Advanced Heart Failure and Transplant Fellowship
Program Curriculum

Program Director – Ron Zolty, MD, PhD

Clinical Competency Committee – Drs. Arif Albulushi, Adam Burdorf, Marshall Hyden, Brian Lowes, Scott Lundgren, Doug Stoller and Ron Zolty

Teaching faculty: Drs. Arif Albulushi, Adam Burdorf, Marshall Hyden, Brian Lowes, Scott Lundgren, Doug Stoller and Ron Zolty

LEVEL III OF TRAINING:

Level III training is required of individuals seeking subspecialty board certification in AHFTC. Trainees in AHFTC are expected to have completed 3 years of a cardiovascular fellowship and achieved Level I competency as 2017 ATS on Advanced Heart Failure and Transplant Cardiology as described in the ACC’s Core Cardiovascular Training Statement (2) and the COCATS 4 Task Force 12 report (3) before beginning the AHFTC fellowship. Level II training may be completed prior to or in conjunction with Level III training.

- **Training Program Mandate:** All AHFTC fellows should successfully complete level II training Heart Failure to during their 3 years of cardiovascular fellowship.

- **Rotation Requirements:**

  **Objectives:**

  The fellow(s) will play a key role in the inpatient and out-patient heart failure and transplant service and will gain experience in evaluation and management of patients with acute and chronic heart failure of various etiologies, mechanical circulatory support including left ventricular assist devices, pre-transplantation candidates, post-transplant patients, palliative and comfort care of end-stage heart failure patients.

  This rotation aims to develop the core competencies that include patient care that is compassionate, appropriate and effective, medical knowledge based on evidence based learning, practice based learning and improvement. Given the complexity and multidisciplinary nature of care needed for these patients, the fellow will develop his interpersonal and communication skills that result in effective information exchange with patients, their families and professional associates. The fellow(s) is expected to participate in research that advances the field. Opportunities are available in clinical trials, outcomes research and the basic sciences.
Specific Learning Objectives:

1. The diagnosis of acute and chronic heart failure, including history taking, physical examination, differential diagnosis and efficient use of appropriate diagnostic tests/imaging modalities.

2. Understand normal cardiac physiology and the derangements in heart failure

3. Understand the pathophysiology of heart failure (HF with reduced EF (HFrEF) and HF with preserved LVEF (HFpEF)).

4. Diagnosis and management of patients with acute decompensated heart failure/cardiogenic shock.

5. Evaluation and treatment of RV dysfunction

6. Pharmacology and pharmacotherapy of various meds used in heart failure

7. Impact and treatment of comorbidities in heart failure

8. Exercise and rehabilitation in patients with heart failure

9. Surgical approaches to chronic heart failure, including mechanical assist devices, heart transplantation.


11. Gaining insights into the timing and work-up for cardiac transplantation.

12. Understand basic heart transplant physiology.

13. Understand immunosuppression therapy, pharmacology and drug interactions

14. Understand common post-transplant complications


16. Diagnosis and treatment of uncommon entities like myocarditis, infiltrative cardiomyopathies, constrictive and restrictive cardiomyopathy, HCM.

17. End-of-life considerations.

Teaching Strategies:

1. The Congestive Heart Failure (CHF) Service consists of one AHFTC teaching attending, one advanced heart failure fellow (PGY7), one clinical cardiology fellow, APP and one heart failure/heart transplant nurse coordinator.

2. The scope of potential learning opportunities is extremely broad, and includes all of the challenges that can be brought to bear in the care of patients with acute and chronic ischemic and non-ischemic heart disease, valvular heart disease, cardiomyopathies, and acute and chronic rhythm disorders.

3. In order to meet the demands of the patients, we incorporate all potential teaching opportunities, including:
   
a. Structured attending rounds for at least two hours per day to allow detailed presentation of new patients, review of old patients, and a detailed, patient-oriented discussion and examination by the attending.

b. Patient management and care is oriented towards a team approach, and all members of the team will critically review and discuss the results of non-invasive and invasive diagnostic and therapeutic modalities.

c. All patients will be seen and examined by the attending physician and at least one other member of the team, and salient points of the history and physical examination will be emphasized at the bedside.

d. The cardiology fellow will gain experience as the team leader, under direct supervision of the attending. As such, the fellow will have considerable independence in patient evaluations, family meetings, working with nursing and ancillary staff, ordering noninvasive studies, requesting consultations from other medical and surgical services.

e. Participation in all required Cardiology conferences, including monthly journal clubs and morning didactics.

f. The Fellow is expected to review and implement appropriate guidelines for care and treatment of all heart failure problems. Formal guidelines from ACC, AHA, HFSA, ISHLT, etc. are available from web-based resources in the McGoogan Library. Other web-based resources are excellent sources for self-study, and include Cardiosource, UpToDate, and MDConsult.

