1. Objectives of Training and Specialty Training Requirements in Cardiac Surgery 2000

(Please see also the “Policies and Procedures” booklet.)

1.1 Definition
Cardiac Surgery is that branch of surgery concerned with diseases of the pericardium, heart and great vessels. The resident who has completed training in Cardiac Surgery is expected to function as an independent consultant with respect to the diagnosis and management of patients with cardiovascular disease, including the provision of surgical intervention when indicated and postoperative care. Appropriate roles for the cardiac surgeon include: medical expert and clinical decision maker, communicator, collaborator, manager, health advocate, scholar, and research scientist. As a dedicated professional, and consistent with the obligations of a physician, the cardiac surgeon must endeavor to deliver highest quality care with integrity, honesty and compassion, exhibit appropriate personal and interpersonal professional behaviours and practice medicine ethically giving priority to the needs of individual patients. Continuing education and evaluation are expected throughout the cardiac surgeon’s professional life including an appreciation of the role of research and the need for critical analysis of current scientific and practice developments related to the specialty.

1.2 General Objectives
On completion of the educational program, the graduate physician will be competent to function as a consultant in Cardiac Surgery. Residents must demonstrate the knowledge, and technical skills relating to gender, culture and ethnicity pertinent to cardiac surgery. In addition, all residents should demonstrate an ability to incorporate gender, cultural and ethnic perspectives in research methodology, data presentation and analysis.

1.3 Specific Objectives
At the completion of training, the resident will have acquired the following competencies and will function effectively as:

Medical Expert/Clinical Decision-Maker

General Requirements

Demonstrate diagnostic and therapeutic skills for ethical and effective patient care. Access and apply relevant information to clinical practice. Demonstrate effective consultation services with respect to patient care, education and legal opinions.

Specific Requirements
Acquire knowledge of the principles essential to care of cardiac surgical patients including:
Thoracic incisions: types, indications.
Surgical nutrition.
Anticoagulation: indications, complications, management of heparin induced thrombocytopenia.
Cardiac medications: inotropes, antiarrhythmics, vasoactive agents; use and complications.
Recognition and management of concomitant medical conditions including diabetes, renal failure, respiratory failure.
Principles of diagnosis and management of the trauma patient particularly thoracic injury.
Recognition and management of vascular, neurological and general surgical complications in cardiac patients including peptic ulcer disease, hepatobiliary disease, limb ischemia, etc.
Natural history, presentation, investigation and management of extracranial cerebral vascular disease, particularly when presenting with cardiac disease.
Anesthetic management including the use of sedatives, analgesics and local anesthetic agents.

**Acquire the following clinical skills:**

Recommend appropriate surgical approach.
Recognize and treat wound complications including infections, dehiscence, mediastinitis and prescribe appropriate prophylactic measures for infection prevention.
Institute and monitor surgical nutrition via enteral or parenteral route.
Recognize need for and appropriate use of cardiac medications.
Manage patients with concomitant medical problems including control of diabetes and other endocrine imbalances, renal failure, respiratory insufficiency.
Diagnose and institute appropriate management of trauma patients.
Diagnose and institute appropriate management of gastrointestinal complications in cardiac patients.
Diagnose and institute appropriate management of generalized atherogenesis.
Recommend appropriate investigations and therapeutic interventions for patients with cerebrovascular disease, particularly when presenting with concomitant cardiac disease.

**Acquire the following technical skills:**

Perform sternotomy and thoracotomy incisions: understand and perform techniques for safe redo sternotomy.
Perform wound debridement, resuturing of sternum.
Insert central venous cannulas for parenteral nutrition and dialysis.
Insert chest tubes, resuscitate trauma patients.
Perform repair of traumatic injuries to chest including thoracic aortic tears, cardiac lacerations, and lung lacerations.
Implant appropriate devices including pacemaker and defibrillator systems, intraaortic balloon pumps and other cardiopulmonary support devices.
Manage airway problems including performance of tracheostomy.

The following specific objectives describe the knowledge, clinical and technical skills required of a physician upon completion of the educational program in cardiac surgery. The list of operations included under technical skills is neither exclusive nor compulsory but rather is included as a guide.

**Cardiopulmonary Bypass**

**Knowledge**

- Use and pathophysiology of cardiopulmonary bypass including deleterious effects.
- Design and function of components of cardiopulmonary bypass circuits including alternate types of pumps and oxygenators.
- Catastrophic complications of cardiopulmonary bypass (CPB).
- Effects of CPB on inflammatory, coagulation and hematological systems as well as endorgan damage.

**Clinical Skills**

- Recommend appropriate method of CPB including cannulation, temperature management.
- Recognize and manage catastrophic complications including air embolism, mechanical failure of CPB equipment, clotting on CPB.
- Recognize deleterious effects of CPB and recommend methods to minimize them.

**Technical Skills**

- Institute CPB using a variety of cannulation devices and techniques.
- Conduct bypass appropriately including venting and cooling techniques.
- Institute appropriate action for CPB accidents.

**Myocardial Protection**

**Knowledge**

- Mechanisms of myocardial injury and their prevention.
- Myocardial metabolic pathways and their response to ischemia and reperfusion.
- Cardioplegia composition, temperature, alternate delivery methods and assessment of myocardial protection.

**Clinical Skills**

- Recognize the need for myocardial protection and recommend appropriate methods to achieve it.
**Technical Skills**

Institute effective myocardial protection using a variety of delivery methods. Demonstrate ability to assess effectiveness of protection.

**Ischemic Heart Disease**

**Knowledge**

- Principles of management of patients with ischemic heart disease
- Anatomy and physiology of coronary circulation and effects of obstruction.
- Pathophysiology of atherosclerosis and acute ischemic syndromes.
- Principles and use of imaging techniques for myocardial ischemia including electrocardiography (EKG), stress tests, coronary angiography, nuclear medicine scans, stress echocardiography.
- Medical and surgical management of chronic coronary insufficiency including indications, timing and outcomes for revascularization.
- Management of unstable angina and acute myocardial infarction and its complications including ischemic ventricular septal defect (VSD), cardiac rupture and mitral insufficiency.
- Role of primary and secondary prevention; current recommendations.

**Clinical Skills**

- Use and interpret appropriately tests of myocardial ischemia.
- Use and interpret appropriately tests of myocardial viability including differentiation of stunned/hibernating myocardium from necrotic/scar tissue.
- Recognize and manage acute and chronic coronary ischemia.
- Recommend appropriate timing of alternative treatment strategies including medical, interventional catheterization and surgical treatment.
- Recognize and recommend treatment for complications of coronary ischemia including low cardiac output, ischemic VSD, mitral insufficiency.
- Provide appropriate risk reduction recommendations and use appropriate drug therapy properly.

**Technical Skills**

- Perform coronary bypass grafting using a range of venous and arterial conduits.
- Perform surgical repair of complications of ischemia: repair of VSD, mitral insufficiency, left ventricular aneurysm.
- Insert intra-aortic balloon pumps and ventricular assist devices.

**Valvular Heart Disease**

**Knowledge**

- Principles of management of patients with valvular heart disease.
- Anatomy of the cardiac valves and relationships to adjacent structures.
Natural history of all forms valvular heart disease.
Principles and use of imaging techniques for valvular heart disease including cardiac auscultation, echocardiography including transoesophageal echocardiography (TEE), cardiac catheterization and hemodynamic evaluation, magnetic resonance imaging (MRI).
Indications for medical and surgical intervention.
Advantages and disadvantages of available valve repair methods/prostheses.
Guidelines for reporting valve results including time-related multivariable analysis of morbidity/mortality.

**Clinical Skills**

Use and interpret appropriately tests of valvular heart disease.
Recommend and institute appropriate medical therapy for valve patients including antifailure medication and anticoagulants.
Recommend appropriate timing of surgical intervention.
Recommend appropriate valve operation and prosthesis.
Recognize complications of valve surgery including residual obstruction / insufficiency, infection, thrombosis, degeneration and recommend treatment.

