

TRAINING STATEMENT

COCATS 4 Task Force 12: Training in Heart Failure



Endorsed by the Heart Failure Society of America

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1. INTRODUCTION

1.1. Document Development Process

1.1.1. Writing Committee Organization

The Writing Committee was selected to represent the American College of Cardiology (ACC) and the Heart Failure Society of America (HFSA) and included a cardiovascular training program director, a heart failure training program director, an HFSA representative, an early-career cardiologist, highly-experienced specialists representing both the academic and community-based practice settings, and physicians experienced in defining and applying training standards according to the 6 general competency domains promulgated by the Accreditation Council for Graduate Medical Education (ACGME) and American Board of Medical Specialties (ABMS) and endorsed by the American Board of Internal Medicine (ABIM). The ACC determined that relationships with industry or other entities were not relevant to the creation of this general cardiovascular training statement. Employment and affiliation details for authors and peer reviewers are provided in [Appendixes 1 and 2](#), respectively, along with disclosure reporting categories. Comprehensive disclosure information for all authors, including relationships with industry and other entities, is available as an [online supplement](#) to this document.

1.1.2. Document Development and Approval

The writing committee developed the document, approved it for review by individuals selected by the ACC and HFSA, and then addressed the reviewers' comments. The document was revised and posted for public comment from December 20, 2014, to January 6, 2015. Authors addressed the additional comments to complete the document. The final document was approved by the Task Force, COCATS Steering Committee, and ACC Competency Management Committee; ratified by the ACC Board of Trustees in March 2015; and endorsed by the HFSA. This document is considered current until the ACC Competency Management Committee revises or withdraws it.

1.2. Background and Scope

The Task Force was charged with updating published standards for training fellows in clinical cardiology enrolled in fellowship programs (1-4) on the basis of changes in the field since 2008 (3) and as part of a broader effort to establish consistent training criteria across all aspects of cardiology. This document does not provide specific guidelines for training advanced cardiovascular subspecialty areas but identifies opportunities to obtain advanced training where appropriate. The Task Force also updated previously published standards to address the evolving framework of competency-based medical education described by the ACGME Outcomes Project and the 6 general competencies endorsed by the ACGME and ABMS. The background and overarching principles governing fellowship training are provided in the COCATS 4 Introduction, and readers should become familiar with this foundation before considering the details of training in a subspecialty like heart failure. The Steering Committee and

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Task Force recognize that implementation of these changes in training requirements will occur incrementally over time.

For most areas of adult cardiovascular medicine, 3 levels of training are delineated:

- **Level I training** is the basic training required for trainees to become competent consultant cardiologists. It is required of all fellows in cardiology and can be accomplished as part of a standard 3-year training program in cardiology. In the case of heart failure, Level I training will provide an understanding of the depth and breadth of the heart failure syndrome, as well as nuances of diagnosis and management, including the important topic of heart failure prevention. Trainees should understand which heart failure patients should be considered for implantable cardioverter-defibrillators, cardiac resynchronization therapies, or more advanced therapies such as cardiac transplant or mechanical circulatory support (MCS). (In this document, MCS represents both durable ventricular assist devices and temporary mechanical support, such as intra-aortic balloon pumps or the Impella device.) The trainee should be able to delineate the potential risks and benefits of these therapies for heart failure patients and provide appropriate referral.
- **Level II training** refers to additional training in 1 or more areas that enables some cardiologists to perform or interpret specific procedures or render more specialized care for patients and conditions. This level of training is recognized for those areas in which an accepted instrument or benchmark, such as a qualifying examination, is available to measure specific knowledge, skills, or competence. Level II training in selected areas may be achieved by some trainees during the standard 3-year cardiovascular fellowship, depending on the trainee's career goals and use of elective rotations. It is anticipated that during a standard 3-year cardiovascular fellowship training program, sufficient time will be available to receive Level II training in a specific subspecialty. In the case of heart failure, Level II training will be for those individuals who wish to develop expertise in caring for heart failure patients, particularly those with more advanced and challenging syndromes. This curriculum can, in particular, provide the opportunity to learn to manage devices (other than durable MCS) implanted for heart failure therapy, arrhythmia, or hemodynamic monitoring. Level II will also emphasize more detailed hemodynamic assessment of these patients and will focus on transitions of care for heart failure patients as well as the systems of care that are necessary to avoid hospital admission and/or readmission. Level II training also prepares individuals with a focused interest in heart failure to develop expertise

sufficient to perform an initial screen for advanced therapies of individuals cared for at nontransplant/nondurable MCS facilities, in collaboration with Level III-trained individuals at advanced therapy sites.

