV.C.5. Fellows must have formal instruction in and clinical experience with performance of the following procedural and technical skills:
- IV.C.5.a) conscious sedation;
- IV.C.5.b) intra-aortic balloon counterpulsation;
- IV.C.5.c) intra-cardiac electrophysiologic studies;
- IV.C.5.d) MRI;
- IV.C.5.e) percutaneous transluminal coronary angioplasty and other interventional procedures;
- IV.C.5.f) pericardiocentesis;
- IV.C.5.g) placement and management of temporary pacemakers, including transvenous and transcutaneous; and,
- IV.C.5.h) programming and follow-up surveillance of permanent pacemakers and implantable cardioverter-defibrillators (ICDs).
- ~~IV.C.6. Each fellow must perform 10 direct cardioversions or defibrillations.~~
- ~~IV.C.7. Each fellow must perform a minimum of 75 echocardiogram studies, must interpret a minimum of 150 of them, and must observe the performance and interpretation of transesophageal cardiac studies.~~
- ~~IV.C.8. Each fellow must perform a minimum of 50 stress ECG tests (exercise stress testing).~~
- ~~IV.C.9. Each fellow must perform right and left heart catheterization, including coronary arteriography, with participation in a minimum of 100 catheterizations.~~
- ~~IV.C.10. Fellows must have experience interpreting:~~

- IV.C.10.a) ~~ambulatory ECG recordings;~~
- IV.C.10.b) ~~a minimum of 3500 ECGs;~~
- IV.C.10.c) ~~nuclear cardiology, including a minimum of 100 radionuclide studies per fellow, to include SPECT myocardial perfusion imaging and ventriculograms; and,~~
- IV.C.10.d) ~~chest x-rays.~~

IV.C.6. The program must provide educational experiences in team-based care that allow fellows to interact with and learn from other health care professionals.

IV.C.7. The educational program must provide fellows with elective experiences relevant to their future practice or to further skill/competence development.

IV.C.8. Fellows must have experience in the role of a cardiology consultant in the inpatient and outpatient setting.

IV.C.9. Fellows should participate in training using simulation.

IV.C.10. Fellows should have a structured continuity ambulatory clinic experience for the duration of the program that exposes them to the breadth and depth of cardiology.

IV.C.10.a) ~~This experience should include an appropriate distribution of patients of each gender and a diversity of ages.~~

IV.C.9.a) This experience should average one half-day each week throughout the educational program.

IV.C.9.a).(1) ~~Each fellow should, on average, be responsible for four to eight patients during each half-day session.~~

IV.C.9.a).(1).(a) ~~Each fellow should, on average, be responsible for no more than eight to 12 patients during each half-day ambulatory session.~~

IV.C.9.b). The continuing patient care experience should not be interrupted by more than one month, excluding a fellow's vacation.

IV.D. Scholarly Activity

IV.D.1. Fellows' Scholarly Activity

IV.D.1.a) While in the program all fellows must engage in at least one of the following scholarly activities: participation in grand rounds, posters, workshops, quality improvement presentations, podium presentations, grant leadership, non-peer-reviewed print/electronic resources, articles or publications, book chapters, textbooks, webinars, service on professional committees, or serving as a journal reviewer, journal editorial board member, or

editor.

IV.D.2.

Faculty Scholarly Activity

See International Foundational Requirements, Section IV.D.2.

V. Evaluation

See International Foundational Requirements, Section V.

VI. The Learning and Working Environment

VI.A. Principles

See International Foundational Requirements, Section VI.A.

VI.B. Patient Safety

See International Foundational Requirements, Section VI.B.

VI.C. Quality Improvement

See International Foundational Requirements, Section VI.C.

VI.D. Supervision and Accountability

VI.D.1.

Direct supervision of procedures performed by each fellow must occur until competence has been acquired and documented by the program director.

VI.E. Professionalism

See International Foundational Requirements, Section VI.E.

VI.F. Well-Being

See International Foundational Requirements, Section VI.F.

VI.G. Fatigue

See International Foundational Requirements, Section VI.G.

VI.H. Transitions of Care

See International Foundational Requirements, Section VI.H.

VI.I. Clinical Experience and Education

See International Foundational Requirements, Section VI.I.

VI.J. On-Call Activities

See International Foundational Requirements, Section VI.J.