UNIVERSITY OF ALBERTA

Cardiology Residency Training Program

Edmonton, Alberta

Canada
SUMMARY:

At the University of Alberta, we offer a well-organized comprehensive training program in Adult Cardiology with specific objectives, and a large complement of training experiences designed to enable the trainee to meet these objectives. Our program is committed to the training of excellent cardiologists who are well equipped to meet the expectations of the contemporary cardiovascular specialist. We are committed to fostering the career goals of our graduates across the broad spectrum of opportunities available in the specialty: either in clinical cardiology and/or as clinician scientists.

HIGHLIGHTS:

1. Dedicated and comprehensive educational rounds including: core curriculum, bedside physical examination, hemodynamics, angiography and interventional cardiology, advanced cardiac imaging, ECG and electrophysiology, CCU, journal clubs, research rounds, and program director rounds.

2. Fully developed rotations with experienced attending staff in the following areas:
   a. Cardiac Intensive Care Unit (hemodynamic monitoring, mechanical ventilation and intra-aortic balloon pulsation)
   b. Consultation Service
   c. In-patient General Cardiology
   d. Echocardiography (M-mode, 2D, Doppler & color flow mapping, transesophageal echocardiograms, contrast echocardiography, & stress echocardiography)
   e. Exercise Stress Testing and nuclear cardiology
   f. Electrophysiology (ECGs, ambulatory monitoring, pacemakers, invasive EP studies & ablation)
   g. Invasive cardiology (cardiac catheterization, percutaneous coronary intervention, atrial septal defect and PFO percutaneous closures, percutaneous valve replacement)
   h. Ambulatory Care: general cardiology, adult congenital heart disease, heart failure and transplant, electrophysiology (arrhythmia, ICD and pacemaker), pediatric cardiology, risk reduction clinic, and EASE clinic (rapid access outpatient investigation and consultation)
   i. Chest Pain Program (an emergency department based chest pain evaluation program)
   j. Pediatric Cardiology
   k. Electives (e.g., CV anesthesia, transplant cardiology)
   l. Research (broad range of research opportunities from population to basic science)

3. Strong Clinical and Basic Research Programs
   a. Acute coronary syndromes
   b. Atherosclerosis
   c. Congestive heart failure
   d. Infarct expansion and remodeling
   e. Advanced Cardiac Imaging
   f. Cardiovascular exercise physiology
   g. Myocardial metabolism
   h. Vascular biology
   i. Cardiac Biomarkers
   j. Pulmonary hypertension

4. Unique, world-class institution (Mazankowski Alberta Heart Institute) with state-of-the-art diagnostic equipment.

5. Exposure to a busy, community-based practice at the Royal Alexandra Hospital

6. Subspecialty preparation examinations for all trainees with written and oral practice examinations.
INTRODUCTION AND GENERAL OBJECTIVES

The Cardiology Training Program at the University of Alberta accepts as its overall goals the objectives for subspecialty training in cardiology put forth by the Royal College of Physicians and Surgeons of Canada and the Bethesda Task Force in Adult Cardiology Training of the American College of Cardiology. The general principles important in general internal medicine training are also applicable to cardiology. However, major advances in the diagnosis and treatment of patients with cardiovascular diseases have increased the demands on the cardiovascular specialist and require ongoing re-evaluation of cardiovascular training.

The Cardiology Training Program is blessed with an outstanding physical plant and diagnostic facilities. Within this setting, the Division is able to provide an intellectual environment in which the knowledge, clinical skill, judgment, compassion and attitudes essential to the modern cardiologist can be developed. The Division maintains close working relationships with cardiovascular surgery as well as with the Department of Medicine and the other subspecialty divisions within it. Well-defined levels of responsibility by trainees and staff are necessary, with the trainee assuming greater responsibility as training progresses. The trainee is encouraged to cultivate an attitude of scholarship and dedication to continuing education that will remain throughout his or her professional career.

The training program believes that the following overall objectives must be met at the conclusion of training:

1. All trainees must be adept at obtaining a history and performing a complete cardiovascular physical examination. They must be familiar with psychological factors and their impact on cardiovascular diseases and must be familiar with the importance of preventive and rehabilitative management in cardiovascular medicine.

2. The trainee must become well educated in pathogenesis, pathology, epidemiology, natural history, diagnosis and management of cardiovascular disease including coronary atherosclerosis, valvular disease, cardiomyopathy, congenital heart disease, arrhythmias, hypertension, pericardial disease, infective endocarditis, pulmonary heart disease, cardiac trauma, cardiac tumors and cardiac complications of systemic disease.

3. The trainee must be adept in the management of patients requiring cardiovascular intensive care and must be an expert in the techniques of advanced cardiac life support.

4. The trainee must be well versed in outpatient management of the cardiac patient, with expertise in all age groups from adolescence to old age.

5. The trainee must be an expert in 12-lead electrocardiographic interpretation and skilled in interpretation of exercise and ambulatory electrocardiograms.

6. The trainee must have experience in right and left heart catheterizations, with this experience emphasizing interpretation of pressure recordings, analysis of hemodynamics, angiographic interpretation, and understanding of indications for coronary angioplasty and valvuloplasty.

7. The trainee must have experience in performance and interpretation of M-mode, two-dimensional and Doppler echocardiograms.

8. The trainee must know the general principles, indications for and limitations of nuclear cardiovascular investigations and must understand the principles of radiation safety. The trainee must have experience supervising and interpreting these examinations.

9. The trainees must be knowledgeable of the indications for permanent cardiac pacing and the long-term management of the pacemaker patient.

10. The trainee must understand the indications for and principles of invasive electrophysiologic testing.
11. The trainee must complete a minimum of one research project. This must include the development of a hypothesis and a means to answer that question, the implementation of the project, the analysis of results, and the formulation of these results into a form suitable for submission to a scientific forum for presentation and publication.

12. The trainee must attend and participate in regular cardiology conferences, seminars, journal review activities, multidisciplinary conferences, and lectures by visiting professors and research seminars.

13. The trainee must participate in medical education through presentation of rounds and seminars, teaching during ward rounds, and supervision of junior residents and medical students.

14. The trainee must undergo biannual evaluation, which will be based on his/her meeting the overall objectives for the program as well as the specific objectives for each rotation. Evaluations will also evaluate intellectual abilities, technical skills, interpersonal skills, judgment, and clinical acumen, as well as a more formal assessment through a biannual RCPSC style examination.

Towards these ends, our program is organized to allow each trainee to meet these objectives to the best of his or her ability. Trainees wishing to become an expert in any particular technical skill will require additional supervised training in that area following the guidelines of the Canadian Cardiovascular Society. The core program is strongly based in clinical cardiology, and is designed to expose the trainee to a broad range of acute and chronic cardiovascular diseases. We emphasize accurate bedside diagnosis, appropriate use of diagnostic tests, and application of general cardiologic principles to each individual case with an appreciation of the uniqueness of each patient. We provide exposure to nearly all methods of invasive and noninvasive testing in cardiology. Finally, we require participation in research by trainees as a means to develop critical thinking and an inquisitive attitude toward current problems in cardiovascular disease.

The present core program includes:

- 15 four-week blocks in non-laboratory clinical activities (CCU, consults, outpatient cardiology, pediatric cardiology, cardiology wards).
- 15 four-week blocks in laboratory clinical activities (Cardiac Catheterization Laboratory, Echocardiography Laboratory, Nuclear Cardiology, Electrocardiography and Electrophysiology).
- 2 four-week blocks of research.
- 4 four-week blocks of elective time which can be used to gain additional experience in any of the major rotations, or to obtain exposure to related areas of interest to the trainee.

These rotations are all essential to gain adequate exposure to the broad range of contemporary cardiologic practice. In addition, weekly rounds, seminars and core curriculum lectures will supplement the trainees' reading and enhance didactic learning. The diversity of clinical and research expertise within the Division of Cardiology, as well as the breadth and depth of clinical material available at the Mazankowski Alberta Heart Institute, will provide the trainee with extensive clinical experience. This combined with the examination preparation series will, we believe, prepare the trainee for the RCPSC examinations.
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<td>K. Woo</td>
<td>Clinical Associate Professor</td>
<td>Cardiology</td>
<td>Intervention</td>
<td>Clinical, teaching</td>
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A. Non-Laboratory Clinical Rotations

1. CARDIAC INTENSIVE CARE ROTATION

University of Alberta CCU Rotation
Revised March 2012

1.1 Rotation Supervisor:
- Dr. Wayne Tymchak

1.2 Location:
- UAH CCU 5A7 at the Mazankowski Alberta Heart Institute

1.3 General Objectives:

The cardiac intensive care unit at the University of Alberta Hospital has over 1000 admissions each year. Approximately 1/3 of these are patients with acute myocardial infarct and another 1/3 are patients with other unstable ischemic syndromes. The remaining 1/3 include patients with severe congestive heart failure of multiple etiologies, pre or post heart transplant patients, patients with a wide spectrum of brady and tachyarrhythmias, patients with acute pericardial disease as well as pre or postoperative patients, those with acute hypertensive syndromes, those with acute valvular heart disease and those with complex congenital heart disease. The heart and heart/lung transplantation program at the University of Alberta results in the referral of patients who may be critically ill, requiring invasive hemodynamic monitoring, inotropic therapy, intra-aortic balloon counterpulsation and mechanical ventilation. These patients, as well as others, may develop multi-system complications requiring the trainee to deal with the complex interactions between the cardiovascular system and other organ systems. This intensive care unit supports patients who require mechanical ventilation, invasive hemodynamic monitoring, invasive hemodynamic support, as well as many patients who may require temporary pacing. The intensive care unit is equipped with fluoroscopy capability. The trainee is expected to participate fully in the management of the broad spectrum of patients who are admitted to this unit.

1.4 Specific Objectives:
- To become proficient in cardiology critical care medicine
- See below for specific objectives in CanMEDS

1.5 Responsibilities:
- Supervise junior residents, ensure that they “pre-round” and have written notes on their patients. Be sure to communicate expectation of the junior residents on the first day, including pre-rounding, writing good notes and transfer notes, and exhibit professional behavior towards patients and other health professionals
- Conduct rounds in CCU at 09:00 and again at 17:00 (sign-out)
- To review consults with junior residents and attending physicians
- To help teach junior residents acute cardiology
- Participation in the UAH Cardiology Senior call pool
- Independent reading
- Participate in CCU teaching rounds every Monday (0800-0900 hr), to consist of 2, ½ hour presentations by junior resident staff on topics chosen in conjunction with senior cardiology resident
- Present at morbidity and mortality rounds at noon on the last Friday of the rotation

1.6 First Day:
- Go to the 4A9.016 conference room at 7:30 am for CCU orientation with the junior residents

1.7 Recommended Reading:
- ACC/AHA Guidelines for STEMI, and for Unstable Angina/NSTEMI
- ESC Guidelines for Unstable Angina and NSTEMI
- ACC/AHA Guidelines for peri-operative cardiovascular evaluation
- ACC/AHA Guidelines for Congestive Heart Failure
- ACC/AHA Guidelines for Atrial Fibrillation
- ACC/AHA Guidelines for Hypothermia Therapy in Cardiac Arrest
2.0 Trainees should obtain expertise in the following areas:

2.1 Medical Expert

Although the points listed below are key areas on which to focus during this rotation the trainee is expected to develop a broad based expertise in the assessment, diagnosis and management of all cardiovascular disease during core training.

1. Emergency assessment of patients with unstable angina, acute myocardial infarction, life threatening arrhythmias, and other acute cardiologic problems requiring admission to the CCU.
2. Conventional emergent and urgent treatment of patients with acute ischemic syndromes.
4. Recognition of, and principles of the treatment of complications following myocardial infarction, such as:
   a. Post infarction angina, infarct extension, and pericarditis
   b. Tachyarrhythmias
   c. Conduction defects and bradyarrhythmias
   d. Mechanical events
      i. Acute ventricular septal defect
      ii. Acute mitral regurgitation
      iii. Infarct expansion and extension
      iv. Pseudoaneurysm formation
      v. Myocardial rupture with tamponade
   e. Hemodynamic problems unrelated to mechanical complications (left and right ventricular failure, high output states, etc)
5. Indications for, and timing of, specific techniques
   a. Arterial line insertion
   b. Central venous line insertion
   c. Swan-Ganz catheter insertion
   d. Intra-aortic balloon pump insertion
   e. Cardiac catheterization in the setting of acute infarction and unstable angina
   f. Pericardiocentesis (under ECG, fluoroscopic, or echo guidance)
   g. Temporary pacemaker insertion
   h. Bedside echocardiography
6. Indications for and techniques of endotracheal intubation, ventilator management, and indications for and techniques of ventilator weaning.
7. Indications for heart and heart/lung transplantation, and management of both pre and post-transplantation patients.
8. Treatment of patients with other disorders, which frequently present to the coronary care unit including:
   a. Cardiopulmonary arrest of uncertain etiology
   b. Acute pulmonary embolism
   c. Acute pericarditis without tamponade
   d. Hypertensive crisis
   e. Syncope of suspected cardiac origin
   f. Dissecting aortic aneurysm
   g. Multi-organ system involvement such as, renal failure, resp failure, sepsis, CVA
   h. VT storm and ICD malfunction

As part of a process of graded responsibility, more senior cardiology trainees are on “Back-Up” call in order to assist more junior cardiology trainees, especially in the technical and procedural areas. In addition all levels of cardiology trainees are to directly supervise junior rotating house staff.
2.2 Communicator

1. Establish therapeutic relationships with patients / families in the setting of the intensive care unit
2. Obtain and synthesize relevant history from patients / families / communities
3. Discuss appropriate information with patients / families and the health care team including end of life discussions

2.3 Collaborator

1. Works effectively with CCU staff including other physicians, nursing team and other health care professionals
2. Work effectively with patient navigators and ward teams when planning transfers

2.4 Manager

1. Effectively balances patient care, learning needs, and outside activities
2. Prioritizes patient care according to urgency
3. Allocate finite health care resources. Judicious use of diagnostic testing, consultative medicine and interventional procedures.
4. Work effectively and efficiently in a health care organization – acting as CCU team leader (organizing junior trainees)
5. Utilize information technology to optimize patient care, life-long learning and other activities

