This service performs coronary revascularization, valve replacement and lung cancer resections. There are 2 faculty members who are primarily at the VA and other faculty who participate on a daily basis in conjunction with two physician extenders. There is a first or second year cardiothoracic resident, and a PGY I and PGY III general surgery resident on the service. General learning objectives and responsibilities include:

**PGY I** - This resident is responsible for initial work-ups and management of the floor patients. The PGY I will also manage the ICU patients in conjunction with the PGY III and cardiothoracic resident under the supervision of the faculty. Attendance at Tuesday morning TCV Resident Conference and Friday morning TCV General Surgery Resident Conference is essential. At the completion of the rotation the resident should be able to:

**Patient Care**

1. Use critical thinking when making decisions affecting the life of a patient and the patient's family.
2. Teach patients and their families about the patient's health needs.
3. Perform a directed history and physical in the patient with cardiovascular disease.

**Medical Knowledge**

1. Manage surgical disorders based on a thorough knowledge of basic and clinical science.
2. Recognize and treat postoperative complications after thoracic surgery.
3. Understand the anatomy and physiology of the cardiopulmonary system and changes expected after cardiopulmonary bypass.
4. Describe the pharmacology and use of drugs to support the myocardium.

**Practice-Based Learning and Improvement**

1. Value lifelong learning as a necessary prerequisite to maintaining surgical knowledge and skill.
2. Utilize appropriate skill in those surgical techniques required of a qualified surgeon.
3. Place monitoring lines and interpret data obtained from them.
4. Participate as assistant in cardiovascular procedures and vein harvest/closure

**Interpersonal and Communication Skills**

1. Collaborate effectively with colleagues and other health professionals.
2. Teach and share knowledge with colleagues, residents, students, and other health care providers.
**Professionalism**

1. Respect the cultural and religious needs of patients and their families, and provide surgical care in accordance with those needs.
2. Make sound ethical and legal judgments appropriate for a qualified surgeon.
3. Be committed to scholarly pursuits through the conduct and evaluation of research.

**Systems-Based Practice**

1. Provide cost-effective care to surgical patients and families within the community.
2. Be prepared to manage complex programs and organizations.

**PGY III** - This resident is the senior general surgery resident on the service and is responsible for the management of the intensive care unit patients, responding to consults and performing thoracotomies under the supervision of the cardiothoracic resident and faculty. Attendance at Tuesday morning TCV Resident Conference and Friday morning TCV General Surgery Resident Conference is essential. At the completion of the rotation the resident should be able to:

**Patient Care**

1. Use critical thinking when making decisions affecting the life of a patient and the patient's family.
2. Teach patients and their families about the patient's health needs.
3. Manage critically ill patients and use a variety of modalities to support the patient including drugs, fluids, diuretics and mechanical devices.

**Medical Knowledge**

1. Manage surgical disorders based on a thorough knowledge of basic and clinical science.
2. Identify the indications for thoracotomy and perform thoracotomies and lung resections under supervision.
3. Perform diagnostic and therapeutic bronchoscopy and mediastinoscopy.
4. Explain the indications, risks, benefits and alternatives in the treatment of acquired cardiac and pulmonary disease.
5. Discuss commonly occurring congenital anomalies of the heart and lungs and their correction.

**Practice-Based Learning and Improvement**

1. Value lifelong learning as a necessary prerequisite to maintaining surgical knowledge and skill.
2. Utilize appropriate skill in those surgical techniques required of a qualified surgeon.
Interpersonal and Communication Skills

1. Collaborate effectively with colleagues and other health professionals.
2. Teach and share knowledge with colleagues, residents, students, and other health care providers.
3. Outline the treatment of thoracic injuries and the indication for further diagnostic or therapeutic interventions.

Professionalism

1. Respect the cultural and religious needs of patients and their families, and provide surgical care in accordance with those needs.
2. Make sound ethical and legal judgments appropriate for a qualified surgeon.
3. Be committed to scholarly pursuits through the conduct and evaluation of research.