Attending Responsibilities:

1. The attending must see each patient.

2. Provide guidance on the indications, implications, complications, and limitations of non-
invasive and invasive techniques.

3. Conduct daily morning rounds (9:30 am) for the CHF Service. To the extent possible, these rounds should focus on teaching and education, rather than “work rounds”.

4. The attending is expected to make the CHF Service activities a top priority and is encouraged to cancel other responsibilities including clinics and echo interpretation, etc.

5. The CHF Service attending will meet with the fellow at the beginning of the rotation to verbally review the goals, objectives and responsibilities for the upcoming month.

6. The CHF Service attending will meet with the fellow at the end of the monthly rotation to verbally review the fellow’s written evaluation and performance. The attending will also complete a formal evaluation of the fellow using New Innovations.

**Fellow Responsibilities:**

1. The Advanced Heart Failure and Transplant fellow will evaluate and admit (as deemed appropriate in discussion with the service attending) advanced heart failure patients, LVAD patients being admitted for medical reasons or after hours/weekend, pre- and post-transplant patients.

2. Will conduct daily in-patient rounds with the attending staff and team and will present and discuss patient’s hospital course and be actively involved in patient care.

3. Interact with LVAD team/transplant coordinator.

4. Participate in decision making on biopsy results and laboratory values, immunosuppression, heart failure and mechanical circulatory support (MCS) management under supervision.

5. Participate in clinical/basic research project under supervision. Help with patient evaluation and selection for new heart failure therapies.

**Fellow Requirements:**

1. Recognize various presentations of heart failure syndrome.

2. Perform a detailed history and a thorough physical examination for patients suspected of heart failure.

3. Develop an appropriate differential diagnosis and order appropriate laboratory and imaging studies.

4. Discuss appropriate invasive studies with the attending and arrange accordingly.
5. Address the comorbidities appropriately and consult the appropriate services.

6. Learn the basics of mechanical circulatory support and cardiac transplantation and actively seek information from the attending about these advanced therapies.

7. Recognize when to seek immediate help from other members of the team.

8. Become more familiar and proficient in the interpretation and performance of diagnostic modalities:
   a. Right heart catheterization.
   b. Hemodynamic studies.
   c. Right ventricular endomyocardial biopsies.

9. Understand the appropriate timing to refer patients with advanced heart failure to a center that offers expertise in the care and management of advanced heart failure.

10. Knowledge of advanced therapies available to patients with advanced heart failure.
    a. AICD ± CRT: Indications, effectiveness and limitations.
    b. Mechanical Circulatory Support (IABP, ECMO, RVAD, LVADs as BTT & DT) - able to interrogate the devices and perform basic interpretation recognizing the range of normal (and discuss with attending for troubleshooting), interpretation of imaging studies in patients with MCS.
    c. Cardiac transplantation (indications, contraindications, outcomes and limitations).
    d. Combined cardiac & renal transplantation (indications, limitations).

11. Understand the care and management of the heart transplant patient.
    a. Perioperative (emphasis on immunosuppression).
    b. Early postoperative (both cellular and humoral rejection).
    c. Active participation in management of immunosuppression, interpretation of biopsy results, imaging studies, infectious disease management, need for prophylaxis and appropriate prophylactic agents.
    d. Late post-operative (rejection and malignancy).
TRAINING GOALS FOR LEVEL III COMPETENCY IN AHFTC

MEDICAL KNOWLEDGE

Heart Failure

1. Know the principles of excitation-contraction coupling and the contractile apparatus of the cardiomyocyte.

2. Know the pathophysiology of heart failure, including such concepts as ventricular remodeling, neurohormonal activation, fetal gene expression, wall stress, signaling pathways (calcium, beta-adrenergic signaling, and nitric oxide), myocardial energetics, electrical and mechanical dyssynchrony, and the role of the extracellular matrix.