2.5 Health Advocate

1. Identify patient CV risk factors and determine if effective secondary prevention strategies are in effect
2. Recognize the differing care needs of specific patient populations including but not limited to the elderly, Jehovah’s witness, the renal patient, cardiac transplant patient and adult congenital heart disease
3. Understand patient care preferences, personal directives and power of attorney
4. Maintain a safe and clean working environment

2.6 Scholar

1. Provide regular teaching on a number of pre-selected topics during the afternoons after CCU rounds, while being supervised by the attending staff (see Appendix). It is the intent that a minimum of 15 topics be covered during the 4 week rotation with half of talks given by the cardiology resident and half by the attending staff.
2. Develop, implement and monitor a personal continuing education strategy
3. Critically appraise available evidence for acute/critical cardiac care medicine
4. Facilitate learning of patients, housestaff/students and other health professionals

2.7 Professional

1. Deliver highest quality care with integrity, honesty and compassion
2. Exhibit appropriate personal and interpersonal professional behaviors
3. Practice medicine ethically consistent with obligations of a physician
4. Answer pages promptly
5. Communicate absences in a timely fashion to preceptor and the training office

2.8 Year Specific CCU Duties:

In the absence of the CCU Director or attending cardiologist, the trainee is the physician in charge of the unit and as such should be completely familiar with all of the patients in the unit. Specific responsibilities of the cardiology trainee, according to level of training, are as follows:
1\textsuperscript{st} year Cardiology Trainee (C1 or PGY-4)
1. Participate actively in all matters relating to patient care and contribute to decision-making during daily rounds, with assistance from the attending staff.
2. Attend morning hand-over (7:45AM) and sign-out rounds (16:45) to assist in transferring care to/from the on-call team.
3. Assist in screening potential transfers/admissions to the CCU and discharges, with assistance from the attending staff.
4. Provide telephone guidance to physicians seeking advice from the UAH CCU medical staff for acute cardiac problems during evenings and weekends/holidays, with backup provided from the attending staff.
5. Supervision and education of junior house staff.
6. Assist in the performance of certain technical procedures (as outlined in 1.1-5, such as central venous catheter insertion, arterial line insertion, temporary pacemaker insertion, etc.) under the direct supervision of the attending physician.
7. Ensure that daily progress notes are made on all patients.
8. Approve/clarify orders (investigations, consultations and treatments) written by junior house staff in cases of uncertainty.
9. Present cases at CCU rounds, CV surgery/cardiology combined rounds and Morbidity and Mortality Rounds.
10. Provide regular junior resident teaching in the afternoon, under the supervision of the attending staff.

2\textsuperscript{nd} year Cardiology Trainee (C2 or PGY-5)
1. Trainees will be allowed to take on certain responsibilities of an advanced trainee (see 3\textsuperscript{rd} year Cardiology Trainee below) based on individual proficiency, while meeting all expectations of a 1\textsuperscript{st} year resident.
2. For example, trainees may be given more flexibility in the types of techniques/procedures attempted (assist with intra-aortic balloon pump insertion, assist with pericardiocentesis, independently insert central venous catheters, etc.).

3\textsuperscript{rd} year Cardiology Trainee (C3 or PGY-6)
1. Take charge of morning rounds, and be the first voice in generating patient management plans.
2. Take a leading role in screening potential transfers/admissions and discharged to the CCU.
3. Take a leading role in morning hand-over (7:45AM) and sign-out rounds (16:45).
4. Provide telephone guidance to physicians seeking advice from the UAH CCU medical staff for acute cardiac problems during weekdays, evenings and weekends/holidays.
5. Be able to independently demonstrate the skillful performance of technical procedures in the CCU as the need arises (as outlined in 1.1-5), with attending physician back-up as required.
6. Supervision and education of junior house staff.
7. Ensure that daily progress notes are made on all patients.
8. Approve/clarify orders (investigations, consultations and treatments) written by junior house staff in cases of uncertainty.
9. Present cases at CCU rounds, CV surgery/cardiology combined rounds and Morbidity and Mortality Rounds.
10. Provide regular junior resident teaching in the afternoon, under the supervision of the attending staff.

It is still the understanding that the Attending Staff Physician, at an appropriate time needs to be made aware of all CCU activities such as admissions, discharges and change in patient status.

The trainee is excused from all responsibilities in the CCU during the Cardiology Core Curriculum lectures and all other mandatory rounds and lectures. It must be recognized, however, that patient safety is a priority and that there may be occasions where it is not possible to attend all teaching sessions/rounds because of patient acuity.
2. CARDIOLOGY WARD ROTATION

University of Alberta Cardiology Ward Rotation:

1.1 Rotation Supervisor:
   - Dr. Gabor Gyenes

1.2 Location:
   - 5A6 Mazankowski Alberta Heart Institute

1.3 General Objectives:
This rotation will provide the trainee with experience in management of hospitalized cardiac patients outside the CCU setting. The general objectives previously outlined for CCU apply to this rotation as well. Trainees will be exposed to patients recovering from acute ischemic syndromes who are transferred from CCU, transfers from other institutions for cardiac investigation, and patients directly admitted by members of the attending staff.

1.4 Specific Objectives:
   - To independently manage cardiology ward patients in a supervised training environment
   - To gain exposure to the broad range of in-patient cardiovascular medicine

1.5 Responsibilities:
   - Direct daily management of ward patients under staff supervision
   - Teaching of medical students and residents assigned to the ward
   - Evaluation of all admissions during the hours of 08:00-17:00 Monday to Friday
   - Daily notes on patients and discharge summary dictations
   - Participation in the Cardiology Senior Call pool (attend CCU sign-out rounds at 17:00)
   - Independent reading

1.6 First Day:
   - Join your attending for ward rounds on 5A6 at 09:00

1.7 Recommended Reading:
   - ACC/AHA 2009 Guidelines (plus updates) on STEMI and PCI
   - ACC/AHA 2007 Guidelines (plus updates) on UA/NSTEMI
   - CCS 2006-present Guidelines on Heart Failure
   - ACC/AHA 2006 Guidelines (plus updates) on Valvular Heart Disease
   - ACC/AHA 2011 Guidelines on CABG
   - CCS 2011 Guidelines on Atrial Fibrillation
   - CCS 2009 Guidelines on Management of Dyslipidemia
   - CCS 2003 Guidelines on Fitness to Drive and to Fly
   - ACC/AHA/HRS 2008 Guidelines for Device-Based Therapy of Cardiac Rhythm Abnormalities
Trainees should direct themselves to obtaining expertise in the following areas:

### 2.1 Medical Expert

Although the points listed below are key areas on which to focus during this rotation the trainee is expected to develop a broad based expertise in the assessment, diagnosis and management of all cardiovascular disease during core training.

1. Assessment of patients with acute coronary syndromes, heart failure, arrhythmias, and other acute cardiologic problems requiring admission to the hospital.
2. Treatment of patients with cardiovascular disease including medical, interventional, social and psychological measures.
3. Attaining excellence in bedside clinical diagnosis in cardiac patients.
4. Logical sequencing of cardiovascular investigations in hospitalized patients.
5. Recognition and management of psychological problems associated with cardiac disease.
6. Recognition of, and principles of the treatment of complications following myocardial infarction, such as:
   a. Post infarction angina, infarct extension, and pericarditis
   b. Tachyarrhythmias
   c. Conduction defects and bradyarrhythmias
   d. Mechanical events
   e. Acute ventricular septal defect
   f. Acute mitral regurgitation
   g. Infarct expansion and extension
   h. Pseudoaneurysm formation
   i. Myocardial rupture with tamponade
7. Indications for heart and heart/lung transplantation, and management of both pre and post-transplantation patients.
8. Treatment of patients with other disorders, including:
   a. Pacemaker/ICD Failure
   b. Endocarditis
   c. Cardiopulmonary arrest of uncertain etiology
   d. Acute pericarditis without tamponade
   e. Acute myocarditis
   f. Complex Adult Congenital Heart Disease
   g. Pulmonary Hypertension
   h. Syncope of suspected cardiac origin

### 2.2 Communicator

1. Establish therapeutic relationships with patients / families
2. Obtain and synthesize relevant history from patients / families / communities
3. Listen effectively
4. Discuss appropriate information with patients / families and the health care team
5. Write clear, concise discharge summaries
6. In C3 year, the trainee will be expected to lead patient/family meetings

### 2.3 Collaborator

1. Consult effectively with other physicians, nurses and other health care professionals
2. Contribute effectively to other interdisciplinary team activities
3. In C3 year, the trainee will be expected to coordinate discharge planning with the multidisciplinary team

### 2.4 Manager

1. Rational and cost-conscious hospital bed utilization by cardiac patients in the setting of bed pressure and
cost containment.
2. Effectively balances patient care, learning needs, and outside activities
3. Allocate finite health care resources wisely. Judicious use of diagnostic testing, consultative medicine and interventional procedures. Discuss medication coverage and affordability with patient and pharmacist.
4. Plan effective discharges with appropriate cardiology follow-up
5. Utilize information technology to optimize patient care, life-long learning and other activities
6. In C3 year, the trainee will be expected to lead bedside rounds

2.5 Health Advocate
1. Identify patient CV risk factors and determine if effective secondary prevention strategies are in place
2. Recognize the differing care needs of specific patient populations including but not limited to the elderly, Jehovah’s witness, the renal patient, cardiac transplant patient and adult congenital heart disease patient
3. Understand patient care preferences, personal directives and power of attorney
4. Council patients on the merits of cardiac rehabilitation and secondary prevention

2.6 Scholar
1. Develop, implement and monitor a personal continuing education strategy
2. Critically appraise sources of medical information for current practice guidelines
3. Facilitate learning of patients, housestaff/students and other health professionals

2.7 Professional
1. Deliver highest quality care with integrity, honesty and compassion
2. Exhibit appropriate personal and interpersonal professional behaviors
3. Practice medicine ethically consistent with obligations of a physician
4. Answer pages promptly
5. Communicates absences to the preceptor and training office (well in advance if possible)

2.8 Specific Duties:
Direct daily management of ward patients under staff supervision.
Daily teaching of residents and medical students assigned to the ward.
Evaluation of all admissions during the hours of 08:00-17:00 Monday through Friday, including those seen by junior house staff; the trainee should write a note on each new admission or transfer.
Discharge summaries.
3. CONSULTATION SERVICE

University Hospital (UAH) Consult Rotation:

1.1 Rotation Supervisor:
- Dr. Gabor Gyenes

1.2 Location:
- UAH Hospital

1.3 General Objectives:
An important part of cardiologists' practice involves consultation for other physicians on hospitalized patients. On this rotation, trainees will gain experience in dealing with acute and chronic cardiovascular problems of inpatients that often have multi-system disease of which heart disease is just one part. In addition, consults from the Cardiovascular Surgical Division will expose the trainee to the pre-operative and post-operative evaluation of patients undergoing cardiac surgery. The trainee will gain experience in the art of written and oral communications with other specialists and subspecialists.

1.4 Specific Objectives:
- Gain experience in dealing with acute and chronic cardiovascular issues arising in inpatients with multi-system disease
- Gain experience in the pre-operative and post-operative evaluation of patients undergoing non-cardiac and cardiac surgery

1.5 Responsibilities:
- Be available for consults in various locations, and review each consult with the attending physician
- Ensure that consults seen by on-call residents (nights, weekends) are followed appropriately
- Participation in the UAH Cardiology Senior call pool
- independent reading

1.6 First Day:
- contact the previous consult resident to obtain a list of patients that require follow-up
- contact the residents on-call over the weekend to see if any patients seen require follow-up
- round on the patients, and see new consults

1.7 Recommended Reading:
- ACC/AHA 2009 Guidelines (plus updates) for STEMI
- ACC/AHA 2007 Guidelines (plus updates) Unstable Angina/NSTEMI
- ACC/AHA 2007 Guidelines (plus updates) for peri-operative cardiovascular evaluation
- CCS 2006-present Guidelines for Congestive Heart Failure
- CCS 2011 Guidelines for Atrial Fibrillation
2.0 **Trainees should obtain expertise in the following areas:**

2.1 **Medical Expert**

Although the points listed below are key areas on which to focus during this rotation the trainee is expected to develop a broad based expertise in the assessment, diagnosis and management of all cardiovascular disease during core training.

a) Assessment of a cardiac problem within the context of the patient with multi-system disease as a whole.

b) Assessment of post-operative cardiac surgical patients with problems such as post-operative arrhythmias, cardiogenic shock, pericardial tamponade.

c) Assessment of patients with acute coronary syndromes, heart failure, life threatening arrhythmias, and other acute cardiologic problems that requiring transfer to the CCU or cardiology ward for observation, hemodynamic or ECG monitoring and cardiac investigation.

d) Treatment of patients with other disorders including:
   
i) Cardiopulmonary arrest of uncertain etiology
   ii) Acute pulmonary embolism
   iii) Acute pericarditis without tamponade
   iv) Acute myocarditis
   v) Syncope of suspected cardiac origin
   vi) Dissecting aortic aneurysm

2.2 **Communicator**

1. Establish therapeutic relationships with patients / families
2. Obtain and synthesize relevant history from patients / families / communities
3. Discuss appropriate information with patients / families and the health care team
4. Writing a concise consultative note, that answers the questions, asked by the referring physician and directs subsequent investigation and treatment.
5. In C3 year, the trainee will be expected to lead patient/family meetings

2.3 **Collaborator**

1. Consult effectively with other physicians and health care professionals
2. Coordinate transfers effectively with CCU and ward teams

2.4 **Manager**

1. Develop the capability to triage patients in order of urgency
2. Effectively balances patient care, learning needs, and outside activities
3. Allocate finite health care resources wisely including diagnostic testing and patient transfers
4. Plan effective discharges with appropriate cardiology follow-up
5. Utilize information technology to optimize patient care, life-long learning and other activities
6. In C2 year, the trainee will also be expected to independently manage the follow-up of patients on the consult service. The supervising staff will be consulted if there is a significant change in the clinical status or therapeutic plan.

