ROYAL COLLEGE
OF PHYSICIANS AND SURGEONS OF CANADA
COLLÈGE ROYAL
DES MÉDECINS ET CHIRURGIENS DU CANADA

royalcollege.ca • collegeroyal.ca

NATIONAL CURRICULUM GUIDE FOR THORACIC SURGERY:

SURGICAL AND CanMEDS COMPETENCIES

February 2015

774, PROMENADE ECHO DRIVE, OTTAWA, ON, CANADA K1S 5N8 **TEL/TÉL** 613-730-8177 **TOLL FREE/SANS FRAIS** 1-800-668-3740

National Curriculum Guide for Thoracic Surgery:
Surgical and CanMEDS Competencies

The Royal College of Physicians and Surgeons of Canada
774 Echo Drive
Ottawa, Ontario K1S 5N8 Canada
Telephone: 1-800-668-3740 or 613-730-8177
Fax: 613-730-3707
Web site: http://royalcollege.ca
E-mail: documents@royalcollege.ca

Note: Portions of this document were written by: Deslauriers, J., and Beauchamp, G.
Portions were edited by: Maziak, D., and Stewart, J.

© 2015 The Royal College of Physicians and Surgeons of Canada. All rights reserved.
This document may be reproduced for educational purposes only provided that the following phrase is included in all related materials: *Copyright © 2015 The Royal College of Physicians and Surgeons of Canada. Referenced and produced with permission.* Please forward a copy of the final product to the Office of Specialty Education, attn: Associate Director, Specialties. Written permission from the Royal College is required for all other uses. For further information regarding intellectual property, please contact: documents@royalcollege.ca. For questions regarding the use of this document, please contact: credentials@royalcollege.ca.

TABLE OF CONTENTS

INTRODUCTION **5**

Section I: POSTOPERATIVE CARE OF THE THORACIC SURGICAL PATIENT **6**

1.1 Surgical competencies 6
1.2 CanMEDS competencies 8
1.3 Recommended lectures 11

Section II: MASTERY OF THORACIC SYMPTOMS AND SYNDROMES **12**

2.1 Surgical competencies 12
2.1.1 Hemoptysis 12
2.1.2 Dyspnea and airway obstruction 13
2.1.3 Dysphagia 14
2.1.4 Superior vena cava syndrome 15
2.2 CanMEDS competencies 16
2.3 Recommended lectures 19

Section III: MASTERY OF PROCEDURES IN THORACIC SURGERY **20**

3.1 Surgical competencies 20
3.1.1 Bronchoscopy and endobronchial therapies 20
3.1.2 Oesophagogastroscopy and endo-oesophageal therapies 21
3.1.3 Oesophageal dilatation 22
3.1.4 Pleural drainage 23
3.1.5 Central venous and arterial lines 24
3.1.6 Intubation 24
3.1.7 Mediastinoscopy and mediastinotomy 25
3.1.8 Tracheostomy 26
3.1.9 Mastery of anaesthesia for Thoracic Surgery 27
3.1.10 Surgical approaches 39
3.2 CanMEDS competencies 30
3.3 Recommended lectures 33

Section IV: MASTERY OF THORACIC TRAUMA **35**

4.1 Surgical competencies 35
4.1.1 Trauma of the chest wall 35
4.1.2 Trauma of the airway and lungs 36
4.1.3 Trauma of the oesophagus 37
4.1.4 Trauma of the diaphragm 38
4.1.5 Cardiovascular trauma 39
4.2 CanMEDS competencies 40
4.3 Recommended lectures 43

Section V: CARDIAC SURGERY, EXTRACORPOREAL CIRCULATION, COAGULATION, AND BLOOD PRODUCTS **45**

5.1 Surgical competencies 45
5.1.1 Physiology of extracorporeal circulation 45
5.1.2 Techniques of extracorporeal circulation 46
5.1.3 Mechanical support 47
5.1.4 Principles applicable to anticoagulation and alteration of blood elements 49
5.1.5 Cardiac Surgery 50
5.2 CanMEDS competencies 52
5.3 Recommended lectures 55

Section VI: CHEST WALL 56
6.1 Surgical competencies 56
6.1.1 Anatomy and physiology 56
6.1.2 Congenital anomalies 57
6.1.3 Acquired disorders 58
6.1.4 Thoracic outlet syndromes 60
6.1.5 Vasospastic syndromes of the upper extremities 61
6.2 CanMEDS competencies 62
6.3 Recommended lectures 65

Section VII: TRACHEA AND BRONCHI 66
7.1 Surgical competencies 66
7.1.1 Embryology, anatomy, and physiology 66
7.1.2 Congenital and benign diseases 67
7.1.3 Airway neoplasms 68
7.2 CanMEDS competencies 70
7.3 Recommended lectures 73

Section VIII: LUNGS AND PLEURA 74
8.1 Surgical competencies 74
8.1.1 Embryology and anatomy 74
8.1.2 Physiology and investigation 75
8.1.3 Congenital anomalies of the lung 76
8.1.4 Benign diseases of the lung 77
8.1.5 Neoplasms of the lungs and bronchi 79
8.1.6 Pleural diseases 80
8.2 CanMEDS competencies 82
8.3 Recommended lectures 85

Section IX: MEDIASTINUM AND PERICARDIUM 86
9.1 Surgical competencies 86
9.1.1 Embryology, anatomy and physiology 86
9.1.2 Congenital anomalies of the mediastinum 87
9.1.3 Acquired diseases of the mediastinum 88
9.1.4 Congenital and acquired diseases of the pericardium 90
9.2 CanMEDS competencies 91
9.3 Recommended lectures 94

Section X: DIAPHRAGM 96
10.1 Surgical competencies 96
10.1.1 Embryology, anatomy, physiology 96
10.1.2 Congenital anomalies 97
10.1.3 Acquired diseases 98
10.2 CanMEDS competencies 99
10.3 Recommended lectures 102

Section XI: OESOPHAGUS 103
11.1 Surgical competencies 103
11.1.1 Embryology, anatomy, physiology 103
11.1.2 Congenital anomalies 104
11.1.3 Non neoplastic acquired diseases 105
11.1.4 Neoplasms of the oesophagus 107
11.2 CanMEDS competencies 109
11.3 Recommended lectures 112

Section XII: TRANSPLANTATION 113
12.1 Surgical competencies 113
12.1.1 Lung transplantation 113
12.1.2 Heart-lung transplantation 115
12.2 CanMEDS competencies 116
12.3 Recommended lectures 119

Section XIII: RESEARCH 121
13.1 Surgical competencies 121
13.2 CanMEDS competencies 122
13.3 Recommended lectures 125

INTRODUCTION

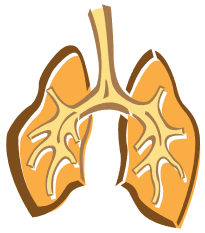
Included are the objectives of training in Thoracic Surgery incorporating surgical and CanMEDS competencies as well as selected readings. They are elaborate but they define the speciality and provide each program with a detailed model of the training curriculum. They put an emphasis on the anatomy and physiology of intrathoracic organs, spaces, and structures as well as on the investigation and treatment of disorders affecting the airway, lungs, pleura, mediastinum, oesophagus, chest wall, and diaphragm. There is a section on research and how to learn the scientific method which must be considered an important feature of the training of competent Thoracic Surgeons. These objectives were written in 2007-2008 and revisions will obviously have to be made in future years with respect to new technologies and therapeutic strategies.

For the first time, a model curriculum is presented in the two official languages of the country and will become standard for all eight Thoracic Surgery training programs in Canada. This achievement reflects the uniformity of academic activities and quality of training in Thoracic Surgery throughout this country.

This national curriculum guide has been mapped to the Royal College Objectives of Training (OTR) in Thoracic Surgery. At the end of each competency, reference to the corresponding CanMEDS Role and objective has been included in parentheses.

SECTION I:

POSTOPERATIVE CARE OF THE THORACIC SURGICAL PATIENT



1.1. SURGICAL COMPETENCIES

A. Unit objectives

Within this unit the resident must demonstrate knowledge of the principles applicable to the postoperative care of the thoracic surgical patient including monitoring, pain control, maintenance of fluid balance, respiratory care, and pharmacologic interventions when necessary.

B. Learner specific objectives

Upon completion of this unit, the resident must:

1. Demonstrate knowledge of the principles of monitoring of the postoperative thoracic surgical patient including clinical monitoring, hemodynamic and respiratory monitoring, monitoring of air and blood losses (thoracic drainage) and radiographic monitoring of the postoperative chest. **(OTR Medical Expert 3.5.3)**
2. Demonstrate knowledge of the principles of postoperative pain control as they apply to the thoracic surgical patient including the various available methods of analgesia, their indications and contra indications as well as the potential complications that can occur with each method. **(OTR Medical Expert 3.5.3)**
3. Demonstrate knowledge of the principles involved in the maintenance of fluid balance in the postoperative thoracic surgical patient including the indications for use of colloid and cristalloid solutions, as well as the indications for the use of blood products. Describe the fundamental differences in terms of fluid balance between the patient undergoing pulmonary surgery and the patient undergoing oesophageal surgery. **(OTR Medical Expert 3.5.3)**
4. Demonstrate knowledge of the principles involved in pharmacologic interventions for the postoperative thoracic surgical patient including indications, contra-indications, and possible complications of oxygen therapy, bronchodilation, antibiotics, and medications used to prevent deep thrombophlebitis. **(OTR Medical Expert 3.5.3)**

C. Contents

1. Clinical monitoring **(OTR Medical Expert 3.5.3)**
   a) Level of consciousness, respiratory amplitude, subcutaneous emphysema **(OTR Medical Expert 3.5.3)**
2. Hemodynamic and respiratory monitoring **(OTR Medical Expert 3.5.3)**
   a) Heart rate, urinary output **(OTR Medical Expert 3.5.3)**
   b) Cardiac monitoring and monitoring of fluid losses (thoracic drainage) **(OTR Medical Expert 3.5.3)**
   c) Monitoring of oxygen saturation and of arterial blood gases **(OTR Medical Expert 3.5.3)**
3. Monitoring of thoracic drainage **(OTR Medical Expert 3.5.3)**
   a) Air and fluid losses, oscillation of the fluid column **(OTR Medical Expert 3.5.3)**
4. Monitoring by daily chest radiographs (advantages and disadvantages) **(OTR Medical Expert 3.5.3)**
5. Analgesia **(OTR Medical Expert 3.5.3)**
   a) Pathophysiology of postoperative pain **(OTR Medical Expert 3.5.3)**

b) Pre, intra, and postoperative analgesia **(OTR Medical Expert 3.5.3)**
c) Loco-regional analgesia : advantages, indications, contra indications, and possible complications **(OTR Medical Expert 3.5.3)**
   1) Epidural analgesia, intrapleural and extrapleural analgesia **(OTR Medical Expert 3.5.3)**
   2) Paravertebral nerve blocs **(OTR Medical Expert 3.5.3)**
   3) Cryo analgesia **(OTR Medical Expert 3.5.3)**
d) TENS (Transcutaneous Nerve Stimulation): advantages, indications and contra indications, potential complications. **(OTR Medical Expert 3.5.3)**
e) Parenteral analgesia : advantages, indications, contra indications, and potential complications **(OTR Medical Expert 3.5.3)**
   1) Analgesia with the use of opioids, patient controlled analgesia (PCA) **(OTR Medical Expert 3.5.3)**

6. Fluid balance in the postoperative thoracic surgical patient **(OTR Medical Expert 3.5.3)**
   a) Physiology of fluid balance in the postoperative thoracic surgical patient after pulmonary and oesophageal surgery **(OTR Medical Expert 3.5.3)**
   b) Replacement fluids (benefits and disadvantages) **(OTR Medical Expert 3.5.3)**
      1) Cristalloid solutions, colloid solutions, blood products **(OTR Medical Expert 3.5.3)**
   c) Monitoring of fluid balance **(OTR Medical Expert 3.5.3)**
7. Pharmacologic interventions in the postoperative thoracic surgical patient **(OTR Medical Expert 2.1.1)**
   a) Oxygen **(OTR Medical Expert 2.1.1)**
      1) Consequences of hypoxemia **(OTR Medical Expert 2.1.1)**
      2) Pharmacology of and indications for supplemental oxygen therapy **(OTR Medical Expert 2.1.1)**
      3) Methods that can be used to administer supplemental oxygen and complications **(OTR Medical Expert 2.1.1)**
   b) Bronchodilators including cortisone **(OTR Medical Expert 2.1.1)**
      1) Pharmacology of bronchodilators and cortisone **(OTR Medical Expert 2.1.1)**
      2) Indications for bronchodilators and other types of medications **(OTR Medical Expert 2.1.1)**
      3) Side effects and potential complications **(OTR Medical Expert 2.1.1)**
   c) Antibiotics **(OTR Medical Expert 2.1.1)**
      1) Pharmacology, indications and side effects **(OTR Medical Expert 2.1.1)**
      2) Pre- and post-operative anti-tuberculosis medication usage in tuberculosis-related surgical cases (lungs, chest wall) **(OTR Medical Expert 2.1.1)**
   d) Anticoagulation **(OTR Medical Expert 2.1.1)**
      1) Principles of prophylactic anticoagulation **(OTR Medical Expert 2.1.1)**
      2) Prophylaxis against deep vein thrombosis **(OTR Medical Expert 2.1.1)**
      3) Medications that can be used to prevent deep vein thrombosis **(OTR Medical Expert 2.1.1)**
      4) Side effects and potential complications **(OTR Medical Expert 2.1.1)**

D. Clinical skills

During the training period, the resident must:

1. Demonstrate familiarity with the techniques of monitoring the thoracic surgical patient including cardio respiratory monitoring, monitoring via thoracic drainage units, and radiological monitoring. **(OTR Medical Expert 2.1.1, 2.1.3, and 2.1.5)**
2. Interpret clinical, cardio respiratory, hemodynamic, and radiologic modifications that may occur during the immediate post operative period correctly, and be able to take appropriate actions. **(OTR Medical Expert 2.1.1, 2.1.3, and 2.1.5)**
3. Assume control of the postoperative analgesia of the thoracic surgical patient. **(OTR Medical Expert 2.1.1, 2.1.3, and 2.1.5)**
4. Recognize potential side effects and complications of postoperative analgesia and make appropriate

changes if required. **(OTR Medical Expert 2.1.1, 2.1.3, and 2.1.5)**
5. Assume responsibility for the management of fluids after surgery of the lung and/or the oesophagus. **(OTR Medical Expert 2.1.1, 2.1.3, and 2.1.5)**
6. Recognize potential complications related to fluid infusion including those complications related to infusion of blood products and be able to take appropriate actions to counteract those complications. **(OTR Medical Expert 2.1.1, 2.1.3, and 2.1.5)**
7. Prescribe and supervise the administration of oxygen, bronchodilators, antibiotics, and anticoagulants. **(OTR Medical Expert 2.1.1, 2.1.3, and 2.1.5)**
8. Recognize the possible complications associated with oxygen administration, use of bronchodilators, antibiotics**,** and anticoagulants, and take appropriate action in cases where such complications have occurred. **(OTR Medical Expert 2.1.1, 2.1.3, and 2.1.5)**

1.2. CanMEDS COMPETENCIES

1.1.1 COMMUNICATOR

A. Unit objectives

Upon completion of this segment, the resident must:

1. Present to colleagues in a clear and precise manner knowledge concerning the evaluation and treatment of the thoracic surgical patient in the immediate postoperative period including monitoring, fluid balance, respiratory care, and pharmacologic interventions. **(OTR Communicator 3.1)**
2. Discuss with the patient, family, and paramedical personnel the main complications that can occur during the immediate postoperative period of the thoracic surgical patient as well as their prevention and treatment. **(OTR Communicator 1.2.1)**

B. Contents

1. Demonstrate confidence and ethics in the relationship between thoracic surgeon and patient. **(OTR Communicator 1.1)**
2. Establish a therapeutic relationship with the patient, family, and other participants (medical and non medical). **(OTR Communicator 1.2)**
3. Establish mutual comprehension and understanding of the patient's needs. **(OTR Communicator 2.1)**
4. Collect and summarize pertinent information regarding the thoracic surgical patient during the immediate postoperative period. **(OTR Communicator 2.2)**
5. Provide oral and written communication of information pertinent to the care of the postoperative thoracic surgical patients, including clinical history, physical examination, differential diagnosis, and therapeutic options. **(OTR Communicator 5.1, 5.2 and 5.3)**
6. Respect the diversity and pay attention to the psychosocial aspects of the patient during the immediate postoperative period. **(OTR Communicator 4.2)**
7. Report mistakes and undesirable side effects. **(OTR Communicator 5.1 and 5.2)**

1.1.2 COLLABORATOR

A. Unit objectives

Upon completion of this segment, the resident must:

1. Collaborate with the chest physician, intensivist and other health professionals with regards to the evaluation and choice of therapy during the immediate postoperative care of the thoracic surgical patient. **(OTR Collaborator 1.4)**
2. Determine, with the help of these consultants, the best methods of monitoring thoracic surgical

patients during the immediate postoperative period as well as what precautions should be taken to prevent complications. **(OTR Collaborator 1.7)**

B. Contents

1. Share knowledge, information, and decision making processes. **(OTR Collaborator 1.6)**
2. Delegate appropriately and encourage team work **(OTR Collaborator 1.2.1)**
3. Respect other members of the multidisciplinary team. **(OTR Collaborator 1.3)**
4. Provide inter and multiprofessionnal care of the thoracic surgical patient during the immediate postoperative period. **(OTR Collaborator 1.6)**
5. Identify, manage, prevent, and resolve conflicts. **(OTR Collaborator 2.2)**
6. Recognize one's own role within the multidisciplinary team and recognize one's own limitations. **(OTR Collaborator 1.1)**

1.1.3 MANAGER

A. Unit objectives

Upon completion of this segment, the resident must:

Appreciate the relationship between costs, benefits, and results in the care of the thoracic surgical patient during the immediate postoperative period. **(OTR Manager 3.1 and 3.2)**

B. Contents

1. Describe the role and responsibilities of the Thoracic Surgeon in the health care system and more specifically in the care of the thoracic surgical patient during the immediate postoperative period. **(OTR Manager 1.3)**
2. Demonstrate leadership, supervision, and administration within the health care system. **(OTR Manager 4.2)**
3. Describe the organization, structure, and financing of the health care system. **(OTR Manager 3.1)**
4. Manage time in the context of clinical work. **(OTR Manager 2.1)**
5. Manage financial aspects of the medical practice and negotiations. **(OTR Manager 1.4)**
6. Demonstrate knowledge of career evolution. **(OTR Manager 4.1, 4.2 and 4.3)**

1.1.4 HEALTH ADVOCATE

A. Unit objectives

Upon completion of this segment, the resident must:

1. Appreciate the health hazards associated with smoking and exposure to other pollutants and their impact on lung cancer and other respiratory illnesses, especially those that are likely to require surgery. **(OTR Health Advocate 1.2.3)**
2. Recognize the importance of managing the monitoring, pain control, fluid balance, and respiratory care of the thoracic surgical patient during the immediate postoperative period. **(OTR Health Advocate 2.1.1)**

B. Contents

1. Demonstrate knowledge of patient and their background. **(OTR Health Advocate 1.2.1)**
2. Promote health and integrate concepts of preventive medicine. **(OTR Health Advocate 2.1.3)**
3. Identify risk factors for postoperative complications including psychological, biological, sociological, cultural, and economic factors. **(OTR Health Advocate 3.1, 2.1.2 and 1.2.2)**
4. Describe the role of the Thoracic Surgeon within the community and responsible use of authority

and influences. **(OTR Health Advocate 2.2)**
5. Adapt one's personal practice according to patient's needs. **(OTR Health Advocate 2.3)**
6. Ensure the security of patients. **(OTR Health Advocate 4.6)**

1.1.5 SCHOLAR

A. Unit objectives

Upon completion of this segment, the resident must:

1. Critically assess the medical literature pertinent to the care of the thoracic surgical patient in the immediate postoperative period. **(OTR Scholar 1, 1.6 and 2.3)**
2. Critically assess the methods and techniques that can be used to prevent postoperative complications. **(OTR Scholar 2.2)**

B. Contents

1. Maintain and enhance knowledge. **(OTR Scholar 1.2 and 4.4)**
2. Demonstrate moral and professional obligation to maintain and improve his/her competencies. **(OTR Scholar 1.1, 1.9 and 4.4)**
3. Perform self-evaluation and identification of the need to improve one's own knowledge and level of competence. **(OTR Scholar 1.2, 1.3, 1.4 and 1.8)**
4. Access available information and critically evaluate the literature. **(OTR Scholar 1.6 and 4.5)**
5. Demonstrate willingness to learn and use modern learning techniques. **(OTR Scholar 1.3, 1.7, 3.5, 3.6 and 3.7)**
6. Demonstrate research and scientific curiosity. **(OTR Scholar 1.5, 1.10, 4.3)**
7. Demonstrate knowledge of ethics and research, human subjects and relationship with industry. **(OTR Scholar 4.1 and 4.2)**
8. Contribute academically to the teaching of undergraduate students and of paramedical personnel. **(OTR Schloar 3.1 and 3.4.1)**
9. Identify and report on conflicts of interest. **(OTR Scholar 4)**

1.1.6 PROFESSIONAL

C. Unit objectives

Upon completion of this segment, the resident must:

1. Provide high level perioperative care with integrity, honesty, and compassion. **(OTR Professional 1.1)**
2. Ensure optimal professional conduct (individual and multidisciplinary) with regards to the thoracic surgical patient in the immediate postoperative period. **(OTR Professional 1.2)**
3. Practice Thoracic Surgery according to the principles of deontology, and according to the obligations of the surgeon involved in the perioperative care of thoracic surgical patients. **(OTR Prfoessional 1.3)**
4. Demonstrate a high level of responsibility towards the postoperative thoracic surgical patient by his availability, respect of confidentiality, and respect of the physical and emotional needs of each patient. **(OTR Professional 1.5)**
5. Work with integrity and according to best practice guidelines, specifically by referring or consulting other health professionals when required. **(OTR Professional 1.2)**
6. Report clinical or scientific information with a high level of precision. **(OTR Professional 1.1, 2.5)**
7. Demonstrate practical knowledge of the provincial and federal regulations with regards to the practice of Thoracic Surgery during the immediate postoperative period. **(OTR Professional 2.1)**
8. Maintain control of one's own emotions and opinions and identify personal reactions that could be detrimental to the patient/surgeon relationship. Explore and even accept possible ways to change

attitudes that may be perceived as damaging to the patient/surgeon relationship. **(OTR Professional 1.6, 3.2.1, and 2.4)**
9. Identify a colleague or another physician with whom it is possible to discuss personal objectives, conflicts, or stress. **(OTR Professonal 2.4, 3.1 and 3.3)**

D. Contents

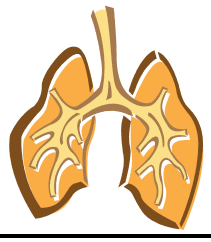
1. Demonstrate integrity, honesty and compassion. **(OTR Professonal 1.1)**
2. Behave ethically and responsibly towards other health professionals. **(OTR Professonal 3.3)**
3. Demonstrate excellence in the clinical practice of Thoracic Surgery and maintenance of competence. **(OTR Professonal 1.2)**
4. Demonstrate awareness of the obligation to provide the necessary information to organizations responsible for regulating the profession. **(OTR Professonal 2.2, and 2.3)**
5. Describe the principles and theories of bioethics and medico legal aspects of the practice of Thoracic Surgery. **(OTR Professonal 1.7)**

1.3. RECOMMENDED LECTURES

1. Deslauriers J, Mehran R : Handbook of perioperative care in general thoracic surgery. Elsevier 2005 (chapters 6.1-6.4)
2. Franco KL, Putnam JB : Advanced therapy in thoracic surgery. BC Decker Inc. 2005 (pp1-32)
3. Frank JR : Le cadre des compétences CanMEDS 2005 pour les médecins. Le Collège des médecins et chirurgiens du Canada
4. Klafta JM : Advances in anaesthesia and pain management. Thorac Surg Clinics, Vol. 15, No 1, February 2005
5. Pearson's Thoracic Surgery, Third Edition, Elsevier 2008 (chapters 5, 11, 12)
6. Shields T et al : General Thoracic Surgery, Sixth Edition, Lippincott, Williams, and Wilkins, 2005 (chapters 39-40)
7. Whyte RI : Preoperative preparation of patients for thoracic surgery. Thorac Surg Clinics, Vol. 15, No 2, May 2005
8. Yang SC, Cameron DE : Current therapy in thoracic and cardiovascular surgery. Mosby 2004 (pp8-12; 32-36)
9. Zwischenberger JB : Critical care in the general thoracic surgical patient. Chest Surg Clinics, Vol. 2, No 2, May 2002

SECTION II:

MASTERY OF THORACIC SYMPTOMS AND SYNDROMES



2.1. SURGICAL COMPETENCIES

2.1.1 Hemoptysis

A. Unit objectives

Within this unit the resident must learn to define and characterize hemoptysis. The resident must also learn to clarify the causes of hemoptysis, as well as to investigate and treat patients presenting with hemoptysis.

B. Learner specific objectives

Upon completion of this segment, the resident must:

1. Demonstrate knowledge of the pathophysiology, classification and causes of hemoptysis. **(OTR ME 2.1.3**)
2. Demonstate knowledge of the techniques and methods of investigation (imaging, endoscopy) that can be used in a patient with hemoptysis. **(OTR ME 3.1 and 3.2)**
3. Describe the principles of surgical and non-surgical treatment of the patient presenting with hemoptysis. **(OTR ME 3.5.1)**

C. Contents

1. Pathophysiology of hemoptysis **(OTR ME 2.1.3)**
   a) Definition and classification
   b) Source of the hemoptysis (systemic or pulmonary circulation) and causes
   c) Clinical presentation and consequences of hemoptysis
2. Investigation of hemoptysis **(OTR ME 3.4.4)**
   a) Imaging : Standard radiographs, CT scan, angiography
   b) Endoscopy : Flexible and rigid bronchoscopy under local or general anaesthesia **(OTR ME 5.1.1)**
3. Management of hemoptysis **(OTR ME 5.2.2.5)**
   a) Non-surgical : general measures, embolization
   b) Surgical : approaches, techniques
   c) Surgical morbidity after pulmonary surgery for hemoptysis

D. Clinical skills

During the training period, the resident must:

1. Evaluate patients with massive hemoptysis **(OTR ME 1.1 and 3.5.1)**
2. Perform flexible and rigid bronchoscopy in patients with massive hemoptysis **(OTR ME 5.1.1)**
3. Participate in radiological sessions of embolization in patients with massive hemoptysis **(OTR ME 3.5.1)**
4. Perform surgery in patients with massive hemoptysis **(OTR ME 5.2.2.5)**

2.1.2 DYSPNEA AND AIRWAY OBSTRUCTION

A. Unit objectives

Within this unit, the resident must learn to define, characterize, and grade dyspnea and airway obstruction. The resident must also learn to classify the causes of dyspnea and airway obstruction, to investigate those problems and to treat them.