- **Level III training** requires additional training and experience beyond the cardiovascular fellowship for the trainee to acquire specialized knowledge and experience in performing, interpreting, and training others to perform specific procedures or render advanced specialized care for specific procedures at a high level of skill. In the case of heart failure, Level III training is directed at those who anticipate focusing the majority of their clinical or research activities on the syndromes of heart failure, with a curriculum requiring additional fellowship training beyond that required for cardiovascular specialization board examination. It is recognized that not all cardiovascular fellowship training programs are capable of providing the most intense Level III training curriculum. Level III training is covered in a range of programs that might include heart transplantation, mechanical circulatory support devices, advanced heart failure electrophysiology, and end-of-life management skills, although not necessarily all of these. See further resources for ABIM policies and ACGME training requirements (5). Level III training is described here only in broad terms to provide context for trainees and clarify that these advanced competencies are not covered during the cardiovascular fellowship. The additional exposure and requirements for Level III training will be addressed in a subsequent, separately published Advanced Training Statement.

2. GENERAL STANDARDS

Three organizations—the ACC, American Heart Association, and HFSA—have addressed training requirements and guidelines for the management of patients with heart failure in both inpatient and outpatient settings (2,4,6). The recommendations are congruent and address faculty, system requirements, management, emerging technologies, and practice. We recommend strongly that candidates for the ABIM examination for certification in cardiovascular diseases, as well as those seeking certification of added qualifications in Advanced Heart Failure and Transplantation (AHFT), review the specific requirements of the ABIM documents (5,7).

Cardiovascular fellowship programs should satisfy the requirements regarding facilities and faculty for training in heart failure. Eligibility for the ABIM AHFT examination requires that training take place in a program accredited by the ACGME. The intensity of training and required resources vary according to the level of training provided. The recommended number of cases, procedures, and experiences is based on published

guidelines (2,4), competency statements (6), and the experience and opinions of the writing group. It is assumed that training is directed by appropriately trained mentors in an ACGME-accredited program (7) and that satisfactory completion of training is documented by the program director. The number and types of encounters and the duration of training required for trainees are summarized in Section 4.

2.1. Faculty

Faculty should include specialists skilled in evaluating heart failure patients and in the pharmacological, catheter-based, and surgical aspects of heart failure care. For a program to be accredited to train candidates for AHFT, there must be a minimum of 2 key clinical, board-certified, AHFT faculty members, including the program director. To provide Level I training in heart failure, however, faculty need not be board-certified in AHFT.

2.2. Facilities

Facilities should be adequate to ensure a safe, sterile, and effective environment for the optimal management of patients with heart failure of all etiologies and severity. In addition, outpatient clinical facilities should be available for training in the consultative aspects of heart failure management, including appropriate referral for advanced therapies such as transplant or MCS devices.

3. TRAINING COMPONENTS

3.1. Didactic Program

During training, fellows should actively participate in didactic activities relating specifically to heart failure. The core curriculum of the fellowship program should include didactics focused on providing the trainee with appropriate medical knowledge in heart failure. At a minimum, such a program should provide the trainee with knowledge of current heart failure guidelines as well as an understanding of the medical knowledge milestones expected for Level I training. Additionally, didactic opportunities to acquire Level II medical knowledge should be available to interested trainees. In addition to the core curriculum, the didactic portion of training should include research conferences and journal clubs with the heart failure syndrome as their primary focus and include topics related to enhancement of patient safety and resource management.

3.1.1. Heart Failure Disease Management

Education and counseling strategies include: 1) the importance of nonpharmacological as well as pharmacological management; 2) end-of-life care, including care options and participation in an interdisciplinary palliative

care team; 3) assessment for quality of life, psychological problems (e.g., anxiety and depression), cognitive impairment, literacy problems, social isolation, financial problems, and other barriers to adherence and risk factors for rehospitalization; 4) management of heart failure with multiple comorbidities; 5) collaboration and skill as a team leader with nurses, dietitians, social workers, pharmacists, and other health professionals in the management of patients to stabilize or improve health status and prevent hospitalization; and 6) transitional care principles, that is, facilitating communication between caregivers and physician extenders.