**Technical Skills**

Perform routine valve replacements for aortic and mitral valve disease.
Perform complex valve operations including mitral valve reconstruction, aortic root enlargement, and stentless valve/homograft/autograft surgery.

**Thoracic Aortic Pathology**

**Knowledge**

Principles of management of patients with thoracic aortic disease at an independent consultant level.
Anatomy of aorta including its intrathoracic branches.
Pathophysiology of aortic disease including atherosclerotic disease, Marfan’s, and cystic medial necrosis.
Pathophysiology of thoracic and thoracoabdominal aortic aneurysms and dissections.
Natural history of aortic disease.
Sensitivity and specificity of methods for diagnosing aortic disease including emergencies.
Indications for medical and surgical intervention.
Methods of surgical repair including choice of conduits, techniques for preventing brain and spinal cord damage, management of complications of aortic surgery.
Indications for postoperative surveillance of patients, and investigation of relatives.

**Clinical Skills**
Recognize and diagnose thoracic and thoracoabdominal aortic disease including emergency presentations: use appropriate diagnostic tests.
Recommend and institute appropriate medical therapy for thoracic and thoracoabdominal aortic pathology including emergency dissections.
Recommend appropriate surgical intervention including strategies to minimize neurological and other complications.

**Technical Skills**

Perform repair of thoracic and thoracoabdominal aortic pathology including aneurysms and dissections, using appropriate techniques for distal aortic perfusion and prevention of complications.

**Transplantation And Cardiac Failure**

**Knowledge**

- Principles of management of patients with end-stage heart failure.
- Pathophysiology and endocrinology of heart failure.
- Natural history of cardiac failure.
- Indications for medical therapy and pharmacology of available agents.
- Indications for surgical therapy for heart failure including conventional revascularization, valve surgery, transplantation as well as unconventional therapy: laser revascularization, left ventricular reduction, and cardiomyoplasty.
- Indications for alternative transplantation procedures including heart-lung or lung transplantation with repair of cardiac lesions in patients with primary or secondary pulmonary hypertension.
- Indications for and complications of temporary/permanent mechanical cardiac support.
- Pathophysiology of brain death, donor management including biochemistry and pharmacology of donor heart preservation.
- Immunology of rejection, and management of immunosuppression.

**Clinical Skills**

- Recognize end-stage cardiac failure.
- Institute appropriate medical therapy for heart failure.
- Recommend appropriate surgical therapy including instituting mechanical support, conventional surgery and transplantation.
- Manage donor patient appropriately including criteria for brain death.
- Manage immunosuppression and its complications.

**Technical Skills**

- Institute mechanical cardiac support.
- Perform donor heart procurement and cardiac transplantation.

**Electrophysiology**
**Knowledge**

Principles of management of patients with dysrrythmias.
Pathophysiology and electrophysiology of atrial and ventricular dysrrythmias.
Pharmacology, indications and results of medical management of dysrhythmias.
Indications for and results of medical and surgical ablation for dysrrythmias.
Indications for implantation of pacemakers including automatic implantable cardioverter (AICD) devices and management of their complications.

**Clinical Skills**

Recognize and treat patients with dysrrhythmias.
Recommend appropriate pacemaker device for implantation.
Recognize and recommend appropriate treatment for complications of cardiac pacing including pacemaker syndrome and infections.

**Technical Skills**

Implant various types of pacemakers including single and dual chamber, AICD’s; endocardial and epicardial leads.

**Cardiac Tumours**

**Knowledge**

Principles of management of patients with cardiac tumours.
Incidence, pathology, natural history and presentation of cardiac tumours.
Principles and use of imaging techniques for cardiac tumours including echocardiography, cardiac catheterization, computed tomography (CT) and MRI.
Indications for surgical intervention for cardiac tumours.
Surgical techniques for resection of cardiac tumours.

**Clinical Skills**

Use and interpret appropriately tests for cardiac tumours.
Recommend appropriate surgical approach for cardiac tumours.
Recommend appropriate follow-up for surgical patients following operation.

**Technical Skills**

Perform surgical resection of appropriate cardiac tumours.

**Pericardial Disease**

**Knowledge**

Principles of management of patients with pericardial disease.
Anatomy and physiology of the pericardium.
Pathophysiology of the pericardium including congenital and acquired pericardial diseases.
Pathophysiology of acute cardiac tamponade and chronic pericardial constriction.
Principles and use of diagnostic techniques for pericardial pathology including physical examination, echocardiography, CT and MRI.
Role and interpretation of cardiac catheterization and hemodynamic studies as they pertain to pericardial disease.
Indications for medical and surgical intervention for pericardial disease.
Surgical techniques for pericardial disease including relief of cardiac tamponade, pericardectomy.
Principles of postoperative care of patients with pericardial disease.

Clinical Skills

Use and interpret appropriately tests of pericardial disease, and recognize cardiac tamponade.
Recommend appropriate surgical intervention for cardiac tamponade and pericardial disease.
Recognize and treat appropriately patients with postpericardotomy syndrome.

Technical Skills

Perform pericardial aspiration, biopsy and pericardectomy.

Pediatric Cardiac Surgery

Knowledge
Principles essential to care of neonatal, infants and pediatric cardiac patients including:

Embryology and nomenclature of congenital cardiac defects.
Physiology and pathophysiology of fetal, neonatal and pediatric circulations.
Principles of intensive care management of pediatric cardiac patients including ventilator management, inotropes, treatment of pediatric dysrhythmias and the manipulation of the pulmonary and systemic circulations.
Design and functional requirements of CPB circuits for pediatric patients.
Principles of CPB management for pediatric cases: myocardial protection strategies, use of profound hypothermia and circulatory arrest.
Principles and use of techniques for support of failing circulation in pediatric population.
Principles and use of imaging techniques in congenital cardiac disease including auscultation, echocardiography, cardiac angiography and hemodynamic assessment, as well as MRI.
Pathophysiology, indications and techniques for repair of simple and complex congenital cardiac defects.
Principles of management of adults with congenital cardiac defects including pathophysiology and evaluation of pulmonary vascular disease; indications and contraindications for repair.
**Clinical Skills**

Classify and describe accurately congenital cardiac defects.
Recognize and recommend appropriate treatment for ill neonates and children including maintenance of ductal patency, and control of pulmonary vascular resistance problems support of systemic circulation.
Recommend appropriate size of circuit components, and techniques for safe conduct of CPB in all ages of children.
Recognize signs of cardiac failure in children and recommends appropriate support including inotropes, pacing and use of mechanical support.
Use and interpret correctly tests for congenital cardiac defects for common congenital defects.
Recommend appropriate timing of surgery and choice of operation for specific congenital cardiac defects in both children and adults.

**Technical Skills**

Establish cardiopulmonary bypass for most pediatric cases including extracorporeal membrane oxygenation or ventricular assist device where appropriate.
Repair selected pediatric cases including: coarctation of aorta, patent ductus arteriosus (PDA), vascular rings, epicardial pacemakers, atrial septal defect (ASD), Partial atrioventricular septal defect (AVSD), VSD, and non-neonatal tetralogy.
Repair most adult congenital lesions including pulmonary valve replacement, hypertrophic cardiomyopathy coarctation of aorta and ASD.

**Other**

Residents should have the knowledge, clinical skills and technical skills pertinent to cardiac surgery from General Surgery, Thoracic Surgery, Vascular Surgery and Cardiology.

**Communicator**

**General Requirements**

Establish therapeutic relationships with patients and families.
Obtain and synthesize relevant history from patients and families, and their communities.
Listen effectively.
Discuss appropriate information with patients and families, and the health care team.

**Specific Requirements**

In order to achieve these objectives the resident must develop the ability to:

Obtain and synthesize relevant history from patients and family.
Inform patients and families about their condition at an appropriate and understandable level.
Be sensitive and respond appropriately to issues of gender, culture and ethnicity in dealing with patients and families.
Write a preliminary report on operations on chart.
Dictate concise, clear description of operation.
Write clear consultation note/discharge summary/clinic note.
Prepare and present ward and intensive care unit (ICU) rounds in an organized manner.
Participate actively in scheduled rounds.