B. Learner specific objectives

Upon completion of this unit, the resident must:

1. Demonstrate knowledge of the definition, pathophysiology, causes and grades of dyspnea. **(OTR ME 2.1.3)**
2. Demonstrate knowledge of the methods (imaging, pulmonary function studies) that can be used to investigate patients with dyspnea secondary to Chronic Obstructive Pulmonary Disease (COPD). **(OTR ME 3.4.2 and 3.4.3)**
3. Describe the principles of medical treatment as well as the indications for surgery in patients with dyspnea secondary to COPD. **(OTR ME 4.2.1)**
4. Demonstrate knowledge of the definition, pathophysiology, classification, grades and causes of airway obstruction. **(OTR ME 2.1.3)**
5. Demonstrate knowledge of the methods of investigation (imaging, bronchoscopy) that should be used in the investigation of patients with airway obstruction. **(OTR ME 5.1.1 and 3.4.5)**
6. Describe the principles of medical treatment and the surgical indications in patients presenting with airway obstruction. **(OTR ME 3.5.2)**

C. Contents

1. Dyspnea
   a) Definition, grades, pathophysiology, and etiology **(OTR ME 2.1.3)**
   b) Investigation including standard radiographs, CT scan, pulmonary function tests, exercise tests, and nuclear scans. **(OTR ME 3.4.5)**
   c) Principles of medical treatment **(OTR ME 4.1)**
2. Surgery for the patient with COPD **(OTR ME 4.3 and 5.2.1.6)**
   a) Investigation, pathophysiology, indications for surgery
   b) Bullectomy: Indications, surgical approaches, techniques, complications, and results.
   c) Lung volume reduction surgery (LVRS): Indications, surgical approaches, techniques, complications, and results.
3. Airway obstruction **(OTR ME 5.2.2.2 and 4.3)**
   a) Etiology
   b) Clinical presentation, and investigation including imaging and flexible and rigid bronchoscopy
   c) Surgical and non-surgical treatment

D. Clinical skills

During the training period, the resident must:

1. Evaluate patients who have dyspnea, including interpreting the results of pulmonary function studies and imaging results and establishing the appropriate differential diagnosis. **(OTR ME 3.4.2)**
2. Evaluate COPD patients who could be candidates for bullectomy or LVRS including being able to correctly interpret the results of the investigation. **(OTR ME 3.4.2)**
3. Perform surgery in COPD patients including bullectomy and LVRS. **(OTR ME 5.2.1.6)**

4. Treat complications secondary to those procedures. **(OTR ME 5.2.1.6)**
5. Evaluate patients with airway obstruction. **(OTR ME 5.2.2.2)**
6. Order, in a judicious manner, diagnostic tests pertinent to the investigation of patients with airway obstruction. **(OTR ME 3.4.5)**
7. Interpret the results of those tests correctly. **(OTR ME 3.4.5)**
8. Establish an appropriate differential diagnosis. **(OTR ME 3.3)**
9. Perform flexible and rigid bronchoscopy in patients with suspected airway obstruction. **(OTR ME 5.1.1)**

2.1.3 DYSPHAGIA

A. Unit objectives

Within this unit, the resident must learn to define and characterize dysphagia. The resident must also learn to classify the causes of dysphagia and to investigate this symptom. The resident must finally learn to treat surgically or non-surgically patients who have dysphagia.

B. Learner specific objectives

Upon completion of this unit, the resident must:

1. Demonstrate knowledge of the pathophysiology, classification, and causes of dysphagia. **(OTR ME 2.1.4)**
2. Demonstrate knowledge of the methods of investigation (imaging, manometry, endoscopy) that can be used in a patient presenting with dysphagia. **(OTR ME 3.4.1 and 5.1.2)**
3. Describe the principles of surgical and non-surgical treatment of the patient who presents with dysphagia. **(OTR ME 5.1.2 and 5.2.2.6)**

C. Contents

1. Pathophysiology of dysphagia **(OTR ME 2.1.4)**
   a) Definition, classification, origin, and causes of dysphagia
   b) Clinical presentation and consequences of dysphagia
2. Investigation of dysphagia **(OTR ME 3.4.1, 3.4.5 and 5.2.1.2)**
   a) Clinical presentation, signs and symptoms
   b) Imaging : Standard radiographs, contrast studies, CT scan
   c) Endoscopy : Oesophagograstroscopy (flexible or rigid) under local or general anaesthesia
   d) Manometry and isotopic nuclear studies **(OTR ME 3.4.1)**
3. Treatment of dysphagia
   a) Medical or surgical according to aetiology **(OTR ME 5.2.1.7 and 5.2.2.6)**

D. Clinical skills

During the training period, the resident must:

1. Evaluate patients who have dysphagia. **(OTR ME 3.3)**
2. Order, in a judicious manner, all of the diagnostic tests that are available to investigate the patient who presents with dysphagia. **(OTR ME 3.3, 3.4.1 and 3.4.4)**
3. Interpret correctly the results of those tests and establish an appropriate differential diagnosis. **(OTR ME 3.5.1)**
4. Perform flexible and rigid oesophagogastroscopy in patients who present with dysphagia. **(OTR ME 5.1.2)**
5. Treat medically or surgically (according to the cause) patients who present with dysphagia. **(OTR ME 5.2.1.7 and 5.2.2.1)**

2.1.4 SUPERIOR VENA CAVA (SVC) SYNDROME

A. Unit objectives

Within this unit the resident must learn to define and characterize the superior vena cava (SVC) syndrome. The resident must also learn the etiology, classification, and consequences of an SVC obstruction in both the acute and chronic phases. Finally, the resident must investigate and treat patients who present with an SVC syndrome, both surgically and non-surgically.

B. Learner specific objectives

Upon completion of this segment, the resident must:

1. Demonstrate knowledge of the normal anatomy of the superior vena cava and its variants as well as the anatomical relationships of the SVC with neighbouring structures. **(OTR ME 2.1.2)**
2. Demonstrate knowledge of the pathophysiology, classification (acute and chronic), and causes of the SVC syndrome. **(OTR ME 2.1.1)**
3. Demonstrate knowledge of the collateral venous system of the SVC. **(OTR ME 2.1.2)**
4. Demonstrate knowledge of the methods of investigation (imaging, angiography, endoscopy) that can be used in a patient presenting with an SVC syndrome. **(OTR ME 3.4.4 and 3.4.5)**
5. Describe the principles of non-surgical treatment including the use of stents and of surgical treatment. **(OTR ME 3.4.5)**

C. Contents

1. Pathophysiology of SVC syndrome **(OTR ME 2.1.5)**
   a) Classification and causes
   b) Collateralisation
   c) Physiologic consequences of acute or chronic obstruction
2. Investigation of the patient with an SVC syndrome **(OTR ME 3.4.4)**
   a) Clinical presentation : Signs and symptoms
   b) Imaging : Standard radiographs, CT scan, angiography
   c) Endoscopy : Bronchoscopy, mediastinoscopy
3. Treatment **(OTR ME 3.4.5 and 5.2.1.4)**
   a) Non-surgical : Medications, chemotherapy, radiotherapy, stents
   b) Surgical : Venous bypasses

D. Clinical skills

During the training period, the resident must:

1. Evaluate patients with acute or chronic SVC obstruction **(OTR ME 1.1 and 3.2)**
2. Perform a physical examination of patients with an SVC syndrome including the recognition of the collateral venous system. **(OTR ME 3.3)**
3. Order, in a judicious manner, diagnostic tests available for the investigation of a patient with SVC syndrome, including mediastinoscopy. **(OTR ME 3.4.5)**
4. Interpret correctly the results of these investigations and make an appropriate differential diagnosis. **(OTR ME 3.5.1)**
5. Participate in radiologic interventions for the insertion of endovenous stents. **(OTR ME 3.4.5)**
6. Perform surgical procedures intended to palliate SVC syndromes. **(OTR ME 5.2.1.4)**

2.2 CanMEDS COMPETENCIES

2.2.1 COMMUNICATOR

A. Unit objectives

Upon completion of this segment, the resident must:

1. Present to colleagues in a clear and precise manner knowledge concerning major thoracic symptoms and syndromes such as hemoptysis, dyspnea, dysphagia, and SVC syndrome. **(OTR Communicator 2.1)**
2. Discuss the causes, nature, and treatment of thoracic symptoms and syndromes in a clear manner with the patient, family and paramedical personnel. **(OTR Communicator 1.2.1)**

B. Contents

1. Demonstrate confidence and ethics in the relationship between thoracic surgeon and patient. **(OTR Communicator 1.1 and 1.5)**
2. Establish a therapeutic relationship with the patient, family, and other participants (medical and non medical). **(OTR Communicator 1.2)**
3. Establish mutual comprehension and understanding of the patient's needs. **(OTR Communicator 3.1.2)**
4. Demonstrate the ability to obtain and summarize pertinent information concerning the investigation and treatment plan for the patient who has a major thoracic symptom and syndrome. **(OTR Communicator 2.2.1 and 2.2.1)**
5. Provide oral and written communication of information pertinent to the care of the patient who has a major thoracic symptom and syndrome including clinical history, physical examination, differential diagnosis and therapeutic options. **(OTR Communicator 3.1)**
6. Respect the diversity and pay attention to the psychosocial aspects of the patient. **(OTR Communicator 3.1.2 and 4.2)**
7. Report mistakes and undesirable side effects. **(OTR Communicator 4.5)**

2.2.2 COLLABORATOR

A. Unit objectives

Upon completion of this segment, the resident must:

1. Collaborate with the chest physician and other health professionals with regards to the optimal evaluation and treatment of patients presenting with a major thoracic symptom or syndrome. **(OTR Collaborator 1.1 and 1.3.1)**
2. Determine with the help of these consultants the best methods to investigate and treat these patients and the precautions that should be taken to prevent complications. **(OTR Collaborator 1.2 and 1.2.1)**

B. Contents

1. Share knowledge, information, and decision making processes. **(OTR Collaborator 1.6)**
2. Delegate appropriately and encourage team work **(OTR Collaborator 2.3)**
3. Respect other members of the multidisciplinary team. **(OTR Collaborator 1.3 and 2.6)**
4. Provide inter and multiprofessional care of the thoracic surgical patient who has a major thoracic symptom or syndrome. **(OTR Collaborator 1.5 and 1.6)**

5. Identify, manage, prevent, and resolve conflicts. **(OTR Collaborator 2.2, 2.3 and 2.4)**
6. Recognize one's own role within the multidisciplinary team and recognize one's own limitations. **(OTR Collaborator 2.4 and 2.5)**

2.2.3 MANAGER

A. Unit objectives

Upon completion of this segment, the resident must:

Appreciate the relationships between costs, benefits, and results in the investigation and choice of treatment of the thoracic surgical patient who presents with a major thoracic symptom or syndrome. **(OTR Manager 3.1 and 3.2)**

B. Contents

1. Describe the role and responsibilities of the Thoracic Surgeon in the investigation and treatment of the patient who has a major thoracic symptom or syndrome. **(OTR Manager 1.1 and 1.3)**
2. Demonstrate leadership, supervision, and administration within the health care system. **(OTR Manager 1.3 and 4.2)**
3. Describe the organization, structure, and financing of the health care system. **(OTR Manager 1.4, 3.1 and 3.2)**
4. Manage time in the context of clinical work. **(OTR Manager 1.4, 2.3, 2.2, 2.1, and 4.3)**
5. Manage financial aspects of the medical practice and negotiations. **(OTR Manager 2.2, 2.3 and 1.4)**
6. Demonstrate knowledge of career evolution. **(OTR Manager 4.2, 4.3 and 4.1)**

2.2.4 HEALTH ADVOCATE

A. Unit objectives

Upon completion of this segment, the resident must:

1. Appreciate the health hazards associated with smoking and exposure to other polluants and their impact on the occurrence of major thoracic symptoms and syndromes such as dyspnea or SVC syndrome. **(OTR Health Advocate 1.2.3)**
2. Recognize the importance of taking over the investigation and treatment of the patient who has a major thoracic symptom or syndrome. **(OTR Health Advocate 2.1.1)**

B. Contents

1. Demonstrate knowledge of patient and their background. **(OTR Health Advocate 1.1 and 1.2.1)**
2. Promote health and prevention of major thoracic symptoms or syndromes. **(OTR Health Advocate 2.1.4 and 2.1.3)**
3. Identify risk factors for major thoracic symptoms and syndromes including psychological, biological, sociological, cultural, and economic factors. **(OTR Health Advocate 2.1.2 and 3.1)**
4. Describe the role of the Thoracic Surgeon within the community and responsible use of authority and influences. **(OTR Health Advocate 2.2)**
5. Adapt one's personal practice according to patient's needs. **(OTR Health Advocate 2.3 and 4.5)**
6. Ensure the security of patients. **(OTR Health Advocate 3.1 and 4.6)**
7. Integrate concepts of preventive medicine. **(OTR Health Advocate 4.4)**

2.2.5 SCHOLAR

A. Unit objectives

Upon completion of this segment, the resident must:

1. Critically assess the medical literature pertinent to the investigation and treatment of patients who have a major thoracic symptom or syndrome. **(OTR Scholar 1.6 and 2.3)**
2. Critically evaluate the methods and techniques that can be used to prevent major thoracic symptoms and syndromes. **(OTR Scholar 2.2.1)**

B. Contents

1. Maintain and enhance knowledge. **(OTR Scholar 1.2 and 4.4)**
2. Demonstrate moral and professional obligation to maintain and improve competencies. **(OTR Scholar 1.1, 4.4 and 1.9)**
3. Perform self-evaluation and identification of the need to improve one's own knowledge and level of competence. **(OTR Scholar 1.3, 1.4 and 1.8)**
4. Access available information and critically evaluate the literature. **(OTR Scholar 1.6 and 4.5)**
5. Demonstrate willingness to learn and use modern learning techniques. **(OTR Scholar 1.3, 1.7, 3.5, 3.6 and 3.7)**
6. Demonstrate research and scientific curiosity. **(OTR Scholar 1.5, 1.10, 2.1.1 and 4.3)**
7. Demonstrate knowledge of ethics and research, human subjects and relationship with industry. **(OTR Scholar 4.1 and 4.2)**
8. Contribute academically to the teaching of undergraduate students and paramedical personnel. **(OTR Scholar 3.4.1 and 3.1)**
9. Identify and report conflicts of interest. **(OTR Scholar 4)**

2.2.6 PROFESSIONAL

A. Unit objectives

Upon completion of this segment, the resident must:

1. Provide high level care with integrity, honesty, and compassion to the patient who has a major thoracic symptom or syndrome. **(OTR Professional 1.1)**
2. Ensure optimal professional conduct (individual and multidisciplinary) with regards to the investigation and treatment of the patient who has a major thoracic symptom or syndrome. **(OTR Professional 1.2)**
3. Practice Thoracic Surgery according to the principles of deontology, and according to the obligations of the surgeon involved in the investigation and treatment of the patient who has a major thoracic symptom or syndrome. **(OTR Professional 1.2 and 1.3)**
4. Demonstrate a high level of personal responsibility towards the patient who has a major thoracic symptom or syndrome by being available, respecting confidentiality, and respecting the physical and emotional needs of each patient. **(OTR Professional 1.5)**
5. Work with integrity and according to best practice guidelines, specifically by referring to or consulting other health professionals when required. **(OTR Professional 1.2 and 1.3)**
6. Report clinical or scientific information with a high level of precision. **(OTR Professional 1.1)**
7. Demonstrate practical knowledge of the provincial and federal regulations with regards to the practice of Thoracic Surgery during the investigation and treatment of the patient who presents with a major thoracic symptom or syndrome. **(OTR Professional 2.3 and 2.1)**
8. Maintain control of one's own emotions and opinions and identify personal reactions that could be detrimental to the patient/surgeon relationship. Explore and even accept possible ways to change attitudes that may be perceived as damaging to the patient/surgeon relationship. **(OTR**

Professional 1.6, 2.4, and 2.1)

9. Identify a colleague or another physician with whom it is possible to discuss personal objectives, conflicts, or stress. **(OTR Professional 3.1)**

B. Contents

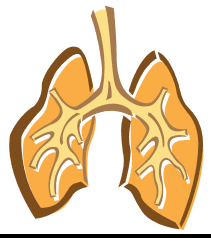
1. Demonstrate integrity, honesty, compassion. **(OTR Professional 1.1)**
2. Behave ethically and responsibly towards other health professionals. **(OTR Professional 3.3)**
3. Demonstrate excellence in the clinical practice of Thoracic Surgery and maintenance of competence. **(OTR Professional 1.2)**
4. Demonstrate awareness of the obligation to provide necessary information to the organizations responsible for regulating the profession. **(OTR Professional 2.2 and 2.3)**
5. Describe the principles and theories of bioethics and medico legal aspects of the practice of Thoracic Surgery. **(OTR Professional 1.7)**

2.3 RECOMMENDED LECTURES

1. Deslauriers J, Mehran R : Perioperative care in general thoracic surgery. Elsevier 2005 (chapters 3.5, 11.1, 11.4)
2. Frank JR : Le cadre des compétences CanMEDSS 2005 pour les médecins. Le Collège des médecins et chirurgiens du Canada
3. Pearson's Oesophageal Surgery, Third Edition, Elsevier 2008
4. Pearson's Thoracic Surgery, Third Edition, Elsevier 2008
5. Shields T et al : General Thoracic Surgery, Sixth Edition, Lippincott, Williams, and Wilkins, 2005
6. Yang SC, Cameron DE : Current therapy in thoracic and cardiovascular surgery, Mosby 2004 (pp 74-76; 78-91)

SECTION III :

MASTERY OF PROCEDURES IN THORACIC SURGERY



3.1 SURGICAL COMPETENCIES

3.1.1 Bronchoscopy and endobronchial therapies

A. Unit objectives

Within this unit, the resident must demonstrate knowledge of the indications for bronchoscopy, patient preparation, and techniques of flexible and rigid bronchoscopy.

B. Learner specific objectives

Upon completion of this segment, the resident must:

1. Demonstrate knowledge of the indications, techniques and complications of flexible and rigid bronchoscopy. **(OTR Medical Expert 2.1.2 and 5.5.1)**
2. Demonstrate knowledge of the indications, techniques, and complications of endobronchial laser therapies. **(OTR Medical Expert 5.1.1)**
3. Demonstrate knowledge of the indications, techniques, and complications of the use of endobronchial stents. **(OTR Medical Expert 5.1.1)**

C. Contents

1. Rigid bronchoscopy **(OTR Medical Expert 5.1.1)**
   a) Indications and patient selection **(OTR Medical Expert 3.5.1, 5.2.2.2, and 5.3)**
   b) Instrumentation, techniques under local and general anaesthesia
   c) Techniques of brushing, biopsy, and dilatation
   d) Techniques of core excision of tumors and extraction of foreign bodies
   e) Complications **(OTR Medical Expert 5.2.2.2)**
2. Flexible bronchoscopy **(OTR Medical Expert 5.1.1)**
   a) Indications and patient selection **(OTR Medical Expert 3.5.1)**
   b) Instrumentation and techniques under local and general anaesthesia
   c) Techniques of brushing, biopsy, and bronchoalveolar lavage (BAL)
   d) Techniques for extraction of foreign bodies
   e) Techniques of bedside flexible bronchoscopy
   f) Complications
3. Laser endobronchial therapies **(OTR Medical Expert 5.1.1)**
   a) Indications and patient selection **(OTR Medical Expert 4.2)**
   b) Instrumentation, techniques and safety measures
   c) Complications
4. Insertion of endobronchial stents **(OTR Medical Expert 5.1.1 and 4.2)**
   a) Indications, patient selection, instrumentation and techniques
   b) Early and late complications **(OTR Medical Expert 5.2.2.2)**

D. Clinical skills

During this training period, the resident must:

1. Evaluate indications for bronchoscopy **(OTR Medical Expert 5.1.1)**
2. Perform flexible and rigid bronchoscopies under local and general anaesthesia **(OTR Medical Expert 5.1.1)**
3. Perform bedside bronchoscopies **(OTR Medical Expert 5.1.1)**
4. Perform brushings and endobronchial biopsies **(OTR Medical Expert 5.1.1)**
5. Perform laser techniques with the bronchoscope **(OTR Medical Expert 5.1.1)**
6. Insert endobronchial stents **(OTR Medical Expert 5.1.1)**

3.1.2 OESOPHAGOGASTROSCOPY AND ENDOESOPHAGEAL THERAPIES

A. Unit objectives

Within this unit, the resident must demonstrate knowledge of the indications, patient preparation and techniques of flexible and rigid oesophagogastroscopy. The resident must also perform these procedures under local and general anaesthesia.

B. Learner specific objectives

Upon completion of this segment, the resident must:

1. Demonstrate knowledge of the indications, techniques, and complications of flexible and rigid oesophagogastroscopy. **(OTR Medical Expert 5.1.2)**
2. Demonstrate knowledge of the indications, techniques, and complications of endoesophageal therapies. **(OTR Medical Expert 5.1.2)**
3. Demonstrate knowledge of the indications, techniques, and complications of endoesophageal stent insertion. **(OTR Medical Expert 5.1.2)**

C. Contents

1. Rigid oesophagogastroscopy **(OTR Medical Expert 5.1.2)**
   a) Indications and patient selection **(OTR Medical Expert 3.5.2 and 5.3)**
   b) Instrumentation and techniques under local and general anaesthesia
   c) Techniques of brushing, biopsy, and dilatation
   d) Techniques of foreign body extraction
   e) Complications **(OTR Medical Expert 5.5)**
2. Flexible oesohagogastroscopy **(OTR Medical Expert 5.1.2)**
   a) Indications and patient selection **(OTR Medical Expert 3.5.2 and 5.3)**
   b) Instrumentation and techniques under local and general anaesthesia
   c) Techniques of brushing, biopsy, and foreign body extraction
   d) Complications **(OTR Medical Expert 5.5)**
3. Endoesophageal laser therapies **(OTR Medical Expert 5.1.2)**
   a) Indications and patient selection **(OTR Medical Expert 3.5.2 and 5.3)**
   b) Instrumentation, techniques and safety measures
   c) Complications **(OTR Medical Expert 5.5)**
4. Insertion of endoesophageal stents **(OTR Medical Expert 5.1.2)**
   a) Indications and patient selection **(OTR Medical Expert 3.5.2 and 5.3)**
   b) Instrumentation and techniques
   c) Early and late complications **(OTR Medical Expert 5.5.)**

D. Clinical skills

During the training period, the resident must:

1. Evaluate patients who require oesophagogastroscopy **(OTR Medical Expert 3.5.2)**
2. Perform flexible and rigid oesophagogastroscopies under local and general anaesthesia **(**OTR Medical Expert 5.1.2)
3. Perform brushings and endoesophageal biopsies (OTR Medical Expert 5.1.2)
4. Insert endoesophageal stents **(OTR Medical Expert 5.1.2)**
5. Perform endooesophageal laser techniques **(OTR Medical Expert 5.1.2)**

3.1.3 OESOPHAGEAL DILATATION

A. Unit objectives

Within this unit, the resident must demonstrate knowledge of the indications, patient preparation and techniques of oesophageal dilatation. The resident must also perform these procedures under local and general anaesthesia.

B. Learner specific objective

Upon completion of this segment, the resident must:

Demonstrate knowledge of the indications, techniques, and complications of esophageal dilatation.

C. Contents

1. Bougie dilatation **(OTR Medical Expert 5.1.2 and 5.2.1.3)**
   a) Indications and patient selection
   b) Instrumentation and techniques under local and general anaesthesia
   c) Complications

2. Pneumatic dilatation (achalasia) **(OTR Medical Expert 5.1.2 and 5.2.1.3)**
   a) Indications and patient selection
   b) Instrumentation and techniques
   c) Complications

D. Clinical skills

During the training period, the resident must:

1. Evaluate patients in need of oesophageal dilatation **(OTR Medical Expert 5.1.2 and 5.2.1.3)**
2. Perform oesophageal dilatations under local and general anaesthesia **(OTR Medical Expert 5.1.2 and 5.2.1.3)**
3. Familiarize themselves with the techniques of pneumatic dilatation for achalasia **(OTR Medical Expert 5.1.2 and 5.2.1.3)**

3.1.4 PLEURAL DRAINAGE

A. Unit objectives

Within this unit, the resident must demonstrate knowledge of the indications, patient preparation, and techniques of pleural drainage. The resident must also perform a pleural drainage and be aware of the potential complications associated with the procedure.

B. Learner specific objectives

Upon completion of this segment, the resident must:

1. Demonstrate knowledge of the indications and contra-indications of pleural drainage **(OTR Medical Expert 5.2.1.1 and 5.2.2.10)**
2. Perform the technique of pleural drainage **(OTR Medical Expert 5.2.1.1 and 5.2.2.10)**
3. Demonstrate knowledge of the complications associated with pleural drainage and their treatment **(OTR Medical Expert 5.2.1.1 and 5.2.2.10)**

C. Contents

1. Indications of pleural drainage **(OTR Medical Expert 2.1.2, 3.1 and 3.3)**
   a) Pneumothorax, hemothorax
   b) Empyema with or without bronchopleural fistula **(OTR Medical Expert 2.1.2, 3.1, 3.3 and 5.2.2.3)**
   c) Pleural effusion
   d) Post thoracotomy drainage
2. Technique of pleural drainage **(OTR Medical Expert 5.2.1.1 and 5.2.2.10)**
   a) Selection of the site of tube insertion
   b) Instrumentation and techniques of chest tube insertion
3. Drainage systems **(OTR Medical Expert 5.2.2.10)**
   a) Under water seal drainage and drainage with unidirectional valves
   b) Drainage with active suction systems
   c) Balanced drainage
4. Complications **(OTR Medical Expert 3.5.3)**
   a) Perforation of the lung or other viscera
   b) Intercostal trauma (nerve, artery)
   c) Infection

D. Clinical skills

During the training period, the resident must:

1. Evaluate patients in need of pleural drainage **(OTR Medical Expert 3.5.1, 3.5.2, and 3.5.3)**
2. Perform pleural drainage procedures under local and general anaesthesia **(OTR Medical Expert 3.5.1, 3.5.2 and 3.5.3)**
3. Treat complications related to pleural drainage **(OTR Medical Expert 3.5.1, 3.5.2 and 3.5.3)**

3.1.5 CENTRAL VENOUS AND ARTERIAL LINES

A. Unit objectives

Within this unit, the resident must demonstrate knowledge of the indications, contra-indications, monitoring, and complications related to the use of central venous lines, Swan-Ganz catheters, and arterial lines. The resident must also demonstrate knowledge of insertion techniques with these lines.