3. Know common genetic underpinnings of both dilated and hypertrophic cardiomyopathy, their clinical phenotypes, and the role of genetic testing for patients and their families.

4. Know important hemodynamic principles related to heart failure, including normal cardiac physiology, contractility, preload, afterload, and interpretation of pressure-volume loops and ventricular performance (Frank-Starling) curves.

5. Know the epidemiology and risk determinants of left ventricular dysfunction, ventricular hypertrophy, and heart failure (both with reduced and preserved ejection fraction), including incidence and prevalence overall and in special populations.

6. Know classification methods of heart failure including American College of Cardiology/American Heart Association stages, New York Heart Association classes, and INTERMACS (Interagency Registry for Mechanically Assisted Circulatory Support) profiles.

7. Know the risk factors, methods, and risk scores commonly used to stratify patients with heart failure, including their limitations, and how these methods are used to evaluate the need for advanced therapies.

8. Know the epidemiology and pathophysiology of acute systolic or diastolic heart failure, including new-onset and acute-on-chronic heart failure.

9. Know typical and atypical clinical presentations of patients with advanced heart failure (e.g., cachexia, worsening renal function, cognitive impairment, medication intolerance, ventricular tachycardia) and their management.


11. Know the pathophysiology, clinical presentation, and differential diagnosis of heart failure with preserved ejection fraction and its management.
12. Know the pathophysiology, clinical presentation, and methods of risk stratification of patients with hypertrophic cardiomyopathy and its management.

13. Know the distinguishing features of and appropriate diagnostic studies for specific etiologies of heart failure, including coronary artery disease, valvular heart disease, hypertension, myocarditis, infiltrative processes, toxins (e.g., illicit drugs), chemotherapy, pregnancy, congenital heart disease, radiation, pericardial processes, endocrinopathies, high-output states, stress cardiomyopathy, and inherited syndromes.


15. Know the evidence base, including randomized clinical trial data, supporting contemporary guideline-directed heart failure therapy.

16. Know the pharmacology of common inotropes and vasopressors used in the management of low-output heart failure and shock.

17. Know key principles regarding transitions of care between the outpatient and inpatient setting, and vice versa, including indications for hospitalization and readiness for discharge for patients with heart failure.

18. Know the role of assays for natriuretic peptide and other biomarkers in the management of patients with heart failure.

19. Know the utility of noninvasive imaging (e.g., echocardiography, nuclear cardiology, cardiac magnetic resonance imaging, and positron emission tomography) in assessment of patients with cardiomyopathy (including those related to valvular heart disease) and heart failure.

20. Know the strengths and limitations of common quality-of-life tools (e.g., Minnesota Living with Heart Failure and Kansas City Cardiomyopathy Questionnaire) used in patients with heart failure.

21. Know which lifestyle choices and comorbidities (e.g., obstructive sleep apnea, depression, anemia, diabetes, hypertension, renal failure) contribute to the development of or clinical instability of patients with heart failure, as well as potential management options for such comorbid conditions.

22. Know the roles of submaximal (including 6-minute walk) and maximal exercise testing, and cardiopulmonary stress testing in patients with heart failure.

23. Know the roles of implantable cardiac electronic device therapy in patients with heart failure, including cardioverter-defibrillators, pacemakers, and resynchronization devices.
24. Know the roles of coronary imaging, ischemia testing, viability testing, and revascularization in patients with heart failure.


26. Know the epidemiology and pathophysiology of the cardiorenal syndrome and its management.

27. Know the pathophysiology of cardiac dysfunction associated with cirrhosis and the hemodynamic consequences of portal hypertension.

28. Know the role of implantable technology to allow monitoring of patients with heart failure, including from afar (i.e., remote monitoring).

29. Know the definition of frailty, tools available for assessment of frailty, and how frailty influences diagnosis, prognosis, and candidacy for advanced therapies in patients with heart failure.

30. Know the roles of palliative and hospice care in patients with heart failure and the steps needed to implement them.

31. Know the role of endomyocardial biopsy in the evaluation of myocarditis and infiltrative cardiomyopathies.

32. Know the various chemotherapy agents associated with heart failure and the management of cardiac complications of chemotherapy.