2.5 **Health Advocate**

1. Identify CV risk factors and determine if effective treatment strategies are in place
2. Identifies when it is appropriate to delay non-cardiac surgery due to cardiac risk
3. Recognize and respond to those issues where patient advocacy is appropriate
2.6 Scholar

1. Develop, implement and monitor a personal continuing education strategy
2. Critically appraise sources of medical information relevant to consultative cardiology
3. Facilitate learning of patients, housestaff/students and other health professionals

2.7 Professional

1. Deliver highest quality care with integrity, honesty and compassion
2. Exhibit appropriate personal and interpersonal professional behaviors
3. Practice medicine ethically consistent with obligations of a physician
4. Answers pages promptly
5. Communicates absences to preceptor and training office (well in advance if possible)

2.8 Specific Consult Service Duties:

1. Trainees assigned to the Consult Service will be responsible for the assessment, management and in-hospital follow-up of all in-patients consulted to Cardiology. The consult service will also be responsible for the care of off-service cardiology patients. They will act as the team leader in conjunction with the attending staff.

2. The cardiology trainee may assign consults to the junior residents working on this service but remains ultimately responsible for their completion. Consults received between 8 am and 3 p.m. should be seen the same day; emergency consults must be seen immediately and discussed promptly with the attending staff. Consults directed to a designated cardiologist should be seen and presented to the attending staff involved.

3. Daily progress notes are expected when active changes in the clinical picture of the patient are occurring; frequent notes are required at other times. Follow up of patients’ investigations and clinical status is the responsibility of the trainee and the attending staff should be kept apprised of developments at all times.
4. CLINICS ROTATION

Cardiology Clinics Rotation

1.1 Rotation Supervisor:
- Dr. Naji AlHulaimi – Cardiology Clinics Rotation
- Dr. Ian Paterson – Longitudinal Clinic Rotation

1.2 Location:
- Mazankowski Alberta Heart Institute – 2A7

1.3 Objectives:
- To become proficient in cardiac consultation in the ambulatory care setting
- To advocate a heart healthy lifestyle
- To learn about the impact of cardiology diseases on employment and personal circumstances
- To practice cardiology in a multidisciplinary setting

This rotation is designed to help the trainee gain expertise in the management of outpatients with cardiac disease. Trainees will be exposed to a wide variety of patients in the following settings:

1. Adult Congenital Heart Disease Clinic
2. Heart Transplant Clinic
3. Heart Function Clinic
4. Vascular Disease Clinic (McMurtry)
5. Transcatheter Aortic Valve Implantation
6. Arrhythmia and Device Clinics
7. EASE Clinic (Ensuring Access & Speedy Evaluation)
8. General Cardiology Clinic

Trainees in cardiology will gain exposure to arrhythmia and device clinics during their EP rotation.

1.4 Responsibilities:
- Meet with Dr. AlHulaimi on the first day of the rotation at 8:00AM to review the objectives of the rotation
- Attend at least 70% of half-day clinics (excluding holidays, post-call days, pre-approved leaves and conferences). The resident should have the staff supervisor of each clinic complete the clinic rotation daily evaluation form. Post call days and other absences should be indicated on the form. Failure to demonstrate attendance in the requisite number of clinics at the end of the rotation will result in an incomplete evaluation
- Advance notification to the secretaries coordinating each clinic to ensure that patients are booked in advance. At least 2 weeks prior to start of rotation, the trainee should choose from the clinic schedule (see below) and contact the appropriate contact person to schedule the clinic (see contact list below).
- Daily attendance at scheduled clinics as per the published schedule (see next page). Once you have committed to a clinic it is expected that you will attend. Morning clinics start times may vary but typically start at 9AM and afternoon clinics start at 1PM.
- Residents in their second or third year of training will be expected to teach one of the following classes to a group of patients: (1) Post-MI teaching (Sherry Pysyk), (2) Pre/Post cardiac surgery (Paul Shelby), or (3) Anticoagulation (Margaret Ackman). The resident will first observe a class with the teacher and then teach a class in the following week. They will be evaluated by the teacher according to their advocacy and communication CanMEDS skills.
- For the longitudinal clinic, residents will be expected to follow patients that they have encountered in the course of their inpatient services as well as see new consultations. Residents will be assigned to one clinic half-day/block unless on CCU or away on elective or holiday. Each year they will be expected to see a minimum of 30 patients. Trainees able to achieve this benchmark in each of the first two years of training will receive credit for one clinics block and have the option to have an extra elective in their
final year of training. Supervising physicians will be asked to complete a clinic assessment form to be handed in to the residency training office.

1.6 Recommended Reading:
- CCS 2009 Lipid Guidelines
- CCS 2003 Fit to Drive/Fly
- ACCP Anticoagulation guidelines
- CCS 2005-present Heart Failure guidelines
- CCS 2011 AF guidelines
- AHA/ACC 2006 Guidelines on Valvular Heart Disease
**Clinics Schedule**  
Last modified July 2012

* All clinics take place in the 2A6 clinics area, with the exception of PM Clinic and the ACHD

### “Clinics A” – For Cardiology Residents ONLY

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### “Clinics C” – For Students ONLY

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<td>Kimber Tymchak</td>
<td>EASE Burton</td>
<td>Hammer Wong</td>
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2.0 Training Objectives

Trainees should direct themselves to obtaining expertise in the following areas:

2.1 Medical Expert

1. Broad based understanding of the appropriate investigation and medical therapy of patients with cardiovascular risk factors and/or diagnosis.
2. Understanding unique issues around management of patients with adult congenital heart disease including medical, social and psychological issues.
3. Understanding unique issues around management of patients undergoing assessment of cardiac transplantation and post transplantation including medical, social, and psychological issues.
4. Assessment and determination of the impact of cardiac risk factors and means of modulating specific patient risk.
5. Understanding unique issues in the management of patients with congestive heart failure through a multidisciplinary clinic.
6. Understanding the indications for implantation of pacemakers and internal defibrillators. Also the required follow-up and psychosocial impact of living with implanted devices.
7. Understanding appropriate investigations and treatments for supraventricular and ventricular arrhythmias.
8. Understanding the appropriate investigations and treatment of valvular heart disease.
2.2 Communicator
1. Establish therapeutic relationships with patients / families and multidisciplinary clinic staff
2. Obtain and synthesize relevant history from patients / families / communities
3. Listen effectively
4. Discuss appropriate information with patients / families and the health care team
5. Effective written communication to referring physician

2.3 Collaborator
1. Consult effectively with other physicians, special clinic nurses and other health care professionals
2. Contribute effectively to other interdisciplinary team activities such as the HTx, HFC and the TAVI clinics.

2.4 Manager
1. Utilize resources effectively to balance patient care, learning needs, and outside activities
2. Allocate finite health care resources wisely including an understanding of the costs and availabilities of various diagnostic and treatment strategies. Determine patient’s health insurance coverage and potential treatment costs.
4. Utilize information technology to optimize patient care, life-long learning and other activities

2.5 Health Advocate
1. Identify CV risk factors and if effective treatment strategies are in place
2. Identify patient populations where family counseling and screening for disease is appropriate
3. Recognize and respond to those issues where advocacy is appropriate such as return to work and fitness to operate a motor vehicle
4. Teach patients to manage their cardiac disease and its treatments

2.6 Scholar
1. Develop, implement and monitor a personal continuing education strategy
2. Critically appraise sources of medical information relevant to ambulatory cardiac care
3. Facilitate learning of patients, housestaff/students and other health professionals

2.7 Professional
1. Deliver highest quality care with integrity, honesty and compassion
2. Exhibit appropriate personal and interpersonal professional behaviours
3. Practice medicine ethically consistent with obligations of a physician
4. Punctuality and attendance as expected for medical professionals
5. Communicate absences in a timely fashion to the preceptor and training office.
6. Prompt response to pages.

2.8 Specific Clinic Duties:
Trainees should become experienced in office clinical evaluation, appropriate sequencing of outpatient investigations, and dictation of letters to referring physicians. Exact schedules for outpatient clinics will vary. Trainees will receive a minimum of 2 blocks experience in Cardiology Clinics during the 3-year program.
Clinic Guidelines and Helpful Tips

Evaluations
• clinic evaluation forms are available on One45 or from the program coordinator
• you will be expected to have the form filled in and signed by each attending that you work with at the time of the clinic

Keys
• be on time - if you will be late or absent, call the attending physician
• complete all paperwork during clinic
• requisitions need to be completed for all procedures & investigations that are ordered
• when dictating, speak slowly and clearly...spell all unusual words

Clinic Charts
• all clinic patients will have a dummy chart (usually blue/black)
• contains the referral letter and often the prior clinic letter as well as any relevant investigations (although these may be found in NetCare or the hospital chart as well)

Return all charts and dictaphones to the supervising physician’s office.
Longitudinal clinic material should be returned to the longitudinal clinic admin assistant.

Dictation Template
1. Demographics
   • Patient Name (spell last name) and DOB
   • UAH #
2. Letter to:
   • Referring doctor (spell name, give location...especially if out-of-province)
   • Copies to be sent to...
3. Cardiac History
   • complete list (with dates, if known) and including cardiac risk factors
   • example:
     • Hypertension (2003)
     • status post MI (2005)
     • status post Medtronic dual chamber ICD (October 2007)
4. Previous Cardiac Investigations/Interventions
   • all investigations and results
   • example:
     • PCI and DES of proximal LAD in 2006
     • EF 20-25% on echocardiography in 2007
5. Medical History (non-cardiac)
   • complete list
6. Medications
   • include everything (spell them if unusual)
   • use generic names
   • give dose and frequency
   • example:
     • amiodarone 200mg daily
     • metoprolol 25 mg bid
7. Allergies
   • include reactions (especially to intravenous dye)
8. Body of letter
Dear Doctor X,

Thank you very much for having me review [Mr./Mrs./Ms. Patient’s name] in the [clinic name] at the
University of Alberta, today, [clinic date]. [Mr./Mrs./Ms. Patient’s name] is an [age] year old [man/ woman] being reviewed for... [reason for referral].

- **include relevant history but do not repeat the information stated above**
- **include a focused cardiovascular exam**

**Impression and Recommendations:**

- **use numbers to outline your plan (ex. #1 CHF, #2 AFib...). List most important issues first. Do not forget to include a section for cardiac risk factors.**

- **in the last paragraph of the letter ALWAYS include whether or not any follow-up will be done and if so, when.**

Overall, [patient’s name] was satisfied with this plan and I trust it will meet with your approval as well. If you have any questions or concerns, please feel free to contact me.

Yours truly...

Dr. Y [spell your name] dictating on behalf of Dr. Z
5. PEDIATRIC CARDIOLOGY

Rotation Contact Information

Dr. Michal Kantoch is the rotation supervisor. Please contact him one week prior to starting to discuss the rotation. Secretary 73963, or pager 445 6447.

General Information

This rotation is designed to provide the adult cardiology trainee with exposure to pediatric cardiology.

The rotation is observation based and trainee driven. The experience will be enhanced by the trainee taking responsibility for using their time to maximize learning opportunities and by independent reading. Trainees should keep a log book of their activities during the rotation (e.g., echos, caths, MRI’s seen, consults performed and clinics attended) which will be used in the evaluation of the rotation.

Trainees should direct themselves to obtaining expertise in the following areas:

Medical Expert

1. Describing basic cardiac embryology*
2. Gaining familiarity with the clinical presentation, diagnosis, management and natural history of congenital heart disease in infant and children
3. Becoming conversant in the basic anatomic, hemodynamic, pathophysiologic, radiologic and echocardiographic features of the following
   - Shunt lesions*
   - LVOT and RVOT obstructive lesions
   - Complex congenital heart heart lesions (transposition, single ventricle physiology)
   - Eisenmenger’s Syndrome and cyanotic congenital heart disease
4. Gaining knowledge in the management of congenital heart lesions in which survival to adulthood is likely (i.e., adult congenital heart disease)*

* Royal College Objective of Training in Adult Cardiology

Communicator

1. Establish therapeutic relationships with patients/families – specific focus on the interaction of parents and their children with cardiac disease
2. Obtain and synthesize relevant history from patients/families/communities
3. Listen effectively
4. Discuss appropriate information with patients/families and health care team

Collaborator

1. Consult effectively with other physicians and health care professionals
2. Attend the multidisciplinary pediatric cardiosurgical conference on Tuesday afternoon
3. Provide integrative care within inpatient and outpatient pediatric services
4. Work effectively with medical geneticist when appropriate

Manager

1. Effectively balance patient care, learning needs, and outside activities
2. Choose most appropriate test and/or treatment while balancing cost and availability
3. Balance time in inpatient and outpatient pediatric cardiology services
4. Utilize information technology to optimize patient care, lifelong learning and other activities

**Health Advocate**

1. Identify the important determinants of health affecting pediatric and adult congenital heart disease patients
2. Understand the psychosocial implications of chronic cardiac disease in children as well as its impact on their parents
3. Provide counseling to parents on familial risks of acquired and inherited cardiac disease
4. Recognize and respond to those issues where advocacy is appropriate

**Scholar**

1. Develop, implement and monitor a personal continuing education strategy
2. Critically appraise available medical literature relevant to pediatric and adult congenital heart disease
3. Facilitate learning of patients, house staff/students and other professionals

**Professional**

1. Deliver high quality care with integrity, honesty and compassion
2. Exhibit appropriate personal and interpersonal professional behaviors
3. Practice medicine ethically consistent with obligations of a physician
4. Answers pages promptly
5. Communicates absences in a timely fashion to the preceptor and the training office

**Duties**

The Trainee will receive a minimum 2-block experience in Pediatric Cardiology during the three year program. The following is a suggested schedule of activity.

Trainee will spend **1 week of the rotation participating in ward rounds / new consults**. The cardiology resident will have no clinical responsibilities on the ward unless specifically requested by the trainee. The purpose of participating in ward rounds will be to see the spectrum of congenital heart disease, and the timing of surgery for specific lesions. The trainee should use the opportunity to read around the lesions of patients seen, review their echo findings and discuss management with the pediatric cardiology attending.

New consults will generally be from pediatric or neonatal ICU and involve new diagnoses of congenital heart disease. These need to be seen in a timely fashion. The resident will inform the pediatric cardiologist on-call of their desire to see these consults, and the pediatric cardiologist will provide the resident with the opportunity to see them first. Resident will gather relevant data and review echo and consult with the staff pediatric cardiologist on call. It is recommended the resident then follow that patient’s hospital course.

Afternoons or spare time during the week of ward rounds/new consults can be spent in the pediatric echo lab.