B. Learner specific objectives

Upon completion of this segment, the resident must:

1. Demonstrate knowledge of the indications, contra-indications, techniques, and complications related to the use of arterial lines. **(OTR Medical Expert 3.5.3)**
2. Demonstrate knowledge of the indications, contra-indications, techniques, and complications related to the use of central venous catheters. **(OTR Medical Expert 3.5.3)**
3. Demonstrate knowledge of the indications, contra-indications, techniques, and complications related to the use of Swan-Ganz catheters. **(OTR Medical Expert 3.5.3)**

C. Contents

1. Central venous lines **(OTR Medical Expert 3.4.8)**
   a) Indications and contra-indications
   b) Techniques used for insertion and positioning, and complications
2. Arterial lines **(OTR Medical Expert 3.4.8)**
   a) Indications and contra-indications
   b) Techniques used for insertion and positioning, and complications
3. Swan-Ganz catheters **(OTR Medical Expert 3.4.8)**
   a) Indications and contra-indications
   b) Techniques used for insertion and positioning
   c) Types and varieties of catheters
   d) Techniques used to record pulmonary artery and wedge pressures
   e) Complications

D. Clinical skills

During the training period, the resident must:

1. Insert central venous catheters with appropriate techniques (i.e. jugular, sub-clavian, femoral) **(OTR Medical Expert 3.5.3)**
2. Insert arterial lines with appropriate techniques (i.e. radial, femoral) **(OTR Medical Expert 3.5.3)**
3. Insert Swan-Ganz catheters with appropriate techniques **(OTR Medical Expert 3.5.3)**
4. Treat complications related to the use of central venous catheters, arterial lines, and Swan-Ganz catheters **(OTR Medical Expert 3.5.3)**

3.1.6 INTUBATION

A. Unit objectives

At the end of this unit, the resident must demonstrate knowledge of the indications, patient preparation, and the techniques of endotracheal intubation. The resident must also intubate a patient and recognize and treat potential complications related to intubation and prolonged mechanical ventilation. Finally, the resident must learn how to use the various types of ventilators and modes of ventilation.

B. Learner specific objectives

Upon completion of the unit, the resident must:

1. Demonstrate knowledge of the indications for and techniques of intubation as well as the various endotracheal tubes that can be used. **(OTR Medical Expert 3.4.3 and 2.1.2)**
2. Demonstrate knowledge of the complications related to intubation and mechanical ventilation (short and long term). **(OTR Medical Expert 3.5.3)**
3. Demonstrate knowledge of the various types of ventilators that are available. **(OTR Medical Expert 3.5.3)**
4. Demonstrate knowledge of the various modes of ventilation. **(OTR Medical Expert 3.5.3)**
5. Demonstrate knowledge of the techniques used to wean a patient off from mechanical ventilation. **(OTR Medical Expert 3.5.3)**

C. Contents

1. Intubation
   a) Indications and objectives of mechanical ventilation **(OTR Medical Expert 2.1.3)**
   b) Preparation of the patient for intubation **(OTR Medical Expert 3.1 and 3.2)**
   c) Technique of intubation and endotracheal tubes
   d) Complications **(OTR Medical Expert 3.5.3)**
2. Mechanical ventilation **(OTR Medical Expert 2.1.3)**
   a) Instrumentation and various types and models of ventilators
   b) Ventilation modes
      1) Volume – targeted modes
      2) Pressure – targeted modes
   c) Complications
   d) Patient support during periods of mechanical ventilation
3. Weaning the patient off the ventilator **(OTR Medical Expert 2.1.3)**
   a) When to begin the wean-off period (timing)
   b) Techniques that can be used to wean a patient off the ventilator

D. Clinical skills

During the training program, the resident must:

1. Evaluate and treat patients who require intubation **(OTR Medical Expert 3.5.3, 4.2 and 4.4)**
2. Intubate patients in need of mechanical ventilation **(OTR Medical Expert 3.5.3, 4.2 and 4.4)**
3. Select the appropriate type of ventilator and mode of ventilation **(OTR Medical Expert 3.5.3, 4.2 and 4.4)**
4. Recognize and treat potential complications related to mechanical ventilation **(OTR Medical Expert 3.5.3, 4.2 and 4.4)**
5. Participate in the weaning of patients who have been mechanically ventilated for short or long periods of time **(OTR Medical Expert 3.5.3, 4.2 and 4.4)**

3.1.7 MEDIASTINOSCOPY AND MEDIASTINOTOMY

A. Unit objectives

At the end of this unit, the resident must demonstrate knowledge of the indications and contra-indications, the surgical techniques and the possible complications associated with mediastinoscopy and anterior mediastinotomy. The resident must also perform these interventions.

B. Learner specific objectives

Upon completion of this unit, the resident must:

1. Demonstrate knowledge of the indications and techniques of cervical mediastinoscopy as well as potential complications of the procedure. **(OTR Medical Expert 2.1.2)**
2. Demonstrate knowledge of the indications, techniques, and possible complications pertinent to anterior mediastinotomy. **(OTR Medical Expert 2.1.2)**

C. Contents

1. Cervical mediastinoscopy **(OTR Medical Expert 4.2 and 4.4)**
   a) History and historical highlights
   b) Indications and selection; contra-indications
   c) Techniques and instrumentation
   d) Video-mediastinoscopy
   e) Diagnosis and treatment of complications
2. Anterior mediastinotomy **(OTR Medical Expert 4.2 and 4.4)**
   a) History and historical highlights
   b) Indications and selection; contra-indications
   c) Technique and instrumentation
   d) Diagnosis and treatment of complications

D. Clinical skills

During the training program, the resident must:

1. Evaluate patients who may require mediastinoscopy or anterior mediastinotomy **(OTR Medical Expert 5.2.1.2)**
2. Perform cervical mediastinoscopies and anterior mediastinotomies **(OTR Medical Expert 5.2.1.2)**
3. Sample nodal tissue through aspiration or biopsy during those procedures **(OTR Medical Expert 5.2.1.2)**
4. Treat potential complications that may occur during those procedures. **(OTR Medical Expert 5.2.2.8)**

3.1.8 TRACHEOSTOMY

A. Unit objectives

At the end of this unit, the resident must demonstrate knowledge of the indications, patient preparation, and techniques of open and percutaneous tracheostomy. The resident must also perform these procedures under general or local anaesthesia (sedation).

B. Learner specific objectives

Upon completion of this unit, the resident must:

1. Demonstrate knowledge of the indications, techniques, and potential complications related to open tracheostomy. **(OTR Medical Expert 2.1.2)**
2. Demonstrate knowledge of the indications for, techniques, and potential complications related to percutaneous tracheostomy. **(OTR Medical Expert 2.1.2)**

C. Contents

1. Open tracheostomy **(OTR Medical Expert 3.4.3)**
   a) Indications and contra-indications, patient selection and timing
   b) Techniques and instrumentation
   c) Tracheostomy tubes
   d) Postoperative treatment and follow-up **(OTR Medical Expert 6.3)**
   e) Complications
2. Percutaneous tracheostomy **(OTR Medical Expert 3.4.3)**
   a) Indications and contra-indications; patient selection and timing
   b) Techniques and instrumentation
   c) Tracheostomy tubes
   d) Follow-up of patients who underwent a percutaneous tracheostomy **(OTR Medical Expert 6.3)**
   e) Complications

D. Clinical skills

During the training program, the resident must:

1. Evaluate patients likely to require a tracheostomy **(OTR Medical Expert 5.1.1 and 5.2.1.8)**
2. Perform open tracheostomies **(OTR Medical Expert 5.1.1 and 5.2.1.8)**
3. Perform or be familiar with the techniques of percutaneous tracheostomy (OTR Medical Expert 5.1.1 and 5.2.1.8)
4. Follow up with tracheostomized patients **(OTR Medical Expert 5.1.1, 5.2.1.8, 5.5)**
5. Recognize and treat complications of open or percutaneous tracheostomies **(OTR Medical Expert 5.1.1, 5.2.1.8 and 3.5.3)**

3.1.9 MASTERY OF ANAESTHESIA FOR THORACIC SURGERY

A. Unit objective

At the end of this unit, the resident must describe and understand the general principles applicable to thoracic anaesthesia including anaesthesia for pulmonary resection, resection of mediastinal masses, airway surgery, and lung transplantation. The resident must also demonstrate knowledge about intubation techniques, types of endotracheal tubes that are available, principles of one-lung anaesthesia, and techniques and timing of extubation.

B. Learner specific objectives

Upon completion of this unit, the resident must:

1. Describe the principles pertinent to anaesthesia for lung resection including patient preparation, pre-anesthesic evaluation, endotracheal tubes and intubation, maintenance of anaesthesia, extubation, and complications. **(OTR Medical Expert 4.2)**
2. Describe the principles pertinent to anaesthesia for the removal of mediastinal tumors and masses, including patient preparation, pre-anesthesic evaluation, endotracheal tubes and intubation, maintenance of anaesthesia, extubation, and complications. **(OTR Medical Expert 5.2.1.4)**
3. Describe the principles pertinent to anaesthesia for airway surgery (trachea, carina, main bronchi), including patient preparation, pre-anesthesic evaluation, endotracheal tubes and intubation, maintenance of anaesthesia, extubation, and complications. **(OTR Medical Expert 5.2.1.8)**
4. Describe the principles pertinent to anaesthesia for lung transplantation (single, bilateral, heart-lung), including patient preparation, pre-anesthesic evaluation, endotracheal tubes and intubation, maintenance of anaesthesia, extubation, and complications. He must also be familiar with the use of extracorporeal oxygenation techniques that can be used during lung transplantation. **(OTR**

Medical Expert 5.2.3)

5. Describe the principles and options for one-lung ventilation and anaesthesia. **(OTR Medical Expert 3.5.3)**
6. Recognize and treat complications that may occur during anaesthesia for thoracic procedures. **(OTR Medical Expert 3.5.3)**

C. Contents

1. Anaesthesia for resectional lung surgery **(OTR Medical Expert 3.5.3)**
   a) Preoperative evaluation **(OTR Medical Expert 6.2)**
   b) Conduct of anaesthesia including induction and maintenance
   c) Positioning of the patient and monitoring
   d) Peri-operative analgesia
   e) Fluid balance and body temperature
   f) Complications and extubation
2. Anaesthesia for the resection of mediastinal masses **(OTR Medical Expert 5.2.1.4)**
   a) Pre-anesthesic evaluation including risk factors for complications during the surgical procedure.
   b) Airway obstruction; superior vena cava obstruction
   c) Intubation and conduct of anaesthesia including induction and maintenance of anaesthesia
   d) Fluid balance and body temperature
   e) Complications and extubation **(OTR Medical Expert 3.5.3)**
3. Anaesthesia for tracheal resection **(OTR Medical Expert 5.2.8)**
   a) Pre-anesthesic evaluation including risk factors for complications during the surgical procedure
   b) Conduct of anaesthesia including induction, intubation, and maintenance of anaesthesia
   c) Conduct of anaesthesia during airway reconstruction
   d) Monitoring
   e) Complications and extubation **(OTR Medical Expert 3.5.3)**
4. Anaesthesia for lung transplantation **(OTR Medical Expert 5.2.3)**
   a) Pre-anesthetic evaluation
   b) Conduct of anaesthesia including induction and maintenance of anaesthesia
   c) Monitoring
   d) Anaesthesia during and after the use of cardiopulmonary by-pass
   e) Fluid balance and body temperature
   f) Complications and extubation
5. One-lung anaesthesia **(OTR Medical Expert 5.2.1.6)**
   a) Indications and physiology of ventilation during one-lung anaesthesia
   b) Techniques
      1) Double-lumen endotracheal tubes : Advantages and disadvantages
      2) Endobronchial blockers : Advantages and disadvantages
   c) Complications associated with one-lung anaesthesia **(OTR Medical Expert 3.5.3)**

D. Clinical skills

During the training period, the resident must:

1. Participate in the pre-anesthetic evaluation of patients who are to undergo pulmonary resection, resection of mediastinal tumors and masses, tracheal resection, and lung transplantation. **(OTR Medical Expert 3.5.3, 5.2.1.4, 5.2.1.6 and 5.2.1.8)**
2. Participate in the conduct of anaesthesia of patients undergoing pulmonary resection, resection of mediastinal masses or tumors, tracheal resection, and lung transplantation. (OTR Medical Expert 3.5.3, 5.2.1.4, 5.2.1.6 and 5.2.1.8)
3. Treat complications that may occur during the course of anaesthesia. **(OTR Medical Expert 3.5.3)**

3.1.10 SURGICAL APPROACHES

A. Unit objectives

At the end of this unit, the resident must demonstrate knowledge of the indications, contra-indications, and complications related to the different surgical approaches that can be used for the treatment of intra thoracic disorders, including open and minimally invasive approaches. The resident must also demonstrate knowledge of the repercussions of these approaches upon the cardiorespiratory physiology. Finally, the resident must learn how and where to make the incisions in cases of open surgery and of thoracoscopy surgery (VATS).

B. Learner specific objectives

Upon completion of this unit, the resident must:

1. Demonstrate knowledge of the anatomy, indications, techniques for opening and closing the chest, and complications related to the surgical approaches used for open thoracic surgery. **(OTR Medical Expert 2.1.2 and 5.2.1.6)**
2. Demonstrate knowledge of the indications, techniques and technologies, instrumentation and complications related to the surgical approaches used for VATS surgery. **(OTR Medical Expert 2.1.2 and 5.2.1.6)**

C. Contents

1. Posterolateral thoracotomy with and without muscle sparing **(OTR Medical Expert 2.1.2)**
   a) Anatomy, indications, and patient positioning
   b) Techniques of opening and closing **(OTR Medical Expert 5.2.1.6)**
   c) Complications
2. Anterior thoracotomy **(OTR Medical Expert 2.1.2)**
   a) Anatomy, indications, and patient positioning
   b) Techniques of opening and closing
   c) Complications
3. Axillary and vertical thoracotomies **(OTR Medical Expert 2.1.2 and 5.2.1.6)**
   a) Anatomy, indications, and patient positioning
   b) Techniques of opening and closing
   c) Complications
4. Thoraco-abdominal incisions **(OTR Medical Expert 2.1.2)**
   a) Anatomy, indications, and patient positioning
   b) Techniques of opening and closing
   c) Complications
5. Midline sternotomy (partial or complete), transverse sternotomy (clam shell incision) **(OTR Medical Expert 5.2.2.8)**
   a) Anatomy, indications, and patient positioning
   b) Techniques of opening and closing
   c) Complications
6. Cervical incisions used for tracheal or oesophageal surgery **(OTR Medical Expert 2.1.2)**
   a) Anatomy and indications (transverse cervical, oblique), and patient positioning
   b) Techniques of opening and closing **(OTR Medical Expert 5.2.1.8)**
   c) Complications
7. Video thoracoscopy **(OTR Medical Expert 2.1.1)**
   a) Indications (diagnostic, pulmonary, oesophageal, and mediastinal procedures)
   b) Laparoscopy
   c) Technology and instrumentation
   d) Placement of incisions

e) Drainage and complications

D. Clinical skills

During the training period, the resident must:

1. Perform the various incisions used in open thoracic surgery including posterolateral thoracotomies, anterior and vertical thoracotomies and sternotomies. **(OTR Medical Expert 5.2.1.4 and 5.2.1.6)**
2. Open and close these incisions. **(OTR Medical Expert 5.2.1.4 and 5.2.1.6)**
3. Perform the various approaches used for thoracoscopic surgery including diagnostic and resectional procedures. **(OTR Medical Expert 5.2.1.4 and 5.2.1.6)**
4. Identify and treat complications secondary to these surgical approaches **(OTR Medical Expert 5.2.1.4, 5.2.1.6 and 4.2)**

3.2 CanMEDS COMPETENCIES

3.2.1 COMMUNICATOR

A. Unit objectives

Upon completion of this unit, the resident must:

1. Present to colleagues in a clear and precise manner knowledge of the various procedures that can be used by a thoracic surgeon. **(OTR Communicator 3.1.1, 5.1 and 5.2)**

2. Clearly discuss with the patient, his family, and the paramedical personnel the most important complications that can occur during those procedures and their treatment. **(OTR Communicator 1.1, 1.2.1 and 3.1)**

B. Contents

1. Demonstrate confidence and ethics in the relationship between thoracic surgeon and patient. **(OTR Communicator 1.1 and 1.5)**
2. Establish a therapeutic relationship with the patient, family, and other participants (medical and non medical). **(OTR Communicator 1.2)**
3. Establish mutual comprehension and understanding of the patient's needs. **(OTR Communicator 2.1 and 3.1.2)**
4. Collect and summarize pertinent information regarding indications, techniques, and possible complications associated with procedures that are used in thoracic surgery. **(OTR Communicator 2.1 and 2.2)**
5. Provide oral and written communication of information pertinent to the patient who must have a thoracic surgical procedure including clinical history, physical examination, differential diagnosis and therapeutic options. **(OTR Communicator 3.1, 5.1, 5.2 and 5.3)**
6. Respect the diversity and pay attention to the psychosocial aspects of the patient who has to undergo a thoracic surgical procedure. **(OTR Communicator 4.2 and 3.1.2)**
7. Report mistakes and undesirable side effects. **(OTR Communicator 4.5, 5.1 and 5.2)**

3.2.2 COLLABORATOR

A. Unit objectives

Upon completion of this segment, the resident must:

1. Collaborate with the chest physician, the anesthesist and other health professionals concerning the indications and techniques for thoracic surgical procedures. **(OTR Collaborator 1.3, 1.3.1 and 1.4)**

2. Determine with the help of these consultants the best methods to carry out these procedures and the precautions to be taken to prevent complications. **(OTR Collaborator 1.2, 1.2.1 and 1.7)**

B. Contents

1. Share knowledge, information, and decision making processes. **(OTR Collaborator 1.6)**
2. Delegate appropriately and encourage team work **(OTR Collaborator 1.2.1 and 2.3)**
3. Respect other members of the multidisciplinary team. **(OTR Collaborator 1.3, 1.8, and 2.6)**
4. Provide inter and multiprofessionnal care of the patient who must have a thoracic surgical procedure. **(OTR Collaborator 1.5 and 1.6)**
5. Identify, manage, prevent, and resolve conflicts. **(OTR Collaborator 2.2, 2.3, and 2.4)**
6. Recognize one's own role within the multidisciplinary team and recognize one's own limits. **(OTR Collaborator 1.1, 2.5 and 2.4)**

3.2.3 MANAGER

A. Unit objectives

Upon completion of this segment, the resident must:

Appreciate the relationship between costs, benefits, and results in the choice and use of thoracic surgical procedures. **(OTR Manager 3.1 and 3.2)**

B. Contents

1. Desribe the role and responsibilities of the Thoracic Surgeon in the use of thoracic surgical procedures. **(OTR Manager 1.1)**
2. Demonstrate leadership, supervision, and administration within the health care system. **(OTR Manager 1.3)**
3. Describe the organization, structure, and financing of the health care system. **(OTR Manager 1.4 and 3.2)**
4. Manage time in the context of clinical work. **(OTR Manager 2.2 and 4.3)**
5. Manage financial aspects of the medical practice and negotiations. **(OTR Manager 1.4, 2.2, and 2.3)**
6. Demonstrate career evolution. **(OTR Manager 4.1, 4.2, and 4.3)**

3.2.4 HEALTH ADVOCATE

A. Unit objectives

Upon completion of this segment, the resident must:

1. Appreciate the health hazards associated with smoking and exposure to other polluants and their impact on lung cancer and other respiratory illnesses, more specifically those that may require a

diagnostic or therapeutic thoracic procedure. **(OTR Health Advocate 1.2.3)**
2. Recognize the importance of taking control of the patient who needs to have a thoracic surgical procedure. **(OTR Health Advocate 2.1.1)**

B. Contents

1. Demonstrate knowledge of patients and their background. **(OTR Health Advocate 1.1 and 1.2.1)**
2. Promote health and prevention of complications that could occur during a thoracic surgical procedure. **(OTR Health Advocate 2.1.4 and 2.1.3)**
3. Identify risk factors for postoperative complications after a thoracic surgical procedure including psychological, biological, sociological, cultural, and economic factors. **(OTR Health Advocate 2.1.2, 3.1 and 1.2.2)**
4. Describe the role of the Thoracic Surgeon within the community and responsible use of authority and influences. **(OTR Health Advocate 2.2)**
5. Adapt one's personal practice according to patient's needs. **(OTR Health Advocate 2.3 and 4.5)**
6. Ensure the security of patients. **(OTR Health Advocate 3.1 and 4.6)**
7. Integrate the concepts of preventive medicine. **(OTR Health Advocate 4.4)**

3.2.5 SCHOLAR

A. Unit objectives

Upon completion of this segment, the resident must:

1. Critically assess the medical literature pertinent to thoracic surgical procedures. **(OTR Scholar 1 and 2.3)**
2. Critically evaluate the methods and techniques that can be used to prevent complications that may occur during or after thoracic surgical procedures. **(OTR Scholar 2.2)**

B. Contents

1. Maintain and enhance knowledge. **(OTR Scholar 1.2 and 4.4)**
2. Demonstrate moral and professional obligation to maintain and improve competencies. **(OTR Scholar 1.1, 1.9, and 4.4)**
3. Perform self-evaluation and identification of the need to improve one's own knowledge and level of competence. **(OTR Scholar 1.2, 1.3, 1.4 and 1.8)**
4. Access available information and critically evaluate the literature. **(OTR Scholar 1.6 and 4.5)**
5. Demonstrate willingness to learn and use modern learning techniques. **(OTR Scholar 1.3, 1.7, 3.5, 3.6, and 3.7)**
6. Demonstrate research and scientific curiosity. **(OTR Scholar 1.10, 1.5, 2.1, and 4.3)**
7. Demonstrate ethics and research, human subjects, and relationship with industry. **(OTR Scholar 3.7, 4.1 and 4.2)**
8. Contribute academically to the teaching of undergraduate students and paramedical personnel. **(OTR Scholar 3.1 and 3.4.1)**
9. Identify and report conflicts of interest. **(OTR Scholar 4)**

3.2.6 PROFESSIONAL

A. Unit objectives

Upon completion of this segment, the resident must:

1. Provide high level care with integrity, honesty, and compassion to the patient in need of a thoracic procedure. **(OTR Professional 1.1)**
2. Ensure optimal professional conduct (individual and multidisciplinary) with regards to the patient who must have a thoracic procedure. **(OTR Professional 1.2)**
3. Practice Thoracic Surgery according to the principles of deontology, and according to the obligations of the surgeon involved in the care of patients who must have a thoracic procedure. **(OTR Professional 1.2 and 1.3)**
4. Demonstrate a high level of responsibility towards the postoperative thoracic surgical patient by being available, respecting confidentiality, and respecting the physical and emotional needs of each patient. **(OTR Professional 1.5)**
5. Work with integrity and according to best practice guidelines, specifically by referring or consulting other health professionals when required. **(OTR Professional 1.2 and 1.3)**
6. Report clinical or scientific informations with a high level of precision. **(OTR Professional 1.1 and 2.5)**
7. Demonstrate practical knowledge of the provincial and federal regulations with regards to the practice of Thoracic Surgery during the investigation of patients in need of a thoracic surgical procedure. **(OTR Professional 2.1)**
8. Maintain control of one's own emotions and opinions and identify personal reactions that could be detrimental to the patient/surgeon relationship. Explore and even accept possible ways to change attitudes that may be perceived as damaging to the patient/surgeon relationship. **(OTR Professional 1.6, 2.4 and 3.2.1)**
9. Identify a colleague or another physician with whom it is possible to discuss personal objectives, conflicts, or stress. **(OTR Professional 3.3)**

B. Contents

1. Demonstrate integrity, honesty, compassion. **(OTR Professional 1.1)**
2. Behave ethically and responsibly towards other health professionals. **(OTR Professional 3.3)**
3. Demonstrate excellence in the clinical practice of Thoracic Surgery and maintenance of competence. **(OTR Professional 1.2)**
4. Demonstrate awareness of the obligation to provide necessary information to the organizations responsible for regulating the profession. **(OTR Professional 2.2 and 2.3)**
5. Describe the principles and theories of bioethics and medico legal aspects of the practice of Thoracic Surgery. **(OTR Professional 1.7)**

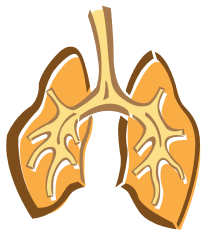
3.3 RECOMMENDED LECTURES

1. Deslauriers J, Mehran R: Handbook of perioperative care in general thoracic surgery. Elsevier 2005 (chapters 5.1, 5.4, 5.6, 5.7, 7.3, 10.1, 10.2)
2. Franco KL, Putnam JB: Advanced therapy in thoracic surgery. BC Decker Inc 2005 (pp 91-101)
3. Frank JR : Le cadre des compétences CanMEDSS 2005 pour les médecins. Le Collège des médecins et chirurgiens du Canada.
4. Kaiser LR, Kron IL, Spray TL: Mastery of cardio thoracic surgery, Second Edition. Lippincott, Williams, and Wilkins (chapters 1-3)
5. Kaiser LR, Jamieson GG: Operative thoracic surgery. Hodder Arnold, Fifth Edition 2006 (chapters 7, 8, 10-13, 23, 32)
6. Klafta JM: Advances in anaesthesia and pain management. Thorac Surg Clinics, Vol. 15, No 1, February 2005

7. Pearson's Oesophageal Surgery, Third Edition, Elsevier 2008 (chapters 4, 7-10, 17, 18, 29)
8. Pearson's Thoracic Surgery, Third Edition, Elsevier 2008 (chapter 8)
9. Shields T et al : General Thoracic Surgery, Sixth Edition, Lippincott, Williams, Wilkins, 2005 (chapters 16, 21-25, 128)
10. Urschel HC, Cooper JD: Atlas of thoracic surgery. Churchill Livingstone, New York 1995 (pp 59-68)
11. Wood DE: Therapeutic bronchoscopy. Chest Surgery Clinics, Vol. 11, No 4, November 2001
12. Yang SC, Cameron DE: Current therapy in thoracic and cardiovascular surgery. Mosby 2004 (pp 21-32; 36-47; 456-477)

SECTION IV :

MASTERY OF THORACIC TRAUMA



4.1 SURGICAL COMPETENCIES

4.1.1 TRAUMA OF THE CHEST WALL

A. Unit objectives

At the end of this unit, the resident must demonstrate knowledge of the pathophysiology and mechanisms of action involved in trauma to the chest wall. The resident must also diagnose and treat these patients, including performing open stabilization if necessary.