33. Know the potential contribution of arrhythmias to development of heart failure and/or decompensation and appropriate pharmacological and ablation options for therapy.

34. Know the roles of exercise training and cardiac rehabilitation in patients with heart failure with or without pulmonary hypertension, cardiac transplantation, or mechanical circulatory support.

**Pulmonary Hypertension**

35. Know the World Heart Organization classification and etiologies of pulmonary hypertension.

36. Know the epidemiology, risk factors, prognostic factors, and natural history of pulmonary hypertension.

37. Know the functional classes and appropriate treatment of patients with each type of pulmonary hypertension.
38. Know the role of invasive hemodynamic assessment, including when to perform vasoreactivity testing to assess and manage patients with pulmonary hypertension, including pre- and post-capillary components.

39. Know the classes of medications available to treat pulmonary hypertension and their use alone and in combination, including management of side effects.

40. Know the roles of exercise and cardiopulmonary testing to assess and manage patients with pulmonary hypertension.

41. Know the indications for referral to a specialized pulmonary hypertension center.

42. Know the roles of balloon atrial septostomy, thromboendarterectomy, and lung transplantation in patients with pulmonary arterial hypertension.

**Mechanical Circulatory Support**

43. Know indications for and contraindications to both temporary and durable mechanical circulatory support for bridging and destination therapy.

44. Know the expected survival following use of durable mechanical circulatory support.

45. Know clinical determinants favoring mechanical circulatory support versus transplantation as durable strategies.

46. Know optimal anticoagulation strategies for patients with ventricular assist devices.

47. Know the management principles for patients with cardiogenic shock, including selection of temporary mechanical circulatory support.

48. Know the management principles and potential complications of extracorporeal membrane oxygenation.

49. Know the anatomic, surgical, and comorbid conditions that may impact mechanical circulatory support strategies in adult patients with congenital heart disease.

50. Know intraoperative and early postoperative complications of durable mechanical circulatory support.

51. Know the risk factors for and presentations and management of common complications of durable ventricular assist devices, including right heart failure, stroke, driveline infections, device thrombosis, hemolysis, gastrointestinal bleeding, and aortic insufficiency.

52. Know the risk scores that predict right heart failure in patients with left ventricular assist devices.
Cardiac Transplantation
53. Know the indications for and contraindications to heart transplantation.

54. Know when patients listed for heart transplant need mechanical circulatory support, and the potential benefits and complications of this type of therapy.

55. Know current United Network for Organ Sharing allocation listing policies for heart transplantation.

56. Know the expected short- and long-term survival rates following heart transplantation.

57. Know the role of multiorgan (e.g., heart-lung, heart-kidney, heart-liver) transplantation.

58. Know the principles of immunology that pertain to heart transplantation, including sensitization and histocompatibility.

59. Know and understand the efficacy, risks, and limitations of currently available methods for desensitization of patients awaiting heart transplantation.

60. Know the preoperative considerations applicable to potential heart transplant recipients.

61. Know the anatomic, surgical, and comorbid conditions that may impact transplant surgery planning and outcomes in adult patients with congenital heart disease, necessitating evaluation at a transplant center with expertise in these conditions.

62. Know the intraoperative and early postoperative complications of heart transplantation and their management.

63. Know the process by which the heart procurement team interacts with teams procuring other organs from donors.

64. Know the factors used to assess the suitability of a potential donor heart.

65. Know the mechanisms of action, side effects, and potential drug–drug interactions of immunosuppressant drugs.

66. Know how cardiac denervation impacts cardiac physiology, including response to exercise and pharmacological agents, and clinical manifestations of myocardial ischemia.

67. Know the risk factors for, clinical presentations of, and treatment for hyperacute, acute cellular, and antibody-mediated rejection.

68. Know the risk factors, clinical presentation, International Society for Heart & Lung Transplantation grading system, and strengths and limitations of diagnostic tools for
cardiac allograft vasculopathy.

69. Know when to consider cardiac retransplantation.

70. Know common post-transplant complications and how to monitor them in the outpatient setting, including hypertension, diabetes, malignancy, renal dysfunction, infection, obesity, and endocrinological and neurological sequelae.