**Collaborator**

*General Requirements*

Consult effectively with other physicians and health care professionals. Contribute effectively to other interdisciplinary team activities.

*Specific Requirements*

In order to achieve these objectives the resident must develop the ability to:

- Work with ward, ICU, operating room and expanded role nurses to manage patients appropriately.
- Identify social, rehabilitative, dietetic concerns with patients and consult appropriate allied health professionals.
- Consult and work with medical specialists appropriately.
- Assist allied health professionals though active participation in their training and educational rounds.

**Manager**

*General Requirements*

Utilize resources effectively to balance patient care, learning needs, and outside activities.
Allocate finite health care resources wisely.
Work effectively and efficiently in a health care organization.
Utilize information technology to optimize patient care, life-long learning and other activities.

*Specific Requirements*

In order to achieve these objectives the resident must develop the ability to:

- Understand the importance of and mechanisms to safely utilize resources in a cost-effective manner to benefit all patients.
- Recommend practices to effectively utilize resources including undertaking studies to assess effectiveness of standard care procedures.

**Health Advocate**

*General Requirements*
Identify the important determinants of health affecting patients. Contribute effectively to improved health of patients and communities. Recognize and respond to those issues where advocacy is appropriate.

**Specific Requirements**
In order to achieve these objectives the resident must understand the:

- Principles and data supporting primary and secondary prevention of coronary artery disease.
- Triage system for the surgical wait list; its rationale, and how patients are added or upgraded.
- Value of outcomes research for surgical procedures.

In order to achieve these objectives the resident must develop the ability to:

- Assess all patients for risk factors for cardiovascular disease and advise appropriate interventions.
- Utilize appropriate lipid lowering agents correctly.
- Participate in outcomes research and assist in disseminating resulting information.
- Develop and support constructive relationships with hospital administrators; Regional, Provincial and Federal Government Agencies and Representatives.
- Support the activity of local and national organizations promoting health advocacy.

**Scholar**

**General Requirements**

- Develop, implement and monitor a personal continuing education strategy.
- Critically appraise sources of medical information.
- Facilitate learning of patients, house staff/students and other health professionals.
- Contribute to development of new knowledge.

**Specific Requirements**
In order to achieve these objectives the resident must:

- Recognize gaps in knowledge and develop strategies to correct this by self-directed reading, and consulting with other professionals.
- Contribute knowledge learned to service rounds.
- Understand principles and practice of basic and applied research including the scientific method, design and conduct of clinical trials, critical appraisal of literature and the use of statistics.
- Understand need to incorporate gender, cultural and ethnic perspectives in research methodology.
- Read around clinical cases.
- Prepare and present scheduled rounds.
- Participate actively in scheduled morbidity and mortality conferences.
- Actively participate in journal club.
Prepare and present clinical research papers at peer-reviewed meetings/publish in medical literature.
Participate effectively in teaching fellow professionals including junior house staff.

**Professional**

**General Requirements**

Deliver highest quality care with integrity, honesty and compassion. Exhibit appropriate personal and interpersonal professional behaviours. Practice medicine ethically consistent with obligations of a physician.

**Specific Requirements**

In order to achieve these objectives the resident must develop the ability to:

- Deliver care with integrity, honesty and compassion.
- Understand the professional, legal, and ethical codes to which physicians are bound.
- Recognize self limitations and seek outside assistance where appropriate.
- At all times function professionally at an independent consultant level.
- Be sensitive to and respond appropriately to patients of different social status, ethnic groups, age and gender.

Revised into CanMEDS format - May 2000.

1.4 Royal College Objectives of Training and Specialty Training Requirements

Click here for the Royal College Objectives of Training and Specialty Training Requirements in Cardiac Surgery

2. Specialty Training Requirements in Cardiac Surgery

These specialty requirements apply to those who began creditable training on or after 1 June 2000. Acceptance to write the Royal College Certification Examination in Cardiac Surgery will require:

2.1 Pathway 1. Six years of approved residency training. This period must include:

1. Twenty-four months of core surgery (see Objectives of Core Surgery)
2. Six months of approved residency training in Cardiac Surgery
3. One year of approved senior residency in or under the aegis of accredited programs in some combination of General Surgery, Vascular Surgery or Thoracic Surgery, with up to six months in any one of these disciplines
4. Six months of approved senior residency training in pediatric Cardiac Surgery
5. Twelve months of approved senior residency training in adult Cardiac Surgery
6. Twelve months of academic/clinical enrichment

This year is flexible both in terms of its content and its location within the six years of residency training. For those individuals entering a clinician investigator program, the academic enrichment period could serve as the initial phase of a two or three year program leading to qualifications for a Masters degree or PhD. For other residents, the year, or part of it, might be spent in clinical situations to obtain further training in Vascular Surgery or one of the subspecialty areas within Cardiac Surgery.

A period of focused training could include:

- basic science research and study related to cardiovascular sciences;
- six months of cardiovascular sciences subspecialty / didactic training including some or all of: Perfusion Science; Cardiology (CCU / consultation, Echo, Cath Lab); Cardiac Pathology; Chest and Vascular Radiology to include tomography, CT scanning, MRI, noninvasive and invasive vascular studies; pacemaker service including pacemaker and defibrillator implantation and clinic-follow-up; cardiac sciences basic research laboratory introductory experience, and / or database management including the concepts and mechanisms of reliability audit, quality appraisal and improvement, risk adjustment and systematic late follow-up. This period of training would provide broad exposure to important subjects that were otherwise not covered during the regular Cardiac Surgery rotations or the core years;
- highly focused clinical training, for example in transplantation, critical care medicine, great vessel surgery, additional accredited pediatric Cardiac Surgery, new or less common techniques and evolving technologies including: stentless valves, pulmonary autographs, atrial and ventricular dysrhythmia surgery, biventricular assist devices / out-patient ventricular assist programs, and / or alternative surgical approaches for end-stage heart disease which may include cardiomyoplasty, ventriculoplasty, transmyocardial revascularization, multisite / multi chamber pacing, artificial organ development, and clinical / applied research programs related to any of the preceding;
- clinical epidemiology;
- surgical education in a specialized program approved for postgraduate qualification in education;
- combinations of the above.

Notes regarding Pathway 1:

The sequence of the requirements listed above does not imply that they must be met in the same order. However, the senior residency training required under Section 1(c), 1(d) and 1(f) should ordinarily be undertaken during the final years of residency.

Senior residency is defined as a period during which the resident is regularly entrusted with the responsibility for pre-operative, operative, and post-operative care. This must include the
most difficult problems in adult Cardiac Surgery. No other resident shall intervene between the senior resident and the attending staff surgeon.

OR

Pathway 2. Full residency training in General Surgery in a Royal College accredited program plus:

1. Six months of approved senior residency in pediatric Cardiac Surgery
2. Six months of approved Cardiac Surgery residency training if not completed under the aegis of an accredited Cardiac Surgery program during the course of training for General Surgery
3. Six months of approved senior residency training in Thoracic and/or Vascular Surgery if not completed under the aegis of an accredited Thoracic or Vascular Surgery program during the course of training for General Surgery
4. Twelve months of academic enrichment as under 1(e) if not completed during General Surgery training,
5. Twelve months of Senior Residency in Cardiac Surgery.