Systems-Based Practice

1. Provide cost-effective care to surgical patients and families within the community.
2. Be prepared to manage complex programs and organizations.

Senior level residents on the Thoracic Surgery Service work at the VAMC closely with the Thoracic Surgery Resident and attending faculty. They play an integral part in the daily rounds, operating room interventions and post op care, taking in-house call and covering all aspects of the service. This close interaction allows hourly, daily and overall evaluation and critique opportunities by the faculty to broaden their awareness of unique cardio-thoracic problems. When possible, they also participate in the transplant program at Shands at UF, and operate with the faculty frequently on non-cardiac cases at Shands if their work load permits. Their evaluations at the end of the rotation provide good feedback as to their progress in our specialty.

Goal

Demonstrate knowledge of the anatomy, physiology, and pathophysiologic conditions of the heart and great vessels which are amenable to surgical correction.

Demonstrate the ability to clinically manage patients with pathologic conditions of the heart and great vessels.
COMPETENCY-BASED KNOWLEDGE OBJECTIVES:

Junior Level:

1. Describe and demonstrate a working knowledge of the heart and great vessels, including:
   a. Cardiac chambers (atria and ventricles)
   b. Cardiac valves (mitral, aortic, tricuspid, pulmonic)
   c. Coronary arteries
   d. Intrinsic neural conduction system
   e. Extrinsic neural innervation (sympathetic and parasympathetic)
   f. Great vessels (cavae, aorta, innominate artery, carotid arteries, and subclavian arteries)
2. Describe and demonstrate working knowledge of cardiac physiology, including:
   a. Electrophysiology (action potential, depolarization, repolarization, mechanisms of rhythm control)
   b. Determinants of cardiac output (heart rate and stroke volume)
   c. Interactions and control mechanisms (preload, afterload, contractility, Frank-Starling Law, peripheral resistance)
   d. Determinants of myocardial oxygen consumption
   e. Normal pressures, waveforms, and oxygen saturation in cardiac chambers

4. Discuss the information obtained from the history and physical examination pertinent to cardiac and peripheral vascular pathophysiology. Determine the interactions of those details and their implications on planned surgical procedures and outcomes. Consider the following for risk assessment and perioperative management:
   a. Patient age
   b. Risk factors for cardiovascular disease (family history, smoking, hypertension, diabetes mellitus, hyperlipidemia, and obesity)
   c. Symptoms/signs associated with coronary artery disease, ventricular dysfunction, and valvular dysfunction
   d. Pulmonary dysfunction (pulmonary hypertension, chronic obstructive pulmonary disease [COPD], previous pulmonary resection)

5. Discuss the use and interpretation of cardiovascular diagnostic tests in identification of cardiovascular pathology, including:
   a. Electrocardiography
   b. Echocardiography (transthoracic and transesophageal)
   c. Traditional roentgenography
6. Describe and assess the operative indications, risk, and expected outcomes associated with several cardiac surgical procedures, including:
   a. Coronary artery bypass and minimally invasive direct coronary artery bypass surgery
   b. Valvular replacement/repair (aortic, mitral, tricuspid)
   c. Operations of the ascending aorta, aortic arch and descending thoracic aorta
   d. Permanent pacemaker/automatic defibrillator insertion
e. Pericardial drainage procedure

7. Discuss the complications of cardiac surgery and methods used to reduce their incidence. Complications: death, myocardial infarction, stroke, bleeding, arrhythmias, low cardiac output syndrome, cardiac tamponade, pneumothorax, sternal and extremity wound infections, respiratory and renal failure

Senior Level:

1. Discuss the pathophysiology of acquired cardiac disease including:
   a. Myocardial ischemia
   b. Valvular heart disease (stenotic and regurgitant)
   c. Endocarditis
   d. Ventricular aneurysms
   e. Thoracic aneurysms
   f. Trauma to the heart and great vessels

2. Summarize the management of the following post-cardiac surgery variances, including the monitoring, prevention, and the therapeutic intervention of:
   a. Arrhythmias (ventricular and atrial)
   b. Bleeding (correction of coagulopathy, indications for re-exploration)
   c. Infection (methods of prophylaxis, empiric and culture-specific therapy)
   d. Low cardiac output and hypotension
   e. Postoperative hypertension