The remaining **three weeks will be spent in clinics and labs** as follows:
Where more than one activity is listed, the first activity is recommended. Other listed activities are alternatives, in case of cancellation of first activity or if special trainee interest.

**Mon**

8AM: Case conference, 4D2 conference room. Presenting and teaching around typical congenital heart disease cases.

AM/PM Dr. Smallhorn clinic, 4C2
alternative: Dr. Dyck clinic, 4C2

**Tues**
AM Cardiology Residents Academic Half Day

Noon Pediatric Cardiology Core Curriculum lecture, 4D conference room

PM Cardiac cath lab with Dr. Taylor if adult congenital cases
or Pediatric EP lab (if trainee has interest)
or Pediatric Cardiosurgical conference, 4A9.016, a working meeting to decide
case management.

Wed

AM Pediatric MRI, Elko MRI unit (good opportunity to see uncorrected, partially
corrected lesions)
or Pediatric cath lab (if trainee interest, probably will be observational)

PM Adult congenital clinic with Dr. Kantoch, 4C2 (mandatory)
or Adult congenital MRI, Elko MRI unit (only if no clinic with Dr. Kantoch)

Thurs

AM Pediatric cardiology clinic, various cardiologists
or Pediatric cath lab (if trainee interest, probably will be observational)

PM Pediatric Echo lab, 4C2

Fri

AM/PM Adult congenital clinic, 4C2 (mandatory)

Suggested Reading

Braunwald’s Heart Disease, Chapters on Pediatric Cardiology, Adult congenital heart disease

European Guidelines for Management of ACHD, 2010
B. Laboratory Clinical Rotations

1. ECHOCARDIOGRAPHY ROTATION

Objectives for resident training in echocardiography follow the recommendations of the Canadian Cardiovascular Society.

1.1 Echo Training Program director:
Dr. Bibiana Cujec
Echo Lab Director:
Dr. Jonathan Choy

1.2 Location:
UA echo lab – Mazankowski Alberta Heart Institute

1.3 Objectives:
The residents are expected to undergo a total of 24 weeks of echocardiography training and achieve level 2 certification during their core cardiology training as per Royal College of Physicians and Surgeons of Canada recommendations.

- **Level 2** training is defined as an advanced proficiency in echocardiography for physicians with knowledge of clinical cardiology, who demonstrated ability to independently perform and interpret a comprehensive transthoracic echocardiogram. Physicians successfully completing Level 2 training are sufficiently experienced to supervise sonographers.

- **Basic Level 2** training emphasizes an exposure to a variety of pathologies, achievement of proficiency in the performance and interpretation of complete echocardiographic examinations using M-mode, 2D, Doppler blood flow, and Tissue Doppler imaging, evaluation of cardiac chamber volumes, systolic function and cardiac hemodynamics, and some exposure to 3D, contrast and stress echocardiography.

Requirements for basic Level 2

1. **Perform a minimum of 150 complete transthoracic studies**
   - The case volumes proposed for training are minimal rather than optimal.
   - Most studies should be performed under direct supervision of a sonographer to verify acceptable image acquisition and identification of the significant pathology (see section 1.4 for more details).
   - Studies performed by the residents should only be recorded as complete if all essential images were obtained and all major pathology identified.

2. **Interpret a minimum of 450 complete transthoracic studies** under the supervision of an attending echocardiographer.

1.4 Responsibilities:
- attendance in the echo lab during working days (Monday to Friday, 08:00-17:00)
- **performance of echo exams and provisional reports** (see section 1.6 for more details)
  - it is imperative that each pre-read case be reviewed with attending staff
- trainees must maintain a logbook with counts of all performed and interpreted echocardiograms that should be updated regularly
  - cases performed must be signed by the supervising sonographer
  - cases pre-read must signed by the attending staff who also reviewed the cases
- participation in the day-to-day activity of the echocardiography laboratory
  - interacting with sonographers, referring physicians
  - managing abnormal echocardiographic findings of varying acuity
- **assistance/performance of pericardiocenteses** as they are available
- **assistance/performance of contrast studies** (saline contrast and Definity contrast). At this point, the residents are expected to assist with intravenous cannula insertion and contrast administration in the echo laboratory, as needed. They are also expected to administer intravenous contrast to the patients on the wards, until the ICU/CCU nurses are fully trained in administering contrast (work in progress).
- participation in the UAH Cardiology Senior Call (CCU sign-out rounds at 5 PM)
- **presentation of Echo rounds** on the assigned Thursdays at 12 PM.
  o echo rounds schedule is provided in advance for each academic half-year.
  o **presenting echo studies / images**
    ▪ relevant to the chosen topic (at least 2 cases for each echo round). The list of suggested topics is provided in the echo lab. The teaching echo cases can be provided by Jane Lavallee, the sonographer-educator.
    ▪ interesting cases (can be presented at the end of the rounds)
  o must prepare a 1 page handout related to the topic presented
  o presenter is responsible for finding a replacement presenter in case of his/her absence once the echo rounds schedule is finalized.
    ▪ The echo rounds schedule will be updated every 6 months. The final version will be provided at least one month in advance prior to the next 6-month period, after reviewed by all the participants.
    ▪ **The replacement presenters** include: 1) cardiology resident on echo rotation at the Royal Alexandra Hospital; 2) cardiology resident on pediatric rotation; 3) Cardiology resident on nuclear medicine rotation.
  o echocardiography fellows are responsible for assisting the cardiology residents in preparation for the echo rounds
- cardiology residents are expected to notify the echocardiography laboratory 780-407-7209 and Dr. Cujec (Bibiana.cujec@albertahealthservices.ca) of their absence from the echo lab in advance (at least 2 weeks prior to the start of their rotation), or at the time of unforeseen circumstances

1.5 First Day:
- Presents in the echo lab at 8 AM
  o 8 AM – orientation by Dr. Cujec or attending cardiologist
  o **The first rotation only:** 8:30 AM – orientation to the echo lab by the sonographer-educator

1.6 Recommended Reading: Introduction to Clinical Echo by Otto; The Echo Manual; ACC/AHA/ASE Guidelines for the Clinical Application of Echocardiography
Medical Expert:

Although the points listed below should be the key focus of this rotation; history, physical examination skills as well as general medical and cardiovascular knowledge pertinent to the specific patient and investigations must be developed.

Week 1:
1. Observation of scanning and performance of the measurements by the sonographers

Week 2
1. Mostly observation with some supervised hands-on experience in obtaining standard views, Doppler tracings and measurements.
2. Becoming familiar with the echocardiographic equipment: basic functions input of the patient demographics, storage of the images.
3. Becoming familiar with the Xcelera reporting system.

Weeks 3-4
1. Supervised scanning of ≤ 50% study
2. Scans 2-4 studies per day
3. Performs measurements off line
4. Attempts wall motion assessment using Xcelera coding system
5. Reviews with the sonographers

Weeks 5-8
1. Sonographer supervised scanning of 50 - 100% study
2. Scans 2-4 studies per day
3. Pre-reads ≥6 studies per day, including the ones they scanned
4. Reviews with the staff cardiologist

At the end of week 8:
1. Able to independently perform an M-mode/2D echocardiographic/Doppler examination using all standard views.
2. Able to pre-read a complete study independently using Xcelera system.
3. Able to perform accurate measurements of the chamber size, wall thicknesses, valve motion and orifice size by M-mode and 2D techniques.
4. Able to identify semi-quantitative and quantitative regional and global abnormalities in ventricular function.
5. Able to acquire appropriate images for echo-emergencies (cardiac tamponade, mechanical complications of myocardial infarction, aortic dissection, cardiac signs of pulmonary embolism), to provide accurate interpretation, and to suggest management.
6. Become familiar with the application, administration, and interpretation of intravenous saline contrast for detecting shunts, and understanding of its safe, effective use.
7. Acquire basic knowledge of left ventricular contrast echocardiography, including understanding of the basic physics, and its safe, effective use.
8. Able to optimize echo image quality by adjusting the settings of the echo machine.

Weeks 8-16:
Scans 2-4 cases per day
- at least some supervision by the sonographer to assure acquisition of all necessary images and appropriate image quality before reviewing with the staff cardiologist

Pre-reads a minimum of 6 studies per day, including the once they scanned

At the end of week 16:
1. Able to independently perform an M-mode/2D echocardiographic/Doppler examination using all
standard views and ancillary views when indicated.

2. Acquires knowledge of echo criteria for diagnosis of all types of valvular heart disease, myocardial disease, pericardial disease, diseases of the great arteries, diastolic function and pulmonary hypertension.

3. Acquires knowledge of Doppler methods for determining flow velocities, calculating pressure gradients, determining the severity of valvular stenosis and regurgitation, measuring cardiac output, and detecting intracardiac shunts.

4. Exposure to congenital heart disease, and prosthetic valves.

5. Acquires thorough understanding of the principles of image formation and blood flow velocity measurement using ultrasound.

6. Provides independent interpretation of complete echo studies that is mostly accurate (“general agreement”, or “some differences that would not affect patient management”) in a majority of cases (suggested benchmark 80%).

**Weeks 17 – 24:**

**Scans 2-4 studies per day**

- residents with advanced skills may scan without sonographer supervision after passing the evaluation of their scanning by a staff cardiologist, and MUST review the studies with the staff cardiologist that is aware of unsupervised scanning before discharging the patients from the echo laboratory

**Pre-reads a minimum of 6 studies per day, including the one they scanned.**

**At the end of week 24**

1. Able to perform independently an excellent M-mode/2D echocardiographic examination himself/herself using all standard views and ancillary views when indicated.

2. Provide independent interpretation of complete echo studies that is accurate in a clear majority of cases (suggested benchmark 90%).

3. Able to independently and accurately assess congenital heart disease, and prosthetic valve function.

4. Able to assess the quality of the acquired images, and to supervise the sonographers if necessary.

5. Able to apply the echo findings in the clinical settings; sufficient expertise in cardiac auscultation, ECG and chest x-ray interpretation, and cardiac catheterization techniques to relate echocardiographic findings to the results of these investigations.

6. Able to synthesize available clinical information to produce differential diagnoses and to direct and modify the echocardiographic examination as necessary in the investigation of differential diagnoses.

7. Exposure to 3D echocardiography – basic principles, image acquisition and post processing.

8. Exposure to stress echocardiography – basic understanding of the principles, indications and contraindication of stress echocardiography, and interpretation of the results.

To assess the progress of the residents, starting week 5 of their training, the residents will be observed each week during their scanning by one of the staff cardiologists that will fill out the evaluation form. The residents will file keep this form for future review during Level 2 competence assessment.

**Communicator**

1. Establish therapeutic relationships with patients/families

2. Discuss appropriate information with patients/families and the healthcare team

3. Formulate a clinically relevant report for the referring physician

**Collaborator**

1. Work effectively with other learners in the echo lab

2. Work effectively with the echo technologist

3. Respond well to feedback from the echo technologist and /or staff person

**Manager**

1. Effectively balances patient care, learning needs, and outside activities

2. Recognize when an alternate imaging modality provides similar or additional information at lower cost. Know when the addition of echo contrast justifies the additional cost.
3. Work effectively and efficiently with the echo technologists in order to balance learning with patient throughput
4. Utilize information technology to optimize patient care, life-long learning and other activities

**Health Advocate**
1. Identify patient factors affecting echo test performance, eg. post-cardiac surgery, and advocate for alternate testing in these instances.
2. Recognize and respond to other issues where patient advocacy is appropriate. For example suggesting a cardiac consultation when dictated by echo findings.
3. Maintains a clean and safe working environment

**Scholar**
1. Develop, implement and monitor a personal continuing education strategy
2. Critically appraise sources of medical information
3. Facilitate learning of patients, housestaff/students and other health professionals. Residents will be expected to present at least once per year at echo rounds.
4. Contribute to development of new knowledge

**Professional**
1. Deliver highest quality care with integrity, honesty and compassion
2. Exhibit appropriate personal and interpersonal professional behaviors
3. Practice medicine ethically consistent with obligations of a physician
4. Maintain a clean working environment
5. Communicates absences in a timely fashion to the preceptor and training office

**Level 2 Certification/Proof of Expertise**
The following factors will be considered in final evaluation of successful completion of Level 2 training:

1. **The logbooks**: the number and quality of independently performed and accurately interpreted complete transthoracic echocardiograms.
2. An examination consisting of performance of an echocardiogram, interpretation of echo studies and short answer questions
3. **Feedback from the attending staff** on the knowledge and clinical skills, ability to supervise scanning, professionalism, and quality of interaction with other echo laboratory staff and patients.

A letter or certificate from either the supervising echocardiography laboratory director or the training program director, with input from the echocardiography laboratory director, should document both the duration of training and the counts of performed and interpreted echocardiograms at the end of their training program.
2. NUCLEAR CARDIOLOGY ROTATION

1.1 Rotation Supervisor:
- Dr. Lucille Lalonde

1.2 Location:
- 2A7 Stress Lab and 2A3.22 Nuclear Reporting area

1.3 General Objectives
This rotation provides experience in both nuclear cardiology and exercise testing. More than 1000 imaging procedures are performed annually in the Nuclear Cardiology Laboratory in the University of Alberta Hospital. These included primarily exercise and/or pharmacological perfusion scans, and rest/exercise radionuclide angiogram. The trainees should become familiar with the techniques of nuclear cardiac imaging through day-to-day lab operations, interaction with technical and attending staff, independent reading, and attendance at reporting sessions. The rotation is designed to make trainees conversant in the field of nuclear cardiology but will not prepare them to assume full responsibility for performance of clinical nuclear cardiac investigations.