B. Learner specific objectives

Upon completion of this unit, the resident must:

1. Demonstrate knowledge of the pathophysiology and mechanisms of action involved in traumas to the chest wall. **(OTR Medical Expert 2.1.2 and 3.5.2)**
2. Demonstrate knowledge of the pathophysiology of the cardio respiratory consequences of these traumas (i.e. flail chests). **(OTR Medical Expert 3.5.2 and 3.5.3)**
3. Describe the principles of non-surgical and surgical treatment of penetrating and non penetrating traumas to the chest wall. **(OTR Medical Expert 5.2.2.4)**

C. Contents

1. Traumas of the chest wall **(OTR Medical Expert 2.1.2)**
   a) Rib fractures; fractures of the first rib and of the sternum
   b) Flail chests : varieties, consequences, treatment including open stabilization, mechanical ventilation, and treatment of associated lung contusion
2. Complications of chest wall trauma **(OTR Medical Expert 3.5.2)**
   a) Pneumohorax
   b) Tension and open pneumothorax (pathophysiology, diagnosis and treatment)
   c) Hemothorax (pathophysiology, diagnosis, and treatment)
   d) Lung contusion and respiratory failure (pathophysiology, diagnosis, and treatment)

D. Clinical skills

During the training period, the resident must:

1. Evaluate and treat patients with thoracic traumas involving the chest wall. **(OTR Medical Expert 3.5.2, 4.1, 4.2.1, 4.3 and 4.4)**
2. Evaluate and treat patients with flail chests including being familiar with the techniques of open surgical stabilization. **(OTR Medical Expert 5.2.2.4)**
3. Evaluate and treat patients with traumatic pneumothorax whether it is simple, under tension or open. **(OTR Medical Expert 3.5.2, 4.1, 4.2.1, 4.3 and 4.4)**
4. Perform thoracic drainage procedures in patients with chest wall trauma. **(OTR Medical Expert 5.2.2.4)**

5. Evaluate and treat patients with traumatic hemothoraces. **(OTR Medical Expert 3.5.2, 4.1, 4.2.1, 4.3, and 4.4)**

4.1.2 TRAUMA OF THE AIRWAY AND LUNGS

A. Unit objectives

At the end of this unit, the resident must demonstrate knowledge of the pathophysiology and mechanisms of action involved in traumas of the airway and lungs. The resident must also evaluate these patients, perform reanimation, and perform more definitive therapies.

B. Learner specific objectives

Upon completion of this segment, the resident must:

1. Demonstrate knowledge of the different mechanisms of action involved in blunt and penetrating traumas of the cervical trachea, intra thoracic trachea, main bronchi, and lungs. **(OTR Medical Expert 2.1.2)**
2. Demonstrate knowledge of the various clinical presentations of patients with airway or lung trauma as well as the different methods of investigation that may be useful and pertinent in such cases. **(OTR Medical Expert 3.1 and 3.2)**
3. Describe the basic principles of maintaining an open airway. **(OTR Medical Expert 3.1, 3.2 and 3.3)**
4. Demonstrate knowledge of the radiographic and bronchoscopic signs that are indicative or may be associated with blunt and penetrating traumas of the airway and lungs. **(OTR Medical Expert 3.3.4.5)**
5. Describe the principles of surgical and non-surgical treatment of patients suspected to have a blunt or penetrating injury to the airway and lungs. **(OTR Medical Expert 5.2.2.4)**
6. Demonstrate knowledge of the nature and treatment of the most common traumas associated with those of the airway and lungs. **(OTR Medical Expert 5.2.2.4)**
7. Demonstrate knowledge of the possible sequelae of traumas to the airway and lungs as well as their treatment. **(OTR Medical Expert 6.3)**

C. Contents (OTR Medical Expert 3.2, 3.3, 3.4.4, 3.4.5, 3.5.1, 3.5.2, 3.5.3, 4.1, 4.2, 4.3, 4.4, and 5.2.2.4)

1. Non penetrating trauma to the cervical trachea and intra thoracic trachea
   a) Pathophysiology and clinical presentation (signs and symptoms)
   b) Investigation through imaging and bronchoscopy
   c) Diagnostic and treatment during the acute phase
   d) Diagnostic and treatment of late sequelae
2. Non penetrating trauma to the main bronchi
   a) Pathophysiology and clinical presentation (signs and symptoms)
   b) Investigation through imaging and bronchoscopy
   c) Diagnostic and treatment during the acute phase
   d) Diagnostic and treatment of late sequelae
3. Maintenance of open airway
   a) Control of upper airway during the acute phase, bronchoscopy
   b) Role of intubation, tracheostomy
   c) One-lung ventilation, high-frequency ventilation
4. Lung contusion
   a) Pathophysiology and clinical presentation (signs and symptoms)
   b) Radiologic investigation (standard radiographs, CT, and bronchoscopy)
   c) Diagnostic and treatment during the acute phase

   d) Diagnostic and treatment of late sequelae
5. Penetrating traumas of the airway and lung
   a) Clinical presentation : signs and symptoms
   b) Evaluation of the main injury and of associated lesions
   c) Surgical indications
   d) Air (gas) embolization

D. Clinical skills

During the training period, the resident must:

1. Evaluate and treat patients with penetrating or blunt trauma to the airway (cervical trachea, intra thoracic trachea, carina, and main bronchi). **(OTR Medical Expert 3.1, 3.2, 3.3, 3.3.4.5, 5.2.2.4, and 5.2.2.5)**
2. Evaluate and treat patients with severe lung contusion including conservative treatment, intubation, and mechanical ventilation. **(OTR Medical Expert 3.5.1, 3.5.2, and 3.5.3)**
3. Repair blunt or penetrating traumatic lesions of the airway. **(OTR Medical Expert 5.2.2.5)**
4. Evaluate and treat patients with intra thoracic penetrating injuries to the airway and lung including the repair of penetrating wounds of the pulmonary hilum. **(OTR Medical Expert 3.5.3, 4.1 and 4.2)**
5. Demonstrate knowledge of the different precautions to be used in order to avoid gas embolization. **(OTR Medical Expert 3.5.2)**
6. Evaluate and treat patients with late sequelae of chest injuries (airway and lung) such as tracheal strictures, bronchial strictures, arterial-venous fistulae, and pseudo-cysts of the lung. **(OTR Medical Expert 3.5.2 and 3.5.3)**

4.1.3 TRAUMA OF THE OESOPHAGUS

A. Unit objectives

At the end of this unit, the resident must demonstrate knowledge of the pathophysiology and mechanisms of action involved in penetrating and blunt trauma to the oesophagus. The resident must also diagnose these types of trauma, evaluate the patient, and plan/administer the pertinent treatment. **(OTR Medical Expert 2.1.2, 3.1, 3.2, and 3.5.2)**

B. Learner specific objectives

Upon completion of this segment, the resident must:

1. Learn and describe the pathophysiology and mechanisms of action involved in blunt and penetrating trauma of the oesophagus. **(OTR Medical Expert 2.1.2)**
2. Demonstrate knowledge of the techniques of investigation and diagnosis. **(OTR Medical Expert 3.4, 3.4.4, and 3.4.5)**
3. Describe the principles involved in the treatment of penetrating and non penetrating trauma of the oesophagus. **(OTR Medical Expert 5.1.2 and 5.2.1.7)**
4. Demonstrate knowledge and awareness about the possible complications associated with oesophageal trauma. **(OTR Medical Expert 3.5.3 and 3.5.2)**
5. Demonstrate knowledge of the pathophysiology and treatment of post traumatic tracheo-oeosophageal fistulae. **(OTR Medical Expert 3.5.3 and 3.5.2)**

C. Contents

1. Blunt and penetrating trauma of the oesophagus **(OTR Medical Expert 3.1, 3.2 and 3.3)**
   a) Signs and symptoms

   b) Evaluation (standard radiographs, CT, radiological studies with contrast) **(OTR Medical Expert 3.4.4 and 3.4.5)**
2. Techniques used for repair **(OTR Medical Expert 5.2.1.4 and 5.2.1.7)**
   a) Surgical approaches
   b) Primary repair
   c) Resection and reconstruction
   d) Oesophageal diversion
3. Complications **(OTR Medical Expert 3.5.3 and 5.2.2.7)**
   a) Oesophageal fistulae, mediastinitis
   b) Obstruction of the oesophagus
   c) Treatment
4. Post traumatic tracheo-oesophageal fistulae **(OTR Medical Expert 3.5.3)**
   a) Signs, symptoms, and evaluation (imaging, endoscopy)
   b) Techniques used for repair (primary closure, interposition, tracheal resection)

D. Clinical skills

During the training period, the resident must:

1. Evaluate the results of diagnostic tests ordered for patients suspected of having a traumatic oesophageal perforation. **(OTR Medical Expert 3.4.4, 3.4.5, and 3.5.1)**
2. Perform surgery in patients with known oesophageal perforation. **(OTR Medical Expert 5.2.2.4)**
3. Evaluate and treat patients with complications related to oesophageal trauma. **(OTR Medical Expert 3.4.3 and 5.2.2.7)**

4.1.4 TRAUMA OF THE DIAPHRAGM

A. Unit objective

At the end of this unit, the resident must demonstrate knowledge of the pathophysiology and mechanisms of action involved in blunt and penetrating trauma of the diaphragm. The resident must also evaluate these patients and diagnose and initiate treatment of these patients using available, useful modalities. Finally, the resident must learn how to reanimate and perform the definitive treatment of patients with diaphragmatic injuries. **(OTR Medical Expert 2.1.2, 3.1, 3.2 and 3.3)**

B. Learner specific objectives

Upon completion of this segment, the resident must:

1. Demonstrate knowledge of the various clinical presentations of patients with diaphragmatic trauma, know how to evaluate them, and describe the principles involved in the treatment of patients with blunt or penetrating diaphragmatic trauma. **(OTR Medical Expert 3.1, 3.2, 5.2.1.1, 5.2.2.4 and 5.2.2.11)**
2. Demonstrate knowledge about the lesions most commonly associated with diaphragmatic trauma. **(OTR Medical Expert 4.2)**
3. Demonstrate knowledge about the various clinical presentations of patients with chronic diaphragmatic hernias. The resident must also know how to evaluate, diagnose, and treat such patients. **(OTR Medical Expert 4.2 and 4.3)**

C. Contents (OTR Medical Expert 2.1.2, 3.2, 3.3, 3.4.4, 3.4.5, 3.5.1, 3.5.2, 4.1, 4.2, and 5.2.2.11)

1. Non penetrating trauma of the diaphragm during the acute phase
   a) Pathophysiology and mechanisms of action

   b) Signs and symptoms
   c) Diagnostic and evaluation (standard radiographs, CT, studies with contrast)
   d) Surgical indications and surgical approaches
   e) Techniques used for repair and treatment of associated lesions
2. Penetrating trauma of the diaphragm
   a) Signs and symptoms
   b) Diagnostic and evaluation (standard radiographs, CT)
   c) Surgical indications and surgical approaches
   d) Techniques used for repair and treatment of associated lesions
3. Chronic post traumatic diaphragmatic hernia
   a) Pathophysiology and mechanisms of action
   b) Signs and symptoms
   c) Diagnostic and evaluation (standard radiographs, CT, MRI studies with contrast)
   d) Surgical indications and surgical approaches
   e) Techniques used for repair and complications of surgery

D. Clinical skills

During the training program, the resident must:

1. Evaluate patients suspected of having a trauma to the diaphragm during the acute phase, including performing all of the investigations that are necessary to confirm the diagnosis as well as the diagnosis of associated lesions. **(OTR Medical Expert 3.2, 3.3, 3.4.4, and 3.4.5)**
2. Perform surgical correction of a diaphragmatic trauma during the acute phase. **(OTR Medical Expert 3.5.2 and 5.2.2.11)**
3. Evaluate patients suspected of having a chronic post traumatic diaphragmatic hernia. **(OTR Medical Expert 5.2.2.11)**
4. Establish the surgical indication in patients with chronic post traumatic diaphragmatic hernia and perform the surgery. **(OTR Medical Expert 5.3 and 5.4)**

4.1.5 CARDIOVASCULAR TRAUMA

A. Unit objectives

At the end of this unit, the resident must demonstrate knowledge of the pathophysiology and mechanisms of action involved in penetrating and non penetrating traumas of the cardiovascular system. The resident must also evaluate these types of traumas, establish a precise diagnosis, and treat these patients, including doing the initial reanimation if necessary. **(OTR Medical Expert 2.1.2, 3.2, 3.3, 3.4.5, and 3.4.4)**

B. Learner specific objectives

Upon completion of this segment, the resident must:

1. Demonstrate knowledge of the pathophysiology and mechanisms of action involved in cardiovascular trauma including deceleration injuries of the aorta. **(OTR Medical Expert 2.1.2 and 3.2)**
2. Demonstrate knowledge of the cardio pulmonary consequences of penetrating and non penetrating cardiovascular injuries. **(OTR Medical Expert 5.2.1.4)**
3. Demonstrate knowledge of the techniques that can be used for evaluation and diagnosis of patients suspected of having a penetrating or non penetrating cardiovascular injury including imaging and ultrasonography. **(OTR Medical Expert 3.4.4 and 3.4.5)**
4. Describe the principles of surgical and non-surgical treatment of these patients. **(OTR Medical Expert 3.5.1)**

5. Demonstrate knowledge of the indications for emergency thoracotomy. **(OTR Medical Expert 3.5.2)**

C. Contents (OTR Medical Expert 2.1.2, 2.1.5, 3.4.4, 3.4.5, 3.5.2, and 3.5.3)

1. Cardiac contusion
   a) Pathophysiology and consequences
   b) Methods of investigation and treatment
   c) Follow-up and natural history
2. Penetrating cardiovascular trauma
   a) Laceration of the important arteries or veins of the base of the heart.
   b) Penetrating cardiac wounds and cardiac tamponnade
   c) Invasive and non invasive diagnostic methods
   d) Indications and techniques for emergency thoracotomy
   e) Treatment
      1) Surgical approaches and techniques used for repair
      2) Utilisation of cardiac by-pass or of other support techniques
      3) Treatment of associated injuries
      4) Treatment of postoperative complications (short or long term)
3. Aortic ruptures
   a) Pathophysiology and mechanisms of action
   b) Sites of ruptures and surgical approaches
   c) Principles of surgical and non-surgical treatment (role of endovascular stents)
   d) Treatment of associated lesions
   e) Prognosis and natural history

D. Clinical skills

During the training period, the resident must:

1. Evaluate and treat patients with cardiac contusions. **(OTR Medical Expert 4.1 and 4.2)**
2. Evaluate and treat (reanimation and definitive treatment) patients with post traumatic pericardial effusions and tamponnade. **(OTR Medical Expert 4.1 and 4.2)**
3. Participate during operations intended to repair penetrating cardiovascular wounds. **(OTR Medical Expert 5.2.1.4 and 5.2.2.4)**
4. Participate during operations intended to repair aortic ruptures (open surgery and placement of endovascular prosthesis). **(OTR Medical Expert 5.2.1.4 and 5.2.2.4)**

4.2 CanMEDS COMPETENCIES

4.2.1 COMMUNICATOR

A. Unit objectives

Upon completion of this segment, the resident must:

1. Present to colleagues in a clear and precise manner knowledge concerning the evaluation and treatment of the patient who has suffered a chest injury. **(OTR Communicator 1.1, 5.1 and 5.2)**
2. Discuss with the patient, his family, and the paramedical personnel the main complications that can be associated with chest injuries and their treatment. **(OTR Communicator 1.1, 3.1 and 2.1)**

B. Contents

1. Demonstrate confidence and ethics in the relationship between thoracic surgeon and patient. **(OTR Communicator 1.1 and 1.5)**
2. Establish a therapeutic relationship with the patient, family, and other participants (medical and non medical). **(OTR Communicator 1.2)**
3. Establish mutual comprehension and understanding of the patient's needs. **(OTR Communicator 2.1 and 3.1.2)**
4. Collect and summarize pertinent information concerning the patient who has suffered a major chest injury. **(OTR Communicator 2.1 and 2.2.1)**
5. Provide oral and written communication of information pertinent to the patient who has suffered a major chest injury, including clinical history, physical examination, differential diagnosis and therapeutic options. **(OTR Communicator 5.2, 5.3, 5.3.1 and 3.1.2)**
6. Respect the diversity and pay attention to the psychosocial aspects of the patient who has suffered a chest injury. **(OTR Communicator 3.1.2 and 4.2)**
7. Report mistakes and undesirable side effects. **(OTR Communicator 4.5, 5.1 and 5.2)**

4.2.2 COLLABORATOR

A. Unit objectives

Upon completion of this segment, the resident must:

1. Collaborate with the emergency physician, intensivist, and chest physician with regards to the optimal evaluation and treatment of the patient who has suffered a thoracic injury. **(OTR Collaborator 1.4, 1.1, and 1.3.1)**
2. Determine with the help of these consultants the best methods to evaluate and treat the patient who has suffered a chest injury and what precautions should be taken to prevent complications. **(OTR Collaborator 1.2, 1.2.1, and 1.7)**

B. Contents

1. Share knowledge, information, and decision making processes. **(OTR Collaborator 1.6)**
2. Delegate appropriately and encourage team work **(OTR Collaborator 1.2.1 and 2.3)**
3. Respect other members of the multidisciplinary team. **(OTR Collaborator 1.3, 1.8, and 2.6)**
4. Provide inter and multiprofessionnal care of the patient who has suffered a major chest injury. **(OTR Collaborator 1.5 and 1.6)**
5. Identify, manage, prevent, and resolve conflicts. **(OTR Collaborator 2.2, 2.3, and 2.4)**
6. Recognize one's own role within the multidisciplinary team and recognize one's own limits. **(OTR Collaborator 1.1, 2.4 and 2.5)**

4.2.3 MANAGER

A. Unit objectives

Upon completion of this segment, the resident must:

Appreciate the relationship between costs, benefits, and results in the care of the patient who has suffered a major chest injury. **(OTR Manager 3.1 and 3.2)**

B. Contents

1. Describe the role and responsibilities of the Thoracic Surgeon in the health system in general and more specifically in the care of the thoracic trauma patient. **(OTR Manager 1.1)**

2. Demonstrate leadership, supervision, and administration within the health care system. **(OTR Manager 1.3)**
3. Describe the organization, structure, and financing of the health care system. **(OTR Manager 1.4 and 3.2)**
4. Manage time in the context of clinical work. **(OTR Manager 2.2 and 4.3)**
5. Manage financial aspects of the medical practice and negotiations. **(OTR Manager 1.4, 2.2, and 2.3)**
6. Demonstrate knowledge of career evolution. **(OTR Manager 4.1, 4.2 and 4.3)**

4.2.4 HEALTH ADVOCATE

A. Unit objectives

Upon completion of this segment, the resident must:

1. Appreciate the methods that can be used to prevent thoracic injuries such as wearing a safety belt while driving, and control of driving under the influence. **(OTR Health Advocate 1.2.3)**
2. Recognize the importance of taking control of the patient who has suffered a thoracic injury. **(OTR Health Advocate 2.1.1)**

B. Contents

1. Demonstrate knowledge of patient and their background. **(OTR Health Advocate 1.1 and 1.2.1)**
2. Promote health and integrate concepts of preventive medicine. **(OTR Health Advocate 2.1.4 and 2.1.3)**
3. Identify risk factors associated with thoracic trauma including psychological, biological, sociological, cultural, and economic factors. **(OTR Health Advocate 1.2.2, 2.1.2, and 3.1)**
4. Describe the role of the Thoracic Surgeon within the community and responsible use of authority and influences. **(OTR Health Advocate 2.2)**
5. Adapt one's personal practice according to patient's needs. **(OTR Health Advocate 2.3 and 4.5)**
6. Ensure the security of patients. **(OTR Health Advocate 3.1 and 4.6)**

4.2.5 SCHOLAR

A. Unit objectives

Upon completion of this segment, the resident must:

1. Critically assess the medical literature pertinent to thoracic trauma. (OTR Scholar 1 and 2.3)
2. Critically assess the methods and techniques that can be used to prevent complications associated with chest injuries. **(OTR Scholar 2.2)**

B. Contents

1. Maintain and enhance knowledge. **(OTR Scholar 1.2 and 4.4)**
2. Demonstrate moral and professional obligation to maintain and improve competencies. **(OTR Scholar 1.9, 1.1 and 4.4)**
3. Perform self-evaluation and identification of the need to improve one's own knowledge and level of competence. **(OTR Scholar 1.2, 1.3, 1.4, and 1.8)**
4. Access available information and critically evaluate the literature. **(OTR Scholar 1.6 and 4.5)**
5. Demonstrate willingness to learn and use modern learning techniques. **(OTR Scholar 1.3, 1.7, 3.5, 3.6, and 3.7)**
6. Demonstrate research and scientific curiosity. **(OTR Scholar 2.1.1, 1.10 and 1.5)**
7. Demonstrate knowledge of ethics and research, human subjects and relationship with industry.

(OTR Scholar 4.2, 4.3, and 4.4)

8. Contribute academically to the teaching of undergraduate students and paramedical personnel. **(OTR Scholar 3.1 and 3.4.1)**
9. Identify and report conflicts of interest **(OTR Scholar 4)**

4.2.6 PROFESSIONAL

A. Unit objectives

Upon completion of this segment, the resident must:

1. Provide high level care with integrity, honesty, and compassion to the thoracic trauma patient. **(OTR Professional 1.1)**
2. Ensure optimal professional conduct (individual and multidisciplinary) with regards to the care of the patient who has suffered a thoracic trauma. **(OTR Professional 1.2)**
3. Practice Thoracic Surgery according to the principles of deontology, and according to the obligations of the surgeon involved in the care of the patient who has suffered a thoracic injury. **(OTR Professional 1.2 and 1.3)**
4. Demonstrate a high level of personal responsibility towards the patient who has suffered a chest injury by being available, respecting confidentiality, and respecting the physical and emotional needs of each patient. **(OTR Professional 1.5)**
5. Work with integrity and according to best practice guidelines, specifically by referring or consulting other health professionals when required. **(OTR Professional 1.2 and 1.3)**
6. Report clinical or scientific information with a high level of precision. **(OTR Professional 1.1 and 2.5)**
7. Demonstrate practical knowledge of the provincial and federal regulations regarding the practice of Thoracic Surgery in the care of thoracic trauma patients. **(OTR Professional 2.1)**
8. Maintain control of one's own emotions and opinions and identify personal reactions that could be detrimental to the patient/surgeon relationship. Explore and even accept possible ways to change attitudes that may be perceived as damaging to the patient/surgeon relationship. **(OTR Professional 1.6, 3.2.1 and 2.4)**
9. Identify a colleague or another physician with whom it is possible to discuss personal objectives, conflicts, or stress. **(OTR Professional 3.1)**

B. Contents

1. Demonstrate integrity, honesty, compassion. **(OTR Professional 1.1)**
2. Behave ethically and responsibly towards other health professionals. **(OTR Professional 3.3)**
3. Demonstrate excellence in the clinical practice of Thoracic Surgery and maintenance of competence. **(OTR Professional 1.2)**
4. Demonstrate awareness of the obligation to provide necessary information to the organizations responsible of regulating the profession. **(OTR Professional 2.2 and 2.3)**
5. Describe the principles and theories of bioethics and medico legal aspects of the practice of Thoracic Surgery. **(OTR Professional 1.7)**

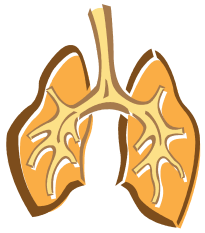
4.3 RECOMMENDED LECTURES

1. Deslauriers J, Mehran R: Handbook of peri operative care in general thoracic surgery. Elsevier 2005 (chapters 12.1-12.4)
2. Frank JR: Le cadre des compétences CanMEDSS 2005 pour les médecins. Le Collège Royal des médecins et chirurgiens du Canada.
3. Hazelrigg SR: Thoracic trauma. Chest Surg Clinics, Vol. 17, NO 1, February 2007
4. Kaiser LR, Jamieson GG: Operative thoracic surgery. Hodder Arnold, Fifth Edition 2006 (chapter 2)
5. Pearson's Thoracic Surgery, Third Edition, Elsevier 2008 (chapters 143-148)

6. Shields T et al : General Thoracic Surgery, Sixth Edition, Lippincott, Williams, Wilkins 2005 (chapters 70-74)
7. Yang SC, Cameron DE: Current therapy in thoracic and cardiovascular surgery. Mosby 2004 (pp47-74; 526-530)

SECTION V:

CARDIAC SURGERY, EXTRACORPOREAL CIRCULATION, COAGULATION, AND BLOOD PRODUCTS



5.1 SURGICAL COMPETENCIES

5.1.1 PHYSIOLOGY OF EXTRACORPOREAL CIRCULATION

A. Unit objectives

At the end of this unit, the resident must demonstrate knowledge of the physiologic and pathologic consequences related to the use of extracorporeal circulation, pulsatile or non pulsatile. The resident must also demonstrate knowledge of the physiology of membrane oxygenators, perfusion systems, and systems of ventricular support as they apply to the adult patient. **(OTR Medical Expert 2.1, 2.1.5, 3.4.6, and 3.4.8)**

B. Learner specific objectives

Upon completion of this segment, the resident must:

1. Demonstrate knowledge of the physiology and mechanisms of bubble and membrane oxygenators. **(OTR Medical Expert 2.1.5)**
2. Demonstrate knowledge of the physiology, mechanics, and functioning of rotative and centrifugation pumps. **(OTR Medical Expert 2.1.5)**
3. Demonstrate knowledge of the physiology of the various systems that can be used for extracorporeal circulation and the possible alterations of blood elements associated with their usage. **(OTR Medical Expert 2.1.5)**
4. Demonstrate knowledge of the coagulation cascade and the changes that may occur during the use of extracorporeal circulation devices. **(OTR Medical Expert 2.1)**
5. Demonstrate knowledge of the basic design and functioning of the various systems used for ventricular support. **(OTR Medical Expert 2.1.3 and 2.1.5)**