3.2. Clinical Experience

Trainees must have formal instruction and clinical experience in the following specific areas to attain Level I curricular milestones:

1. Basic disease mechanisms leading to syndromes of acute and chronic systolic and diastolic heart failure.
2. Clinical trial evidence relevant to heart failure management.
3. Indication, prescription, pharmacology, adverse effects, and appropriate monitoring of all classes of drugs relevant to the heart failure patient, including those known to benefit patients with heart failure, those suspected of benefiting patients with heart failure, and those known or suspected of adversely affecting patients with heart failure, in both the acute and chronic settings.
4. Indication and prescription of nonpharmacological/nondevice treatment modalities in heart failure, including diet, exercise, and the patient's involvement in daily clinical assessment such as weight, fluid intake, and exercise capacity.
5. Indications for cardiac transplantation and both durable and nondurable mechanical circulatory support devices.
6. Recognition of differences in appropriate management and response to therapy based on differences in etiology, cardiac structure and function, age, sex, ethnic background, and genetics.
7. Impact of psychosocial factors on the manifestations, expression, and management of heart failure.
8. Existence, importance, and management of common comorbidities encountered in patients with heart failure, including but not limited to obesity, metabolic syndrome, diabetes mellitus, sleep breathing disorders, depression, anxiety, and sexual dysfunction.

These scenarios represent a broad and basic spectrum of clinical heart failure. It is accepted that for some specific situations (i.e., heart failure patients with congenital heart disease or pregnancy-related heart failure states), clinical material may not be readily available. In those

specific situations, didactic and interactive, case-based training would be an acceptable substitute for formal inpatient or outpatient clinical exposure.

3.2.1. Prevention of Heart Failure

With respect to heart failure prevention, trainees must have formal instruction regarding conditions and factors known to predispose patients to, or exacerbate, heart failure syndromes. Specifically, a curriculum that emphasizes comprehensive cardiovascular risk factor modification more generally (e.g., primary and secondary prevention of coronary artery disease, treatment of hypertension), and with respect to the heart failure syndrome specifically, will be required. Trainees are expected to know the risk factors associated with the development of heart failure and the pathophysiology of myocardial cellular dysfunction, ventricular remodeling, and ventricular dysfunction.

3.3. Hands-On Experience

Hands-on experience is required for effective training in heart failure management. During rotations in the cardiac care unit, trainees should assess and manage the variety of heart failure patients referred to in the previous text, including appropriately referring heart failure patients for surgery, devices, and advanced therapies. In addition to inpatient experience, Level I and II trainees are expected to gain experience managing outpatients with mild-to-moderate chronic heart failure and to determine the appropriate medical and device therapies for these patients.

4. SUMMARY OF TRAINING REQUIREMENTS

4.1. Development and Evaluation of Core Competencies

Training and requirements in heart failure address the 6 general competencies promulgated by the ACGME/ABMS and endorsed by the ABIM. These competency domains are: medical knowledge, patient care and procedural skills, practice-based learning and improvement, systems-based practice, interpersonal and communication skills, and professionalism. The ACC has used this structure to define the components of the core clinical competencies for cardiology. The curricular milestones for each competency and domain also provide a developmental roadmap for fellows as they progress through various levels of training and serve as an underpinning for the ACGME/ABIM reporting milestones. The ACC has adopted this format for its competency and training statements, career milestones, lifelong learning, and educational programs. Additionally, it has developed tools to assist physicians in assessing, enhancing, and documenting these competencies.

Table 1 delineates each of the 6 competency domains as well as their associated curricular milestones for training in heart failure. The milestones are categorized into Level I, II, and III training (as previously defined in this document) and indicate the stage of fellowship training (12, 24, or 36 months, and additional time points) by which the typical cardiovascular trainee should achieve the designated level. Given that programs may vary with respect to the sequence of clinical experiences provided to trainees, the milestones at which various competencies are reached may also vary. Level I competencies may be achieved at earlier or later time points. Acquisition of Level II skills requires additional training that may be completed during the standard 3-year cardiovascular fellowship. Level III skills require additional training in a dedicated advanced heart failure program after completion of the general cardiovascular fellowship. The table also describes examples of evaluation tools suitable for assessment of competence in each domain.