OR

Pathway 3. Full training in Thoracic Surgery in a Royal College approved program plus:

1. Six months of senior residency training in pediatric Cardiac Surgery
2. Twelve months academic enrichment as under 1(e) if not completed during Thoracic Surgery training (it is recommended that this period include three to six months of senior vascular surgery experience)

1. Twelve months of Senior Residency in adult Cardiac Surgery.

Note regarding Pathways 2 and 3:
All approved Canadian Cardiac Surgery training programs are required to demonstrate adequate resources for the six year pathway. The alternative entry pathways (2 and 3) are detailed to give more advanced candidates a general ideal of the range of additional training that may be required. Partial training in a Royal College approved program may also be recognized at the discretion of the Credentials Committee. It is very important to understand that the specific additional training required by a candidate, under any of the alternate pathways, cannot be assumed by either potential trainees or program directors. For each candidate, request for assessment of prior postgraduate training and for determination of additional training requirements must be submitted to the Office of Education -Credentials of the Royal College. It is prudent to seek approval prior to entering one of the alternative pathways.
3. Goals and Objectives: Cardiac Surgery Rotations

3.1 PGY 1 Year

Medical Expert/Clinical Decision Maker

Knowledge: Basic Science, Anatomy and Clinical Skills

- Understand cardiac anatomy – coronary arteries, valves, great vessels
- Understand basic cardiac physiology
- Understand pathophysiology of myocardial ischemia, heart failure, and associated treatments - indications for surgical intervention
- Understand the cardiopulmonary bypass circuit its components how it works.
- Understand principles of myocardial protection.
- Understand anticoagulation and antithrombotic agents – when they are used, when they should be stopped before surgery, and their complications, including HIT.
- Understand most common dysrhythmias including pathophysiology, need for AICD.
- Understand principles of pacemakers – leads, settings, indications for implantation in cardiac surgery patients.
- The resident is expected to perform a history and physical examination on patients admitted to undergo cardiac surgery or to be seen in consultation by the cardiac surgery service.
- Understand indications for coronary artery bypass surgery.
- Will be able to assess for peri-operative risk factors that can lead to adverse peri-operative outcomes.
- Be knowledgeable of medical conditions seen frequently in cardiac surgical patients such as: diabetes, peripheral and cerebrovascular disease, renal insufficiency, and be able to manage these conditions in cardiac surgical patients as necessary.
- Be able to interpret ancillary investigations in particular echo, nuclear imaging studies and cardiac angiograms.
- Learn to recognize and initiate treatment of complications of cardiac surgery including frequent arrhythmias, respiratory complications, wound problems.
- Be able to adjust and use temporary pacemakers in cardiac surgery patients.

Knowledge: Technical

Procedures: comfortable doing without supervision

- harvesting saphenous vein
- opening chest
- sternal closure
- femoral line insertion
- tube thoracostomy, thoracentesis
Perform partly with supervision:

- radial artery harvesting
- IMA harvesting
- proximal saphenous vein anastomosis
- insertion of femoral arterial line and IABP

Be able to first assist surgeon on cannulation, coronary anastomosis and valve replacement

**Communicator**

The resident is expected to demonstrate communication skills in both verbal and written manner with:

Patients and their families – to perform history and physical examinations, complete written consultation notes, explain investigations, procedures and obtain consent related to surgical procedures, explain underlying disease process and anticipated course.

Health care professionals including:

- referring physician (cardiologist or internist)
- consulting physicians, radiologists
- family physicians
- fellow surgical residents, clinical clerks, medical students
- nurses
- other health care professionals, OT/PT, pharmacy, etc.

**Collaborator**

Participate as a member of an interdisciplinary team, to ensure optimal management of patients, including preoperative and postoperative investigations, treatments and continuing care both in hospital and in the ambulatory setting.

**Manager**

Understand how cardiac surgery functions within the confines of structure, financing and operation of the health care system.

Understand the provincial triage system in place for cardiac surgery delivery.

Understand how a cardiac surgeon functions effectively in health care organization ranging from an individual clinical practice to organization at the hospital, local, regional and national levels.

Be familiar with the national and international societies related to Cardiac surgery.

Understand and contribute to optimal discharge planning and management of resources, coordinating investigations or treatments

**Health Advocate**
Identify risk factors in individual patients for the underlying coronary diseases and educate patients in preventive measures.
Ensure optimal medical therapy is instituted postoperatively an continued post discharge

**Scholar**

Be able to evaluate and critically appraise the literature as relevant to the patients seen on the service.
Be aware of landmark research publications in cardiology as related to cardiac surgery and in cardiac surgery, that impact on practice. Disseminate the knowledge and findings of these studies.

**Professional**

Interact with patients, families, nurses and colleagues in a professional manner with appropriate attitudes.
Demonstrate punctuality, responsibility and commitment in dealing.

3.2 Cardiology Rotations: CCU, Consults, Arrhythmia Service - PGY 1 Year

During these rotations there will be a tremendous overlap in patients seen and the resident’s on-call responsibilities will be the same in each rotation (ie -in the CCU setting); hence the goals and objectives will be grouped together.

**Medical knowledge**

To understand from a medical perspective the most frequent disease processes that ultimately may require cardiac surgical treatment.

The residents will understand the pathophysiology of the following conditions as well as their clinical presentations, diagnosis, initial management, short and long term management:
Angina, unstable angina, acute coronary syndrome, myocardial infarction.
Ventricular and atrial arrhythmias.
Pulmonary edema, congestive heart failure and cardiogenic shock
Bacterial endocarditis and other acute valvular emergencies
The resident will have a strong grasp of thrombolytic drugs, indications for their use as well as understanding of other anticoagulant or anti-platelet drugs used in acute coronary presentation.
The resident will be familiar with the major classes of anti-anginal medications.
The resident will be able to interpret ECG’s recognizing the common abnormalities seen in the CCU.
The resident will know the indications for stress testing and nuclear imaging, as well as the need for heart catheterization. He/she will be familiar with results of interventional maneuvers such as PTCA, vs. surgical revascularization.
The resident will learn about major complications of myocardial infarction, how to diagnose them and manage them acutely.
The resident will recognize abnormal rhythms and know how to manage them. He/she will be familiar with the common anti-arrhythmic medications. He/she will know the indications for pacemaker implantation, types of pacemakers available and become familiar with technical points regarding their insertion.
The resident will know the indications for Electro-physiologic studies, understand the significance of these procedures and know the indications for AICD implantations.

Communicator
The resident will liaise with his supervising fellows and staff regarding patients’ condition and progress, particularly when a change in condition occurs.
He/she will communicate with nursing staff as well as ancillary staff involved in the care of patients.
He/she will record patients course in progress notes or consultations, and will complete discharge or transfer notes as required.

Collaborator
The resident is part of the cardiology team looking after patients with heart disease. As such he/she will involve specialists in pursuing tests and intervention in a timely fashion.

Manager
The resident will utilize resources effectively in providing care to his/her patients.
The resident will ensure timely discharge from specialized units such as the Coronary Care Unit.
The resident will assist in prioritizing patients in undergoing costly tests for which there is a long waiting list such as cardiac catheterization, or electrophysiologic study.

Health Advocate
The resident will educate patients in risk factors that are known to contribute to causing coronary artery disease.
The resident will assist patients in trying to modify the reversible risk factors such as smoking cessation, and dietary changes vis a vis cholesterol and blood sugar levels.
The resident will optimize drug therapy in improving lipid levels and diabetes management. The resident will encourage patients to participate in cardiac rehabilitation programs.
The resident will educate the patients about the importance of compliance with medications.

Scholar
The resident will learn of the major studies that have influenced the management of patients with coronary artery disease, heart failure as well as ventricular arrhythmias.
The resident will learn of ongoing studies at the Hamilton General Hospital involving patients under his/her care.

**Professional**

Will demonstrate punctuality, responsibility and commitment in dealing with patients and ICU staff.
He/she will deliver care with integrity, honesty and compassion.
He/she will understand and follow the professional, legal and ethical codes to which physicians are bound.

**3.3 PGY 2 Year**

**Medical Expert/Clinical Decision Maker**

Understand pathophysiology of myocardial ischemia, heart failure, and associated treatments, particularly results of surgical vs. medical interventions, and other options available such as assist devices and transplantation.

Indications for surgical interventions in heart failure including transplantation; high risk CABG and valve surgery; ventricular assist device placement as bridge or destination; biventricular pacing; and more novel approaches to ventricular remodelling. Management of transplant recipients in terms of immunosuppression and common acute complications, as well as donor management and donor heart protection.

Diagnosis, management, and surgical principles of treating complications of CAD including VSD; ruptured papillary muscle; ventricular aneurysm.

Understand valvular pathology including – particularly indications for surgical interventions as well as techniques and results.

Understand aortic disease pathology.

Principles of management of patients with thoracic aortic disease including pathophysiology of all relevant disease processes; natural history; indications for aortic replacement in aneurysmal disease; management of acute and chronic dissections; various surgical approaches with attention to techniques for preventing brain and spinal cord injury.