1.4 Specific Objectives:
- To independently perform exercise stress, dobutamine, and persantine stress tests with technetium labeled sestamibi and thallium imaging
- To be exposed to rubidium PET stress perfusion scans. To be exposed to FDG viability PET scans.
- To read and review exercise stress test ECG tracings with staff
- To read and interpret myocardial perfusion imaging studies, and review the interpretations with attending staff

1.5 Responsibilities:
- Daily attendance in the stress lab to supervise pharmacologic stress tests (08:00-12:00)
- Weekly attendance (Mondays) in the stress lab to supervise exercise stress tests (13:00-16:00)
- Daily attendance at nuclear cardiology reading sessions (13:00 in the nuclear reading area) except on Mondays (see above)
- Participate in the teaching of nuclear cardiology at the Academic Half-Day. The teaching curriculum will be developed by Dr. Lalonde and given monthly at academic half-day. The trainee will be responsible for case presentations and didactic teaching that is shared with a staff expert in stress testing and/or nuclear cardiology.
- Participation in the Cardiology Senior Call pool (attend CCU sign-out rounds at 17:00, when on-call)
- Independent reading

1.6 First Day:
- go to the stress lab at 08:00

1.7 Recommended Reading:
- ACC/AHA 2002 Guidelines and updates for Exercise Testing
- ACC/AHA/ASNC 2003 Guidelines and updates for the Clinical Use of Cardiac Radionuclide Imaging
2.0 Trainees should obtain expertise in the following areas:

2.1 Medical Expert:

1. The ability to perform and interpret exercise EKG stress tests (see below)
2. The ability to perform pharmacological stress test (see below)
3. The ability to read and interpret the results of myocardial perfusion studies (technetium-labeled sestamibi and thallium)
4. There should also be knowledge of the concepts of PET imaging as applied to nuclear cardiology along with basic knowledge of newer tracers and procedures of nuclear cardiology.
5. Know the principles of quality assurance as they relate to the practice of nuclear cardiology, particularly with attention to preparation of the various tracers used in nuclear cardiology.

2.2 Communicator

1. Establish therapeutic relationships with patients/families
2. Obtain and synthesize relevant history from patients/families
3. Discuss appropriate information with patients/families and the healthcare team
4. Formulate a clinically relevant report for the referring physician

2.3 Collaborator

1. Work effectively with attending physicians, nurses and technologists
2. Supports activities in the ECG stress lab as well as the nuclear medicine lab
3. Learn to co-report with nuclear medicine

2.4 Manager

1. Utilize resources effectively to balance patient care, learning needs, and outside activities.
2. Allocate finite health care resources wisely. Advise the referring physician on the most appropriate nuclear investigation and/or sequence of investigations for the presenting clinical problem. Recommends alternate diagnostic testing when appropriate
3. Work effectively and efficiently in nuclear medicine and the exercise stress lab. The resident should be able to manage the workflow through the exercise laboratory, with efficient use of the technical staff and of the equipment.
4. Utilize information technology to optimize patient care, life-long learning and other activities

2.5 Health Advocate

1. Identify the important determinants of cardiovascular health affecting patients. Determine how CV risk factors, age and gender affect CV likelihood.
2. Learn and raise awareness of radiation safety
3. Recognize patient groups in whom nuclear cardiology is most appropriate
4. Maintain a safe and clean working environment

2.6 Scholar

1. Develop, implement and monitor a personal continuing education strategy
2. Critically appraise sources of relevant medical information
3. Facilitate learning of patients, house staff/students and other health professionals relevant to exercise stress testing and nuclear cardiology
4. To become involved in teaching nuclear medicine during core teaching
5. Contribute to development of new knowledge

2.7 Professional
1. Deliver highest quality care with integrity, honesty and compassion
2. Exhibit appropriate personal and interpersonal professional behaviors
3. Practice medicine ethically consistent with obligations of a physician
4. Communicate absences in a timely fashion to the preceptor and training office

**Training Requirements** (from the ACC/AHA Clinical Competence Statement on Stress Testing)

**Minimum Training Necessary for Competence**

A minimum of 4 weeks or the equivalent should be devoted to this training to achieve competence in both supervision and interpretation. The number of procedures necessary to ensure competence has not been established by objective criteria. The majority opinion of this committee and its consultants is that the trainee should participate in at least **50 procedures** during training. It is recognized that not all training or practice environments are the same, and a local credentials committee may deem a greater or smaller number of procedures appropriate.

**Minimum Training Necessary for Competence in Performing and Interpreting Stress Radionuclide Cardiac Imaging**

Training required for performance of basic exercise testing is described above. Both the performance of pharmacological stress and the integration of stress (exercise or pharmacological) studies with radionuclide cardiac imaging require training beyond that necessary for standard exercise testing alone. Specific training and experience for performing and supervising pharmacological stress in conjunction with radionuclide cardiac imaging should be equivalent to level 1 training defined by the ACC Core Cardiology Training Symposium (COCATS) Task Force 2 (Exercise Testing) to include a minimum of 2 months of training. The number of procedures necessary to ensure competence has not been established by objective criteria. However, the COCATS Task Force 2 described the minimum experience required for appropriate level 1 training to be 100 procedures (including both exercise testing and pharmacological stress); of these, at least 50 need to be personally reviewed with a faculty member. It is the consensus of the present committee that training for physicians who desire to perform vasodilator stress studies should include at least 50 cases of vasodilator stress. Interpretation of stress radionuclide cardiac imaging requires training specifically designed to establish competence in nuclear cardiology.

**TABLE 1. Cognitive Skills Needed to Competently Perform Exercise Tests**

I. Cognitive skills needed to competently supervise exercise tests
   a. Knowledge of appropriate indications for exercise testing
   b. Knowledge of alternative physiological cardiovascular tests
   c. Knowledge of appropriate contraindications, risks, and risk assessment of testing (not limited to Bayes’ theorem and sensitivity/specificity, including concepts of absolute and relative risk)
   d. Knowledge to promptly recognize and treat complications of exercise testing
   e. Competence in cardiopulmonary resuscitation and successful completion of an AHA-sponsored course in advanced cardiovascular life support and renewal on a regular basis
   f. Knowledge of various exercise protocols and indications for each
   g. Knowledge of basic cardiovascular and exercise physiology, including hemodynamic response to exercise
   h. Knowledge of cardiac arrhythmias and the ability to recognize and treat serious arrhythmias
   i. Knowledge of cardiovascular drugs and how they can affect exercise performance, hemodynamics, and the ECG
   j. Knowledge of the effects of age and disease on hemodynamic and ECG responses to exercise Knowledge of principles and details of exercise testing, including proper lead placement and skin preparation
   k. Knowledge of end points of exercise testing and indications to terminate exercise testing

II. Additional cognitive skills needed to competently interpret exercise tests
   a. Knowledge of specificity, sensitivity, and diagnostic accuracy of exercise testing in different patient
b. Knowledge of how to apply Bayes’ theorem to interpret test results

c. Knowledge of electrocardiography and changes in the ECG that may result from exercise, hyperventilation, ischemia, hypertrophy, conduction disorders, electrolyte disturbances, and drugs

d. Knowledge of conditions and circumstances that can cause false-positive, indeterminate, or false-negative test results

e. Knowledge of prognostic value of exercise testing

f. Knowledge of alternative or supplementary diagnostic procedures to exercise testing and when they should be used

g. Knowledge of the concept of metabolic equivalent (MET) and estimation of exercise intensity in different modes of exercise

TABLE 4. Cognitive Skills Needed to Perform Stress Radionuclide Cardiac Imaging

A. Supervision of exercise stress (see Table 1, part I)

B. Supervision of vasodilator or adrenergic-stimulating agent stress

a. Knowledge of appropriate indications

b. Knowledge of appropriate contraindications

c. Knowledge of advantages and disadvantages of different exercise and pharmacological stress for radionuclide cardiac imaging

d. Knowledge of complications and ability to recognize and appropriately treat complications, including use of adenosine/dipyridamole antagonists such as theophylline and aminophylline

e. Competence in cardiopulmonary resuscitation and successful completion of an AHA-sponsored course in advanced cardiovascular life support and renewal on a regular basis

f. Knowledge of various vasodilator, adrenergic stress protocols

g. Knowledge of the pharmacokinetics of vasodilator and adrenergic drugs

h. Knowledge of basic cardiovascular physiology, including heart rate and blood pressure response to vasodilators and adrenergic-stimulating agents

i. Knowledge of electrocardiography and changes that may occur in response to vasodilators or adrenergic-stimulating agents

j. Knowledge of cardiac arrhythmias and their treatment, including high-grade ventricular arrhythmia and heart block

k. Knowledge of cardiovascular drugs (and other agents, eg, caffeine) and their effects on vasodilator and adrenergic drugs

C. Interpretation and reporting of imaging results

a. Knowledge of clinical use and safe handling of radiopharmaceuticals

b. Knowledge of computer display, systems, standard formats for display of images (SPECT and planar), normalization of images

c. Knowledge of technical sources of error (including motion, attenuation, adjacent/overlap uptake, and reconstruction and count statistic artifacts), ability to recognize such errors and correct them

d. Knowledge of image interpretation, including ventricular size, lung uptake (201Tl imaging), perfusion defect assessment (location, extent, severity, reversibility), noncardiopulmonary findings, and integration of findings into final interpretation

e. Knowledge of gated SPECT display, quality control, and interpretation of regional and global right ventricular and left ventricular function

f. Knowledge of quantitative image analysis

g. Knowledge of coronary anatomy and relation to cardiac images

h. Knowledge of normal global and regional function, the physiological determinants of these characteristics, and the potential pathophysiological causes of ventricular dysfunction

i. Knowledge of reporting systems and ability to generate a coherent, meaningful report that maximizes clinical utility

D. Integration of clinical, stress, and radionuclide cardiac imaging data for final interpretation
a. Knowledge of kinetics of uptake of radionuclide tracers that influence timing of injection and imaging
b. Knowledge of advantages and disadvantages of different perfusion agents
c. Knowledge of physiology of exercise or pharmacological stress that influences timing of stress and injection of radionuclide perfusion agent
d. Knowledge of diagnostic information that stress radionuclide cardiac imaging adds to exercise testing
e. Knowledge of sensitivity/specificity of stress radionuclide cardiac imaging for diagnosis of coronary artery disease
f. Knowledge of improvement in diagnostic accuracy for coronary artery disease compared with exercise testing
g. Knowledge of integration of perfusion and function results
h. Knowledge of relationship of imaging results to presence or absence of myocardial viability
i. Knowledge of prognostic value of stress radionuclide cardiac imaging in ischemic and nonischemic heart diseases
j. Knowledge of impact of extent and severity of perfusion defects and reversibility on prognostic implications of imaging results in ischemic heart disease
k. Knowledge of how to apply Bayes’ theorem to test results
l. Knowledge of factors involved with generating preimaging probability of coronary artery disease (including age, sex, symptomatology, and stress ECG results)
m. Knowledge of impact of levels of stress, medications, and timing of perfusion agent injection on diagnostic sensitivity/specificity of imaging results
n. Knowledge of improvement in diagnostic and prognostic value with radionuclide cardiac imaging compared with exercise testing
3. ECG/ELECTROPHYSIOLOGY

University of Alberta ECG/EP Rotation:

1.1 Rotation Supervisor:
- Dr. Ian Paterson - ECG
- Dr. Tomasz Hruczkowski - EP

1.2 Location:
- MAHI

1.3 Objectives:
- To become proficient in the ECG interpretation of ischemia/infarction, pericardial disease, arrhythmia, conduction disease, chamber enlargement and devices. To learn to recognize common ECG artifacts and other pitfalls with interpretation. To be learn the basics of holter interpretation. To become proficient with electrical cardioversion and learn the indications, contraindications and potential complications of this intervention.
- To attend morning ambulatory EP/arrhythmia clinics according to the enclosed schedule. Residents are also strongly encouraged to attend the multi-disciplinary inherited arrhythmia clinic on Thursday afternoon.
- To provide inpatient consultative EP services at MAHI during weeks 1-8 of EP rotation. Residents will see inpatient consults during the afternoons and review with the EP fellow and staff.
- To become familiar with invasive EP diagnostic procedures and pacemaker/ICD implants during weeks 5-8. In lieu of Tuesday and Friday morning clinic during week 5-8, trainees will be expected to attend EP lab for SVT therapy procedures with Dr. Kimber and Dr. Sandhu on Tuesday and Friday, respectively. Residents have the option to attend additional EP lab sessions to tailor self-learning and procedural competency.
- See below for specific objectives in CanMEDS format

1.4 Responsibilities:
- During ECG block
  o Review ECGs with Drs. Paterson, AlHulaimi, Choy, Hruczkowski, Kimber
  o Review Holters with Drs. AlHulaimi, Sonnenberg
  o Conduct outpatient elective cardioversions on Thursday mornings in the cath lab recovery room in 2A6
  o Write ECG exam during the last Wednesday of the block
  o Participate in the teaching of ECGs to junior trainees, peers and other programs (eg. Emergency medicine)
- During EP block,
  o will attend to EPS consults and the arrhythmia/device clinics
  o Residents are responsible for EPS consults from the ward in a timely fashion.
  o Attending staff are responsible for reviewing EPS consults with the resident at the bedside within 24 hours, and signing off on device requisitions as appropriate (residents do not sign off device requisitions or book procedures).
  o When in the lab, the first priority is the lab. If the EP lab full/unavailable then time should be spent on consults and clinics.
  o Participation in the UAH Cardiology Senior call pool
  o Attendance at other core educational rounds (Divisional, echo, CVS rounds, etc.)
  o Independent reading
<table>
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<tr>
<th></th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
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<tbody>
<tr>
<td>09:00-12:00</td>
<td>EP Lab Dr Shane</td>
<td>EP Lab (Dr. Gulamhusein/</td>
<td>EP Lab Dr Sivakumaran/</td>
<td>EP Lab Dr Sandhu</td>
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<td></td>
<td>Kimber</td>
<td>Dr. Hruczkowski</td>
<td>Dr Lockwood</td>
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<td>12:00-13:00</td>
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<td>13:00-17:00</td>
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<td>Inherited Congenital EP</td>
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<td>Clinic – Dr. Kimber</td>
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- **09:00-12:00**
  - Arrhythmia Clinic - Dr. Hruczkowski (ALL DAY)
  - ICD clinic - Dr. Hruczkowski
  - Pacemaker Clinic
  - A.FIB clinic – Dr. Kimber
  - EP Clinic – Dr. Sandhu

- **13:00-17:00**
  - Inherited Congenital EP Clinic – Dr. Kimber
1.5 **First Day:**
- For ECG rotation, contact Dr. Paterson and arrange meeting time at his office in 2C2 on the first Monday of the rotation
- For the EP rotation, report 7:30 am on first Monday of rotation to room 2A6.064 to meet Dr. Hruczkowski for hand-over and orientation

1.6 **Recommended Reading:**
- ACC 2000 Review Course on ECGs
- CCS 2011 Guidelines for Atrial Fibrillation
- ACC/AHA/HRS 2008 Guidelines for Device-Based Therapy of Cardiac Rhythm Abnormalities
- ACC/AHA 2006 Guidelines for Supraventricular Tachycardias
- ACC/AHA 2009 Guidelines for STEMI (section on ICD’s)

1.7 **Teaching sessions**
- EKG and EP didactic sessions are incorporated into Academic Half Day curriculum.
- EP special topic rounds: Occurring on a monthly basis. Resident to confirm date and time during rotation orientation.