4.2. Number of Procedures, Cases, and Duration of Training

The goals of the heart failure milestones and competencies are to ensure that cardiovascular medicine trainees acquire an appropriate degree of skill and knowledge in the care of patients with heart failure at basic (Level I) or more refined levels (Levels II and III). Training directors and trainees are encouraged to incorporate this resource in the course of training. The specific competencies for Levels I, II, and III are delineated in **Table 1**. Trainees in cardiology should spend a minimum of 2 months on a heart failure consultation service to acquire the core competencies identified in **Table 1**. Level I competencies must be obtained by all fellows during the 3-year cardiovascular disease fellowship training program. Level II competencies may be obtained during the cardiovascular disease fellowship by selected fellows depending on their career focus and elective experiences. Level III competencies are noted so that fellows are aware of the competencies for which additional, advanced training beyond the standard 3-year fellowship is required. A brief discussion of the competencies and training requirements for Levels I, II, and III follow. There are no volume or procedural requirements for heart failure training at Levels I and II. Please refer to the ACGME program requirements for an outline of procedures and volume requirements for Level III training. Although the training duration and numbers of procedures are typically required to obtain competency, trainees must also demonstrate achievement of the competencies as assessed by the outcomes evaluation measures.

This training scheme recognizes that there is an ever-increasing number of treatments and interventions that improve outcomes and significantly alter the course of the heart failure syndrome. These treatments have generally

TABLE 1 Core Competency Components and Curricular Milestones for Training in Heart Failure

Competency Component		Milestones (Months)			
		12	24	36	Add
MEDICAL KNOWLEDGE					
1	Know the pathophysiology, differential diagnosis, stages, and natural history of heart failure.		I		
2	Know the characteristic history and physical examination findings, and their limitations, in evaluation of heart failure syndromes.	I			
3	Know the pathophysiology of heart failure at the molecular, cellular, organ, and organismal levels, with emphasis on the roles of neurohormonal activation and left ventricular remodeling in disease progression.		I		
4	Know the indications, contraindications, and clinical pharmacology for drugs used for treatment of heart failure, including adverse effects.	I			
5	Know the indications, contraindications, and clinical pharmacology for the drugs used for the treatment of heart failure of all etiologies and degrees of severity and in special populations.			II	
6	Know the indications and clinical rationale for the pharmacological management of patients implanted with mechanical circulatory support.				III
7	Know the indications, contraindications, and clinical pharmacology for intravenous, vasoactive, and inotropic drugs used for cardiovascular support in advanced/refractory heart failure.		I		
8	Know the appropriate pharmacological or nonpharmacological treatment for the prevention of heart failure in patients with either "pre" or "established" heart failure.	I			
9	Know the clinical pharmacology and use of immunosuppressive medications and other interventions in heart transplant patients in the treatment of acute rejection.			II	
10	Know the types of and indications for mechanical circulatory support.			II	
11	Know the effects and interactions of heart failure with other organ systems (kidney, nutritional, metabolic) and in the setting of other systemic disease.		I		
12	Know the management of cardiac arrhythmias in heart failure patients, as well as the indications and risks of use of implantable cardioverter-defibrillator and cardiac resynchronization therapies.		I		
13	Know the indications for referral for cardiac transplantation.		I		
14	Know the late stage complications of heart failure in patients with congenital heart disease.				III
15	Know the management and diagnostic strategies for populations with heart failure not due to ischemic heart disease, including infiltrative and restrictive cardiomyopathies, inherited cardiomyopathies, and those associated with pregnancy and chemotherapy.			II	
16	Know the management strategies for highly specialized populations with heart failure, including those associated with congenital heart disease and chronic pulmonary disease.				III

EVALUATION TOOLS: chart-stimulated recall, direct observation, in-training examination.