71. Know the strengths and limitations of strategies used to detect and monitor transplant rejection.

72. Know the grades of acute cellular and antibody-mediated transplant rejection, based on interpretation of an endomyocardial biopsy.

73. Know the clinical presentation of common opportunistic infections in cardiac transplant recipients, as well as the potential for donor transmission of infectious organisms.

**EVALUATION TOOLS:** chart-stimulated recall and direct observation.

**PATIENT CARE AND PROCEDURAL SKILLS**

**Heart Failure**

1. Skill to oversee genetic testing of patients with cardiomyopathy, including selection of patients and collaboration with genetic counselors.

2. Skills to optimize therapeutic regimens based on guideline-directed pharmacological and device-based therapies in stable patients with heart failure with reduced ejection fraction.

3. Skill to estimate the jugular venous pressure by clinical examination.

4. Skills to optimize a diuretic regimen in both the inpatient and outpatient settings.

5. Skill to decide whether and when to hospitalize patients with heart failure.

6. Skill to optimize pharmacological therapies in patients with decompensated heart failure, including adjustments after stabilization and prior to discharge.


8. Skill to select individualized diagnostic testing for patients with a new diagnosis of heart failure.
9. Skill to minimize the risk of hospital readmission following discharge for decompensated heart failure.

10. Skills to recognize and stabilize patients with cardiogenic shock.

11. Skills to recognize and stabilize noncardiogenic shock in patients with cardiomyopathy or a history of heart failure.

12. Skills to perform and interpret findings from right heart catheterization in patients with heart failure.

13. Skills to assess risk of patients with heart failure undergoing cardiac or noncardiac surgery, and to manage their hemodynamic status perioperatively.

14. Skills to perform and interpret cardiopulmonary stress testing.

15. Skills to initiate palliative and supportive care and to address symptoms and goals of care for patients with advanced heart failure across the care continuum.

16. Skills to manage supraventricular and ventricular arrhythmias in patients with stable or decompensated heart failure.

17. Skill to collaborate with cardiac electrophysiologists to stabilize patients with ventricular tachycardia storm complicating cardiomyopathy, heart failure, or mechanical circulatory support.

18. Skill to collaborate with cardiac surgeons, interventional cardiologists, or members of a structural heart care team to determine whether percutaneous or surgical valve intervention is necessary for patients with heart failure.

19. Skills to work effectively with experts in adult congenital heart disease to assess and manage patients with these conditions, including determining when to employ mechanical support or cardiac transplantation.

20. Skill to determine the indications for coronary revascularization in patients with ischemic cardiomyopathy.

21. Skills to interrogate implantable cardioverter-defibrillators, cardiac resynchronization pacemakers, and cardiac resynchronization-defibrillator devices in patients with cardiomyopathy and/or heart failure to determine the burden of arrhythmias, diagnostic information, and basic device functionality.

22. Skill to determine when patients are inotrope-dependent and to manage them in the outpatient setting.

23. Skill to work effectively with obstetricians in the care of pregnant patients with a
cardiomyopathy and/or heart failure.

24. Skill to provide self-help tools to patients with heart failure to minimize the risk of decompensation.

25. Skills to educate heart failure patients about warning signs that signify or predict clinical instability, and to help them develop action plans in the event warning signs appear.

**Pulmonary Hypertension**

26. Skill to evaluate patients with pulmonary hypertension to determine etiology.

27. Skill to recommend the initial pharmacological regimen for patients with pulmonary arterial hypertension.


29. Skills to perform serial noninvasive assessments of right ventricular function and pulmonary arterial pressure and integrate these data in the management of patients with pulmonary hypertension.

30. Skills to detect clinical deterioration in patients with pulmonary hypertension and adjust treatment accordingly, including determining when hospitalization is necessary.

31. Skill to stabilize patients with acute right ventricular failure in the setting of pulmonary hypertension.

**Mechanical Circulatory Support**

32. Skill to identify appropriate options for temporary hemodynamic support for patients in cardiogenic shock.

33. Skill to identify appropriate candidates for durable ventricular assist devices.

34. Skills to interrogate, interpret, and manipulate pump parameters in patients with temporary and durable hemodynamic assist devices.

35. Skill to recognize the indications for total artificial heart or right ventricular assist device rather than left ventricular assist device alone.