Be familiar with cardiac medications particularly inotropes, vasoactive drugs, and anti-arythmic agents.

The resident will have knowledge and understanding of major cardiac trauma emergencies and how to diagnose and manage them.

Understand the management of mediastinal infection post cardiac surgery and participate in operative management including sternal debridement, rewiring and muscle flap closure.
The resident continues to perform a history and physical examination on patients admitted to undergo cardiac surgery or to be seen in consultation by the cardiac surgery service, is able to independently review angiograms and synthesize ancillary investigations such as echo, nuclear imaging studies to come up with a management plan, will be able to estimate peri-operative risk based on underlying cardiac pathology and patient co-morbidity, synthesize all pertinent information competently to arrive at a correct diagnosis and or effective treatment plan for the cardiac surgical patient.

The resident will understand and recognize critical postoperative conditions, such as cardiac tamponade postoperative bleeding, understand pathophysiology of postoperative low output state and multisystem organ failure and understand management, manage patients postoperatively on the ward, be able to manage arrhythmias developing in cardiac surgical patients.

**Technical skills**

The resident will continue to master skills as in the PGY 1 level, with increasingly more skill and speed i.e.

*Procedures*

Comfortable doing without supervision - harvesting saphenous vein

- opening chest
- sternal closure
- insertion of femoral arterial line and IABP (understand function and be able to adjust)
- tube thoracostomy, thoracentesis
- harvesting of short saphenous vein

Be able to perform emergency re-opening of sternotomy incision in ICU.

Perform partly with supervision:

- radial artery harvesting
- IMA harvesting
- proximal saphenous vein anastamosis
- aortic and venous cannulation and institution of cardiopulmonary bypass
- separation from cardiopulmonary bypass and decannulation

Be able to first assist on complex cases including redo’s, complex aortic cases.

**Communicator**

The resident is expected to demonstrate communication skills in both verbal and written manner with:

Patients and their families – to perform history and physical examinations, complete written consultation notes, explain investigations, procedures and obtain consent related to surgical procedures, explain underlying disease process and anticipated course.

Health care professionals including:
Physicians
- referring physician (cardiologist or internist)
- consulting physicians, radiologists,
- family physicians
- fellow surgical residents, clinical clerks, medical students
- nurses
- other health care professionals: OT/PT, pharmacy, etc.,

Collaborator
Participate as a member of an interdisciplinary team, to ensure optimal management of patients, including preoperative and postoperative investigations, treatments and continuing care both in hospital and in the ambulatory setting.

Manager
Understand how cardiac surgery functions within the confines of structure, financing and operation of the health care system.
Understand the provincial triage system in place for cardiac surgery delivery.
Understand how a cardiac surgeon functions effectively in health care organization ranging from an individual clinical practice to organization at the hospital, local, regional and national levels.
Be familiar with the national and international societies related to Cardiac surgery.
Understand and contribute to optimal discharge planning and management of resources, coordinating investigations or treatments.

Health Advocate
Identify risk factors in individual patients for the underlying coronary diseases and educate patients in preventive measures.
Ensure optimal medical therapy is instituted postoperatively and continued post discharge.

Scholar
Be able to evaluate and critically appraise the literature as relevant to the patients seen on the service.
Be aware of landmark research publications in cardiology as related to cardiac surgery and in cardiac surgery, that impact on practice. Disseminate the knowledge and findings of these studies.

Professional
Interact with patients, families, nurses and colleagues in a professional manner with appropriate attitudes.
Demonstrate punctuality, responsibility and commitment in dealing.
3.4 PGY 3/4 Years

**Medical Expert/ Clinical Decision Maker**

**Knowledge**

The resident will consolidate his understanding of treatment for myocardial ischemia and its complications including the diagnosis and surgical management of ischaemic VSD; ruptured papillary muscle; ventricular aneurysm.

The resident will review and consolidate his/her knowledge of surgical interventions in heart failure including CABG surgery, interventions for ischemic mitral regurgitation versus medical therapy.

The resident will become familiar with the procedure of organ harvesting for heart transplantation and donor heart protection. He/she will review management of transplant recipients in terms of immunosuppression, common acute complications and long term management as well as outcomes.

With increased involvement in cases the resident will better understand various valvular pathology and its surgical management as well as aortic disease pathology including aortic dissections and aneurysms.

The resident will appreciate surgical approach to patients with a diseased or calcified aorta.

The resident will review bacterial endocarditis – the pathogens involved, its medical management, complications, surgical options and results.

The resident will consolidate knowledge and understanding of major cardiac trauma emergencies and how to diagnose and manage them.

The resident:

- continues to perform a history and physical examination on patients admitted to undergo cardiac surgery or to be seen in consultation by the cardiac surgery service, reviewing angiograms and other tests, coming up with a management plan.
- will be able to estimate peri-operative risk based on underlying cardiac pathology and patient comorbidity.

The resident will understand and recognize critical postoperative conditions, such as cardiac tamponade and postoperative bleeding, and be able to intervene appropriately, including reopening of the chest on an emergency basis.

He/she understands the pathophysiology of postoperative low output state and multisystem organ failure and understand management, being able to intervene pharmacologically with inotropic agents.

The resident will be able to manage arrhythmias developing in cardiac surgical patients.
Technical Skills
By the end of this rotation the resident should be proficient at independently:

- harvesting arterial conduits: radial artery, IMA
- establishing cardiopulmonary bypass-familiar with a variety of cannulation techniques, including arterial cannulation of ascending aorta and femoral artery
- fashioning a proximal vein anastomosis to the aorta -be able to adequately institute effective myocardial protection using a variety of delivery methods
- be able to first assist on all cases – including complex procedures and redos
- participate in parts of valve replacement and repair operations
- have a detailed technical knowledge of donor heart procurement and transplantation.
- be able to manage resuscitation of thoracic trauma patient and manage emergency thoracotomy with repair of cardiac lacerations

Communicator
The resident is expected to demonstrate communication skills in both verbal and written manner with:

- Patients and their families – to perform history and physical examinations, complete written consultation notes, explain investigations, procedures and obtain consent related to surgical procedures, explain underlying disease process and anticipated course.
- Health care professionals including:
  - physicians
    - referring physician (cardiologist or internist)
    - consulting physicians, radiologists,
    - family physicians
  - fellow surgical residents, clinical clerks, medical students
  - nurses
  - other health care professionals: OT/PT, pharmacy, etc.,

Collaborator
Participate as a member of an interdisciplinary team, to ensure optimal management of patients, including preoperative and postoperative investigations, treatments and continuing care both in hospital and in the ambulatory setting.

Manager
Understand how cardiac surgery functions within the confines of structure, financing and operation of the health care system.
Understand the provincial triage system in place for cardiac surgery delivery.. Understand how a cardiac surgeon functions effectively in health care organization ranging from an individual clinical practice to organization at the hospital, local, regional and national levels.
Be familiar with the national and international societies related to Cardiac surgery.
Understand and contribute to optimal discharge planning and management of resources, coordinating investigations or treatments

**Health Advocate**

Identify risk factors in individual patients for the underlying coronary diseases and educate patients in preventive measures.
Ensure optimal medical therapy is instituted postoperatively and continued post discharge.

**Scholar**

Be able to evaluate and critically appraise the literature as relevant to the patients seen on the service.
Be aware of landmark research publications in cardiology as related to cardiac surgery and in cardiac surgery, that impact on practice. Disseminate the knowledge and findings of these studies.

**Professional**

Interact with patients, families, nurses and colleagues in a professional manner with appropriate attitudes.
Demonstrate punctuality, responsibility and commitment in dealing.