PATIENT CARE AND PROCEDURAL SKILLS		12	24	36	Add
1	Skill to evaluate and manage patients with new-onset, chronic, and acute decompensated heart failure.	I			
2	Skill to evaluate and manage patients with severe heart failure despite treatment.			II	
3	Skill to evaluate and manage patients with mechanical circulatory support or after heart transplant.				III
4	Skill to appropriately obtain and incorporate data from the history, laboratory studies, and imaging modalities in evaluation and management of heart failure patients.	I			
5	Skill to interpret imaging results in the evaluation of heart failure patients.		I		
6	Skill to interpret imaging results found in advanced, rare, or uncommon forms of heart failure.				III
7	Skill to use history and physical examination findings to accurately assess volume status and perfusion in patients with heart failure.			II	
8	Skill to perform invasive hemodynamic monitoring.		I		
9	Skill to incorporate the results of hemodynamic measurements and monitoring to make appropriate management decisions in heart failure patients of all etiologies and severity.			II	
10	Skill to incorporate results of hemodynamic measurements and monitoring to make appropriate management decisions in complex or advanced heart failure patients of all etiologies and severity or in patients with mechanical circulatory support.				III

TABLE 1 Core Competency Components, continued

Competency Component		Milestones (Months)			
PATIENT CARE AND PROCEDURAL SKILLS		12	24	36	Add
11	Skill to identify appropriate candidates for palliative care and hospice.		I		
12	Skill to recognize and manage cardiac arrhythmias, including the identification of appropriate candidates for implantable cardioverter-defibrillators, cardiac resynchronization therapy, or arrhythmia ablation.		I		
13	Skill to select and implement appropriate arrhythmia management, including utilization of implantable cardioverter-defibrillators, cardiac resynchronization therapy, and ablation of arrhythmias in patients with heart failure of all etiologies and severity.			II	
14	Skill to manage patients with advanced heart failure and complex arrhythmias, including patients with mechanical circulatory support, in conjunction with clinical cardiac electrophysiologists.				III
15	Skill to recognize and manage comorbidities in heart failure patients.		I		
16	Skill to manage heart failure patients with complex contributing comorbidities.			II	
17	Skill to identify and manage patients who require transition from hospital to home or to a care facility while on infusion of inotropic or vasoactive agents.			II	
18	Skill to identify and manage patients who require transition from hospital to home or to a care facility after heart transplant or permanent mechanical circulatory support.				III
19	Skill to appropriately utilize initial screening studies to determine patient eligibility for advanced therapies of individuals cared for at nontransplant/nonventricular assist device facilities, in collaboration with Level III-trained individuals, who work at advanced therapy sites.			II	
20	Skill to evaluate, order all appropriate testing, and determine the appropriateness of a patient for cardiac transplant or mechanical circulatory support.				III
21	Skill to interpret and incorporate results of cardiopulmonary exercise testing into management of heart failure patients, including physical activity and exercise recommendations.			II	
22	Skill to recognize, manage, and seek appropriate consultation for depression or undue anxiety in heart failure patients as part of their overall care.		I		
EVALUATION TOOLS: chart-stimulated review, direct observation, and multisource evaluation.					
SYSTEMS-BASED PRACTICE		12	24	36	Add
1	Utilize appropriate care settings and teams for various levels and stages of heart failure.		I		
2	Incorporate risk/benefit analysis and cost considerations in diagnostic and treatment decisions.		I		
3	Identify and address financial, cultural, and social barriers to diagnostic and treatment recommendations.	I			
4	Utilize an interdisciplinary, coordinated, team approach for patient management, including care transitions, palliative care, and employment-related issues.		I		
5	Effectively utilize an interdisciplinary approach to monitor the progress of ambulatory patients with heart failure to maintain stability and avoid preventable hospitalization.			II	
6	Identify the financial, social, and emotional barriers to successful outcomes after surgery.				III
EVALUATION TOOLS: chart-stimulated recall, direct observation, and multisource evaluation.					
PRACTICE-BASED LEARNING AND IMPROVEMENT		12	24	36	Add
1	Identify knowledge and performance gaps and engage in opportunities to achieve focused education and performance improvement.		I		
2	Utilize decision support tools for accessing guidelines and pharmacological information at the point of care.			II	
EVALUATION TOOLS: conference presentation, direct observation, global evaluation, and reflection and self-assessment.					
PROFESSIONALISM		12	24	36	Add
1	Show compassion and effective management of end-of-life issues, including family meetings across the spectrum of patients with heart failure.	I			
2	Clearly and objectively discuss the therapies available for advanced heart failure, including palliative care, transplant, or mechanical circulatory support.				III

TABLE 1 Core Competency Components, continued

Competency Component		Milestones (Months)			
PROFESSIONALISM		12	24	36	Add
3	Interact respectfully with patients, families, and all members of the healthcare team, including ancillary and support staff.	I			
EVALUATION TOOLS: conference presentation, direct observation, multisource evaluation, and reflection and self-assessment.					
INTERPERSONAL AND COMMUNICATION SKILLS		12	24	36	Add
1	Communicate with and educate patients and families across a broad range of cultural, ethnic, and socioeconomic backgrounds.	I			
2	Engage in shared decision making with patients, including options for diagnosis and treatment.		I		
3	Effectively lead and communicate with the interdisciplinary team involved in heart transplant and mechanical circulatory support.				III
EVALUATION TOOLS: direct observation and multisource evaluation.					