1.8 **Evaluation**
The preceptors listed above will be responsible for the overall one year ITER after consultation with other preceptors and allied health professionals.
For the ECG rotation, medical knowledge will also be assessed on an end of rotation exam.

2.0 **Content Objectives Based on Royal College of Physician and Surgeons of Canada Specialty Training Requirements for Cardiology (Adults)**

2.1 **Electrophysiology**

*Knowledge*
- Normal cellular electrophysiology
- Normal sinoauricular (SA) node, auriculoventricular (AV) node, and conducting system function
- Mechanisms of arrhythmogenesis
- Mechanisms of conduction abnormalities
- Pharmacology of antiarrhythmic agents
- Temporary and permanent cardiac pacing: techniques, indications, and follow-up
- Antitachycardia devices
- Invasive electrophysiology studies: indications, techniques, complications
- Invasive ablative techniques for tachyarrhythmias: indications, complications

*Clinical Problems*
- Palpitations
- Syncope
- Resuscitated sudden death
- Supraventricular tachyarrhythmias
- Atrial fibrillation
- Wolff-Parkinson-White syndrome
- Ventricular tachyarrhythmias
- Bradyarrhythmias
3.0 University of Alberta EPS Rotation Objectives (CanMEDS format)

3.1 Trainees should obtain expertise in the following areas:

3.2 Medical Expert

Although the points listed below are key areas on which to focus during this rotation the trainee is expected to develop a broad based expertise in the assessment, diagnosis and management of all cardiovascular disease during core training.

1. Every trainee should become an expert in ECG interpretation during his/her training. This expertise should include: normal variants, arrhythmias and conduction abnormalities, chamber hypertrophy, acute ischemia/infarction, chronic ischemic changes and ECG abnormalities of other cardiovascular and non-cardiovascular diseases.

2. All trainees should be expert in performing limited and maximal exercise tests, and should be familiar with the various available exercise protocols. Trainees should be aware of the indications for and contraindications to exercise testing.

3. The trainee should understand the anatomy and physiology of the electrical conduction system including: The Sinus Node, Atrio-ventricular node and His Purkinje system

4. Arrhythmias: Diagnosis and mechanism of: Sinus and respiratory arrhythmias, Sick Sinus syndrome, entopic and reentrant supraventricular and ventricular tachycardias.

5. Criteria for diagnosis of the various arrhythmias and myocardial ischemia in the ambulatory patient.

6. Indications for ambulatory monitoring, problems inherent in the technique, and clinical significance of abnormal findings.

7. Basic training in the prescription of pacemaker devices, the interpretation of basic pacemaker ECG's, and pacemaker follow up. Selection of patients for cardiac pacing and utilization of the appropriate device. Complications of pacemaker implantation and their management.

8. Use of invasive electrophysiologic studies (intracardiac electrogram recording and programmed electrical stimulation techniques) in the diagnosis and treatment of arrhythmias.

9. Indications for: single and dual chamber pacemakers, automatic implantable defibrillators in primary and secondary sudden cardiac death prevention, anti-tachycardia therapy for atrial and ventricular arrhythmias, and resynchronization therapy. The trainee should also be familiar with the complications of these devices

10. Clinical pharmacology and use of antiarrhythmic drugs.

3.3 Communicator

1. Establish therapeutic relationships with patients / families

2. Advise patients on the potential risks and benefits of EP procedures and devices

3. Help obtain informed consent on EP procedures and devices

4. Writing a concise consultative note, which answers the questions, asked by the referring physician and direct subsequent investigation and treatment.

3.4 Collaborator

1. Consult and collaborate effectively with CV surgeons on arrhythmia management

2. Work effectively with RN led pacemaker clinics

3. Work effectively with anticoagulation management services

3.5 Manager

1. Develop the capability to triage EP patients in order of urgency

2. Learn to balance the costs of various devices with clinical needs
3. Work effectively and efficiently in a health care organization
4. Utilize information technology to optimize patient care, life-long learning and other activities

3.6 Health Advocate

1. Identify cardioembolic risk in patients with atrial fibrillation and advocate for anticoagulation where appropriate
2. Identify patients at risk for sudden cardiac death and advocate for ICD implantation where appropriate
3. Identify at risk populations for arrhythmia and SCD in the inherited arrhythmia clinic. Advocate for genetic counseling where appropriate

3.7 Scholar

1. Develop, implement and monitor a personal continuing education strategy
2. Critically appraise sources of medical information
3. Participate in EP teaching during core curriculum
4. Participate in ECG teaching of junior residents and peers
5. Contribute to development of new knowledge

3.8 Professional

1. Deliver highest quality care with integrity, honesty and compassion
2. Exhibit appropriate personal and interpersonal professional behaviors
3. Practice medicine ethically consistent with obligations of a physician
4. Answers pages promptly
5. Communicates absences as far in advance as possible
Training Requirements (from the ACC/AHA Clinical Competence Statement on EP)

Training in Cardiac Arrhythmia Device Management
All trainees must understand the diagnosis and management of cardiac arrhythmias. Trainees should know the indications for cardiac arrhythmia devices and the principles of management and follow-up of patients with implanted pacemakers and antiarrhythmic devices, as described in the Task Force 6 report. Participation in implantation is desirable.

Training in Electrophysiology
All trainees must be skilled in the selection of patients for specialized electrophysiologic studies, including arrhythmia ablation. Those who wish to perform these procedures should receive additional training, as described in the Task Force 6 report.

Table 1. Summary of Training Requirements for Electrophysiology, Cardiac Pacing, and Arrhythmia Management

<table>
<thead>
<tr>
<th>Level</th>
<th>Curriculum Skills</th>
<th>Time Requirement (Cumulative)</th>
<th>Cumulative Number of Examinations</th>
<th>Special Procedures</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cardiac arrhythmia and electrophysiology core</td>
<td>2 Months (in addition to Task Force 2 ECG training requirements)</td>
<td>10 Temporary pacemakers; 10 cardioversions</td>
<td>Temporary pacer cardioversions</td>
</tr>
<tr>
<td>2</td>
<td>Advanced noninvasive</td>
<td>6 Months interrogations</td>
<td>100 Pacer/ICD interrogation</td>
<td>Pacer/ICD</td>
</tr>
<tr>
<td>3</td>
<td>Device implantation</td>
<td>12 Months</td>
<td>50 Pacer implants; 25 ICD implants; 100 pacer/ICD interrogations</td>
<td>Pacer/ICD implants</td>
</tr>
<tr>
<td>3</td>
<td>Invasive EP</td>
<td>12 Months (beyond 3-years of cardiology)</td>
<td>150 EP procedures; 75 ablation procedures</td>
<td>Invasion EP ablation</td>
</tr>
<tr>
<td>3</td>
<td>Device implantation</td>
<td>24 Months</td>
<td>Same as level 3</td>
<td>Invasive EP ablation; device implantation, pacer/ICD interrogation</td>
</tr>
</tbody>
</table>
EP Curriculum
(to be covered in EP rounds over 3 year period and in readings when on rotation)

Module 1: Basic diagnostic electrophysiology study
Measurement intervals
Pacing protocol
Sinus node recovery time
Atrial extra stimulus testing
Ventricular extra stimulus testing
Measurement of refractory periods

Module 2: Arrhythmogenic mechanisms
Anatomic and functional reentry
Normal and abnormal automaticity
Triggered activity early and delayed after depolarization
Cardiac action potentials fast and slow response
Ionic basis of cardiac action potentials

Module 3: Anti-arrhythmic Drugs
Anti-arrhythmic drug classification
Pharmacologic therapy for supra-ventricular tachycardia
Management for Ventricular arrhythmias
Proarrhythmia.

Module 4: Autonomic and heart conduction system
Sinus node dysfunction
Atrio-ventricular block
Fascicular and bundle branch blocks
Concealed conduction
Gap phenomenon

Module 5: Vasovagal syncope
Pathophysiological mechanisms
Tilt test and drugs protocol
Medical management and pacing

Module 6: Pacemaker
Indication class I II III
Sensing, pacing thresholds impedance
Chronaxia reobase
Pacemaker syndrome.

Module 7: Pacing and CHF
VVI and DDD mode pacing in CHF
Resynchronization therapy

Module 8: AICD
Indication Primary and secondary prevention SCD
ICD anti-tachycardia pacing and biphasic shock
SVT- VT discrimination criteria’s

Module 9: Ablation techniques
Radiofrequency energy
Cold tip irrigation
Cryo-ablation

Module 10: Supraventricular Tachycardia
Pacing initiation and termination of the tachycardia
Atrial activation sequence
Influence of bundle branch block during tachycardia
Atrial and ventricular stimulation during tachycardia
Drugs and physiologic maneuvers during tachycardia
Module 11: Atrioventricular reentry tachycardia (AVRT)

AV node physiology
Fast, slow pathway refractory periods
AV node echo
Typical and atypical AVNRT
Concealed accessory pathway
Atrial activation and P-QRS Sequence
Criteria for A-V reentrant SVT

Module 12: Preexcitation Syndrome

Anatomical substrates of preexcitation
Electrophysiologic Properties of A-V bypass tracts
Orthodromic tachycardia
Antidromic tachycardia
Nodoventricular and fasciculoventricular pathway

Module 13: Atrial tachyarrhythmias

Inappropriate sinus tachycardia
Focal atrial tachycardia
Typical atrial flutter
Atypical atrial flutter

Module 14: Atrial fibrillation

Rate and Rhythm control
AVN ablation and pacing
Pulmonary vein Isolation procedure:
Indication, pre an post procedure medication.
Methods, focal PV ablation-circumferential PV isolation.
Complications stroke, cardiac taponade, PV stenosis, atrio-esophageal fistula
Follow up and repeat procedure.
Comparison with surgical procedures

Module 15: Sustained ventricular tachycardia

VT associated with coronary artery disease
VT associated with dilated cardiomyopathy
EPS VT induction ventricular program stimulation
Pace, activation mapping, and entrainment, and VT ablation

Module 16: Polymorphic VT

Congenital long QT syndrome
Ischemic heart disease
Electrolytes disturbances
Proarrythmia

Module 17: Arrhythmogenic right ventricular dysphasia

Clinical presentation
Diagnosis criteria.
EP study and VT ablation
AICD indication, medical management

Module 18: Hypertrophic cardiomyopathy

Clinical presentation
Assessment echocardiogram
Risk stratification
Medical management
Surgical and nonsurgical septal reduction
DDD mode pacing

Module 19: Brugada Syndrome

Clinical presentation
EP study and drug test
Medical management
ICD indication

Module 20: Idiopathic VT with normal heart

Right outflow tract ventricular tachycardia
Fascicular VT
Ablation and medical management
4. CARDIAC CATHETERIZATION LABORATORY

1.1 Rotation Supervisor:
- Dr. K. Bainey

1.2 Location:
- MAHI Cath Lab

1.3 General Objectives:
- To learn how to independently interpret coronary angiograms
- To become familiar with the hemodynamic manifestations of cardiovascular diseases and methods of quantitation
- To acquire the technical expertise to insert central venous catheters, arterial lines, PA catheters and temporary pacemakers
- To become familiar with IABP insertion, monitoring and management

1.4 Duties and Responsibilities:
- Daily attendance in the cath lab (hours 0700-1800 M-F)
- Performing at least 5 diagnostic coronary angiograms and/or hemodynamic studies per day (trainees are welcome to scrub in extra cases if they wish provided they are familiar with the case as outlined below)
- Perform approximately 10 femoral sheath pulls per block in order to demonstrate proficiency at achieving hemostasis and recognizing potential vascular access site complications
- Patient evaluation should include:
  - a succinct cardiovascular history and examination, review of pertinent cardiovascular investigations including previous catheterization
  - participation in the procedure
  - review results with attending staff
  - completion of post-catheterization orders
  - completion of a progress note explaining the findings and suggested management
  - Gradual assumption of responsibility for completion of the procedural report, including hemodynamic and angiographic data
  - post-catheterization follow up on these cases, including assisting with the management of complications should they arise, both inside and outside the cath lab
- Residents are encouraged to participate in all aspects of functioning in the cath lab including assisting with room/tray preparation and patient turn-over (shorter turn-around times will increase the number of cases completed in a day)
- Provide cases for presentation at weekly rounds (hemodynamics and angiograms) each Friday
- Provide one presentation at PCI education rounds (every 2nd and 4th Tues per month) regarding a pre-specified topic pertinent to cardiac catheterization (Tues 7:00am).
- Residents are free to attend all weekly teaching sessions but are expected to return to the cath lab within 15 minutes of the end of rounds
- Arrange with Dr Bainey a specified time for case and short answer examination (1hr) at the end of the rotation block

1.5 Relationship with Fellows:
- Fellows are routinely in the cath lab as part of PCI training
- Whenever possible, the resident should participate in cases assigned to a diagnostic physician rather than cases directed to interventional staff
- In the situation where only interventional staff are assigned to the lab, every effort will be made to assign the resident to a room where a senior (second year) fellow is working
- If a resident is assigned to a room with a first year fellow, the resident has priority for the cardiac catheterization procedure unless it is an emergency case
2.0 General Objectives:
Trainees should direct themselves to obtaining expertise in the following areas:

2.1 Medical Expert
1. Completion of a succinct history and physical examination relevant to that procedure and patient.
2. Knowledge of the principles underlying proper utilization of angiographic equipment.
3. Familiarity with the complications of cardiac catheterization, their prevention and management.
4. Familiarity with standard catheterization techniques including endomyocardial biopsy.
5. Expertise in right heart catheterization including use of the balloon-tipped catheter and temporary pacemaker insertion using both the femoral and internal jugular approach.
6. Knowledge of the hemodynamic principles underlying pressure measurement, cardiac output calculation (Fick and Thermodilution), measurement of vascular resistance, determination of value area and shunt quantification.
7. Ability to accurately interpret coronary arteriograms and contrast ventriculograms.
8. Familiarity with the use of ancillary diagnostic interventions such as exercise, volume loading and pacing in the catheterization laboratory.
9. Familiarity with the indications for and complications of angioplasty and valvuloplasty.