C. Contents (OTR Medical Expert 2.1.1)

1. Membrane oxygenators
   a) Physiology, design, functioning, and safety measures
   b) Complications
2. Bubble oxygenator
   a) Physiology, design, functioning, and safety measures
   b) Complications
3. Roller head pumps
   a) Physiology, design, functioning, and safety measures
   b) Complications

4. Centrifugal pumps
   a) Design, functioning, and safety measures
   b) Complications
5. Extracorporeal circuits
   a) Organization (total cardio pulmonary by-pass versus partial left ventricular assistance)
   b) Tubing, filters, hemoconcentrators
   c) Safety measures
   d) Interactions between blood and artificial surfaces
   e) Oxygenators (types, indications, advantages and disadvantages)
   f) Venous reservoirs, cardiotomy reservoirs
   g) Osmotic and oncotic pressures (use of mannitol and albumin)
   h) Control of arterial blood
6. Perfusion solutions
   a) Prime solutions and hemodilution
   b) Blood substitutes
7. Manipulations
   a) Flow and pressure
   b) Temperature

D. Clinical skills

During the training period, the resident must:

1. Demonstrate knowledge of extracorporeal circuits to ensure their safe usage. **(OTR Medical Expert 2.1.1)**
2. Utilize extracorporeal circuits **(OTR Medical Expert 2.1.1)**
3. Treat physiologic and pathologic changes that may occur during the use of extracorporeal circulation including the perturbations secondary to interactions between blood and artificial surfaces. **(OTR Medical Expert 2.1.1 and 2.1.3)**
4. Utilize systems of ventricular support **(OTR Medical Expert 2.1.1)**

5.1.2 TECHNIQUES OF EXTRACORPOREAL CIRCULATION

A. Unit objectives

At the end of this unit, the resident must demonstrate knowledge of the techniques applicable to the use of extracorporeal circulation. The resident must also apply these techniques while solving clinical problems. **(OTR Medical Expert 2.1, 2.1.5, 3.4.6, and 3.4.8)**

B. Learner specific objectives

Upon completion of this segment, the resident must:

1. Demonstrate knowledge of the basic techniques of extracorporeal circulation. **(OTR Medical Expert 2.1.1)**
2. Demonstrate knowledge of the techniques of left or right ventricular by-pass as they apply to the treatment of specific clinical conditions. **(OTR Medical Expert 2.1.1)**
3. Demonstrate knowledge of canulation techniques as they apply to the use of cardio pulmonary by-pass. **(OTR Medical Expert 2.1.1)**
4. Supervise patients undergoing extracorporeal circulation. **(OTR Medical Expert 3.5.3)**

C. Contents (OTR Medical Expert 5.2.1.4)

1. Standard cardio pulmonary by-pass
   a) Arterial and venous canulation (approaches, routes, techniques)
   b) Types of systems available for cardio pulmonary by-pass
   c) Monitoring and complications
2. Anticoagulation and cardio pulmonary by-pass
   a) Heparin and other products
   b) Monitoring and reversal of anticoagulation
   c) Complications
3. Specific situations
   a) Left or right ventricular by-pass
   b) Deep hypothermia and circulatory arrest

D. Clinical skills

During the training period, the resident must:

1. Perform canulation for cardio pulmonary by-pass using appropriate accesses and approaches. **(OTR Medical Expert 5.2.1.4)**
2. Treat specific clinical problems using different systems of cardio pulmonary by-pass **(OTR Medical Expert 5.2.1.4)**
3. Utilize left or right ventricular by-pass circuits. **(OTR Medical Expert 5.2.1.4)**

5.1.3 MECHANICAL SUPPORT

A. Unit objectives

At the end of this unit, the resident must demonstrate knowledge of the indications for mechanical support and use of ECMO, patient selection, and selection of appropriate systems. The resident must also recognize and treat complications related to the use of such systems. Finally, the resident must learn and understand weaning techniques as well as the use of such systems as “bridges” to transplantation. **(OTR Medical Expert 2.1, 2.1.5, 3.4.6, and 3.4.8)**

B. Learner specific objectives

Upon completion of this segment, the resident must:

1. Demonstrate knowledge of the indications for cardiac support with mechanical systems and ECMO. **(OTR Medical Expert 2.1)**
2. Demonstrate knowledge of the alternatives to mechanical support including the use of intra-aortic or intra pulmonary balloon pumping. **(OTR Medical Expert 3.4.8)**
3. Demonstrate knowledge of how to use such systems including canulation and turning the system on. **(OTR Medical Expert 3.4.8)**
4. Demonstrate knowledge of the complications associated with the use of such systems. **(OTR Medical Expert 4.2)**
5. Demonstrate knowledge of the techniques used for weaning the patient off such systems. **(OTR Medical Expert 4.2)**
6. Describe the principles of usage of such systems as “bridges” to transplantation. **(OTR Medical Expert 4.2)**
7. Describe the principles of anticoagulation as well as of those of monitoring blood elements. **(OTR Medical Expert 3.4.6)**
8. Demonstrate knowledge of governmental regulations pertinent to the application and use of mechanical support systems. **(OTR Medical Expert 1.7)**

C. Contents

1. Indications for mechanical support **(OTR Medical Expert 5.2.3)**
   a) Deterioration of a patient on a waiting list for transplantation
   b) Acute myocardial infarct with secondary heart failure and dependence on intra-aortic balloon support.
   c) Patient unable to be weaned off extracorporeal circulation and who could be a candidate for transplantation.
2. Respiratory failure **(OTR Medical Expert 2.1.3 and 4.4)**
   a) Indications for the use of ECMO and alternatives
3. Alternatives to mechanical support **(OTR Medical Expert 2.1.5 and 3.4.3)**
   a) Intra-aortic and intra pulmonary balloon support
   b) Centrifugation systems
   c) Impeller devices
   d) Pulsatile systems
   e) Artificial hearts
4. Insertion techniques **(OTR Medical Expert 2.1.5)**
   a) Systems for mechanical cardiac support
   b) ECMO
5. Complications **(OTR Medical Expert 2.1.5)**
   a) Trauma to blood products
   b) Thrombosis, haemorrhage, and infection
6. Weaning the patient off mechanical support **(OTR Medical Expert 3.4.3 and 3.5.3)**
   a) Hemodynamic parameters used, criteria used for weaning, and techniques
   b) Concepts applicable to patients on mechanical support who are on a waiting list for transplant; modification of criterias for transplant in such patients.
7. Anticoagulation **(OTR Medical Expert 2.1.5 and 3.4.6)**
   a) Criterias for anticoagulation according to which system will be used
   b) Early detection and diagnosis of trauma to blood elements

D. Clinical skills

During the training period, the resident must:

1. Evaluate and participate in the selection of patients eligible for mechanical support. **(OTR Medical Expert 2.4)**
2. Treat such patients preoperatively and postoperatively. **(OTR Medical Expert 3.5.3)**
3. Utilize systems for mechanical support and ECMO in an appropriate fashion. **(OTR Medical Expert 4.2)**
4. Install and monitor these systems. **(OTR Medical Expert 4.2)**
5. Treat complications associated with the use of mechanical support and ECMO. **(OTR Medical Expert 4.2)**
6. Wean patients off mechanical support and ECMO **(OTR Medical Expert 4.2)**
7. Treat patients under mechanical support who are waiting for transplantation. **(OTR Medical Expert 4.2)**
8. Manage anticoagulation and its complications in patients under mechanical support or ECMO. **(OTR Medical Expert 4.2)**

5.1.4 PRINCIPLES APPLICABLE TO ANTICOAGULATION AND TREATMENT OF ALTERATIONS OF BLOOD ELEMENTS

A. Unit objectives

At the end of this unit, the resident must demonstrate knowledge of the physiology and techniques pertinent to the diagnosis and treatment of problems related to coagulation and fibrinolysis. The resident must also use therapeutic modalities in specific clinical circumstances. **(OTR Medical Expert 2.1.1)**

B. Learner specific objectives

Upon completion of this segment, the resident must:

1. Demonstrate knowledge of the different types of blood groups, the coagulation cascade and the pathophysiology of coagulation abnormalities (abnormal coagulation, complement activation, kallikrein, prostanoids). **(OTR Medical Expert 2.1.1, 2.1.5, and 3.4.6)**
2. Demonstrate knowledge of the pathophysiology of hemorrhagic and thrombotic complications associated with open heart surgery and their treatment. **(OTR Medical Expert 2.1.1, 2.1.5, and 3.4.6)**
3. Demonstrate knowledge of the techniques used for blood storage and the precautions that must be taken for their safe usage. **(OTR Medical Expert 2.1.1, 2.1.5, and 3.4.6)**
4. Demonstrate knowledge of specific blood products used to treat red cell abnormalities (quantity and quality), platelet abnormalities (quantity and quality) and coagulation abnormalities. **(OTR Medical Expert 2.1.1, 2.1.5, and 3.4.6)**
5. Demonstrate knowledge of risk factors for excessive blood losses and use of blood products. **(OTR Medical Expert 2.1.1, 2.1.5, and 3.4.6)**
6. Demonstrate knowledge of the techniques that are available for maximal blood conservation during and after surgery. **(OTR Medical Expert 2.1.1, 2.1.5, and 3.4.6)**

C. Contents

1. Blood characteristics **(OTR Medical Expert 3.4.6)**
   a) Blood types (groups), specific antigens, and cellular elements
   b) Coagulation cascade and pathophysiology of coagulation
   c) Medications that can affect coagulation and platelet function
2. Hemorrhagic and thrombotic complications **(OTR Medical Expert 3.4.6)**
   a) Diagnosis and treatment (pre, intra, and postoperative)
   b) Heparin, Protamin
   c) Endoprosthesis and cardiovascular prosthesis
3. Blood products **(OTR Medical Expert 3.4.6)**
   a) Red cells, fresh frozen plasma, platelets
   b) Cryo precipitates and specific factors of coagulation
4. Blood preservation **(OTR Medical Expert 3.4.6)**
   a) Indications and contra-indications to blood transfusion, auto transfusion
   b) Preservation of cells and plasma
   c) Hemo concentration
   d) Pharmacologic manipulations

D. Clinical skills

During the training period, the resident must:

1. Evaluate patients in need of blood transfusion or of transfusion of specific blood products. (i.e. platelets). **(OTR Medical Expert 4.2 and 4.3)**
2. Evaluate patients who have coagulation abnormalities (pre, intra, and post operatively) and establish the correct diagnosis. **(OTR Medical Expert 4.2 and 4.2.1)**
3. Utilize appropriate tests to make sure that blood and its components are appropriately stored and used safely. **(OTR Medical Expert 3.4.6)**
4. Utilize available techniques **for blood preservation appropriately. (OTR Medical Expert 3.4.6)**

5.1.5 CARDIAC SURGERY

A. Unit objectives

At the end of this unit, the resident must demonstrate knowledge of how to evaluate cardiac disorders, more specifically surgical pathologies of the adult. The resident must also demonstrate knowledge of the indications and contra-indications of Cardiac Surgery, the main operative techniques, and the postoperative complications. Finally, the resident must learn and develop technical abilities in Cardiac Surgery that will be applicable to the work of a Thoracic Surgeon. **(OTR Medical Expert 2.1.5 and 5.2.1.4)**

B. Learner specific objectives

Upon completion of this segment, the resident must:

1. Demonstrate knowledge of the anatomy and physiology of the heart and great vessels. **(OTR Medical Expert 2.1.2 and 2.1.5)**
2. Demonstrate knowledge of the mechanisms of myocardial ischemia, energetic metabolism of the myocardium, and response to ischemia. **(OTR Medical Expert 2.1.5)**
3. Demonstrate knowledge of the pathophysiology and treatment of stable coronary artery diseases (CAD), of unstable CAD, and of myocardial infarct. **(OTR Medical Expert 2.1.5)**
4. Demonstrate knowledge of the pathophysiology and treatment of valvular heart diseases. **(OTR Medical Expert 2.1.5)**
5. Demonstrate knowledge of the pathophysiology and treatment of supra ventricular and ventricular arrhythmias. **(OTR Medical Expert 2.1.5)**
6. Demonstrate knowledge of Cardiac Surgery techniques as they apply to the practice of Thoracic Surgery including vascular canulation, intra or extra pericardial mobilisation of great vessels, vascular anastomosis, and vascular clamping. **(OTR Medical Expert 5.2.1.4)**
7. Demonstrate knowledge of surgical approaches for cardiac surgical procedures. **(OTR Medical Expert 5.2.1.4)**
8. Describe the principles of postoperative care in Cardiac Surgery. **(OTR Medical Expert 3.5.3)**
9. Describe the principles involved in the monitoring of the postoperative cardiac patient. **(OTR Medical Expert 3.5.3)**
10. Demonstrate knowledge of the main postoperative complications occurring after Cardiac Surgery and their treatment. **(OTR Medical Expert 3.5.3)**
11. Demonstrate knowledge of the techniques of investigation applicable to surgical cardiac diseases of the adult. **(OTR Medical Expert 3.4.8)**

C. Contents

1. Anatomy of the heart and major blood vessels **(OTR Medical Expert 2.1.2)**
   a) Surface anatomy of the heart

   b) Anatomy of heart chambers and valves
   c) Anatomy of the inter ventricular septum
   d) Anatomy of the coronary circulation
   e) Anatomy of the cardiac conduction system
2. Coronary artery disease (CAD) and myocardial ischemia **(OTR Medical Expert 2.1.5)**
   a) Mechanisms and pathophysiology
   b) Techniques of investigation including coronary angiography
   c) Conservative treatment (pharmacologic, angioplasty)
   d) Surgical treatment
      1) Indications and contra-indications
      2) Approaches and techniques of by-pass grafting
      3) Complications
   e) Treatment of complications of CAD including ventricular aneurysms, myocardial rupture, and cardiogenic shock.
3. Valvular heart disease **(OTR Medical Expert 2.1.5)**
   a) Mechanisms and pathophysiology
   b) Techniques of investigation including echography and heart catheterization.
   c) Conservative treatment (pharmacologic, valve dilatation)
   d) Surgical treatment
      1) Indications and contra-indications
      2) Approaches and techniques of valvuloplasty and valve replacement.
      3) Complications
4. Arythmias **(OTR Medical Expert 2.1.5)**
   a) Mechanisms and classification
   b) Electrophysiology and investigation techniques
   c) Principles of surgical and non-surgical treatment
5. Heart failure and cardiogenic shock **(OTR Medical Expert 2.1.5)**
   a) Mechanisms and pathophysiology
   b) Techniques of investigation
   c) Surgical and non-surgical treatment
   d) Pharmacology and mechanisms of action of the various drugs that can be used in the treatment of heart failure and cardiogenic shock
6. Surgical approaches for cardiac surgery **(OTR Medical Expert 5.2.1.4)**
   a) Thoracotomy, sternotomy, minimally invasive approaches
   b) Effects of these approaches upon cardio respiratory function
7. Surgical techniques **(OTR Medical Expert 5.2.1.4)**
   a) Mobilisation of blood vessels (pulmonary arteries, vena cava, aorta), canulation
   b) Vascular anastomosis
8. Postoperative monitoring **(OTR Medical Expert 3.5.3)**
   a) Hemodynamic and cardiac function
   b) Respiratory
   c) Cardiac rhythm
9. Management of postoperative complications **(OTR Medical Expert 3.5.3)**
   a) Haemorrhage, pericardial tamponnade
   b) Myocardial infarct, arrhythmias
   c) Cardiogenic shock
   d) Pleuropulmonary complications
10. Investigative techniques used in adult patients with cardiopathies **(OTR Medical Expert 3.5.1)**
   a) Electrocardiogram
   b) Ultrasonography and exercise tolerance tests
   c) Angiography and ventriculography
   d) Heart catheterisation and intra cardiac pressures

D. Clinical skills

During the training period, the resident must:

1. Evaluate patients with CAD or valvulopathy regarding surgical indications. **(OTR Medical Expert 3.1, 3.2, and 3.3)**
2. Interpret results of cardiac ultrasonography, heart catheterization, and coronary angiography. **(OTR Medical Expert 3.4.8)**
3. Open and close median sternotomies. **(OTR Medical Expert 5.2.1.4)**
4. Mobilise the great vessels and canulate them with appropriate techniques. **(OTR Medical Expert 5.2.1.4)**
5. Manipulate the thoracic aorta proximally and distally. **(OTR Medical Expert 5.2.1.4)**
6. Manipulate and control the pulmonary arteries. **(OTR Medical Expert 5.2.1.4)**
7. Perform vascular anastomosis (aortic, aorto-coronary). **(OTR Medical Expert 5.2.1.4)**
8. Manage and take responsibility for postoperative care, including diagnosis and treatment of postoperative complications. **(OTR Medical Expert 3.5.3)**
9. Diagnose and treat arrhythmias. **(OTR Medical Expert 3.5.3)**
10. Diagnose and treat sternal dehiscences and infections after cardiac surgery. **(OTR Medical Expert 3.5.3)**
11. Diagnose and treat aneurysms of the thoracic aorta. **(OTR Medical Expert 3.4.5)**

5.2 CanMEDS COMPETENCIES

5.2.1 COMMUNICATOR

A. Unit objectives

Upon completion of this segment, the resident must:

1. Present to colleagues in a clear and precise manner knowledge concerning the evaluation and treatment of patients with coronary artery disease, valvular disease, pathologies of the aorta, heart failure, and arrhythmias. **(OTR Communicator 3.1.1, 5.1 and 5.2)**
2. Discuss with the patient, family, and the paramedical personnel the main cardiac disorders that can affect the thoracic surgical patient. **(OTR Communicator 1.1, 1.2.1, and 3.1)**

B. Contents

1. Demonstrate confidence and ethics in the relationship between thoracic surgeon and patient. **(OTR Communicator 1.1 and 1.5)**
2. Establish a therapeutic relationship with the patient, family, and other participants (medical and non medical). **(OTR Communicator 1.2)**
3. Establish mutual comprehension and understanding of the patient's needs. **(OTR Communicator 2.1 and 3.1.2)**
4. Collect and summarize pertinent information regarding the patient who is undergoing a cardiac surgical procedure or the thoracic surgical patient who also has a cardiac co-morbidity. **(OTR Communicator 2.2 and 2.2.1)**
5. Provide oral and written communication of information pertinent to the cardiac surgical patient, including clinical history, physical examination, differential diagnosis, and therapeutic options. **(OTR Communicator 3.1, 5.1, 5.2 and 5.3)**
6. Respect the diversity and pay attention to the psychosocial aspects of the patient who is to undergo a cardiac surgical procedure. **(OTR Communicator 3.1.2 and 4.2)**
7. Report mistakes and undesirable side effects. **(OTR Communicator 4.5, 5.1, and 5.2)**

5.2.2 COLLABORATOR

A. Unit objectives

Upon completion of this segment, the resident must:

1. Collaborate with the cardiologist, family doctor, and other health professionals with regards to the optimal evaluation and choice of treatment of the various disorders that could affect cardiac function. **(OTR Collaborator 1.1, 1.3.1, and 1.4)**
2. Determine with the help of these consultants the best methods to prevent any cardiac complication after thoracic surgical procedures. **(OTR Collaborator 1.2, 1.2.1, and 1.7)**

B. Contents

1. Share knowledge, information, and decision making processes. **(OTR Collaborator 1.6)**
2. Delegate appropriately and encourage team work **(OTR Collaborator 1.2.1 and 2.3)**
3. Respect other members of the multidisciplinary team. **(OTR Collaborator 1.3, 1.8, and 2.6)**
4. Provide inter and multiprofessionnal care of the cardiac surgical patient during the immediate postoperative period. **(OTR Collaborator 1.5 and 1.6)**
5. Identify, manage, prevent, and resolve conflicts. **(OTR Collaborator 2.2, 2.3, and 2.4)**
6. Recognize one's own role within the multidisciplinary team and recognize one's own limitations. **(OTR Collaborator 1.1, 2.4, and 2.5)**

5.2.3 MANAGER

A. Unit objective

Upon completion of this segment, the resident must:

Appreciate the relationship between costs, benefits, and results in the care of the patient with a cardiac disorder and in the care of the patient who requires cardiac support. **(OTR Manager 3.1 and 3.2)**

B. Contents

1. Describe the role and responsibilities of the Thoracic Surgeon in the care of the thoracic surgical patient who also has a cardiac disorder. **(OTR Manager 1.1)**
2. Demonstrate leadership, supervision, and administration within the health care system. **(OTR Manager 1.3)**
3. Describe the organization, structure, and financing of the health care system. **(OTR Manager 1.4 and 3.2)**
4. Manage time in the context of clinical work. **(OTR Manager 2.2 and 4.3)**
5. Manage financial aspects of the medical practice and negotiations. **(OTR Manager 1.4, 2.2, and 2.3)**
6. Demonstrate knowledge of career evolution. **(OTR Manager 4.1, 4.2, and 4.3)**

5.2.4 HEALTH ADVOCATE

A. Unit objectives

Upon completion of this segment, the resident must:

1. Appreciate the health hazards associated with smoking and exposure to other polluants with regards to coronary artery disease and vascular diseases. **(OTR Health Advocate 1.2.3)**

2. Recognize the importance of taking control of the patient who presents with postoperative arrhythmias and of the importance of research in preventing such events. **(OTR Health Advocate 2.1.1)**

B. Contents

1. Demonstrate knowledge of patient and their background. **(OTR Health Advocate 1.1 and 1.2.1)**
2. Promote health and integrate concepts of preventive medicine. **(OTR Health Advocate 2.1.3 and 2.1.4)**
3. Identify risk factors for postoperative complications after thoracic or cardiac procedures including psychological, biological, sociological, cultural, and economic factors. **(OTR Health Advocate 1.2.2, 2.1.2, and 3.1)**
4. Describe the role of the Thoracic Surgeon within the community and responsible use of authority and influences. **(OTR Health Advocate 2.2)**
5. Adapt one's personal practice according to patient's needs. **(OTR Health Advocate 2.3 and 4.5)**
6. Ensure the security of patients. **(OTR Health Advocate 3.1 and 4.6)**

5.2.5 SCHOLAR

A. Unit objectives

Upon completion of this segment, the resident must:

1. Critically assess the medical literature with regards to the treatment of coronary artery disease, valvular heart disease, and vascular disease. **(OTR Scholar 1.6 and 2.3)**
2. Critically evaluate the methods and techniques that can be used to prevent myocardial ischemia, cardiac failure, and postoperative arythmias. **(OTR Scholar 2.2)**

B. Contents

1. Maintain and enhance knowledge. **(OTR Scholar 1.2 and 4.4)**
2. Demonstrate moral and professional obligation to maintain and improve his competencies. **(OTR Scholar 1.1, 1.9, and 4.4)**
3. Perform self-evaluation and identification of the need to improve one's own knowledge and level of competence. **(OTR Scholar 1.2, 1.3, 1.4, and 1.8)**
4. Access available information and critically evaluate the literature. **(OTR Scholar 1.6 and 4.5)**
5. Demonstrate willingness to learn and use modern learning techniques. **(OTR Scholar 1.3, 1.7, 3.5, 3.6, and 3.7)**
6. Demonstrate research and scientific curiosity. **(OTR Scholar 1.5, 1.10, 2.1.1, and 4.3)**
7. Demonstrate knowledge of ethics and research, human subjects and relationship with industry. **(OTR Scholar 4.1 and 4.2)**
8. Contribute academically to the teaching of undergraduate students and paramedical personnel. **(OTR Scholar 3.1 and 3.4.1)**
9. Identify and report conflicts of interest. **(OTR Scholar 4)**

5.2.6 PROFESSIONAL

A. Unit objectives

Upon completion of this segment, the resident must:

1. Provide high level care with integrity, honesty, and compassion to the cardiac patient. **(OTR Professional 1.1)**
2. Ensure optimal professional conduct (individual and multidisciplinary) with regards to the cardiac

patient or the thoracic surgical patient who also has a cardiac co-morbidity. **(OTR Professional 1.2)**

3. Practice cardiothoracic surgery according to the principles of deontology, and according to the obligations of the surgeon involved in the perioperative care of the cardiac patient. **(OTR Professional 1.2 and 1.3)**
4. Demonstrate a high level of responsibility towards the postoperative cardiac surgical patient by being available, respecting confidentiality, and respecting the physical and emotional needs of each patient. **(OTR Professional 1.5)**
5. Work with integrity and according to best practice guidelines, specifically by referring or consulting other health professionals when required. **(OTR Professional 1.2 and 1.3)**
6. Report clinical or scientific informations with a high level of precision. **(OTR Professional 1.1 and 2.5)**
7. Demonstrate practical knowledge of the provincial and federal regulations with regards to the practice of Cardiac Surgery. **(OTR Professional 2.1)**
8. Maintain control of one's own emotions and opinions and identify personal reactions that could be detrimental to the patient/surgeon relationship. Explore and even accept possible ways to change attitudes that may be perceived as damaging to the patient/surgeon relationship. **(OTR Professional 1.6, 2.4, and 3.2.1)**
9. Identify a colleague or another physician with whom it is possible to discuss personal objectives, conflicts, or stress. **(OTR Professional 3.1)**

B. Contents

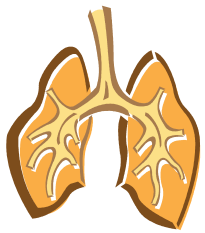
1. Demonstrate integrity, honesty, compassion. **(OTR Professional 1.1)**
2. Behave ethically and responsibly towards other health professionals. **(OTR Professional 3.3)**
3. Demonstrate excellence in the clinical practice of Thoracic Surgery and maintenance of competence. **(OTR Professional 1.2)**
4. Demonstrate awareness of the obligation to provide necessary information to the organizations responsible of regulating the profession. **(OTR Professional 2.2 and 2.3)**
5. Describe the principles and theories of bioethics and medico legal aspects of the practice of Thoracic Surgery. **(OTR Professional 1.7)**

5.3 RECOMMENDED LECTURES

1. Franco KL, Putnam JB : Advanced therapy in thoracic surgery, BC Decker Inc 2005 (chapters 22, 25)
2. Frank JR: Le cadre des compétences CanMEDSS 2005 pour les médecins. Le Collège Royal des médecins et chirurgiens du Canada
3. Kaiser LR, Kron IL, Spray TL : Mastery of cardio thoracic surgery, Second Edition. Lippincott, Williams, and Wilkins, 2007 (chapters 33-38, 47)
4. Yang SC, Cameron DE : Current therapy in thoracic and cardiovascular surgery, Mosby 2004 (pp 447-506; 559-574)

SECTION VI:

CHEST WALL



6.1 SURGICAL COMPETENCIES

6.1.1 ANATOMY AND PHYSIOLOGY

A. Unit objectives

At the end of this unit, the resident must demonstrate knowledge of the anatomy and physiology of the chest wall and interpret the results of diagnostic procedures related to the investigation of pathologies of the chest wall. **(OTR Medical Expert 2.1.2)**

B. Learner specific objectives

Upon completion of this unit, the resident must:

1. Demonstrate knowledge of the anatomy of the chest wall including that of the bony skeleton (sternum, ribs, vertebras), chest wall muscles, intercostal spaces, and costovertebral junction. The resident must also know the anatomical relationships between these structures and adjacent organs (lungs, mediastinum). **(OTR Medical Expert 2.1.2)**
2. Demonstrate knowledge of the vascular, neural, and bony anatomy of the thoracic outlet and that of the thoracic inlet. **(OTR Medical Expert 2.1.2)**
3. Demonstrate knowledge of the cervical anatomy pertinent to the thoracic surgeon (larynx, cervical trachea, thyroid gland, supraclavicular, and prescalenic spaces). **(OTR Medical Expert 2.1.2)**
4. Demonstrate knowledge of all surgical approaches that can be used for procedures done over the chest wall or thoracic outlet and thoracic inlet. **(OTR Medical Expert 5.2.1.5 and 5.2.2.8)**
5. Demonstrate knowledge of the surgical anatomy (topography, vascularisation, innervation) of all main chest wall muscles that can be used as muscular or musculo-cutaneous flaps for chest wall reconstruction. **(OTR Medical Expert 5.2.1.5 and 5.2.2.8)**

C. Contents

1. Embryology of the chest wall and malformations secondary to deficits of embryogenesis. **(OTR Medical Expert 2.1.2)**
2. Chest wall anatomy **(OTR Medical Expert 2.1.2)**
   a) Bony skeleton and anatomy of the costovertebral junction
   b) Chest wall muscles (topography, vascular supply, innervation) and intercostal spaces
   c) Cervico thoracic region and thoracic outlet
   d) Anatomical relationships between the chest wall and adjacent organs
3. Physiology of the chest wall **(OTR Medical Expert 2.1.2)**
   a) Integrity and role of the chest wall in the physiology of respiration
4. Clinical examination of the chest wall **(OTR Medical Expert 2.1.2, 3.1, 3.2, and 3.3)**
   a) Recognition and diagnosis of chest wall anomalies (anatomical variants, deformities)
   b) Recognition of post traumatic and of post infectious sequelae
   c) Evaluation of chest wall masses
   d) Appreciation of the surface anatomy (bony and muscular landmarks), and of the relationships between surface anatomy and underlying organs such as the heart, mediastinum, airway, lungs and fissures.