Add = additional months beyond the 3-year cardiovascular fellowship.

increased the complexity of care. Thus, additional and special expertise are needed to best effect and improve utilization of many heart failure evaluation and treatment strategies. It is also recognized that a significant portion of initial and follow-up care for heart failure patients will continue to be under the purview of cardiologists and primary care clinicians; however, the more advanced Level II and III programs will provide increased sophistication and more skills necessary to manage advanced heart failure syndromes.

It is important to point out that Level III training and subsequent competency do not necessarily equate with the level of experience in cardiac transplantation required for qualification as a heart transplant physician under United Network of Organ Sharing (UNOS) criteria (8). It is anticipated that a much broader group of individuals will be interested in establishing competency in advanced heart failure cardiology than will be directly managing patients undergoing cardiac transplantation. Nonetheless, many programs will offer an experience within the Level III curriculum that can establish heart transplant physician competency according to United Network of Organ Sharing criteria.

4.2.1. Level I Training Requirements

The heart failure training Level I curriculum must ensure that trainees have formal instruction and clinical experience in the evaluation and management of a full spectrum of heart failure patients within the first 2 years of training. The fellow must have access to a patient population with a variety of clinical problems and stages of diseases. The patient population must include patients of each sex and a broad age range, including geriatric patients.

The fundamental concepts of heart failure's pathophysiology and its treatment should be understood by all trainees in cardiovascular medicine as part of the Level I training curriculum. Training in the clinical management of heart failure should include supervised experience in both inpatient and outpatient settings and expose the trainee to a broad spectrum of underlying causes of heart failure. Trainees should be well acquainted with the nuances of therapy for heart failure that are specific to different etiologies and should be well informed about the pharmacology of standard cardiovascular drugs used to treat heart failure. Trainees should also be aware of the treatment strategies for patients with both chronic disease and acute exacerbations. An important element of the curriculum will be to train clinicians to appropriately refer heart failure patients for pacemaker, defibrillator, and percutaneous cardiovascular interventions; surgical procedures (including insertion of mechanical circulatory support devices); and cardiac transplantation. Through interaction with this variety of patients, the trainee will acquire necessary competence and subsequent expertise as outlined in the milestones table (Table 1).

4.2.2. Level II Training Requirements

Trainees who wish to have more training in advanced heart failure should be enrolled in programs that include specific outpatient clinics and inpatient services designed for patients requiring therapy for heart failure, as described for Level I; however, in addition to ensuring a curriculum that satisfies the specifics of Level I training, such programs must offer a greater intensity and exposure to a broader spectrum of heart failure therapy modalities. Level II training can be

accomplished within the scope of the 3 years of initial cardiovascular training, generally during the third year of the cardiovascular training program. Trainees in a Level II curriculum should actively participate in didactic activities relating more specifically to heart failure, including research conferences, seminars, and journal clubs, with the heart failure syndrome as the primary focus.

In addition to satisfying all Level I competencies outlined in [Table 1](#), trainees should have experiences in interpreting the hemodynamic data of advanced heart failure patients during acute and chronic interventions and during prognosis assessment. Alternatively, they might spend more time in the outpatient heart failure clinics, where exposure to a broader range of patients with heart failure will occur. Level II trainees should develop a fundamental understanding of emerging genetic risk factors and biomarkers for the development of heart failure and the use of genetic markers and biomarkers as strategies for heart failure prevention (9).

4.2.3. Level III Training Requirements

In addition to the curriculum specified in Level I and II training, fellows should have formal instruction and attain understanding of the following for Level III competency:

1. Advanced training in cellular, cardiomyocyte, and extracellular matrix biology, including calcium dysregulation; mechanisms of arrhythmia generation; beta-receptor abnormalities; mechanisms of apoptosis, stem cells, and regeneration; metabolic abnormalities of the failing myocyte; and the roles of matrix remodeling in the progression of heart failure.
2. Genetics, including common mutations leading to hypertrophic and dilated cardiomyopathies and an understanding of genetic polymorphisms related to both myocardial disease and targeted heart failure treatment.