36. Skill to optimally set the speed of durable ventricular assist devices.

37. Skills to select and interpret noninvasive and invasive data to evaluate patients with temporary and durable ventricular assist devices (e.g., ramp study, aortic valve opening, or right ventricular assessment).
38. Skills to identify and manage right heart failure in patients with left ventricular assist devices.

39. Skill to manage long-term durable mechanical circulatory support in the outpatient setting.

40. Skills to recognize and manage complications of durable mechanical circulatory support, including stroke, device thrombosis, right heart failure, hypertension, or arrhythmias.

41. Skills to recognize left ventricular recovery and assess patients with left ventricular assist devices for potential explanation.

42. Skill to determine whether and when to hospitalize patients with durable ventricular assist devices.

43. Skill to select management options (including hospitalization and diagnostic investigation) for patients with durable ventricular assist devices and gastrointestinal bleeding.

44. Skills to collaborate with anesthesiologists and procedural specialists to optimize management during invasive procedures or noncardiac surgery in patients with continuous flow, durable ventricular assist devices.

**Cardiac Transplantation**

45. Skill to determine whether and when patients warrant cardiac transplantation.

46. Skill to recognize comorbidities that preclude cardiac transplantation.

47. Skill to recognize irreversible pulmonary hypertension that precludes isolated heart transplantation.

48. Skill to assess the suitability of a given heart for transplantation in a potential recipient.

49. Skills to adjust immunosuppressant therapy to minimize the risk of rejection, while balancing competing risks of infection, malignancy, renal failure, and other toxicities.

50. Skill to collaborate with colleagues in the histocompatibility laboratory to assess a heart transplant recipient’s reactive antibody panel, preformed and post-transplant antihuman leukocyte antigen antibodies, and immunological compatibility with a donor heart.

51. Skill to manage heart transplant recipients in the immediate post-transplant period, including those with complications, in conjunction with a multidisciplinary team.
52. Skill to determine whether and when illness in heart transplant recipients requires hospitalization.

53. Skills to interpret with a pathologist the findings of endomyocardial biopsies to determine the need for treatment of acute cellular or antibody-mediated rejection, and oversee treatment.

54. Skills to collaborate with other members of a multidisciplinary team in managing common comorbidities and complications following heart transplantation, including hypertension, dyslipidemia, renal insufficiency, infection, and cancer.

55. Skills to collaborate with invasive and interventional cardiologists in the prevention, recognition, and treatment of transplant vasculopathy.

56. Skills to interpret noninvasive tests, including echocardiograms, gene expression profiling (e.g., Allomap testing), and other biomarkers to evaluate for rejection in heart transplant recipients.

57. Skill to perform endomyocardial biopsy to assess for transplant rejection.

58. Skill to prescribe therapies to prevent opportunistic infections, including Cytomegalovirus, Nocardia, and Pneumocystis Jiroveci pneumonia in heart transplant recipients.

59. Skill to oversee the use of immunizations in patients before and after cardiac transplantation.

EVALUATION TOOLS: chart-stimulated review, direct observation, and multisource evaluation.

SYSTEMS-BASED PRACTICE

1. Utilize appropriate care settings and teams for patients with various profiles and stages of heart failure before or after mechanical circulatory support or transplantation.

2. Incorporate risk/benefit analysis and cost considerations in diagnostic and treatment decisions, including the adoption of new technologies.

3. Utilize an interdisciplinary, coordinated team approach for patient management, including care transitions, palliative care, and employment-related issues.

4. Effectively utilize an interdisciplinary transitional-care approach to monitor the progress of ambulatory patients with heart failure to maintain stability and avoid preventable hospitalization.

5. Collaboratively work with all members of the advanced heart failure and transplant
cardiology team, including cardiac surgeons, palliative care specialists, other medical consultants, nurses, nurse practitioners, physician assistants, social workers, dietitians, physical and occupational therapists, and pharmacists.

6. Identify the financial, cultural, social, and emotional barriers to successful outcomes after mechanical circulatory support or transplantation.

7. Effectively utilize an interdisciplinary approach to care for patients with or at risk of advanced heart failure, pulmonary hypertension, and mechanical circulatory support or cardiac transplantation.