5. Diagnostic studies that are used to define chest wall masses or anomalies **(OTR Medical Expert 3.4.4 and 3.4.5)**
   a) Imaging : standard radiographs, CT, MRI
   b) Nuclear medicine and tests of pulmonary function
   c) Ultrasonography (documentation of relationships between chest wall masses, pleural spaces, and lungs).
   d) Biopsy techniques : fine needle, trocar, incisional or excisional
   e) Indications and contra-indications for each type of biopsy
6. Anatomy and physiology of the muscles and of other tissues that can be used for the purpose of chest wall reconstruction. **(OTR Medical Expert 2.1.2)**
   a) Latissimus dorsi, serratus anterior, major and minor pectoralis muscles
   b) Trapezius
   c) Intercostal muscles
   d) Rectus abdominus
   e) Greater omentum

D. Clinical skills

During the training program, the resident must be able to:

1. Recognize and appreciate the normal anatomy of the chest wall and its variants. **(OTR Medical Expert 2.1.2)**
2. Perform a complete physical examination of a patient presenting with a chest wall mass or other anomalies such as a chest wall deformity. **(OTR Medical Expert 3.1, 3.2, and 3.3)**
3. Establish an appropriate differential diagnosis. **(OTR Medical Expert 3.3)**
4. Evaluate pathologies or problems related to the chest wall using all available tests in a judicious manner. **(OTR Medical Expert 3.4.4 and 3.4.5)**
5. Interpret the results of these tests correctly. **(OTR Medical Expert 3.4.4)**
6. Perform surgical procedures related to pathologies of the chest wall including tumor excision, reconstruction of the bony component of the chest wall (parietal) and of the soft tissues. **(OTR Medical Expert 5.2.1.5 and 5.2.2.8)**

6.1.2 CONGENITAL ANOMALIES

A. Unit objectives

At the end of this unit, the resident must demonstrate knowledge of the embryogenesis of the different congenital anomalies of the chest wall, their classification, and their repercussions on cardio pulmonary physiology. The resident must also demonstrate knowledge about surgical indications and techniques that can be used for their correction. **(OTR Medical Expert 2.1.2, 5.2.1.5, and 5.2.2.8)**

B. Learner specific objectives

1. Recognize and diagnose pectus excavatum and pectus carinatum, classify them according to their nature and severity, understand the possible cardiopulmonary perturbations secondary to these malformations and interpret the results of the tests (pulmonary physiology, cardiac ultrasonography) that can be used to demonstrate these perturbations. **(OTR Medical Expert 2.1.2)**
2. Demonstrate knowledge of the indications for surgical correction of chest wall deformities. **(OTR Medical Expert 5.2.1.5)**
3. Demonstrate knowledge of the different approaches (invasive or minimally invasive) and techniques that are available for the correction of chest wall deformities. **(OTR Medical Expert 5.2.1.5)**
4. Demonstrate knowledge of the main complications (short and long-term) that can be associated

with the correction of chest wall deformities. **(OTR Medical Expert 3.5.3 and 4.2)**

C. Contents

1. Pectus excavatum **(OTR Medical Expert 2.1.2)**
   a) Embryogenesis and classification
   b) Evaluation and surgical indications
   c) Surgical techniques for correction
      1) Nuss procedure and sternochondroplasty (procedure of Ravich)
      2) Plastic surgery alternatives (prosthesis)
2. Pectus carinatum **(OTR Medical Expert 2.1.2)**
   a) Embryogenesis and classification
   b) Evaluation, surgical indications, and surgical techniques used for correction
3. Other chest wall anomalies **(OTR Medical Expert 2.1.2)**
   a) Poland syndrome
   b) Complex and asymmetrical anomalies
   c) Anomalies of the sternum

D. Clinical skills

During the training program, the resident must be able to:

1. Evaluate and treat patients with chest wall deformities (pediatric and adult population). **(OTR Medical Expert 3.1, 3.2, and 3.3)**
2. Interpret the results of diagnostic tests as well as those of pulmonary function pertinent to patients with chest wall deformities. **(OTR Medical Expert 3.4.2 and 3.4.4)**
3. Perform surgical procedures pertinent to the correction of chest wall deformities. **(OTR Medical Expert 5.2.1.5)**
4. Recognize and treat intra-operative or post-operative complications that may be associated with the correction of chest wall anomalies. **(OTR Medical Expert 3.5.3)**
5. Follow-up after surgical correction and recognize potential long-term complications. **(OTR Medical Expert 3.5.3)**
6. Recommend a non-surgical treatment when necessary. **(OTR Medical Expert 2.4)**
7. Demonstrate knowledge of the various forms of physiotherapy and exercise programs that may be useful as part of a conservative treatment. **(OTR Medical Expert 2.4)**

6.1.3 ACQUIRED DISORDERS

A. Unit objective

At the end of this unit, the resident must demonstrate knowledge of the acquired disorders of the chest wall including chest wall infections and neoplasms. The resident must also be able to biopsy (incisional or excisional) chest wall masses. Finally, the resident must be able to resect chest wall tumors and reconstruct the secondary deficits (parietal and soft tissues.) **(OTR Medical Expert 2.1.2, 3.4.5, 5.2.1.5, and 5.2.2.3)**

B. Learner specific objectives

Upon completion of this unit, the resident must:

1. Perform a meaningful clinical examination of a patient presenting with a chest wall mass, including establishing a differential diagnosis. **(OTR Medical Expert 3.1, 3.2, and 3.3)**
2. Demonstrate knowledge of the pathogenesis, clinical presentation, and treatment of chest wall infections including tuberculosis (cold abscesses) and infections of the sterno clavicular

articulations. **(OTR Medical Expert 3.3)**
3. Evaluate and elaborate a differential diagnosis for a patient presenting with a chest wall neoplasm, whether it is benign or malignant (primary or metastatic). **(OTR Medical Expert 3.3)**
4. Demonstrate knowledge of the classification of benign and malignant chest wall neoplasms. (OTR **Medical Expert 3.5.1)**
5. Demonstrate knowledge of the histological characteristics of benign and malignant chest wall neoplasms. **(OTR Medical Expert 3.4.6)**
6. Demonstrate knowledge of the radiological characteristics of chest wall tumors (standard radiographs, CT scan, MRI). **(OTR Medical Expert 3.4.4 and 3.4.5)**
7. Demonstrate knowledge of the indications for the various types of biopsy of chest wall masses (fine needle, trocar biopsy, incisional biopsies, excisional biopsies). **(OTR Medical Expert 5.2.1.5)**
8. Describe the surgical principles applicable to the surgery of chest wall tumors including surgical indications, resection margins, soft tissue reconstruction (muscular and myocutaneous flaps), and parietal reconstruction with the use of bone grafts or artificial prosthesis (Marlex, methyl methacrylate, Goretex, Vicryl, Dacron). **(OTR Medical Expert 5.2.1.5 and 5.2.2.8)**
9. Demonstrate knowledge of the role of induction and postoperative adjuvant treatments (radiotherapy, chemotherapy) in cases of malignant tumors. **(OTR Medical Expert 2.1.1)**
10. Diagnose and treat postoperative complications related to the surgery of chest wall tumors including complications secondary to the use of autogenous tissue flaps and prosthesis. **(OTR Medical Expert 3.5.3)**
11. Demonstrate knowledge of the indications and principles of non-surgical treatment of all varieties of chest wall tumors. **(OTR Medical Expert 2.4)**
12. Recognize, evaluate, and treat problems secondary to chest wall radionecrosis. **(OTR Medical Expert 3.5.3 and 4.2.1)**

C. Contents

1. Chest wall tumors **(OTR Medical Expert 2.1.2)**
   a) Chondroma, chondrosarcoma, fibrous dysplasia, desmoid tumor
   b) Osteochondroma, eosinophilic granuloma, plasmocystoma
   c) Osteogenic sarcoma, Ewing sarcoma, Askin tumors
   d) Rhabdomyosarcoma, malignant histiofibrocytoma
   e) Lymphoma
   f) Metastatic tumors to the chest wall from an extra thoracic primary
   g) Lung cancer invading the chest wall
   h) Breast cancer invading the chest wall (primary or recurrence)
2. Infections of the chest wall **(OTR Medical Expert 3.4.7)**
   a) Tuberculosis (cold abcess), fungal infections
   b) Septic arthritis of sterno clavicular articulations

D. Clinical skills

During the training program, the resident must learn to:

1. Expose and resect various segments of the chest wall using the various incisions required. **(OTR Medical Expert 5.2.1.5 and 5.2.2.8)**
2. Resect benign or malignant chest wall tumors. **(OTR Medical Expert 5.2.1.5 and 5.2.2.8)**
3. Identify the need to reconstruct the soft tissues of the chest wall with or without the use of muscular or myocutaneous autogenous flaps. **(OTR Medical Expert 5.2.1.5 and 5.2.2.8)**
4. Identify the need to reconstruct the parietal chest wall with or without the use of a prosthesis. **(OTR Medical Expert 5.2.1.5 and 5.2.2.8)**
5. Recognize the characteristics of the various artificial prostheses that can be used for chest wall reconstruction. **(OTR Medical Expert 5.2.1.5 and 5.2.2.8)**
6. Reconstruct chest wall defects. **(OTR Medical Expert 5.2.1.5 and 5.2.2.8)**

6.1.4 Thoracic outlet syndromes

A. Unit objective

At the end of this unit, the resident must demonstrate knowledge of the embryogenesis and pathological anatomy of the various forms of thoracic outlet syndromes (TOS), the diagnostic methods that can be used to define these syndromes, the surgical indications for the treatment of these syndromes, the operative techniques, and the principles of conservative non-surgical treatment. **(OTR Medical Expert 2.1.2 and 5.2.1.5)**

B. Learner specific objectives

Upon completion of this unit, the resident must:

1. Demonstrate knowledge of the pathogenesis, classification, evaluation, differential diagnosis, and diagnostic criteria applicable to thoracic outlet syndromes. **(OTR Medical Expert 2.1.2)**
2. Describe the general principles applicable to the non-surgical treatment of this syndrome. **(OTR Medical Expert 2.4)**
3. Demonstrate knowledge of the surgical indications as well as the different surgical approaches that can be used for the treatment of these syndromes. **(OTR Medical Expert 5.2.1.5)**

C. Contents

1. Anatomy of the thoracic outlet **(OTR Medical Expert 2.1.2)**
   a) Osseous and muscular
   b) Vascular and nervous
2. Diagnostic tests **(OTR Medical Expert 3.1, 3.2, 3.3, 3.4.4 and 3.4.5)**
   a) Clinical history and physical examination
   b) Electromyography
   c) CT scan, angiography, and MRI
   d) Non invasive vascular testing (ultrasonography)
3. Principles of non-surgical treatment of thoracic outlet **syndromes (OTR Medical Expert 2.4)**
   a) Rehabilitation and physiotherapy
   b) Weight loss and psychological aspects
4. Principles of surgical treatment **(OTR Medical Expert 5.2.1.5)**
   a) Approaches (cervical, axillary, posterior)
   b) First rib resection and resection of cervical rib
   c) Treatment of associated vascular anomalies (arterial, venous)
   d) Treatment of potential intra operative complications
   e) Diagnosis and treatment of postoperative complications
   f) Indications and techniques of redo surgery

D. Clinical skills

During the training period, the resident must:

1. Diagnose TOS syndromes based on their clinical presentation. **(OTR Medical Expert 3.1, 3.2, and 3.3)**
2. Interpret the diagnostic tests. **(OTR Medical Expert 3.4.4)**
3. Establish the indication for surgery. **(OTR Medical Expert 4.2)**
4. Recommend, when necessary, a conservative treatment and know the principles of such treatment. **(OTR Medical Expert 2.4)**
5. Perform first rib resection. **(OTR Medical Expert 5.2.1.5)**

6. Diagnose and treat associated vascular or neurologic abnormalities secondary to TOS. **(OTR Medical Expert 3.1, 3.2, and 3.3)**
7. Recognize and treat operative and postoperative complications related to TOS surgery. **(OTR Medical Expert 3.5.3)**
8. Perform 2nd operation for TOS syndrome. **(OTR Medical Expert 5.2.1.5)**

6.1.5 VASOSPASTIC SYNDROMES OF THE UPPER EXTREMITIES

A. Unit objective

At the end of this unit, the resident must demonstrate knowledge of the anatomy and pathophysiology of vasospastic syndromes (Raynaud's phenomena, hyperhidrosis) of the upper extremities that could have surgical implications. **(OTR Medical Expert 2.1.2)**

B. Learner specific objectives

Upon completion of this unit, the resident must:

1. Demonstrate knowledge of the anatomy pertinent to vasospastic disorders of the upper extremities including the anatomy of the brachial plexus, and of the sympathetic system. **(OTR Medical Expert 2.1.2)**
2. Demonstrate knowledge of the classification of vasospastic disorders of the upper extremities. **(OTR Medical Expert 2.1.2)**
3. Demonstrate knowledge of the investigative techniques that can be used to confirm the diagnosis of these syndromes including clinical history and physical examination. **(OTR Medical Expert 3.4.4 and 3.4.5)**
4. Demonstrate knowledge of the surgical indications as well as the principles of non-surgical treatment. **(OTR Medical Expert 2.4 and 3.3)**
5. Demonstrate knowledge of the various surgical approaches (invasive, thoracoscopic) that can be used in the surgical treatment of these disorders. **(OTR Medical Expert 5.2.1.5)**
6. Demonstrate knowledge of the operative techniques. **(OTR Medical Expert 5.2.1.5)**
7. Demonstrate knowledge of the main postoperative complications (short and long-term) that can occur after these operations. **(OTR Medical Expert 3.5.3)**

C. Contents

1. Raynaud's phenomena and other vasculopathies **(OTR Medical Expert 2.1.2)**
   a) Pathogenesis, classification, and differential diagnosis
   b) Evaluation and indications for surgery
   c) Principles of non-surgical treatment
   d) Operative techniques
2. Hyperhidrosis **(OTR Medical Expert 2.1.2)**
   a) Pathogenesis
   b) Evaluation and indications for surgery
   c) Operative techniques

D. Clinical skills

During the training period, the resident must:

1. Evaluate and treat patients affected with vasospastic disorders of the upper extremities. **(OTR Medical Expert 3.3)**
2. Interpret the clinical history of these patients, the findings of physical examinations and the results of the investigations correctly. **(OTR Medical Expert 3.1 and 3.2)**

3. Perform surgical procedures (sympathectomy or others) used to treat and correct these problems. **(OTR Medical Expert 5.2.1.5)**
4. Diagnose and treat intra- and post-operative complications secondary to these operations. **(OTR Medical Expert 5.2.1.5)**
5. Diagnose and treat long-term complications related to these operations. **(OTR Medical Expert 3.5.3)**
6. Recommend non-surgical treatment when needed. **(OTR Medical Expert 2.4)**

6.2 CanMEDS COMPETENCIES

6.2.1 COMMUNICATOR

A. Unit objectives

Upon completion of this segment, the resident must:

1. Present to colleagues in a clear and precise manner knowledge concerning congenital and acquired chest wall disorders, including techniques of investigation and therapeutic options (conservative or surgical). **(OTR Communicator 3.1.1, 5.1, and 5.2)**
2. Clearly discuss with the patient, family, and the paramedical personnel, the main complications that can occur following surgery for congenital and acquired disorders of the chest wall. **(OTR Communicator 1.1, 1.2.1, and 3.1.1)**

B. Contents

1. Demonstrate confidence and ethics in the relationship between Thoracic Surgeon and patient. **(OTR Communicator 1.1 and 1.5)**
2. Establish therapeutic relationship with the patient, family, and other participants (medical and non medical). **(OTR Communicator 1.2)**
3. Establish mutual comprehension and understanding of the patient's needs. **(OTR Communicator 2.1 and 3.1.2)**
4. Collect and summarize the pertinent information concerning the patient with a chest wall lesion. **(OTR Communicator 2.2 and 2.2.1)**
5. Provide oral and written communication of information pertinent to the patient with a disorder of the chest wall including clinical history, physical examination, differential diagnosis, and therapeutic options. **(OTR Communicator 3.1.1, 5.1, 5.2, and 5.3)**
6. Respect the diversity and pay attention to the psychosocial aspects of the patient who has a congenital or acquired disorder of the chest wall. **(OTR Communicator 3.1.2 and 4.2)**
7. Report mistakes and undesirable side effects. **(OTR Communicator 4.5, 5.1, and 5.2)**

6.2.2 COLLABORATOR

A. Unit objectives

Upon completion of this segment, the resident must:

1. Collaborate with the internist, oncologist, and other health professionals with regards to the evaluation and choice of treatment for patients who have a chest wall disorder, whether it is congenital or acquired. **(OTR Collaborator 1.1, 1.3.1, and 1.4)**
2. Determine with the help of these consultants the best way to care for the patient who underwent surgery for a chest wall disorder and the precautions to be taken to avoid complications. **(OTR Collaborator 1.2, 1.2.1, and 1.7)**

B. Contents

1. Share knowledge, information, and decision making processes. **(OTR Collaborator 1.6)**
2. Delegate appropriately and encourage team work **(OTR Collaborator 1.2.1 and 2.3)**
3. Respect other members of the multidisciplinary team. **(OTR Collaborator 1.3, 1.8, and 2.6)**
4. Provide inter and multiprofessionnal care of the patient who has a congenital or acquired disorder of the chest wall. **(OTR Collaborator 1.5 and 1.6)**
5. Identify, manage, prevent, and resolve conflicts. **(OTR Collaborator 2.2, 2.3, and 2.4)**
6. Recognize one's own role within the multidisciplinary team and recognize one's own limitations. **(OTR Collaborator 1.1, 2.4, and 2.5)**

6.2.3 MANAGER

A. Unit objectives

Upon completion of this segment, the resident must:

Appreciate the relationship between costs, benefits, and results in the care of the patient with a chest wall disorder. **(OTR Manager 3.1 and 3.2)**

B. Contents

1. Describe the role and responsibilities of the Thoracic Surgeon in the health system and more specifically in the perioperative care of the patient afflicted by a chest wall disorder. **(OTR Manager 1.1)**
2. Demonstrate leadership, supervision, and administration within the health care system. **(OTR Manager 1.3)**
3. Describe the organization, structure, and financing of the health care system. **(OTR Manager 1.4 and 3.2)**
4. Manage time in the context of clinical work. **(OTR Manager 2.2 and 4.3)**
5. Manage financial aspects of the medical practice and negotiations. **(OTR Manager 1.4, 2.2, and 2.3)**
6. Demonstrate knowledge of career evolution. **(OTR Manager 4.1, 4.2, and 4.3)**

6.2.4 HEALTH ADVOCATE

A. Unit objectives

Upon completion of this segment, the resident must:

1. Appreciate the fact that some health hazards could potentially be associated with chest wall disorders. **(OTR Health Advocate 1.2.3)**
2. Recognize the importance of taking control over the investigation and treatment of patients with chest wall disorders whether there are congenital or acquired. **(OTR Health Advocate 2.1.1)**

B. Contents

1. Demonstrate knowledge of patient and their background. **(OTR Health Advocate 1.1 and 1.2.1)**
2. Promote health and integrate concepts of preventive medicine. **(OTR Health Advocate 2.1.4 and 2.1.3)**
3. Identify risk factors for postoperative complications after surgery for chest wall disorders including psychological, biological, sociological, cultural, and economic factors. (**OTR Health Advocate 1.2.2, 2.1.2 and 3.1)**
4. Describe the role of the Thoracic Surgeon within the community and responsible use of authority

and influences. **(OTR Health Advocate 2.2)**
5. Adapt one's personal practice according to patient's needs. **(OTR Health Advocate 2.3 and 4.5)**
6. Ensure the security of patients. **(OTR Health Advocate 3.1 and 4.6)**

6.2.5 SCHOLAR

A. Unit objectives

Upon completion of this segment, the resident must:

1. Critically assess the medical literature with regards to the investigation and treatment of patients with chest wall disorders. **(OTR Scholar 1.1, 1.6, and 2.3)**
2. Critically assess the methods and techniques that can be used to prevent postoperative complications. **(OTR Scholar 2.2)**

B. Contents

1. Maintain and enhance knowledge. **(OTR Scholar 1.2 and 4.4)**
2. Demonstrate moral and professional obligation to maintain and improve competencies. **(OTR Scholar 1.1, 1.9, and 4.4)**
3. Perform self-evaluation and identification of the need to improve one's own knowledge and level of competence. **(OTR Scholar 1.2, 1.3, 1.4, and 1.8)**
4. Access available information and critically evaluate the literature. **(OTR Scholar 1.6 and 4.5)**
5. Demonstrate willingness to learn and use modern learning techniques. **(OTR Scholar 1.3, 1.7, 3.5, 3.6, and 3.7)**
6. Demonstrate research and scientific curiosity. **(OTR Scholar 1.10, 1.5, 2.1, and 4.3)**
7. Demonstrate knowledge of ethics and research, human subjects and relationship with industry. **(OTR Scholar 4.1 and 4.2)**
8. Contribute academically to the teaching of undergraduate students and paramedical personnel. **(OTR Scholar 3.1 and 4.1)**
9. Identify and report conflicts of interest **(OTR Scholar 4)**

6.2.6 PROFESSIONAL

A. Unit objectives

Upon completion of this segment, the resident must:

1. Provide high level care with integrity, honesty, and compassion with regards to the investigation and treatment of the patient with a chest wall disorder. **(OTR Professional 1.1)**
2. Ensure optimal professional conduct (individual and multidisciplinary) with regards to the investigation and treatment of the patient with a chest wall disorder. **(OTR Professional 1.2)**
3. Practice Thoracic Surgery according to the principles of deontology, and according to the obligations of the surgeon involved in the investigation and treatment of chest wall disorders whether they are congenital or acquired. **(OTR Professional 1.2 and 1.3)**
4. Demonstrate a high level of responsibility towards the patient who is in the perioperative period of a chest wall disorder by being available, respecting confidentiality, and respecting the physical and emotional needs of each patient. **(OTR Professional 1.5)**
5. Work with integrity and according to best practice guidelines, specifically by referring or consulting other health professionals when required. **(OTR Professional 1.2 and 1.3)**
6. Report clinical or scientific information with a high level of precision. **(OTR Professional 1.1, 2.5)**
7. Demonstrate practical knowledge of the provincial and federal regulations with regards to the surgery of chest wall disorders. **(OTR Professional 2.1)**
8. Maintain control of one's own emotions and opinions and identify personal reactions that could be

detrimental to the patient/surgeon relationship. Explore and even accept possible ways to change attitudes that may be perceived as damaging to the patient/surgeon relationship. **(OTR Professional 1.6, 2.4, and 3.2.1)**

9. Identify a colleague or another physician with whom it is possible to discuss personal objectives, conflicts, or stress. **(OTR Professional 3.1)**

B. Contents

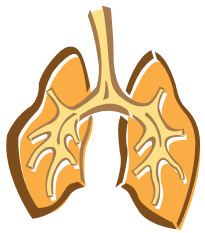
1. Demonstrate integrity, honesty, compassion. **(OTR Professional 1.1)**
2. Behave ethically and responsibly towards other health professionals. **(OTR Professional 3.3)**
3. Demonstrate excellence in the clinical practice of Thoracic Surgery and maintenance of competence. **(OTR Professional 1.2)**
4. Demonstrate awareness of the obligation to provide the necessary information to the organizations responsible for regulating the profession. **(OTR Professional 2.2 and 2.3)**
5. Describe the principles and theories of bioethics and medico legal aspects of the practice of Thoracic Surgery. **(OTR Professional 1.7)**