**3.5 Chief Resident - Senior Year**

**Medical Expert/Clinical Decision Maker**

The resident:

Consolidates the basic science knowledge of cardiac surgery of previous junior rotations supplementing information with current literature.
Attains a knowledge of cardiac tumours: the types, presentation, diagnosis and their surgical management.
Attains a knowledge of pericardial disease presentation, diagnosis and surgical management including constrictive pericarditis and pericardial effusion.
Understand cardiomyopathy, particularly hypertrophic cardiomyopathy, the indications for surgery and techniques.
Able to manage a cardiac surgical consultation including taking history and performing physical examination, reviewing relevant investigations and organizing appropriate treatment.
Able to manage patients with complex cardiac surgical problems.
Able to manage complications of cardiac surgery – both early - in the ICU setting and late.

Supervises junior cardiac surgical residents in ward patient management and at surgery.

**Technical Skills**
 Performs coronary artery bypass surgery including all aspects of the procedure, utilizing various conduits and techniques:
  o cannulation or stabilization for off pump
  o distal anastomosis - vein, radial artery, IMA
  o proximal anastamosis – vein, radial artery, IMA
  o manages separation from cardiopulmonary bypass including interventions with inotropic drugs or IABP

 Be familiar with minimally invasive cardiac procedures.
 Performs valve replacement operations of aortic valve.
 Performs aortic annular enlargement and patch aortoplasty closure for patients with small aortic annulus.
 Performs valve replacement operations of mitral valve
 Able to perform quadrangular resection in mitral prolapse repair.
 Able to perform tricuspid valve repair – familiar with different options.
 Has detailed procedural knowledge of repair of complications of CAD: VSD, mitral insufficiency, LV aneurysm
 Has detailed technical knowledge of complex aortic valve surgery including homograft valve, autograft valve replacement, stentless valve.
 Knowledgeable of surgical technical operations used in managing aortic dissections
 Able to perform parts of aortic surgery for aneurysmal disease.
 Able to manage traumatic thoracic aortic injury.

 **Communicator**

 The resident is expected to demonstrate communication skills in both verbal and written manner with patients and their families – to perform history and physical examinations, complete written consultation notes, explain investigations, procedures and obtain consent related to surgical procedures, explain underlying disease process and anticipated course.
 The resident communicates with both his supervising staff person and junior resident regarding patient care.
 He/she ensures consulting services are notified and informed of the relevant problems, and keeps close contact with the allied health care professionals including nurses, OT/PT, pharmacy, etc. regarding patients and service matters.
 The resident will dictate operative notes for cardiac surgical procedures, where he/she performed a significant component of the operation.

 **Collaborator**

 Participate as a member of an interdisciplinary team, to ensure optimal management of patients, including preoperative and postoperative investigations, treatments and continuing care both in hospital and in the ambulatory setting.

 **Manager**
Understand how cardiac surgery functions within the confines of structure, financing and operation of the health care system.
Understand the provincial triage system in place for cardiac surgery delivery.
Understand how a cardiac surgeon functions effectively in health care organization ranging from an individual clinical practice to organization at the hospital, local, regional and national levels.
Be familiar with the national and international societies related to Cardiac surgery.
Understand and contribute to optimal discharge planning and management of resources, coordinating investigations or treatments.

**Health Advocate**

Identify risk factors in individual patients for the underlying coronary diseases and educate patients in preventive measures.
Ensure optimal medical therapy is instituted postoperatively such as lipid lowering therapy, BP therapy, after-load reduction, and antithrombotic therapy and continued post discharge.

**Scholar**

Be able to evaluate and critically appraise the literature as relevant to the patients seen on the service.
Be aware of landmark research publications in cardiology as related to cardiac surgery and in cardiac surgery, that impact on practice. Disseminate the knowledge and findings of these studies.

**Professional**

Interact with patients, families, nurses and colleagues in a professional manner with appropriate attitudes.
Demonstrate punctuality, responsibility and commitment in dealing.

**3.6 Pediatric Cardiac Surgery Rotation - PGY 5 Year**

**Medical expert/Clinical decision maker**

Understand embryologic development of the cardiovascular system and heart
Understand the physiology and pathophysiology of fetal, neonatal and pediatric circulation.
Be able to describe and classify major congenital cardiac defects.
Recognize the clinical presentation of these conditions, investigations used to confirm their diagnosis such as auscultation, echo, cardiac angiography, MRI.
Be familiar with the following common congenital malformations, their presentation, indications and timing of surgical management as well as long term prognosis:

ASD, secundum, primum, AV defect
PDA
Coarctation of the Aorta
VSD, Tetralogy of Fallot,
Transposition of the Great Arteries,
Vascular rings and slings
Anomalous pulmonary venous return
Truncus arteriosus
Aortic stenosis
Pulmonary stenosis/ataresia
Ebstein’s anomaly
Hypoplastic left heart
Single ventricle

Understand various palliative procedures commonly used in pediatric surgery including AP shunts and pulmonary artery banding.
The resident will understand the techniques for repair of simple and complex congenital cardiac defects

Understand different requirements in cardiopulmonary bypass in neonatal and pediatric patients versus adult.
Will understand selection of appropriate size of circuit components, techniques for safe conduct of CPB.
Understand the systemic changes that accompany cyanotic heart disease.
Understand differences in myocardial preservation in the pediatric vs. adult population.
Understand use of hypothermia and circulatory arrest in neonatal and pediatric patients.
Understand the available assist/supportive devices used in pediatric cardiac surgical patients and the complications of their use.
The resident will learn when cardiac transplantation is necessary, will participate in organ harvesting and transplantation. He/she will be familiar with the technical components of transplant surgery including organ preservation. He/she will understand immunosuppressive postoperative management including complications. The resident will become familiar with clinical features of organ rejection, and their management. He/she will understand the long term outlook for transplant recipients.
The resident will understand the long term implications of common congenital conditions, often as a result of treatment that are seen in the adult congenital patients.
The resident will assess preoperative neonatal and pediatric cases performing an initial assessment, reviewing ancillary investigations and instituting initial therapeutic measures. He/she will assist in cardiac surgery on these patients performing parts of the operations as appropriate for his/her abilities.
The resident will be able to establish cardiopulmonary bypass for access for extracorporeal membrane oxygenation or ventricular support.
The resident may perform selected parts of simpler pediatric cases such as coarctation of aorta, PDA, vascular rings, epicardial pacemakers, ASD, etc.
He/she will participate in postoperative care of pediatric cardiac surgical patients including care when the patients are in the ICU setting as well as ward.
The resident will understand the management of elevated pulmonary vascular resistance. He/she will understand management of ventilators and inotropic drug support, treatment of pediatric dysrhythmias, as well as support with assist devices and ECMO.

**Communicator**
The resident will be involved in communicating with fellow physicians in both the pre, intra and postoperative care of patients. Attendance and participation at rounds and conferences is particularly important in pediatric cases where shared experience of senior staff is very helpful. The resident will be able to inform children as appropriate for their level of understanding what they will experience with cardiac surgery. The resident will be able to inform the families of children about their condition, the proposed surgical management, its risks and complications. Will be able to succinctly summarize patient condition and proposed management in hospital charting, and write preliminary OR reports on chart. Liase with supporting staff including nursing, and various therapy groups as well as social workers.

**Collaborator**

Works with nurses and other health care professionals to manage patients appropriately. Identifies social, rehabilitative issues with patients and consults with appropriate health professionals.

**Manager**

Understands the importance of optimizing resources in cost-effective manner to benefit all patients.

**Health advocate**

Understands principles and data supporting prevention triage system outcome research risk factors info re condition.

**Scholar**

Recognizes gaps in knowledge. Contributes at rounds understands principles and practice of research including scientific method, design and conduct of clinical trials, critical appraisal of literature and stats. reads around cases, presents rounds, participates in research.

**Professional**

Delivers care with integrity, honesty and compassion. Understands the professional legal and ethical codes to which physicians are bound. Is sensitive to and responds appropriately to patients of different social status, ethnic groups age and gender.

3.7 ICU
The resident will have a brief introductory 1 month rotation to the cardiac ICU in the first PGY 1 year. After this rotation the resident will be able to take call while on Cardiac surgery rotations in the Cardiac ICU. In the second year the resident will spent a total of three months on ICU - divided between cardiac ICU and noncardiac ICU. The goals and objectives for these rotations are the same.