To qualify for heart failure Level III training, fellows must have a more in-depth and formal instruction in heart failure disease management, have clinical experience, and demonstrate proficiency as part of an interdisciplinary care team in a clinical setting dedicated to heart failure. Managing interdisciplinary heart failure clinics and home-based care services is envisioned as a primary role of the advanced heart failure cardiologist, who should achieve proficiency in: 1) specific behavioral strategies to enhance adherence to a heart failure therapeutic regimen; 2) supervision of home-based titration and monitoring of diuretics and evidence-based medications, with surveillance for renal dysfunction and electrolyte disturbances; and 3) the comprehensive education and counseling needs of heart failure patients and family members.

Level III training requires further demonstration of proficiency in additional arenas that include exposure to patients with more advanced or challenging heart failure conditions. Level III trainees should spend a considerable amount of time acquiring expertise in the evaluation and management of patients with advanced heart failure, including the hemodynamic evaluation of such inpatients and outpatients, referral for devices such as implantable cardioverter-defibrillators or cardiac resynchronization therapies, and the appropriate selection of patients for transplant or MCS devices.

Level III training requires an additional 12 months of training beyond that required for basic cardiovascular fellowship. A variety of curricula can be created to satisfy Level III training requirements. The competencies identified in [Table 1](#) represent the core expectations or milestones. Detailed components of Level III training will be addressed in a subsequent, separately published Advanced Training Statement.

5. EVALUATION OF PROFICIENCY

Evaluation tools in heart failure include direct observation by instructors, in-training examinations, case logbooks, conference and case presentations, multisource evaluations, trainee portfolios, simulation, and reflection and self-assessment. Case management, judgment, interpretive, and bedside skills must be evaluated in every trainee. Quality of care and follow-up; reliability; judgment, decisions, or actions that result in complications; interaction with other physicians, patients, and laboratory support staff; initiative; and the ability to make appropriate decisions independently should be considered. Trainees should maintain records of participation and advancement in the form of a Health Insurance Portability and Accountability Act (HIPAA)-compliant electronic database or logbook that meets ACGME reporting standards and summarizes pertinent clinical information (number of cases, diversity of referral sources, diagnoses, disease severity, outcomes, and disposition) for each encounter.

The ACC, American Heart Association, American College of Physicians, HFSA, and International Society for Heart and Lung Transplantation have formulated a clinical competence statement on the management of patients with advanced heart failure (10).

Under the aegis of the program director, the faculty should record and verify each trainee's experiences, assess performance, and document satisfactory achievement. The program director is responsible for confirming experience and competence and reviewing the overall progress of individual trainees with the Clinical Competency Committee at least twice annually to ensure achievement of selected training milestones and identify areas in which additional focused training may be required.

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KEY WORDS ACC Training Statement, clinical competence, COCATS, fellowship training, heart failure

**APPENDIX 1. AUTHOR RELATIONSHIPS WITH INDUSTRY AND OTHER ENTITIES (RELEVANT)—
COCATS 4 TASK FORCE 12: TRAINING IN HEART FAILURE**

Committee Member	Employment	Consultant	Speakers Bureau	Ownership/ Partnership/ Principal	Personal Research	Institutional/ Organizational or Other Financial Benefit	Expert Witness
Mariell Jessup (<i>Chair</i>)	University of Pennsylvania School of Medicine—Professor of Medicine	None	None	None	None	None	None
Reza Ardehali	University of California Los Angeles—Assistant Professor of Medicine (Cardiology)	None	None	None	None	None	None
Marvin A. Konstam	Tufts University School of Medicine—Professor; Director, Cardiovascular Center	None	None	None	None	None	None
Bruno V. Manno	Pennsylvania Heart and Vascular Group, P.C.—Cardiologist	None	None	None	None	None	None
Michael A. Mathier	University of Pittsburgh Medical Center Heart and Vascular Institute—Assistant Professor of Medicine; Associate Director, Cardiovascular Fellowship Program	None	None	None	None	None	None
John A. McPherson	Vanderbilt University School of Medicine—Associate Professor of Medicine; Vice-Chair for Education, Department of Medicine	None	None	None	None	None	None
Nancy K. Sweitzer	Sarver Heart Center, University of Arizona—Director; Professor; Chief, Division of Cardiology	None	None	None	None	None	None