**EVALUATION TOOLS:** chart-stimulated recall, direct observation, and multisource evaluation.

**PRACTICE-BASED LEARNING AND IMPROVEMENT**

1. Identify knowledge and performance gaps and engage in opportunities to achieve focused education and performance improvement.

2. Utilize decision support tools to access guidelines and pharmacological information at the point of care.

3. Incorporate feedback from faculty and staff to improve performance.

4. Develop habits of regular and critical reading of the heart failure/transplant literature to maintain current knowledge of the field and promote lifelong learning.

**EVALUATION TOOLS:** conference presentation, direct observation, global evaluation, reflection, and self-assessment.

**PROFESSIONALISM**

1. Show compassion for and effective management of end-of-life issues, including discussions of death and dying, across the spectrum of patients with heart failure, pulmonary hypertension, mechanical circulatory support, or heart transplantation.

2. Clearly and objectively discuss available therapies for advanced heart failure, including palliative care, mechanical circulatory support, or transplantation.

3. Interact respectfully with patients, families, and all members of the healthcare team, including ancillary and support staff.

4. Demonstrate high ethical standards, including the recognition and management of overt and more subtle potential conflicts of interest, when making diagnostic or therapeutic decisions.

**EVALUATION TOOLS:** conference presentation, direct observation, multisource
evaluation, reflection, and self-assessment.

INTERPERSONAL AND COMMUNICATION SKILLS

1. Communicate with and educate patients and families across a broad range of cultural, ethnic, and socioeconomic backgrounds.

2. Engage in shared decision making, including the potential role of palliative care and discussing the risk of death, with patients and their families considering mechanical circulatory support and/or transplant.

3. Effectively lead the interdisciplinary heart failure team to promote comprehensive and balanced decision making with respect to the selection of mechanical circulatory support versus heart transplantation.

4. Skill to discuss the potential for donor transmission of infectious agents to the recipient, and ability to use a shared decision-making approach with recipients when assessing a donor at risk.

5. Skill to provide emotional support to patients and their families before and after mechanical circulatory support or cardiac transplantation.

EVALUATION TOOLS: direct observation and multisource evaluation.

Additional competencies that extend beyond the core expectations and that may be achieved by some advanced heart failure and transplant cardiology (AHFTC) specialists based on career focus, either during or following formal AHFTC fellowship training (see text for details).
More specifically:

- Appropriate selection of the optimum modality on a case-by-case basis, clinical judgment, acquisition, and interpretive skills should be evaluated in every trainee.

- Evaluation tools may include direct observation by faculty, case logbooks, conference and case presentations, multisource evaluations, trainee portfolios, or simulation if available. Each fellow is to be evaluated on a monthly basis at the end of the AHFTC rotation, as follows (360° Evaluation):

A formal evaluation will be completed by the AHFRC attending’s, nurses using New Innovations, and the content of the evaluation will be reviewed verbally with the fellow. **Any negative evaluations must be discussed face to face with the fellows and the Program Director must be notified.** Fellows will also be evaluated on a monthly basis by the Round Nurses and fellows rotating on the Heart Failure service.

The AHFC fellows will complete a written evaluation of the AHFCR faculty(s) bi-monthly using New Innovations. This evaluation will be reviewed on an annually basis by the Program Director and Chief of Cardiology.
• Interaction with other physicians, patients, and laboratory support staff; initiative; reliability; decisions or actions that result in complications; and the ability to make appropriate decisions independently and follow up appropriately should be considered in these assessments.

• The teaching faculty and staff should record and verify each trainee’s experiences, assess their performance, and document satisfactory achievement, preferably at the point of care to ensure assessment accuracy and to avoid recollection bias.

• The program director is responsible for confirming trainees’ experience and competence and reviewing the overall progress of individual trainees with the Clinical Competency Committee to ensure achievement of selected training milestones and to identify areas in which additional focused training may be required.

• Fellows are expected to attend Cardiology Grand Rounds, Heart Failure & Cardiac Transplantation conference, and weekly Heart Transplant Selection Committee meeting, bi-weekly Patient Safety Committee meeting and monthly Heart Failure Oversight and PI meeting and, in parallel, utilize self-study reading material.

• To be a candidate for Level III training in AHFRC, fellows have to successfully complete all Level I and II core competencies and curriculum milestones.