**Medical Expert/Clinical Decision Maker**

**Knowledge Goals**

To understand the physiology of fluid shifts in patients undergoing major surgery (both cardiac and noncardiac).

To understand acid/base disturbances – their causes, and their management.

To understand monitoring devices used in critically ill patients and the information they provide: arterial pressure lines, central lines, pulmonary artery (Swan-Ganz) catheters.

To understand ventilation - assess patients with impending respiratory failure, indications for intubation, biPAP, ventilation modalities, application of monitoring parameters – ABG’s, venous oxygen consumption, oxygen content, management of chronic pulmonary failure – including timing and need for tracheostomy, weaning.

To understand nutritional requirements in critically ill patients and the ways in which nutrition is maintained.

To be familiar with GI conditions commonly developing in ICU patients such as stress ulcer bleeding, massive GI bleeding, ischemic bowel, toxic colitis, ileus, including preventive measures.

To understand management of various organ failure, in particular renal failure - including acute, chronic, polyuric and anuric states; monitoring, preventing recognizing and treating renal failure. To understand the indications for dialysis and how dialysis works CNS – support of patient with cerebral edema or spinal cord injury, including use of osmotic diuretics, intracranial pressure monitoring, corticosteroids. To understand diagnosis and treatment of coma, seizures,

To know the definition of brain death and to manage end of life decisions in patients with multiorgan failure.

To develop an appreciation of the ethics of ‘do not resuscitate’ orders; the ethics of managing both a patient and their family when death in the ICU is imminent; the issues surrounding organ donation.

To understand the physiologic state of septic shock. To understand the immunocompromised state of critically ill patients, interpretation of cultures.

To understand major antibiotics groups and drugs used for common infections in ICU patients - their indications, doses and complications.

To be able to assess cardiac function or failure.

To understand inotropic drugs used to support critically ill patients with hemodynamic instability.

To understand the use of intraaortic balloon pump in supporting patients with cardiogenic shock.

**Technical Points**
Develop proficiency at inserting monitoring devices; arterial blood pressure line, venous central insertion, Swan Ganz catheter insertion. 
Be able to drain a pleural effusion or pneumothorax with appropriate tube. 
Develop skills in intubation -should be able to intubate uncomplicated airway patients. 
Be able to insert feeding tubes and assess their appropriate position and function.

Communicator

The resident needs to demonstrate communication skills in talking with patients and their families both in obtaining clinical information and in communicating the patient’s condition, progress and prognosis. The resident will make written consultation and progress notes on ICU patients. 
The resident will communicate with fellow residents, fellows and staff physicians regarding patients, in particular, relaying any new developments in a timely fashion. The resident will communicate with ancillary health care professionals – nurses, respiratory therapists, physiotherapists, nutritionists - as well as social workers and chaplains.

Collaborator

The resident will act as part of the critical care team in providing optimal management of patients. 
The resident will ensure ongoing care of various specialty teams looking after various aspects of the patients’ condition.

Manager

The resident will participate in optimizing care to ensure rapid transfer of patients to and from the ICU. 
The resident will ensure that investigations are carried out and reported in a timely fashion.

Health Advocate

The resident will educate and advice the patients family members regarding the patient’s condition, progress and prognosis. 
The resident will ensure the patient is receiving preventive care for conditions such as deep venous thrombosis, that can affect critically ill patients.

Scholar

The resident will participate in educational teaching sessions and rounds. The resident will learn about significant publications that influence practice in the ICU. And be able to critically appraise them. 
The resident will be aware of the ongoing research studies presently underway in the ICU. 
The resident is expected to read around the cases that he or she sees in the ICU.
Professional

Will demonstrate punctuality, responsibility and commitment in dealing with patients and ICU staff.
He/she will deliver care with integrity, honesty and compassion.
He/she will understand and follow the professional, legal and ethical codes to which physicians are bound.

3.8 General Surgery – PGY 1/2 Years

During one of the two core rotations in General Surgery the resident will be placed at the Hamilton General Hospital, where he/she will be involved in the trauma program. A separate document lists the goals and objectives of the trauma program as well as explaining the duties and responsibilities of the resident.

Medical Expert/Clinical Decision Maker

Knowledge: Basic Science and Anatomy

Understand physiology associated with: - fluids and electrolyte balance, wound healing, surgical stress and the neurohumoral response, nutrition in surgical patients.

Knowledge: Specific Clinical Problems

Acute abdomen

all aspects of diagnosis and treatment
differentiation of surgical from non-surgical abdominal pain

GI Bleeding

assess severity, etiology of bleeding and institute appropriate resuscitation, investigation and therapy Bowel obstruction
all aspects of diagnosis and treatment Bowel resection
understand need for bowel preparation, vis a vis intraoperative resection and primary anastamosis versus colostomy or ileostomy

Biliary Tree

assess patients with acute cholecystitis
participate in operative management

Abdominal Wall

participate in surgery of inguinal, umbilical and incisional hernia repair
should be familiar with normal closure of abdominal incisions
Breast

participate in the surgical management of breast lesions
Skin/soft tissue
participate in excision of skin and soft tissue lesions and tumors
Infections
management of infected and or dehisced wounds

Initial trauma patient assessment and resuscitation – see Trauma program document
Trauma mini – laparotomy and laparotomy – understand when laparotomy is indicated in the trauma patient

Knowledge: Technical

Procedures
Comfortable with doing without supervision:

inserting central lines
  o inserting chest tubes
  o incision and drainage of uncomplicated subcutaneous abscesses
  o closure abdominal incisions

Develop familiarity and understanding and be able to perform with supervision

upper flexible endoscopy and lower rigid endoscopy

Assist or be able to perform with supervision parts of procedures as described above.
The resident is expected to perform a history and physical examination, order and interpret ancillary laboratory and radiologic investigations in general surgical conditions as seen in consultation.

will be able to initiate initial resuscitative measures and therapy for such conditions.
will be able to assess for peri-operative risk factors for general anesthesia as well as in preparation for specific operative procedures.
will understand and apply appropriate peri-operative management for general surgery cases, -will recognize, investigate and manage general surgical complications in his/her patients

Communicator
The resident is expected to demonstrate communication skills in both verbal and written manner with

Patients and their families – to perform history and physical examinations, complete written consultation notes, explain investigations, procedures and obtain consent related to surgical procedures, explain underlying disease process and anticipated course.
Health care professionals including:
  o physicians – referring physician – Family Dr, or ER Dr.
o consulting physicians, radiologists, fellow surgical residents, clinical clerks, medical students
o nurses
o other health care professionals: OT/PT, pharmacy, etc.,

**Collaborator**

Participate as a member of an interdisciplinary team, to ensure optimal management of patients, including preoperative and postoperative investigations, treatments and continuing care both in hospital and in the ambulatory setting.

**Manager**

Understand how general surgery functions within the confines of structure, financing and operation of the health care system.
Understand how the trauma system functions within the province and within the region.
Understand how a general surgeon functions effectively in health care organization ranging from an individual clinical practice to organization at the local, regional and national levels.
Understand and contribute to optimal discharge planning and management of resources, coordinating investigations or treatments

**Health Advocate**

Identify risk factors in individual patients for the underlying diseases and educate patients in preventive measures.

**Scholar**

Be able to evaluate and critically appraise the literature as relevant to the patients seen on the service.
Be aware of landmark research publications in general surgery that impact on practice and disseminate the knowledge and findings of these studies.

**Professional**

Interact with patients, families, nurses and colleagues in a professional manner with appropriate attitudes.
Demonstrate punctuality, responsibility and commitment in dealing.