2.2 Communicator
1. Establish therapeutic relationships with patients / families
2. Obtain and synthesize relevant history from patients / families / referring physicians
3. Effectively explains the procedure including risks and benefits. Obtain consent.
4. Address patient questions and concerns

2.3 Collaborator
1. Consult effectively with referring physician, inpatient team and/or CV surgery
2. Work effectively with all members of the cardiac cath lab team

2.4 Manager
1. Effectively balance patient care, learning needs, and outside activities
2. Understand the indications and contraindications for cardiac catheterization. Recommends alternate diagnostic testing providing similar information when appropriate.
3. Able to triage cath/interventional requests. Has an understanding of wait time and benchmarks.
4. Utilize information technology to optimize patient care, life-long learning and other activities

2.5 Health Advocate
1. Identify CV risks factors and determine if effective treatment strategies are in place
2. Understand how the APPROACH database is used to improve the health of Albertans and Canadians
3. Understand the importance of radiation safety

2.6 Scholar
1. Develop, implement and monitor a personal continuing education strategy
2. Critically appraises available evidence for interventional cardiology
3. Participate in angiogram/hemodynamic rounds and PCI rounds
4. Contribute to development of new knowledge

2.7 Professional
1. Deliver highest quality care with integrity, honesty and compassion
2. Exhibit appropriate personal and interpersonal professional behaviors
3. Practice medicine ethically consistent with obligations of a physician
4. Inform the preceptor and training office of absences in a timely fashion
5. Answer pages promptly
3.0 Objectives based on level of training:

**C1/2 level (completion of first 2 months)**
1. Understand the indications for cardiac catheterization
2. Understand coronary anatomy, its variations, and congenital abnormalities
3. Understand coronary physiology
4. Understand procedural complications and management, such as hypotension, acute myocardial ischemia, congestive heart failure, renal failure, vascular complications, contrast reactions, retroperitoneal bleeding, and cardiac tamponade
5. Understanding of the indications for and risks of each revascularization strategy (PCI and CABG) and be able to rationally determine which strategy would be preferable for individual patients

**Required Technical Skills**
1. Perform percutaneous vascular access from the femoral artery and vein, radial artery and internal jugular vein
2. Perform right heart catheterization using a balloon flotation catheter
3. Perform temporary right ventricular pacemaker insertion

**C2/3 (Completion of final 1-2 months)**
1. All knowledge objectives for C1 level
2. Understand radiologic imaging, factors influencing image quality, radiation quality assurance, and physiology of X-ray contrast media
3. Understand coronary physiology using techniques such as fractional flow reserve
4. Understand the indications for and complications of vascular closure devices

**Required Technical Skills**
1. All technical skills for C1 level
2. Perform left heart catheterization and coronary angiography, as well as visualization of venous bypass and internal mammary artery grafts under supervision (some trainees may be independent)
3. Perform left ventriculography and aortography
4. Perform intra-aortic balloon pump insertion
5. Perform cardiac catheterization in common types of valvular, adult congenital, and cardiomyopathic heart disease

**3.2 Duration of Training**
All trainees must have a minimum of 3 blocks training in the catheterization laboratory, with participation in a minimum of 100 cases from initial clinical evaluation through discharge. Most trainees will have no difficulty exceeding this minimum requirement. Trainees are required to keep a logbook of procedures performed including patient diagnosis, exact procedures done and hemodynamic/angiographic results. Trainees may scrub on angioplasty/valvuloplasty cases if time permits, but should concentrate on diagnostic procedures first until they are
fully familiar with the procedural details of diagnostic cardiac catheterization. Training in PCI is NOT an objective of core catheterization laboratory rotations. Log books will be reviewed by Dr. Bainey at the end of the block.

3.1 Opportunities for exposure to PCI cases:
Trainees with an interest in pursuing a career in interventional cardiology can arrange for elective rotations in the cath lab. During these elective rotations, every effort will be made to allow the resident to work with interventional staff and receive preliminary exposure to PCI. A cath lab elective of this nature will only be considered for trainees who have completed their core cath lab rotations with demonstration of adequate technical skills (vessel punctures, catheter manipulation, and operation of imaging equipment).

4.0 Objective Evaluations
- Administered at weeks 4, 8, 12, and possibly 16

4.1 CARAT Interpretation
One case per day (at the discretion of the attending physician) – the resident will be expected to draw the coronary anatomy and identify their management plan which will then be reviewed with the attending and a score generated:
- Exceeds expectations (sophisticated discussion of management plan, accurate interpretation of anatomy including relationships of side branches with major vessels)
- meets expectations (CARAT accurate with minor changes required, less sophisticated discussion of management plan)
- needs improvement

4.2 Femoral Sheath Pull
Approximately 10 sheath pulls per block rotation - the resident will be expected to pull 10 femoral sheaths as part of their follow-up in cases performed. This will be signed by a recovery nurse who will supervise the sheath pull and assess for hemostasis. The supervising nurse will evaluate based on the following:
- Exceeds expectations (achieves adequate hemostasis with good technique and recognizes potential vascular access site complications)
- meets expectations (achieves adequate hemostasis with reasonable technique)
- needs improvement

** These CARAT and sheath pull evaluation forms will be forwarded to the rotation supervisor (Dr Bainey) and program director and will be considered for the overall evaluation of rotation**

4.3 STACER
CCL STACER will be performed once during your rotation while obtaining a history and consent on a patient in recovery.

4.4 Written and Case-Based Exam
At end of rotation case-based and short answer examination will be performed. Please arrange a time and date with Dr Bainey during the last week of the rotation.
C. ELECTIVE ROTATION

General Objectives:

Electives are intended to provide the cardiology trainee with opportunities to expand his/her horizons in the field of cardiology. Electives may be arranged in any field pertinent to cardiovascular medicine with the approval of the Residency Program Director and the Residency Training Committee. These electives may consist of additional experience in specific areas of cardiology which are of interest to the trainee or they may include experiences in related fields which are not specifically covered in the formal rotation schedule. Residents must identify specific supervisors for all electives. It is expected that the majority of electives will be completed in Edmonton but there will be opportunity for residents to gain elective experience outside of Edmonton if such opportunities do not exist here.

The areas of expertise will depend on the specifics of the rotation. If it is a ‘standard’ rotation with predetermined objectives (listed within) then those objectives will be used.

If the elective does not fit within established rotations then a detailed list of objectives will be developed prior to approval of the experience between the residency program director, rotation preceptor and the trainee.
D. RESEARCH ROTATION (S)

RESEARCH ROTATION OBJECTIVES

Preamble

In keeping with the position of the Royal College of Physicians and Surgeons of Canada, all trainees will be required to develop a research project (scholarly project) to be completed during the core-training program.

Two blocks are available to trainees during their core training to complete their project(s), and elective time can also be devoted to this, at the residents’ discretion, with approval by the Program Director and the Research and Mentorship Sub-committee. However, despite this available protected time, this will ultimately be a longitudinal experience. Actual research rotations will be restricted to second and third year trainees. Ideally, research will be supervised by a member of the Division of Cardiology, however if necessary, supervisors with suitable expertise outside of the Division will be approached as required. Trainees must complete at least one project to the point that it can be submitted for presentation to a major cardiovascular meeting. However the ultimate goal is to expect a completed published manuscript from each resident in the Adult Cardiology Program.

1.1 Rotation Supervisor:
- as indicated by the trainee and with the approval of the research subcommittee

1.2 Location:
- as indicated by the trainee and with the approval of the research subcommittee

1.3 Objectives:
- to learn about hypothesis based research and scientific methodology
- to apply ethical conduct in research
- to conduct systematic reviews of the literature on relevant research
- to produce a scholarly project related to cardiovascular disease and/or health. Examples include: Quality Improvement initiative, Registry/Registry review, Case series with systematic review of the literature, Case-control project, Cohort study and Education initiative
- to submit this work to a major scientific meeting
- to write and submit a manuscript to a peer reviewed medical/scientific journal
- to be exposed to translational research and clinical trials

1.4 Responsibilities:

First year Trainees:
1. Will complete web-based training in consent (NIH) and file a copy of the certificate with the training program (http://phrp.nihtraining.com/users/login.php)
2. Will complete the Introductory Tutorial for the Tri-council Policy Statement (TCPS): Ethical Conduct for Research Involving Humans (http://www.pre.ethics.gc.ca/eng/education/tutorial-didacticiel/) and file a copy of the certificate with the training program
3. Will gain exposure to Good Clinical Practise (GCP) training through annual seminars coordinated by a member of the Division of Cardiology or through on-line training. (http://www.pharmaxm.com/can01.asp)
4. Will formulate possible research ideas and develop a protocol or plan (ideally by January of their first year) which will then be presented to the Research and Mentorship Sub-Committee for approval.

Once the topic, supervisor and action plan have been approved, the resident must move forward with operationalizing the proposal and by preparing, submitting and defending an application to the Health Research Ethics Board. Research rotations will not be scheduled until this is done, with no exceptions. Once these steps have been completed, the residents can move forward with longitudinal data collection, ideally reserving protected blocks for data analysis and manuscript preparation.
Second and Third year Trainees:

1. Will submit progress reports to the Research and Mentorship Sub-committee on a regular basis (quarterly), to ensure that the supervision remains appropriate and the project is on track for completion.
   a. If progress is felt to be inadequate, the resident and supervisor will be required to meet with the Research and Mentorship Sub-committee to review concerns and outline a plan for suitable completion which may include targeting additional collaborators with the necessary expertise for assistance.

2. All third year trainees must submit abstracts to Cardiac Sciences Research Day and Department of Medicine Research day.

3. All second year trainees are strongly encouraged to submit to Cardiac Sciences Research Day and Department of Medicine Research day.

Structure of research rotation:

The resident will organize their time to perform data collection, analysis and manuscript presentation.

Clinical trials are generally discouraged as a primary resident research project as these are likely not feasible to take to completion during the course of training, however exposure and experience in ongoing trials may be very beneficial. Similarly, it would be very difficult for a resident not on a clinician-scientist career track to complete a translational project. We would also like for trainees to gain exposure to the research ethics and regulation. Therefore during their research blocks, trainee is expected to contact the following individuals:

- Sean McMurtry: Vascular Biology and Atherosclerosis (translational research)
- Evangelos Michelakis: Pulmonary hypertension (translational research and clinical trials)
- Gavin Oudit: Heart Failure and models of cardiac remodeling (translational research)
- Ian Paterson: Cardio-oncology (clinical trials)
- Michelle Graham: Approach Database (health outcomes)
- Mark Haykowsky: Cardiovascular Physiology (translational research)
- Justin Ezekowitz: Vigour Centre, Alberta HEART study (clinical trials and translational research)
- Lori Anderson: NACTRC (clinical trials)
- Scott Jamieson: Quality Management in Clinical Research – FoM, U of A (clinical trials)
- Shane Kimber: University of Alberta Health Research Ethics Board

During the two research blocks, the trainee should spend a minimum of one full day with each contact person according to availabilities. The trainee will be evaluated for CanMEDS roles (see Appendix) by the day’s preceptor and be required to produce the evaluation forms to the training office. Copies will be distributed to the rotation preceptor to be considered in the final evaluation.

Other expectations for second and third year:

Other opportunities include attending lectures from graduate student courses that fall within their research block. Residents may also have the opportunity to attend intra- or extra-faculty research courses including but not limited to: research methodology, biostastistics and grant writing. Funding for courses will be limited to the usual annual allotment for attending scientific meetings.

1.5 Recommended Reading:

1. Understanding Evidence Based Medicine
   (http://guides.library.ualberta.ca/content.php?pid=84832&sid=631197)
2. JAMA Evidence – (http://www.library.ualberta.ca/databases/databaseinfo/index.cfm?ID=4173)
   Choose “Core Topics” in Evidence Based Medicine

3. Systematic review and Meta Analyses
   (http://guides.library.ualberta.ca/content.php?pid=84832&sid=1569977)

2.0 Trainees should obtain expertise in the following areas:

2.1 Medical Expert:

   1. Generate a coherent research hypothesis
   2. Perform a relevant literature review
   3. Perform basic statistical analyses
   4. Synthesize and write a summary of the research and put it into context

2.2 Communicator

   1. Communicate well with research participants
   2. Obtain informed consent
   3. Write and discuss research results effectively
   4. Effectively present the research work at a public forum

2.3 Collaborator

   1. Work effectively with study nurses/coordinators, technicians and other study personnel
   2. Work effectively as a member of a research team
   3. Play a supporting role in other research projects

2.4 Manager

   1. Obtain all operational and ethics approvals for the project
   2. Utilize health and scientific resources effectively
   3. Organize research data in a coherent manner
   4. Utilize information technology effectively

2.5 Health Advocate

   1. Educate research participants on the clinical importance of the research question
   2. Identify and remedy any patient safety issues that may arise during the project
   3. Use the research question to influence policy and health delivery locally, nationally and internationally

2.6 Scholar

   1. Critically appraise sources of medical information
   2. Facilitate learning of patients, house staff/students and other health professionals
   3. Generate abstracts and manuscripts related to the research work

2.7 Professional

   1. Conduct oneself ethically according to the Tri-Council Policy Statement
   2. Respect patient confidentiality
   3. Exhibit appropriate personal and interpersonal professional behaviors
   4. Communicate absences in a timely fashion to the preceptor and training office
EVALUATIONS

These will be completed by the divisional member(s) with whom each resident works at the end of each rotation and must be submitted to the postgraduate medical education office.

These evaluations are in CanMEDS format and will be based on:

1. Clinical performance on each rotation, as assessed by corresponding attending staff. A strong emphasis will be placed on the stated rotation objectives as outlined in this syllabus, and trainees will be assessed according to the completeness with which they have met these objectives.

2. The oral and written examinations.

3. An overall assessment of clinical competence, scholarly aptitude, teaching ability, bedside skills, judgment, and technical proficiency as assessed by the Resident Training Committee.