For the purpose of developing a general cardiology training statement, the ACC determined that no relationships with industry or other entities were relevant. This table reflects authors' employment and reporting categories. To ensure complete transparency, authors' comprehensive healthcare-related disclosure information—including relationships with industry not pertinent to this document—is available in an [online data supplement](#). Please refer to <http://www.acc.org/guidelines/about-guidelines-and-clinical-documents/relationships-with-industry-policy> for definitions of disclosure categories, relevance, or additional information about the ACC Disclosure Policy for Writing Committees.

ACC = American College of Cardiology.

**APPENDIX 2. PEER REVIEWER RELATIONSHIPS WITH INDUSTRY AND OTHER ENTITIES (RELEVANT)—
COCATS 4 TASK FORCE 12: TRAINING IN HEART FAILURE**

Name	Employment	Representation	Consultant	Speakers Bureau	Ownership/ Partnership/ Principal	Personal Research	Institutional/ Organizational or Other Financial Benefit	Expert Witness
Richard Kovacs	Indiana University, Krannert Institute of Cardiology—Q.E. and Sally Russell Professor of Cardiology	Official Reviewer, ACC Board of Trustees	None	None	None	None	None	None
Dhanunjaya Lakkireddy	Kansas University Cardiovascular Research Institute	Official Reviewer, ACC Board of Governors	None	None	None	None	None	None
Howard Weitz	Thomas Jefferson University Hospital—Director, Division of Cardiology; Sidney Kimmel Medical College at Thomas Jefferson University—Professor of Medicine	Official Reviewer, Competency Management Committee Lead Reviewer	None	None	None	None	None	None
Kiran Musunuru	Brigham and Women's Hospital, Harvard University	Organizational Reviewer, AHA	None	None	None	None	None	None
Richard Patten	Lahey Hospital And Medical Center, Division of Cardiovascular Medicine	Organizational Reviewer, HFSA	None	None	None	None	None	None
Michael Emery	Greenville Health System	Content Reviewer, Sports and Exercise Cardiology Section Leadership Council	None	None	None	None	None	None
Brian D. Hoit	University Hospitals Case Medical Center	Content Reviewer, Cardiology Training and Workforce Committee	None	None	None	None	None	None
Larry Jacobs	Lehigh Valley Health Network, Division of Cardiology; University of South Florida—Professor, Cardiology	Content Reviewer, Cardiology Training and Workforce Committee	None	None	None	None	None	None
Howard M. Julien	Thomas Jefferson University Hospital—Director, Division of Cardiology; Sidney Kimmel Medical College at Thomas Jefferson University—Vice Chair, Department of Medicine	Content Reviewer, HF&T Council	None	None	None	None	None	None
Andrew Kates	Washington University School of Medicine	Content Reviewer, Academic Cardiology Section Leadership Council	None	None	None	None	None	None
Wayne Miller	Mayo Clinic	Content Reviewer, HF&T Council	None	None	None	None	None	None

For the purpose of developing a general cardiology training statement, the ACC determined that no relationships with industry or other entities were relevant. This table reflects peer reviewers' employment, representation in the review process, as well as reporting categories. Names are listed in alphabetical order within each category of review. Please refer to <http://www.acc.org/guidelines/about-guidelines-and-clinical-documents/relationships-with-industry-policy> for definitions of disclosure categories, relevance, or additional information about the ACC Disclosure Policy for Writing Committees.

ACC = American College of Cardiology; AHA = American Heart Association; HF&T = Heart Failure and Transplant; HFSA = Heart Failure Society of America.

APPENDIX 3. ABBREVIATION LIST

ABIM = American Board of Internal Medicine

ABMS = American Board of Medical Specialties

ACC = American College of Cardiology

ACGME = Accreditation Council for Graduate Medical Education

AHFT = Advanced Heart Failure and Transplantation

COCATS = Core Cardiovascular Training Statement

HFSA = Heart Failure Society of America

HIPAA = Health Insurance Portability and Accountability Act

MCS = mechanical circulatory support

UNOS = United Network of Organ Sharing