**3.9 Vascular Surgery**

**Medical Expert/Clinical Decision Maker**

**Knowledge: Basic Science and Anatomy**

Understand vascular arterial and venous anatomy and physiology.
Knowledge: Specific Clinical Problems

1. Claudication
2. The ischaemic leg - acute and chronic
3. Aneurysmal disease
   - abdominal, iliac, peripheral, other
   - thoracoabdominal - issues in spinal cord and other organ protection
4. Indications for arterial reconstruction and other techniques
5. Non-invasive investigation of the vascular patient
6. Carotid disease – indications for endarterectomy and techniques
7. The diabetic foot
8. Mesenteric ischaemia
9. Management of vascular injuries including injuries to thoracic aorta
10. DVT and coagulation, postphlebitic syndrome
11. Permanent pacemaker implantation – techniques, indications, complications

Knowledge: Technical

Vascular exposure of aorta and peripheral vessels
Vascular anastomosis and repair of arteries and veins
Embolectomy
Fasciotomy
Varicose vein treatment
Insertion permanent pacemaker

The resident is expected to perform a history and physical examination, order and interpret ancillary laboratory and radiologic investigations in vascular surgical conditions as seen in consultation.

will be able to initiate initial resuscitative measures and therapy for such conditions.
will be able to assess for peri-operative risk factors for general anesthesia as well as in preparation for specific operative procedures.
will understand and apply appropriate peri-operative management for vascular surgery cases, -will recognize, investigate and manage vascular surgical complications in his/her patients.

Communicator

The resident is expected to demonstrate communication skills in both verbal and written manner with

Patients and their families – to perform history and physical examinations, complete written consultation notes, explain investigations, procedures and obtain consent related to surgical procedures, explain underlying disease process and anticipated course.
Health care professionals including:
   - physicians – referring physician – Family Dr, or ER Dr.
consulting physicians, radiologists,
- fellow surgical residents, clinical clerks, medical students
- nurses
- other health care professionals: OT/PT, pharmacy, etc.,

Collaborator

Participate as a member of an interdisciplinary team, to ensure optimal management of patients, including preoperative and postoperative investigations, treatments and continuing care both in hospital and in the ambulatory setting.

Manager

Understand how vascular surgery functions within the confines of structure, financing and operation of the health care system.

Understand the ancillary laboratory facilities (eg noninvasive testing) used by the vascular surgery for his/her patients.
Understand and contribute to optimal discharge planning and management of resources, coordinating investigations or treatments.

Health Advocate

Identify risk factors in individual patients for the vascular diseases and educate patients in preventive measures, namely – treatment of hypertension, smoking cessation, weight reduction, lipid management. Ensure prophylactic measures to minimize development of cardiovascular disease are implemented: eg. Lipid lowering agents, ASA,

Scholar

Be able to evaluate and critically appraise the literature as relevant to the patients seen on the service.
Be aware of landmark research publications in vascular surgery that impact on practice and disseminate the knowledge and findings of these studies.
Be aware of ongoing research among staff involving vascular surgery patients.

Professional

Interact with patients, families, nurses and colleagues in a professional manner with appropriate attitudes.
Demonstrate punctuality, responsibility and commitment in dealing.
Deliver care with integrity, honesty and compassion.
Understand the professional, legal and ethical codes to which physicians are bound.

3.10 Thoracic Surgery
Medical Expert/Clinical Decision Maker

**Knowledge: Basic Science and Anatomy**

develop a strong knowledge base in thoracic surgery including physiology, pathology, operative anatomy, natural history

**Knowledge: General Clinical**

develop a strong knowledge base in thoracic surgery including epidemiology, diagnostic methods, prognosis, multimodality cancer care, intensive care medicine in both acute and chronic patients.
this will include all aspects of thoracic trauma, thoracic neoplasia as well as diseases of the diaphragm and thoracic outlet.
experience and participate in preoperative assessment and postoperative care and intensive care unit medicine
become familiar with controversies in the multimodality management of thoracic malignancies Anesthetic management of thoracic surgical patients including ventilatory support and physiotherapy
laboratory procedures in the diagnosis of thoracic disease
sepsis as it applies to the operative care of thoracic and esophageal disease and sternal wound infections
The resident is expected to be aware of the range of outcomes from thoracic surgical interventions and to distinguish from unacceptable to unexpected clinical results.

**Knowledge: Specific Clinical Problems**

It is a goal to obtain an understanding of the following:

Pathology and treatment of neoplasia of the lung, trachea, esophagus, mediastinum and chest wall
Chest wall deformities and trauma
Diaphragmatic trauma, hernias and hiatal hernias
Pleural effusions, empyemas, pneumothoraces, hemothorax
Pericardial disease in thoracic surgery
Thoracic trauma
Tracheal diseases
Congenital, structural, and inflammatory diseases of the lung
Esophageal physiology and motility
Transplantation and emphysema surgery
Thoracic outlet syndrome

**Knowledge: Technical**

To develop operative skills to properly perform bronchoscopy, esophagoscopy, videothoracoscopy, thoracotomy-opening and closing of the chest, wedge resections, uncomplicated pulmonary lobectomy
In particular the resident is expected to develop some skills in and be aware of:
1. Techniques of pulmonary and esophageal biopsy and resection
2. Mediastinal node biopsy.
3. Traumatic repair of chest wall lung, major airways, diaphragm and esophagus.
4. Pulmonary resections
5. Thoracoplasty.
6. Decortication of the lungs.
7. Tracheal resection and approaches.
8. Resection of the esophagus including replacement with stomach, colon and small bowel.
9. Correction of chest wall deformity.
10. Surgical procedures of the chest wall and pulmonary infections.
12. Surgical therapy of thoracic outlet syndrome.
13. Surgical therapy of pleural effusions and infections.
14. Primary and metastatic pleural tumors.
15. Surgical procedures of benign and malignant diseases of the trachea.
16. Correction of benign esophageal disorders including diverticulum cyst, duplications, motor disorders and hiatus hernia as well as gastroesophageal reflux.

1. Surgery for superior vena cava syndrome.
2. Primary tumors and cysts of the mediastinum and thymus gland.
3. Pulmonary transplantation.
4. Laser therapy.
5. Video-assisted thoracic surgery for mediastinal lung parenchyma and esophageal disease.
6. Surgical management of complications of thoracic and esophageal procedures.

Communicator

Each resident is expected to communicate effectively with patients to be compassionate and show an overall understanding of the patient and his disease.

Residents responsible for discharge summary records that accurately reflect the hospital stay.

Residents will have three opportunities to engage in discussions of treatment other than surgery for patient with thoracic malignancies:

1. Preoperatively in the clinic or in the surgeons’ office, at the time of the original consultation discussions surrounding the utility of neoadjuvant chemotherapy and radiotherapy.
2. Post operative consideration of adjuvant chemotherapy and radiotherapy will be reviewed following resection.
3. Finally on Wednesday afternoons at the Multi-discipline Cancer Clinic at the Hamilton Cancer Centre residents may engage in discussion with radiation oncology and medical oncology and thoracic surgery about the management of patients with lung cancer.

Collaborator
The resident is expected to function as a member of a multi-disciplinary health care team and contribute to the understanding and management of patients with their thoracic disease. All residents will collaborate in the operative cases and ultimate care of the patient in the ward as well as the active, vigorous open intensive care unit at St. Joseph’s Hospital.

Manager

The resident is to be actively involved in the appropriate management of the thoracic patient keeping in view of fiscal and expeditious bed management issues.

Health Advocate

Residents will be aware of the lifestyle issues in managing and avoiding disease processes as they relate to thoracic pathologies.

Scholar

The resident is expected to engage in the teaching of others and to develop an understanding and obligation of continuing self-education. Research methodology and evidence-based medicine. The resident is expected to participate in reviewing ongoing studies at forums such as journal club or rounds, and demonstrate a understanding of the principles of critical analysis as they relate to thoracic surgery literature.

Professional

Exposure to ethics and professional behaviour may occur at many levels. The resident is expected to recognize the psycho-social needs of the patient requiring or undergoing thoracic surgery.

The resident on the thoracic service is expected to participate at St Joseph’s hospital in rounds (3 times a year) facilitated by Dr. M. Coughlin (hospital ethics consultant) for issues specific to thoracic surgery. Dr Coughlin also offers a rounds on more general issues in bioethics titled: “ethics in practice: case discussion in bioethics” held the second Thursday of each month.

At the Thoracic Service outpatient clinic held every Friday morning, an ethics consultant is present as part of the multi disciplinary team reviewing patient and family issues. (Especially for patients with advanced emphysema considering surgery or considering entry into the Lung Reduction Surgery Trial.)