3. Demonstrate working knowledge and use of the following postoperative support systems:
   a. Cardiac drugs (inotropic, chronotropic, afterload-reducing, anti-platelet, beta-blockade, ACE inhibition, diuretics)
   b. Mediastinal and pleural drainage
   c. Mechanical ventilation, airway management systems
   d. Temporary and permanent pacemakers
   e. Intra-aortic balloon pumps and other ventricular assist devices
   f. Dialysis and ultrafiltration
   g. Cardiopulmonary bypass and extracorporeal membrane oxygenation

4. Summarize the diagnostic evaluation and indications for each of the following surgical procedures:
   a. Coronary artery bypass grafting
   b. Adult valvular repair and replacement procedures (mechanical vs. bioprosthetic)
   c. Resection of ventricular aneurysms
   d. Resection and grafting of thoracic aneurysms
   e. Combination operations of valve replacement and coronary artery bypass grafting
   f. Surgical treatment of idiopathic hypertrophic subaortic stenosis

5. Discuss the evaluation and therapeutic options available for surgical management of cardiac trauma such as:
   a. Traumatic transection of the aorta and other great vessels
   b. Blunt and penetrating cardiac and great vessel injury

6. Outline the post-hospitalization follow-up and management of cardiac surgery patients to include:
   a. Instructions to the patient
b. Follow-up clinic visit (including physical examination, electrocardiogram [ECG], Chest x-ray)
c. Long-term follow-up for coronary and valve patients (including anticoagulation adjustment where indicated)

**COMPETENCY-BASED PERFORMANCE OBJECTIVES:**

**Junior Level:**

1. Perform preoperative evaluation, history, and physical examination of cardiac surgery patients.
2. Obtain and interpret indicated diagnostic studies.
3. Discuss diagnostic and therapeutic approaches to specific acquired and congenital cardiac diseases with the attending physicians.
4. Assist with selected cardiac and general surgery cases, such as:
   a. Pacemaker and defibrillator insertions
   b. Saphenous vein harvest and wound closure for coronary bypass operations
   c. Valve and coronary operations
   d. Pericardial drainage operations
   e. Tracheostomy
   f. Minor vascular repairs
5. Provide postoperative cardiac surgery follow-up care for the following cases:
   a. Coronary surgery
   b. Valve surgery
   c. Thoracic aortic surgery
   d. Pacemaker and defibrillator placement
6. Perform percutaneous insertion of chest tubes and intravenous, intra-arterial, and pulmonary artery catheters with supervision.

**Senior Level:**

1. Serve as first assistant on selected major cardiothoracic cases, including:
   a. Coronary artery bypass surgery, minimally invasive direct coronary artery bypass
   b. Valvular replacements and repairs, including minimally invasive procedures
   c. Thoracic aortic surgery
   d. Congenital cardiac surgery
   e. Complex defibrillators
   f. Emergency thoracotomies
2. Perform cardiac procedures, under supervision, including the following:
   a. Insert intra-aortic balloon pump
   b. Pacemaker implantation
   c. Median sternotomy incision
   d. Aortic cannulation for cardiopulmonary bypass
   e. Saphenous vein and internal thoracic artery harvest
   f. Perform proximal coronary anastomoses
   g. Repair of vascular trauma
3. Coordinate the work-up of emergency cardiac surgery cases with:
   a. Emergency room or trauma team
   b. Cardiac catheterization laboratory
c. Diagnostic imaging services
d. Laboratory (including blood bank)
e. Anesthesia
f. Operating room
g. Perfusion services
4. Assist with emergency cardiac surgery, including trauma cases.
5. Recognize and prescribe treatment for complications of cardiac surgery such as:
a. Gastrointestinal bleeding
b. Cerebrovascular accident
c. Endocrine abnormalities
d. Pulmonary complications
e. Renal dysfunction
f. Coagulopathy
g. Dysrhythmias
h. Low cardiac output status