4. Logbooks. These are mandatory for Echo, Nuclear Cardiology, Invasive and EPS rotations.

CARDIOLOGY RESIDENT CALL

Residents will determine a rotational call schedule with the Chief Cardiology Resident. Residents shall function in the role of Junior Attending Staff while on call, under the direct supervision of the Faculty member assigned to the Attending Staff call schedule that day.

The responsibilities of the cardiology trainee include:

1. Initial screening of all telephone calls from outside physicians requesting advice in the management of patients with cardiac problems.

2. Screening of all admissions to CCU (5A7), 5A5 and 5A6 after 1700 hours.

3. Provision of back up to the junior house staff. This must include:
   - Reviewing all emergency consultations with the junior resident.
   - Seeing ER, CCU and 5A5/5A6 patients who are sufficiently ill to require decisions which cannot be safely made by the junior house staff.

4. Seeing emergency consults on wards other than 5A5 and 5A6 (these are not the responsibility of junior house staff).

5. Provision of advice to junior house staff. The trainee is the first resource of the junior residents on call who will call the trainee first for help with management problems. Any difficult problems should then be discussed with the attending staff on call.

6. Determining the indications for and performing emergency echocardiograms between 1700 and 0800 hours, if appropriate, following discussion with the cardiologist on call.

7. Performing emergency procedures such as central line or temporary pacemaker insertion.

8. Attendance and participation in emergency cardiac catheterization or PTCA procedures.

Trainees should be aware that the Cardiology rotation for junior residents is often extremely busy and that active back up from the trainee is necessary from both patient care and educational standpoints. While the junior resident is busy in the Emergency Room, it is the responsibility of the senior resident to ensure that the needs of patients in the CCU are met promptly.
PREPARATION FOR EXAMINATIONS IN CARDIOLOGY

The Division will make every effort to help trainees prepare for the subspecialty examinations. During the three year program, trainees participate in a number of practice examinations.

- Written examinations and MCQ
- OSCE and written examinations
- Practice STACER exams

Practice oral examinations beyond those regularly scheduled will also be available to trainees with members of the attending staff. Trainees are encouraged to arrange at least three practice exams with different staff. The RCPSC oral exams are strongly based in clinical cardiology, particularly bedside examination, and are designed to determine whether or not the candidate will be a safe practitioner who acts in the best interest of the patient. Trainees should concentrate on clinical cardiology during their exam preparation, and should not underestimate the cardinal importance of obtaining a concise history, performing a thorough and accurate cardiovascular examination, and the ability to synthesize the data obtained.

POLICY STATEMENT ON HARASSMENT AND INTIMIDATION IN THE WORKING ENVIRONMENT

The Professional Association of Residents of Alberta
And
The Council of Academic Health Centres of Alberta

1.0 Introduction

The Professional Association of Residents of Alberta (PARA) represents physicians in Alberta engaged in a residency training program, primarily for the purpose of negotiating the non-academic terms and conditions of these residency positions. The Council of Academic Health Centres of Alberta (the Council) is a working committee comprised of the Capital Health Authority and Calgary Health Region, the Alberta Cancer Board and the Faculties of Medicine of the University of Alberta and University of Calgary.

On September 29, 1997, both parties concluded an agreement that led to the development of a joint statement regarding the elimination of harassment and intimidation in the working environment of the respective parties. The practical definition of working environment included anywhere a person was in a work-related context, and that was understood broadly to include training situations and regional, hospital or university social functions.

Both parties agreed to review this statement after three years and make any changes that might be required. After three years experience, it was recognized that changes were in order. Member organizations of Council had developed procedures and processes for handling harassment complaints of various sorts and it was judged appropriate to use these routes for resolving any potential issues and problems of harassment.

2.0 Statement of Values Underlying Policy

Both parties are committed to creating working environment free of harassment and intimidation, where mutual respect and the ability of staff to work together productively are supported. All parties remain committed to cultivating an atmosphere of trust, respect and dignity in all our relationships.

Both parties believe in the prevention of harassment and intimidation, including any violation of human rights, and the development of processes that support a safe and supportive environment that protects all people from physical and emotional harm.

3.0 What do we mean by the terms Harassment and Intimidation?

Harassment is considered to be unsolicited, gratuitous, unwanted or unwelcome verbal or physical conduct that is known, or reasonably ought to be known, to have the purpose of effect of:
Violating an individual’s dignity, respect and self worth: and/or,
Instilling fear or discomfort

Harassment may include, but is not limited to the following:

- Inappropriate physical conduct such as striking, pinching, kicking, bumping
- Any threatened or attempted acts such as those noted above
- Verbal or mental abuse such as inappropriate comments and the use of obscene language, gestures or threats
- Sexual harassment which is unwelcome, unsolicited and inappropriate
-Behaviour or speech that is sexual or gender related in nature, and demeans a person by sex, gender or sexual orientation.

Intimidation, either implied or explicit, includes, but is not limited to:

- Behaviours or threats which imply loss of future opportunity, worsening abuse, or compromise of education
- Abuses of power through threats or coercion.

For the purpose of this letter, harassment and intimidation does not include the legitimate exercise of an individual’s supervisory authority in an appropriate manner, this recognition of the appropriate use of supervisory authority is not meant to deflect attention from the intent of this policy.

Harassment and intimidation in the workplace of residents may reflect a power imbalance in the relationships within the workplace. All parties recognize the sensitivity of this situation, and while it may not always appear to be in the best interests of the complaining party to address the issue directly mature, sensitive and confidential discussion regarding these issues are encouraged.

4.0 What to do if You Feel Harassed or Intimidated

If a resident feels harassed or intimidated, at least two options are available:

- As a member of PARA, you are encouraged to contact PARA office (phone: 780 432-1749) in order to obtain advice about how best to approach the particular situation.
- Alternatively, for advice on how to proceed, you may contact:
  - Associate Dean, Post-Graduate Medical Education
  - University of Alberta 780 492-9722

All concerns will be addressed with appropriate confidentiality under the relevant policies of the member institutions.

THE FOLLOWING POLICIES FOR CARDIOLOGY RESIDENCY TRAINING PROGRAM

- Appeal Policy
- Remedial Policy
- Supervision Policy
- Transfer Policy
- Waiver of Training
- Policy on Leave of Absence

CAN BE FOUND ON THE PGME WEBSITE AT:

http://www.med.ualberta.ca/education/pgme/index.cfm

The Cardiology Residency Training program strongly encourages trainees and faculty to review those policies in detail.
SUPPORT SERVICES FOR RESIDENTS

The training program encourages that the resident seek the advice of the program director or mentor when there is a need to receive counseling on personal or health concerns.

Other support services are also available to trainees and include:

Learner Advocacy and Wellness Office
Phone number: 780-492-3092
http://law.med.ualberta.ca/Postgraduate/Resources/Pages/default.aspx

University Wellness Centre
Phone number: 780-492-5205
http://www.uwell.ualberta.ca

The Professional Association of Residents of Alberta
http://www.para-ab.ca/residents/resident-well-being

The AMA Physician and Family Support Program
Phone number: 1-877-767-4637

GUIDELINES FOR CARDIOLOGY RESIDENT RELATIONSHIPS WITH INDUSTRY

1. All direction between cardiology trainees and industry based support or sponsorship programs will be coordinated and approved by the Residency Training Committee. No resident will be permitted to accept textbooks, gifts or other industry support without prior approval of the Residency Training Committee.

2. Lecturers participating in the Core Curriculum series will be chosen by the Residency Training Committee.

3. Lectureships held outside the Core Curriculum series which are directed towards the cardiology trainees or medical residents rotating on Cardiology will be approved by the Residency Training Committee conferring with the outside sponsor.

4. Educational activities held outside the offices of the University of Alberta and the Walter Mackenzie Centre will be the responsibility of the sponsor and although these do not have to be approved by the Residency Training Committee, the Residency Training Committee will in no way participate or support these activities without consultation.

5. Awards received from industry sponsors will be awarded to the most deserving resident meeting the criteria for the award. The awards will be formally acknowledged at the divisional level and by a letter from the Residency Training Committee to the sponsor acknowledging their support of residency program activity.

6. The Residency Training Committee will keep appropriate records pertaining to industry sponsorship of cardiology resident training activities.
 TERMS OF REFERENCE
CARDIOLOGY RESIDENCY TRAINING COMMITTEE

Composition:

The committee shall be composed of (minimum):

1. Program Director (Chairman).
2. Members of the Divisions of Cardiology at the UAH and RAH who have demonstrated an interest in resident education to be appointed by the Training Program Director.
3. The two elected chief residents of cardiology.

Current RTC Members:
Dr. I. Paterson, Chair, Program Director
Dr. E. Lockwood, RAH, Associate Program Director
Dr. C. Butler, Associate Program Director
Dr. N. AlHulaimi
Dr. K. Bainey
Dr. B. Cujec
Dr. J. Ezekowitz
Dr. M. Graham
Dr. B. Sonnenberg
Dr. B. Tyrrell - RAH
Dr. N. Wahab - RAH
Dr. A. Alherbish – Cardiology Co-Chief Resident
Dr. K. Kaila– Cardiology Co-Chief Resident

Authority and Responsibility of the Residency Training Committee:

Organizational Structure of the RTC

The cardiology training committee is subdivided into 4 subcommittees: clinical, education, research and social. Dr. Paterson serves on each subcommittee. The clinical and education subcommittees shall have at least one representative from the Royal Alexandra Hospital. The chief residents will each serve on two of the subcommittees (one plus the social subcommittee) and the remaining will have one other representative from the resident group. These subcommittees will hold formal or informal discussions and then offer 10-15 minute reports to the RTC during quarterly meetings.

Clinical Rotation Subcommittee

Current Members:

Dr. Craig Butler
Dr. Kevin Bainey
Dr. Ken Kaila
Dr. Kris Chan
Dr. Nazeem Wahab

This committee will be responsible for development and maintenance of rotation objectives, regular rotation reviews and service issues that arise during the residents’ training. In addition, this committee will oversee the tools used to evaluate the residents (eg. ITERs). They will work with rotation preceptors to develop standardized exams to assess proficiencies in each cardiology subspecialty specific to
each level of training (C1, C2 and C3). They will monitor and ensure that timely and accurate feedback is received at the end of each rotation.

**Education Curriculum/Exam Subcommittee**
Current Members:

Dr. Aws Alherbish  
Dr. Naji Alhulaimi  
Dr. Bibiana Cujec  
Dr. Evan Lockwood  
Dr. Ben Tyrell

This committee will administer the core curriculum of didactic lectures and other teaching rounds. They will ensure that the rounds conform to the CanMEDS principles. This committee will also be responsible for two standardized exams per year (OSCE and STACER) for the residents as well as coordinating monthly quizzes. Exams will be mandatory and will become a part of residents’ official record. Also, the marks for those exams will be disseminated while maintaining resident anonymity.

**Research/Mentorship Subcommittee**
Current Members:

Dr. Michele Graham  
Dr. Justin Ezekowitz  
Dr. John Dimitry

Members of this subcommittee will meet with each trainee early on during training and then be responsible for finding a suitable mentor (not necessarily someone on the RTC) according to career goals. Residents may also suggest their own mentor but still will need the approval of the subcommittee. The mentor will offer career counselling, stress management and may also supervise academic work (eg. research). This subcommittee will also take an inventory of the residents’ research projects as well as faculty within the division. All resident projects will need to reviewed and approved by this subcommittee. Objectives for the research rotation will be set by this subcommittee but the main goal will be to achieve at least one publication by the end of training.

**Social Subcommittee**
Current Members:

Dr. Evan Lockwood  
Dr. Kris Chan  
Dr. Kristin Lyons

This committee was set up to improve the morale in the program. Members of this committee will be responsible for all the social activities throughout the year (eg. Welcome party, Christmas, End of Year gathering and many others.)

Other responsibilities of the RTC not covered above:

1. To administrate all aspects of Cardiology education at the University of Alberta including:
   
   a. Resident selection  
   b. Resident Remediation  
   c. The securing of funding for trainee salary support  
   d. Regulation of resident relationship with industry  
   e. The solicitation and distribution of funds for the purpose of post-graduate education
2. To act as a forum for presentation of problems from residents within the program or from residents from other programs assigned to Cardiology.

3. To ensure that the program is responsive to changes in Cardiology curriculum and the needs of trainees by conducting an annual review of the program with trainees.

Committee Book last updated – August 5, 2012
### KEY 2012-13 DATES FOR CARDIOLOGY TRAINEES

<table>
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<tr>
<th>Month</th>
<th>Dates and Events</th>
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| **July**       | July 1st - Onset of academic year  
End July – For new C2s and C3s, year-end review with Program Director |
| **August**     | Mid-end August – Welcome Party for cardio residents  
August 31 – For C3s, deadline for preliminary assessment of training for RCPSC Cardiology exams |
| **September**  | Sept 1st - All Rounds and educational activities resume  
Sept 10 – Cardiology Interview day  
Mid September - Deadline for abstract submission to American College of Cardiology meeting |
| **October**    | Oct 27-31 - Canadian Cardiovascular Congress |
| **November**   | Nov 3-7 - American Heart Association Scientific Sessions  
End November – In-training STACER exams for all |
| **December**   | Early/Mid December - Division of Cardiology Christmas Party  
Mid December - MCQ and written exam for all |
| **January**    | Early January - Trainee 6-month review with Program Director |
| **March**      | March 9-11 - American College of Cardiology Scientific Sessions  
Mid March - In-training OSCE and written exam for all  
Mid March – WECREEP exam |
| **April**      | April 7-8 – For C1s, RCPSC written exam for IM certification  
End April – For C3s, in-training STACER examination |
| **May**        | Early May - Deadline for abstract submission to the Canadian Cardiovascular Congress  
Early May – For C1s, RCPSC oral exam for IM certification  
May 15th – For C3s, deadline for registration for RCPSC Cardiology exams  
Mid/end May – For C3s, STACER Examinations |
| **June**       | Early June – For C3s, end of training interviews with Program Director (FITER)  
Early June – For C1s, RCSPS oral exam for IM certification  
June 8, Cardiology Residents' end-of-year party  
Early June – Deadline for abstract submission to American Heart Association Scientific Sessions |