6.3 RECOMMENDED LECTURES

1. Deslauriers J, Mehran R: Handbook of peri operative care in general thoracic surgery. Elsevier 2005 (chapter 3.4)
2. Deslauriers J: Thoracic anatomy, Part I : Chest wall, airway, lungs. Thoracic Surgery Clinics, November 2007
3. Franco KL, Putnam JB: Advanced therapy in thoracic surgery. BC Decker Inc. 2005 (chapters 11, 12, 15)
4. Frank JR : Le cadre des competencies CanMEDSS 2005 pour les médecins. Le Collège Royal des médecins et chirurgiens du Canada
5. Kaiser LR, Kron IL, Spray TL: Mastery of cardio thoracic surgery, Second Edition. Lippincott, Williams, and Wilkins 2007 (chapters 25, 26)
6. Kaiser LR, Jamieson GG: Operative thoracic surgery. Hodder Arnold, Fifth Edition 2006 (chapters 1, 3, 9, 27)
7. Pearson's Thoracic Surgery, Third Edition, Elsevier 2008 (chapters 98-112)
8. Robicsek F: Surgical treatment of anterior chest wall deformities. Chest Surg Clin. Vol. 10, No 2, May 2000
9. Shields T et al : General Thoracic Surgery, Sixth Edition, Lippincott, Williams, and Wilkins 2005 (chapters 41-47)
10. Urschel HC, Cooper JD: Atlas of thoracic surgery. Churchill Livingstone, New York 1995 (Part I (pp1-59))
11. Yang SC, Cameron DE: Current therapy in thoracic and cardiovascular surgery. Mosby 2004 (pp268-290)

SECTION VII:

TRACHEA AND BRONCHI



7.1 SURGICAL COMPETENCIES

7.1.1 EMBRYOLOGY, ANATOMY AND PHYSIOLOGY

A. Unit objective

At the end of this unit, the resident must demonstrate knowledge of the anatomy, vascular supply, physiology, and embryology of the trachea and bronchi. The resident must also demonstrate knowledge of how to apply the techniques of investigation such as imaging and endoscopy to these patients. **(OTR Medical Expert 2.1.2, 3.4.4, and 5.1.1)**

B. Learner specific objectives

Upon completion of this unit, the resident must:

1. Demonstrate knowledge of the embryology, anatomy, and vascular supply of the upper airway including laryngotracheal, cervical and intra thoracic trachea, carina, and main bronchi. **(OTR Medical Expert 2.1.2)**
2. Demonstrate knowledge of the endoscopic anatomy of the nasopharynx, hypopharynx, larynx, trachea, carina, and main bronchi. **(OTR Medical Expert 5.1.1)**
3. Interpret the results of pulmonary function studies as they apply to the investigation of upper airway disease (i.e. flow volume curves). **(OTR Medical Expert 3.4.2)**
4. Interpret the results of imaging techniques as they apply to the investigation of upper airway disease (CT scan, virtual airway reconstruction, virtual bronchoscopy). **(OTR Medical Expert 3.4.4 and 3.4.5)**

C. Contents

1. Larynx and trachea **(OTR Medical Expert 2.1.2)**
   d) Embryology
   a) Topographic and microscopic anatomy
   b) Vascular supply, innervation, and anatomy of the lymphatic drainage
   c) Anatomical relationships with neighbouring structures
   d) Radiological anatomy and interpretation
   e) Endoscopic anatomy and interpretation
2. Carina and main bronchi **(OTR Medical Expert 2.1.2)**
   a) Embryology
   b) Topographic and microscopic anatomy
   c) Vascular supply, innervation, and lymphatic drainage
   d) Anatomical relationships with neighbouring structures
   e) Radiological anatomy and interpretation
   f) Endoscopic anatomy and interpretation
3. Physiologic evaluation **(OTR Medical Expert 3.4.2)**
   a) Dynamics of upper airway
   b) Interpretation of pulmonary functions studies and flow volume curves

4. Evaluation by imaging techniques **(OTR Medical Expert 3.4.4 and 3.4.5)**
   a) Standard radiographs and CT scan with airway reconstruction
   b) Virtual bronchoscopy
   c) Fluoroscopy; oesophageal barium studies
   d) MR imaging

D. Clinical skills

During the training period, the resident must:

1. Interpret the results of imaging techniques and pulmonary functions studies applicable to the investigation of upper airway disease. **(OTR Medical Expert 3.4.2, 3.4.4, and 3.4.5)**
2. Perform endoscopic examinations of upper airway, trachea, and bronchi. **(OTR Medical Expert 5.1.1)**

7.1.2 CONGENITAL AND BENIGN DISEASES

A. Unit objective

At the end of this unit, the resident must demonstrate knowledge of congenital and acquired benign abnormalities of the larynx, trachea, and main bronchi. The resident must also demonstrate knowledge of the pathophysiology of laryngo-tracheo-bronchial abnormalities and be able to treat these abnormalities by surgical and non-surgical methods. **(OTR Medical Expert 2.1.2)**

B. Learner specific objectives

Upon completion of this unit, the resident must:

1. Demonstrate knowledge of the congenital anomalies of the glottis, subglottis, trachea, and main bronchi. **(OTR Medical Expert 2.1.2)**
2. Demonstrate knowledge of the etiology, clinical presentation, investigative methods, and treatment of acquired strictures of the glottis, sub-glottis, trachea, and main bronchi. The resident must also demonstrate knowledge about prophylactic measures that can be taken to prevent them. **(OTR Medical Expert 2.4 and 3.3)**
3. Demonstrate knowledge of the etiology, clinical presentation, investigative methods, and treatment of tracheobronchial lesions secondary to systemic diseases (Wegener, tuberculosis) and of primary tracheal diseases. **(OTR Medical Expert 2.1.2)**
4. Demonstrate knowledge of the etiology, clinical presentation, investigative methods, and treatment of primary and secondary tracheo malacia. **(OTR Medical Expert 3.3)**
5. Demonstrate knowledge of the etiology, clinical presentation, investigative methods, and treatment of benign tracheo-oesophageal fistulas and of tracheo vascular fistulas. **(OTR Medical Expert 3.3)**
6. Demonstrate knowledge of the surgical approaches that can be used for tracheal surgery and the techniques of airway mobilisation. **(OTR Medical Expert 5.2.1.8)**
7. Familiarize themselves with anesthetic techniques that are used during airway surgery (i.e. intubation, airway control, ventilation). **(OTR Medical Expert 5.2.1.8)**
8. Describe the surgical principles applicable to airway surgery. **(OTR Medical Expert 5.2.1.8)**
9. Demonstrate knowledge of the postoperative complications that may occur after tracheal surgery as well as their prevention and treatment. **(OTR Medical Expert 3.5.3)**

C. Contents

1. Radiologic evaluation of the larynx, trachea, and main bronchi. **(OTR Medical Expert 3.4.4 and 3.4.5)**
   a) Standard radiographs, CT scanning and MRI
   b) Imaging reconstruction of the airway
   c) Oesophageal studies
2. Tracheal stenosis **(OTR Medical Expert 2.1.1)**
   a) Post intubation, post tracheotomy, post traumatic, and post operative
   b) Secondary to systemic diseases
3. Stenosis of main bronchi **(OTR Medical Expert 2.1.1)**
   a) Post traumatic
   b) Post operative (after lung transplant)
   c) Post infectious (histoplasmosis, tuberculosis)
4. Anaesthesia for tracheal surgery **(OTR Medical Expert 5.2.1.8)**
   a) Pre anesthetic evaluation
   b) Conduct of anaesthesia including airway control
   c) Techniques of ventilation during tracheobronchial reconstruction
   d) Emergence of anaesthesia and extubation
   e) Immediate postoperative care
5. Surgical approaches and reconstruction techniques **(OTR Medical Expert 5.2.1.8)**
   a) Sub-glottis strictures, strictures of the cervical trachea
   b) Intra thoracic trachea, carina and main bronchi
6. Tracheomalacia and bronchomalacia **(OTR Medical Expert 5.2.1.8 and 2.4)**
   a) Diagnosis and evaluation
   b) Therapeutic strategies (surgical and non-surgical)
7. Benign tracheo oesophageal fistula **(OTR Medical Expert 5.2.1.8 and 2.4)**
   a) Diagnosis and evaluation
   b) Therapeutic strategies

D. Clinical skills

During the training period, the resident must:

1. Interpret and use the results of diagnostic tests done in the context of evaluating benign abnormalities of the trachea and main bronchi. **(OTR Medical Expert 3.4.4 and 3.4.5)**
2. Perform endoscopic evaluations by laryngoscopy and bronchoscopy (rigid and flexible) and dilate stenosis of upper airway. **(OTR Medical Expert 5.1.1)**
3. Evaluate patients in need of tracheal surgery and plan the operation. **(OTR Medical Expert 3.3)**
4. Perfrom laryngotracheal resection for benign diseases and perform the airway reconstruction. **(OTR Medical Expert 5.2.1.8)**
5. Insert tracheal T-tubes. **(OTR Medical Expert 5.2.1.8)**
6. Perform the operative repair of benign tracheo-oesophageal fistulas, and of sub-glottic strictures. **(OTR Medical Expert 5.2.1.8)**

7.1.3 AIRWAY NEOPLASMS

A. Unit objectives

At the end of this unit, the resident must demonstrate knowledge of neoplastic diseases of the trachea, carina, and main bronchi as well as those affecting neighbouring structures with secondary invasion of the airway. The resident must also describe the principles involved in the treatment of these diseases (surgical and non-surgical). **(OTR Medical Expert 2.1.1, 2.1.2, and 5.2.1.8)**

B. Learner specific objectives

Upon completion of this unit, the resident must:

1. Classify tracheobronchial tumors (benign, malignant) and their histology. **(OTR Medical Expert 2.1.2)**
2. Familiarize themselves with their clinical presentation. **(OTR Medical Expert 3.1, 3.2, and 3.3)**
3. Demonstrate knowledge of the methods of investigation that can be used including endoscopy and imaging. **(OTR Medical Expert 3.4.4, 3.4.5, and 5.1.1)**
4. Describe the surgical principles involved in the surgery of these tumors including the methods used for airway reconstruction. **(OTR Medical Expert 5.2.1.8)**
5. Familiarize themselves with the techniques of anaesthesia that can be used during these operations. **(OTR Medical Expert 5.2.1.8)**
6. Demonstrate knowledge of the indications for adjuvant chemotherapy or radiation therapy. **(OTR Medical Expert 2.1.1)**
7. Demonstrate knowledge of the postoperative complications that can occur after the surgery of tracheobronchial tumors. **(OTR Medical Expert 3.5.3)**

C. Contents

1. Tracheobronchial neoplasms **(OTR Medical Expert 2.1.2)**
   a) Benign, malignant
   b) Invasion by tumors of neighbouring organs (lung, thyroid)
   c) Tracheobronchial metastases
   d) Malignant tracheo-oesophageal fistulas
2. Operative techniques **(OTR Medical Expert 5.2.1.8)**
   a) Resection of tracheal tumors
   b) Resection of carinal tumors
   c) Resection of lung cancer invading the carina
   d) Methods that can be used for airway reconstruction
   e) Surgical approaches
3. Tracheal prosthesis **(OTR Medical Expert 5.2.1.8)**
   a) Silastic prosthesis
   b) Stents
   c) Varieties of tracheotomy and T-tubes
4. Alternatives **(OTR Medical Expert 5.1.1)**
   a) Bronchoscopic excision (core excision)
   b) Laser excision and photodynamic therapy

D. Clinical skills

During the training period, the resident must:

1. Perform flexible and rigid bronchoscopies for diagnosis, dilatation and core excision of tracheobronchial tumors. **(OTR Medical Expert 5.1.1)**
2. Perform tracheobronchial resection for neoplasms and do the reconstruction of the airway. **(OTR Medical Expert 5.2.1.8)**
3. Follow-up after trachobronchial resection for neoplasms including treatment of complications. **(OTR Medical Expert 3.5.3)**
4. Familiarize themselves with alternative techniques to surgery such as laser coagulation and photodynamic ablation. **(OTR Medical Expert 2.2.4)**
5. Treat neoplasms of the airway palliatively using endotracheobronchial stents, T-tubes, and tracheostomy tubes. **(OTR Medical Expert 2.2.4)**
6. Recommend the use of adjuvant treatment, if necessary, before or after resection of airway

neoplasms. **(OTR Medical Expert 2.1.1)**
7. Recommend primary treatment with radiotherapy or chemotherapy when indicated. **(OTR Medical Expert 2.1.1)**

7.2 CanMEDS COMPETENCIES

7.2.1 COMMUNICATOR

A. Unit objectives

Upon completion of this segment, the resident must:

1. Present to colleagues in a clear and precise manner knowledge concerning the evaluation and treatment of the patient who presents with congenital or acquired disorders of the trachea and main bronchi. **(OTR Communicator 1.1, 5.1, and 5.2)**
2. Discuss with the patient, family, and paramedical personnel the complications that can occur after surgery for diseases of the trachea and main bronchi, and their treatment. **(OTR Communicator 1.1, 1.2.1, and 3.1)**

B. Contents

1. Demonstrate confidence and ethics in the relationship between Thoracic Surgeon and patient. **(OTR Communicator 1.1 and 1.5)**
2. Establish a therapeutic relationship with the patient, family, and other participants (medical and non medical**). (OTR Communicator 1.2)**
3. Establish mutual comprehension and understanding of the patient's needs. **(OTR Communicator 1.2, 2.1, and 3.3.1.2)**
4. Collect and summarize pertinent information regarding the patient who presents with congenital or acquired disorders of the trachea and main bronchi including clinical history, physical examination, differential diagnosis, and therapeutic options. **(OTR Communicator 2.1 and 2.2)**
5. Provide oral and written communication of pertinent information regarding the care of the patient with a congenital or acquired disorder of the trachea and main bronchi. **(OTR Communicator 3.1, 5.1, 5.2, and 5.3)**
6. Respect the diversity and pay attention to the psychosocial aspects of the patient afflicted by a disorder of the trachea and main bronchi. **(OTR Communicator 3.1.2 and 4.2)**
7. Report mistakes and undesirable side effects. **(OTR Communicator 4.5, 5.1, and 5.2)**

7.2.2 COLLABORATOR

A. Unit objectives

Upon completion of this segment, the resident must:

1. Collaborate with the chest physician, oncologist, anaesthetist, and other health professionals with regards to the evaluation and choice of treatment concerning the patient afflicted by an airway disorder. **(OTR Collaborator 1.1, 1.3.1, and 1.4)**
2. Determine with the help of these consultants the best methods applicable to the care for these patients during the postoperative period and the precautions to be taken to avoid postoperative complications. **(OTR Collaborator 1.2, 1.2.1, and 1.7)**

B. Contents

1. Share knowledge, information, and decision making processes. **(OTR Collaborator 1.6)**
2. Delegate appropriately and encourage team work **(OTR Collaborator 1.2.1 and 2.3)**

3. Respect other members of the multidisciplinary team. **(OTR Collaborator 1.3, 1.8, and 2.6)**
4. Provide inter and multiprofessionnal care of the patient who underwent surgery for an airway disorder. **(OTR Collaborator 1.5 and 1.6)**
5. Identify, manage, prevent, and resolve conflicts. **(OTR Collaborator 2.2, 2.3, and 2.4)**
6. Recognize one's own role within the multidisciplinary team and recognize one's own limitations. **(OTR Collaborator 1.1, 2.4, and 2.5)**

7.2.3 MANAGER

A. Unit objective

Upon completion of this segment, the resident must:

Appreciate the relationship between costs, benefits, and results as they apply to the investigation and treatment of the patient afflicted by an airway disorder. **(OTR Manager 3.1 and 3.2)**

B. Contents

1. Describe the role and responsibilities of the Thoracic Surgeon in the postoperative care of the patient afflicted by a congenital or acquired disorder of the trachea and main bronchi. **(OTR Manager 1.1)**
2. Demonstrate leadership, supervision, and administration within the health care system. **(OTR Manager 1.3)**
3. Describe the organization, structure, and financing of the health care system. **(OTR Manager 1.4 and 3.2)**
4. Manage time in the context of clinical work. **(OTR Manager 2.2 and 4.3)**
5. Manage financial aspects of the medical practice and negotiations. **(OTR Manager 1.4, 2.2, and 2.3)**
6. Demonstrate knowledge of career evolution. **(OTR Manager 4.1, 4.2, and 4.3)**

7.2.4 HEALTH ADVOCATE

A. Unit objectives

Upon completion of this segment, the resident must:

1. Appreciate the health hazards associated with smoking and exposure to other polluants upon trachobronchial neoplasms and other airway disorders, especially those that are likely to require surgery. **(OTR Health Advocate 1.2.3)**
2. Recognize the importance of managing the investigation and treatment of patients afflicted by an airway disorder whether it is congenital or acquired. **(OTR Health Advocate 2.1.1)**

B. Contents

1. Demonstrate knowledge of patient and their background. **(OTR Health Advocate 1.1 and 1.2.1)**
2. Promote health and integrate concepts of preventive medicine. **(OTR Health Advocate 2.1.3 and 2.1.4)**
3. Identify risk factors for postoperative complications including psychological, biological, sociological, cultural, and economic factors. **(OTR Health Advocate 1.2.2, 2.1.2, and 3.1)**
4. Describe the role of the Thoracic Surgeon within the community and responsible use of authority and influences. (OTR Health Advocate 2.2)
5. Adapt one's personal practice according to patient's needs. **(OTR Health Advocate 4.5)**
6. Ensure the security of patients. **(OTR Health Advocate 3.1 and 4.6)**

7.2.5 SCHOLAR

A. Unit objectives

Upon completion of this segment, the resident must:

1. Critically assess the medical literature pertinent to evaluation and treatment of the patient afflicted by an airway disorder. **(OTR Scholar 1.2, 1.6, and 2.3)**
2. Critically assess the methods and techniques that can be used to prevent postoperative complications. **(OTR Scholar 2.2)**

B. Contents

1. Maintain and enhance knowledge. **(OTR Scholar 1.2 and 4.4)**
2. Demonstrate moral and professional obligation to maintain and improve competencies. **(OTR Scholar 1.1, 1.9, and 4.4)**
3. Perform self-evaluation and identification of the need to improve one's own knowledge and level of competence. **(OTR Scholar 1.2, 1.3, 1.4, and 1.8)**
4. Access available information and critically evaluate the literature. **(OTR Scholar 1.6 and 4.5)**
5. Demonstrate willingness to learn and use modern learning techniques. **(OTR Scholar 1.3, 1.7, 3.5, 3.6, and 3.7)**
6. Demonstrate research and scientific curiosity. **(OTR Scholar 1.5, 1.10, 2.1.1, and 4.3)**
7. Demonstrate knowledge of ethics and research, human subjects and relationship with industry. **(OTR Scholar 4.1 and 4.2)**
8. Contribute academically to the teaching of undergraduate students and paramedical personnel. **(OTR Scholar 3.1 and 3.4.1)**
9. Identify and report conflicts of interest. **(OTR Scholar 4)**

7.2.6 PROFESSIONAL

A. Unit objectives

Upon completion of this segment, the resident must:

1. Provide high level care with integrity, honesty, and compassion to the patient afflicted by an airway disorder. **(OTR Professional 1.1)**
2. Ensure optimal professional conduct (individual and multidisciplinary) with regards to evaluation and treatment of the patient afflicted by an airway disorder. **(OTR Professional 1.2)**
3. Practice Thoracic Surgery according to the principles of deontology, and according to the obligations of the surgeon involved in the investigation and treatment of an airway disorder, whether it is congenital or acquired. **(OTR Professional 1.2 and 1.3)**
4. Demonstrate a high level of responsibility towards the patient who underwent an operation for an airway disorder by being available, respecting confidentiality, and respecting the physical and emotional needs of each patient. **(OTR Professional 1.5)**
5. Work with integrity and according to best practice standards, specifically by referring or consulting other health professional when required. **(OTR Professional 1.2 and 1.3)**
6. Report clinical or scientific information with a high level of precision. **(OTR Professional 1.1 and 2.5)**
7. Demonstrate practical knowledge of the provincial and federal regulations with regards to the evaluation and treatment of patients afflicted by an airway disorder. **(OTR Professional 2.1)**
8. Maintain control of one's own emotions and opinions and identify personal reactions that could be detrimental to the patient/surgeon relationship. Explore and even accept possible ways to change attitudes that may be perceived as damaging to the patient/surgeon relationship. **(OTR Professional 1.6, 2.4, and 3.2.1)**

9. Identify a colleague or another physician with whom it is possible to discuss personal objectives, conflicts, or stress. **(OTR Professional 3.1)**

B. Contents

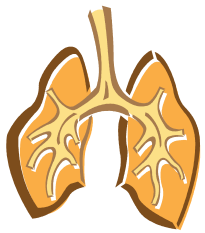
1. Demonstate integrity, honesty, compassion. **(OTR Professional 1.1)**
2. Behave ethically and responsibly towards other health professionals. **(OTR Professional 3.3)**
3. Demonstrate excellence in the clinical practice of Thoracic Surgery and maintenance of competence. **(OTR Professional 1.2)**
4. Demonstrate awareness of the obligation to provide the necessary information to the organizations responsible for regulating the profession. **(OTR Professional 2.2 and 2.3)**
5. Describe the principles and theories of bioethics and medico legal aspects of the practice of thoracic surgery. **(OTR Professional 1.7)**

7.3 RECOMMENDED LECTURES

1. Deslauriers J, Mehran R : Handbook of peri operative care in general thoracic surgery. Elsevier 2005 (chapters 5.4, 11.10)
2. Deslauriers J : Thoracic anatomy, Part I : Chest wall, airway, lungs. Thoracic surgery Clinics, November 2007
3. Franco KL, Putnam JB : Advanced therapy in thoracic surgery. BC Decker 2005 (chapter 17)
4. Frank JR : Le cadre des competencies CanMEDSS 2005 pour les médecins. Le Collège Royal des médecins et chirurgiens du Canada
5. Goldberg M, Patchefsky AS : Uncommon tumors of the tracheobronchial tree : Diagnosis and management. Chest Surg Clinics, Vol 13, No 1, February 2003
6. Kaiser LK, Kron IL, Spray TL : Mastery of cardio thoracic surgery, Second Edition. Lippincott, Williams, and Wilkins, 2007 (chapters 9, 10)
7. Kaiser LR, Jamieson GG : Operative thoracic surgery. Hodder Arnold, Fifth Edition 2006 (chapter 16)
8. Mathisen DJ : Tracheal Surgery. Chest Surg Clinics, Vol 13, No 2, May 2003
9. Pearson's Thoracic Surgery, Third Edition, Elsevier 2008 (chapters 15-34)
10. Shields T et al : General Thoracic Surgery, Sixth Edition, Lippincott, Williams and Wilkins 2005 (chapters 75-79)
11. Urschel HC, Cooper JD : Atlas of thoracic surgery, Churchill Livingstone, New York 1995 (part IV (pp99-149))
12. Yang SC, Cameron DE : Current therapy in thoracic and cardiovascular surgery, Mosby 2004 (pp116-142)

SECTION VIII:

LUNGS AND PLEURA



8.1 SURGICAL COMPETENCIES

8.1.1 EMBRYOLOGY AND ANATOMY

A. Unit objectives

At the end of this unit, the resident must demonstrate knowledge of the embryology and anatomy of the lungs and pleura as well as their relationship with neighbouring structures. **(OTR Medical Expert 2.1.2)**

B. Learner specific objectives

Upon completion of this unit, the resident must:

1. Demonstrate knowledge of the embryology of the lungs and pleura. He must also know and understand the correlations between embryology defects and congenital malformations of the lungs. **(OTR Medical Expert 2.1.2)**
2. Demonstrate knowledge of the general anatomy of the lungs, lobes, bronchopulmonary segments, and fissures. **(OTR Medical Expert 2.1.2)**
3. Demonstrate knowledge of the numerisation of bronchopulmonary segments as well as the pulmonary arterial anatomy and that of the venous drainage. **(OTR Medical Expert 2.1.2)**
4. Demonstrate knowledge of the intra and extra pericardial anatomy of the pulmonary arteries and of their branches. **(OTR Medical Expert 2.1.2)**
5. Demonstrate knowledge of the intra and extra pericardial anatomy of the pulmonary veins. **(OTR Medical Expert 2.1.2)**
6. Demonstrate knowledge of the lymphatic drainage of the lungs including primary sub-pleural sites, intra segmental collection pathways, segmental lymphatic connections, lobar and hilar lymphatic connections as well as the specific lymphatic drainage pertinent to each lobe. **(OTR Medical Expert 2.1.2)**
7. Demonstrate knowledge of the mediastinal lymph node stations as well as the anatomy of the thoracic duct including its abdominal origin and cervical venous termination. **(OTR Medical Expert 2.1.2)**
8. Demonstrate knowledge of the embryology and general anatomy of the pleura and pleural spaces. **(OTR Medical Expert 2.1.2)**

C. Contents

1. Embryology of upper airway, tracheobronchial tree, lungs, and pleura and congenital anomalies secondary to defects of embryogenesis. **(OTR Medical Expert 2.1.2)**
2. Normal anatomy and histology of the lower airway, lungs, and pleura **(OTR Medical Expert 2.1.2)**
   a) Anatomy of main and lobar bronchi
   b) Anatomy and topography of bronchopulmonary segments
   c) Anatomy of the lungs, lobes, and fissures
   d) Anatomy of the pulmonary hilum
   e) Anatomy of the pulmonary arteries and veins

f) Anatomy of the bronchial circulation
g) Anatomy of the general lymphatic drainage of the lungs
h) Specific lymphatic anatomy of each lobe
i) Normal histology of the airway and lungs
j) Normal anatomy of the innervation of the airway and lungs
k) Anatomy, histology, vascular supply, innervation of the pleura
l) General anatomy of the pleural spaces

D. Clinical skills

During the training period, the resident must:

1. Apply his basic knowledge of anatomy to the radiological examination of the airway, lungs, and pleura. **(OTR Medical Expert 2.1.2 and 3.4.4)**
2. Apply his basic knowledge of anatomy to the endoscopic examination of the lower airway, main and lobar bronchi, and segmental bronchi. **(OTR Medical Expert 2.1.2 and 5.1.1)**

8.1.2 PHYSIOLOGY AND INVESTIGATION

A. Unit objectives

At the end of this unit, the resident must demonstrate knowledge of the physiology of the lungs and pleura as well as how to use and interpret diagnostic tests. **(OTR Medical Expert 2.1.3 and 3.4.4)**

B. Learner specific objectives

Upon completion of this unit, the resident must:

1. Demonstrate knowledge of the physiology of the respiratory system and of the pleura. **(OTR Medical Expert 2.1.3)**
2. Demonstrate knowledge of the indications for and interpretation of standard chest radiographs, CT scan, bone scan, MRI (thoracic and brain), and PET scan in the staging of lung cancer. **(OTR Medical Expert 3.4.4 and 3.4.5)**
3. Demonstrate knowledge of the indications for and interpretation of isotope lung scans for the evaluation of operability in patients with lung cancer. **(OTR Medical Expert 3.4.4 and 3.4.5)**
4. Describe the basic principles of pulmonary function studies including spirometry, exercise testing with or without arterial blood gas analysis, and six-minute walk test. **(OTR Medical Expert 3.4.2)**
5. Familiarize themselves with the interpretation of pulmonary function studies. **(OTR Medical Expert 3.4.2)**

C. Contents

1. Normal physiology of the lungs and pleural spaces **(OTR Medical Expert 2.1.3)**
   a) Physiology of the chest wall as it applies to respiration
   b) Physiology of large and small airway
   c) Physiology of gas exchange and pulmonary circulation
   d) Physiology of pleural spaces including fluid turnover and pleural pressures
2. Imaging **(OTR Medical Expert 3.4.4 and 3.4.5)**
   a) Standard chest radiographs, CT scanning of thorax and upper abdomen
   b) Thoracic MRI
   c) Angiography of thoracic blood vessels (pulmonary, bronchial, aorta)
   d) Isotopic lung studies

3. Pulmonary function studies **(OTR Medical Expert 3.4.2)**
   a) Clinical evaluation including grading of dyspnea
   b) Spirometry
   c) Exercise testing and six-minute walk test

D. Clinical skills

During the training period, the resident must:

1. Interpret the results of pulmonary function studies, isotopic lung scans, exercise tests, blood gas analysis, and pulmonary or bronchial angiographies. The resident must also correlate the results of these tests with the patient's operability for lung cancer. **(OTR Medical Expert 3.4.2)**
2. Treat respiratory disorders other than lung cancer (emphysema, pulmonary hypertension) using their knowledge of pulmonary physiology and their interpretation of pulmonary function tests. **(OTR Medical Expert 2.1.3)**
3. Read and interpret standard chest radiographs, CT scans, MRI, and PET scans in patients who have lung cancer or other pleuropulmonary diseases. **(OTR Medical Expert 3.4.4 and 3.4.5)**
4. Supervise a patient during a six-minute walk test. **(OTR Medical Expert 3.4.2)**
5. Interpret the results of thoracentesis and pleural fluid analysis. **(OTR Medical Expert 3.4.5)**

8.1.3 CONGENITAL ANOMALIES OF THE LUNG

A. Unit objectives

At the end of this unit, the resident must demonstrate knowledge of the embryogenesis, pathology and principles of treatment as they apply to congenital anomalies of the lung. **(OTR Medical Expert 2.1.2 and 2.1.1)**

B. Learner specific objectives

Upon completion of this unit, the resident must:

Demonstrate knowledge of the congenital anomalies of the lung and their treatment. The resident must also be familiar with their clinical presentation, investigation, and indications for surgical treatment. **(OTR Medical Expert 2.1.1, 2.1.2, and 5.2.1.6)**

C. Contents (OTR Medical Expert 2.1.1 and 2.1.2)

1. Sequestration
   a) Types, clinical presentation, and embryogenesis
   b) Investigation (CT scan, angiography)
   c) Treatment and surgical indications
   d) Prognosis
2. Bronchogenic cysts
   a) Types, classification, embryogenesis, and clinical presentation (pediatric and adult)
   b) Investigation and surgical indications
   c) Surgical options (approaches, types of resections)
3. Vascular abnormalities of the lung
   a) Types, classification, embryogenesis, and clinical presentation (pediatric and adult)
   b) Investigation and therapeutic options (observation, embolization, surgery)
   c) Surgical indications and options
4. Congenital lobar emphysema
   a) Types, classification, embryogenesis, and clinical presentation (pediatric and adult)
   b) Investigation, therapeutic options and indications for surgery

   c) Prognosis
5. Cystic fibrosis
   a) Clinical presentation and pathophysiology
   b) Evaluation and principles of treatment
   c) Surgical complications and their treatment (i.e. pneumothorax, hemoptysis)
   d) Prognosis and indications for lung transplant
6. Cystic adenomatoid malformations
   a) Types, classification, embryogenesis, and clinical presentation (pediatric and adult)
   b) Investigation and indications for surgery
   c) Surgical options
   d) Results of treatment and prognosis

D. Clinical skills

During the training period, the resident must:

1. Evaluate patients with congenital anomalies of the lung (pediatric and adult) **(OTR Medical Expert 2.1.2)**
2. Perform surgical procedures for the treatment of congenital anomalies of the lung or for complications secondary to these malformations. **(OTR Medical Expert 5.2.1.6)**

8.1.4 BENIGN DISEASES OF THE LUNG

A. Unit objectives

At the end of this unit, the resident must demonstrate knowledge of the pathology of infectious, inflammatory, degenerative, bronchospastic, professional, interstitial, and idiopathic diseases of the lung. The resident must also learn how to investigate these processes and how to treat them surgically or non-surgically. **(OTR Medical Expert 2.1.3)**

B. Learner specific objectives

Upon completion of this unit, the resident must:

1. Demonstrate knowledge of the various procedures that can be used to evaluate patients with benign lung disease. **(OTR Medical Expert 3.4.2, 3.4.4, 3.4.5, and 5.1.1)**
2. Familiarize themselves with the various pathogens that can cause pulmonary infections including their transmissibility, lung access, pathogenesis, clinical presentation, and treatment (surgical (surgical indications) and non-surgical). **(OTR Medical Expert 2.1.3 and 3.4.7)**
3. Familiarize themselves with the pathogenesis, clinical presentation, and treatment of pneumonia acquired or not in the community. **(OTR Medical Expert 3.1, 3.2, and 3.3)**
4. Familiarize themselves with the pathogenesis, clinical presentation, and treatment (surgical or non-surgical) of suppurative lung disease including bronchiectasis and lung abscesses. **(OTR Medical Expert 3.1, 3.2, and 3.3)**
5. Familiarize themselves with the pathogenesis, clinical presentation, and therapeutic options in patients with tuberculosis, atypical mycobacteriosis, and fungal diseases of the lung. **(OTR Medical Expert 2.1.3)**
6. Demonstrate knowledge of the pathogenesis, natural history, evaluation and principles of treatment of COPD patients including emphysema, chronic bronchitis, and bronchospasm (asthma). **(OTR Medical Expert 2.4)**
7. Demonstrate knowledge of the indications for bullectomy, LVRS, and lung transplantation in COPD patients. **(OTR Medical Expert 5.2.3)**
8. Describe the pathogenesis and principles of treatment of patients who have bronchospasm and asthma. **(OTR Medical Expert 2.1.3)**

9. Demonstrate knowledge of the pathogenesis, natural history, evaluation, classification, and principles of treatment of patients who present with interstitial or professional lung diseases. **(OTR Medical Expert 2.1.3)**
10. Describe the basic surgical principles as they apply to patients with benign lung diseases (surgical indications, approaches, types of resection). **(OTR Medical Expert 5.2.1.6)**
11. Demonstrate knowledge of the consequences of pulmonary aspiration including evaluation of the patient, lung drainage and treatment. **(OTR Medical Expert 2.4)**
12. Describe the surgical principles applicable to pulmonary resection done for infectious lung diseases (i.e. lung abscesses, bronchiectasis, mycoses, turberculosis). **(OTR Medical Expert 5.2.1.6)**
13. Demonstrate knowledge of the complications associated with pulmonary resection done for infectious lung disease as well as their prevention and treatment. **(OTR Medical Expert 3.5.3)**
14. Demonstrate knowledge of the complications associated with the surgery of COPD. **(OTR Medical Expert 3.5.3)**

C. Contents

1. Infectious diseases of the lung **(OTR Medical Expert 2.1.3)**
   a) Bacteria and virus
   b) Mycoses and mycobacteria (tuberculosis, atypical mycobacteria)
   c) Protozoans
   d) Risk factors and immuno-suppression
2. Chronic obstructive pulmonary disease **(OTR Medical Expert 2.1.3)**
   a) Classification, pathogenesis, natural history
   b) Clinical presentation, evaluation, changes in pulmonary function
   c) Principles of treatment, surgical and non-surgical
   d) Treatment of complications (giant bullae, hemoptysis, pneumothorax)
3. Bronchospasm **(OTR Medical Expert 2.1.3)**
   a) Pathogenesis, pathology, and natural history
   b) Evaluation, changes in pulmonary function, and principles of treatment
   c) Treatment of complications that may require surgery (pneumothorax)
4. Interstitial and professional lung diseases **(OTR Medical Expert 2.1.3)**
   a) Pathogenesis, classification, pathology, and natural history
   b) Evaluation, changes in pulmonary function and principles of treatment including surgical indications, approaches, and results of surgical lung biopsy
   c) Evaluation and techniques of broncho-alveolar lavage
5. Foreign bodies **(OTR Medical Expert 2.1.3 and 2.4)**
   a) Types of foreign bodies that can be aspirated
   b) Causes, associated lung damage, and evaluation
   c) Principles of treatment

D. Clinical skills

During the training period, the resident must:

1. Diagnose and treat patients with pulmonary infections including bacterial, virus, mycotic, and mycobacterial infections (tuberculosis and atypical mycobacteria) **(OTR Medical Expert 3.1, 3.2, 3.3, and 3.4.7)**
2. Perform surgical and non-surgical treatment of patients who have bronchiectasis or lung abscesses. **(OTR Medical Expert 5.2.1.6)**
3. Perform lung biopsies in patients with diffuse lung disease. **(OTR Medical Expert 3.4.5)**
4. Perform pulmonary resections in patients with benign lung disease. **(OTR Medical Expert 5.2.1.6)**
5. Perform surgical treatment of patients with chronic obstructive lung disease. **(OTR Medical Expert 5.2.1.6)**

6. Treat patients who present with a surgical complication of COPD. **(OTR Medical Expert 3.5.3)**
7. Investigate and treat patients with aspirated foreign bodies. **(OTR Medical Expert 2.4)**
8. Perform external drainage of a lung bulla or of a lung abscess. **(OTR Medical Expert 3.4.5)**
9. Interpret the results of broncho-alveolar lavage and in some cases perform the procedure by themselves. **(OTR Medical Expert 3.3)**

8.1.5 NEOPLASMS OF THE LUNGS AND BRONCHI

A. Unit objective

At the end of this unit, the resident must demonstrate knowledge of the etiology, pathology, evaluation, and surgical treatment of neoplasms of the lung and bronchi; the resident must also describe the principles of non-surgical and palliative treatment of these neoplasms. Finally, the resident must demonstrate knowledge of the surgical techniques pertinent to pulmonary resection done for lung cancer. **(OTR Medical Expert 2.1.1 and 5.2.1.6)**

B. Learner specific objective

Upon completion of this unit, the resident must:

1. Demonstrate knowledge of the histologic classification of neoplasms of the bronchi and lungs (benign and malignant). **(OTR Medical Expert 2.1.1)**
2. Demonstrate knowledge of the TNM terminology and its application in treatment planning of patients suffering from lung cancer. **(OTR Medical Expert 2.1.1)**
3. Diagnose bronchopulmonary neoplasms and evaluate operability and resectability. **(OTR Medical Expert 2.1.1)**
4. Determine the nodal status using all available techniques, including use of CT scan, PET scan, ultrasonography (endobronchial and endo-oesophageal), and mediastinoscopy. (OTR Medical Expert 3.4.4 and 3.4.5)
5. Determine the “M” status using all available techniques. **(OTR Medical Expert 3.4.4 and 3.4.5)**
6. Determine operability through the use of cardio pulmonary testing. **(OTR Medical Expert 3.4.2 and 3.4.8)**
7. Demonstrate knowledge of the role of induction therapies in cases of malignant tumors. **(OTR Medical Expert 2.1.1)**
8. Demonstrate knowledge of the criteria of inoperability in lung cancer patients. **(OTR Medical Expert 2.4 and 3.3)**
9. Demonstrate knowledge of non-surgical options in the management of lung cancer. **(OTR Medical Expert 3.3)**
10. Describe the principles of palliative treatment of lung cancer. **(OTR Medical Expert 3.3 and 5.2.1.6)**
11. Describe the principles of pulmonary resection simple and extended (chest wall, Pancoast, bronchoplasties). **(OTR Medical Expert 5.2.1.5, 5.2.1.6, 5.2.2.8, and 5.2.2.9)**
12. Demonstrate knowledge of the main postoperative complications, how to prevent them and how to treat them. **(OTR Medical Expert 3.5.3)**
13. Demonstrate knowledge of the role of postoperative adjuvant therapies (radiation therapy, chemotherapy). **(OTR Medical Expert 4.2.2.1 and 4.2)**
14. Classify and treat benign tumors of the lungs and bronchi. **(OTR Medical Expert 2.1.1 and 2.1.3)**
15. Describe the principles involved in the follow-up of lung cancer patients. **(OTR Medical Expert 4.2.1)**
16. Evaluate and treat patients who have pulmonary metastases. **(OTR Medical Expert 5.2.2.9)**

C. Contents (OTR Medical Expert 2.1.1)

1. Benign tumors of the lungs and bronchi
   a) Pathology, biology, classification, natural history
   b) Diagnostic, evaluation, and treatment (surgical and non-surgical)
2. Solitary lung nodules
   a) Differential diagnosis (classification), biology, natural history
   b) Principles of surgical and non-surgical treatment
3. Lung cancer
   a) Classification, pathology, biology, natural history
   b) Diagnosis, clinical TNM stage, evaluation of operability and resectability, principles of surgical and non-surgical treatment
4. Lung metastases
   a) Pathology, biology, natural history
   b) Diagnosis, evaluation, principles of surgical and non-surgical treatment

D. Clinical skills

During the training period, the resident must:

1. Evaluate lung cancer patients and recommend the appropriate treatment based on histology, clinical stage, and results of cardio pulmonary evaluation. **(OTR Medical Expert 3.1, 3.2, 3.3, 3.4.2, and 3.4.8)**
2. Perform surgical staging procedures including mediastinoscopy, mediastinonotomy, and video thoracoscopy. **(OTR Medical Expert 5.1.1, 5.2.1.2, and 5.2.1.1)**
3. Perform diagnostic bronchoscopies **(OTR Medical Expert 5.1.1)**
4. Perform the necessary surgical procedure for the treatment of lung cancer including limited resections, lobectomies, sleeve resections, pneumonectomies, and extended resections including chest wall and tumors of the superior sulcus. **(OTR Medical Expert 5.2.1.6, 5.2.2.8, and 5.2.2.9)**
5. Prevent, diagnose, and treat complications associated with these types of surgery (i.e. air leaks, bronchopleural fistulas, empyemas, arythmias). **(OTR Medical Expert 3.5.1 and 3.5.3)**
6. Perform bedside bronchoscopies in the cases of postoperative atelectesis or pneumonia. **(OTR Medical Expert 5.1.1)**
7. Learn and describe the principles of mechanical ventilation in cases of postoperative respiratory failure. **(OTR Medical Expert 3.4.3)**
8. Learn and describe the principles of non-surgical treatment of lung cancer (primary and palliative). **(OTR Medical Expert 4.2)**

8.1.6 PLEURAL DISEASES

A. Unit objectives

At the end of this unit, the resident must demonstrate knowledge of benign and malignant pleural diseases, and the causes of pleural effusions and their investigation. The resident must also describe the principles applicable to the treatment of these disorders. **(OTR Medical Expert 2.1.1 and 5.2.2.10)**

B. Learner specific objectives

1. Familiarize themselves with the clinical presentation, evaluation, and treatment of spontaneous, primary or secondary pneumothoraces. **(OTR Medical Expert 3.5.1)**
2. Describe the principles of investigation and treatment of empyemas, with or without bronchopleural fistulas. **(OTR Medical Expert 3.5.1)**

3. Demonstrate knowledge of the clinical stages of empyemas. **(OTR Medical Expert 3.5.1)**
4. Demonstrate knowledge of the investigation and treatment of chylothoraces. **(OTR Medical Expert 3.5.1)**
5. Classify the various types of pleural effusions, evaluate them, and treat them. **(OTR Medical Expert 3.3)**
6. Demonstrate knowledge of the pathogenesis and treatment of malignant pleural effusions. **(OTR Medical Expert 2.1.1)**
7. Evaluate and treat pneumothoraces. **(OTR Medical Expert 2.1.3)**
8. Demonstrate knowledge of the late sequelae of pleural tuberculosis and their treatment. **(OTR Medical Expert 2.4 and 3.3)**
9. Demonstrate knowledge of the pathology of primary pleural tumors, benign and malignant. **(OTR Medical Expert 2.1.1)**

C. Contents

1. Mesothelioma and other pleural tumors **(OTR Medical Expert 2.1.2)**
   a) Classification, pathology, biology, and natural history
   b) Principles of treatment surgical and non-surgical
   c) Evaluation of the patient who is a candidate for pleuro-pneumonectomy
   d) Principles of palliative treatment
2. Pneumothorax **(OTR Medical Expert 3.3)**
   a) Classification, pathogenesis, evaluation
   b) Principles of surgical treatment including surgical indications, surgical approaches, and techniques
   c) Treatment of recurrences
3. Pleural effusion **(OTR Medical Expert 3.5.1)**
   a) Classification, pathogenesis, and diagnosis
   b) Treatment, surgical and non-surgical
4. Empyema **(OTR Medical Expert 3.3 and 3.4.7)**
   a) Classification according to etiology and stage, pathogenesis, and bacteriology
   b) Clinical presentation with or without associated broncho pleural fistulas, and diagnosis
   c) Therapeutic options

D. Clinical skills

During the training period, the resident must:

1. Evaluate patients with pleural effusions and recommend the appropriate treatment. **(OTR Medical Expert 3.2 and 3.3)**
2. Perform diagnostic procedures such as thoracentesis, needle biopsies, and video thoracoscopies. **(OTR Medical Expert 3.5.1)**
3. Familiarize themselves with pleural fluid analysis (normal and abnormal). **(OTR Medical Expert 3.4.6)**
4. Perform pleural drainage procedures and chemical pleurodesis. **(OTR Medical Expert 3.3)**
5. Perform surgical treatment of spontaneous pneumothoraces, primary and secondary. **(OTR Medical Expert 5.2.1.1)**
6. Perform the drainage of empyemas and peform the surgical treatment of empyemas including deloculation, decortication, and open thoracic window. **(OTR Medical Expert 5.2.1.1 and 5.2.2.10)**
7. Perform therapeutic video thoracoscopies to treat empyemas in the fibrino purulent stage and for the diagnosis and treatment of other pleural disorders. **(OTR Medical Expert 5.2.1.1)**
8. Insert chest tubes for the drainage of malignant pleural effusions. **(OTR Medical Expert 3.3)**
9. Perform open thoracic windows. **(OTR Medical Expert 5.2.2.3)**
10. Insert indwelling pleural catheters and pleuro peritoneal shunts. **(OTR Medical Expert 3.3 and**

5.2.1.1)

11. Perform surgery (pleurectomy, pleuropneumonectomy) for the treatment of malignant mesotheliomas. **(OTR Medical Expert 5.2.2.10)**
12. Manage chylothoraces. **(OTR Medical Expert 3.3)**

8.2 CanMEDS COMPETENCIES

8.2.1 COMMUNICATOR

A. Unit objectives

Upon completion of this segment, the resident must:

1. Present to colleagues in a clear and precise manner knowledge concerning the diagnostic methods, evaluation, and choice of treatment pertinent to patients with pleuropulmonary disorders whether they are benign of malignant. **(OTR Communicator 3.1.1, 5.1, and 5.2)**
2. Discuss with the patient, family, and paramedical personnel the main complications that may occur after surgery of the lung and pleura, their prevention, and their treatment. **(OTR Communicator 1.1, 1.2.1, and 3.1)**

B. Contents

1. Demonstrate confidence and ethics in the relationship between Thoracic Surgeon and patient. **(OTR Communicator 1.1 and 1.5)**
2. Establish a therapeutic relationship with the patient, family, and other participants (medical and non medical). **(OTR Communicator 1.2)**
3. Establish mutual comprehension and understanding of the patient's needs. **(OTR Communicator 2.1 and 3.1.2)**
4. Collect and summarize pertinent information about patients with pleuropulmonary disorders, including clinical history, physical examination, differential diagnosis, and therapeutic options. **(OTR Communicator 2.2 and 2.2.1)**
5. Provide oral and written communication of this information. **(OTR Communicator 3.1, 5.1, 5.2, and 5.3)**
6. Respect the diversity and pay attention to the psychosocial aspects of the patient afflicted by a pleuropulmonary disorder. **(OTR Communicator 3.1.2 and 4.2)**
7. Report mistakes and undesirable side effects. **(OTR Communicator 4.5, 5.1, and 5.2)**

8.2.2 COLLABORATOR

A. Unit objectives

Upon completion of this segment, the resident must:

1. Collaborate with the chest physician, oncologist, and other health professionals with regards to the evaluation and choice of treatment for patients with pleuropulmonary disorders whether they are benign or malignant. **(OTR Collaborator 1.1, 1.3.1, and 1.4)**
2. Determine with the help of these consultants the best way to care for the patient who needs surgery for a pleuropulmonary disorder as well as what precautions should be taken to prevent complications. **(OTR Collaborator 1.2, 1.2.1, and 1.7)**

B. Contents

1. Share knowledge, information, and decision making processes. **(OTR Collaborator 1.6)**
2. Delegate appropriately and encourage team work **(OTR Collaborator 1.2.1 and 2.3)**

3. Respect other members of the multidisciplinary team. **(OTR Collaborator 1.3, 1.8, and 2.6)**
4. Provide inter and multiprofessionnal care of the patient afflicted with a pleuropulmonary disorder whether it is congenital or acquired. **(OTR Collaborator 1.5 and 1.6)**
5. Identify, manage, prevent, and resolve conflicts. **(OTR Collaborator 2.2, 2.3, and 2.4)**
6. Recognize one's own role within the multidisciplinary team and recognize one's own limitations. **(OTR Collaborator 1.1, 2.4, and 2.5)**

8.2.3 MANAGER

A. Unit objectives

Upon completion of this segment, the resident must:

Appreciate the relationship between costs, benefits, and results in the investigation and treatment of the patient afflicted with a pleuropulmonary disorder. **(OTR Manager 3.1 and 3.2)**

B. Contents

1. Describe the role and responsibilities of the Thoracic Surgeon in the health care system and more specifically in the care of the patient afflicted by a pleuropulmonary disorder. **(OTR Manager 1.1)**
2. Demonstrate leadership, supervision, and administration within the health care system. **(OTR Manager 1.3)**
3. Describe the organization, structure, and financing of the health system. **(OTR Manager 1.4 and 3.2)**
4. Manage time in the context of clinical work. **(OTR Manager 2.2 and 4.3)**
5. Manage financial aspects of the medical practice and negotiations. **(OTR Manager 1.4, 2.2, and 2.3)**
6. Demonstrate knowledge of career evolution. **(OTR Manager 4.1, 4.2, and 4.3)**

8.2.4 HEALTH ADVOCATE

A. Unit objectives

Upon completion of this segment, the resident must:

1. Appreciate the health hazards associated with smoking and exposure to other polluants on lung cancer and other respiratory illnesses specially those that are likely to require surgery. **(OTR Health Advocate 1.1, 2, and 2.3)**
2. Recognize the importance of taking control over the investigation and treatment of the patient afflicted by a pleuropulmonary disorder. **(OTR Health Advocate 2.1.1)**

B. Contents

1. Demonstrate knowledge of patient and their background. **(OTR Health Advocate 1.1 and 1.2.1)**
2. Promote health and integrate concepts of preventive medicine. **(OTR Health Advocate 2.1.3 and 2.1.4)**
3. Identify risk factors for postoperative complications including psychological, biological, sociological, cultural, and economic factors. **(OTR Health Advocate 1.2.2, 2.1.2, and 3.1)**
4. Describe the role of the Thoracic Surgeon within the community and responsible use of authority and influences. **(OTR Health Advocate 2.2)**
5. Adapt one's personal practice according to patient's needs. **(OTR Health Advocate 2.3 and 4.5)**
6. Ensure the security of patients. **(OTR Health Advocate 3.1 and 4.6)**

8.2.5 SCHOLAR

A. Unit objectives

Upon completion of this segment, the resident must:

1. Critically assess the medical literature pertinent to the investigation and treatment of a patient afflicted by a pleuropulmonary disorder. **(OTR Scholar 1.6 and 2.3)**
2. Critically assess the methods and techniques that can be used to prevent postoperative complications with regards to the patient afflicted by a pleuropulmonary disorder whether it is benign or malignant. **(OTR Scholar 2.2)**

B. Contents

1. Maintain and enhance knowledge. **(OTR Scholar 1.2 and 4.4)**
2. Demonstrate moral and professional obligation to maintain and improve competencies. **(OTR Scholar 1.1, 1.9, and 4.4)**
3. Perform self-evaluation and identification of the need to improve one's own knowledge and level of competence. **(OTR Scholar 1.2, 1.3, 1.4, and 1.8)**
4. Access available information and critically evaluate the literature. **(OTR Scholar 1.6 and 4.5)**
5. Demonstrate willingness to learning and use modern learning techniques. **(OTR Scholar 1.3, 1.7, 3.5, 3.6, and 3.7)**
6. Demonstrate research and scientific curiosity. **(OTR Scholar 1.5, 1.10, 2.1.1, and 4.3)**
7. Demonstrate ethics and research, human subjects and relationship with industry. **(OTR Scholar 4.1 and 4.2)**
8. Contribute academically to the teaching of undergraduate students and paramedical personnel. **(OTR Scholar 3.1 and 3.4.1)**
9. Identify and report conflicts of interest. **(OTR Scholar 4)**

8.2.6 PROFESSIONAL

A. Unit objectives

Upon completion of this segment, the resident must:

1. Provide high level care with integrity, honesty, and compassion with regards to the investigation and treatment of pleuropulmonary disorders. **(OTR Professional 1.1)**
2. Ensure optimal professional conduct (individual and multidisciplinary) with regards to the investigation and treatment of the patient afflicted by a pleuropulmonary disorder. **(OTR Professional 1.2)**
3. Practice Thoracic Surgery according to the principles of deontology, and according to the obligations of the surgeon involved in the investigation and treatment of pleuropulmonary disorders. **(OTR Professional 1.2 and 1.3)**
4. Demonstrate a high level of responsibility towards the postoperative thoracic surgical patient by being available, respecting confidentiality, and respecting the physical and emotional needs of each patient. **(OTR Professional 1.5)**
5. Work with integrity and according to best practice guidelines, specifically by referring or consulting other health professional when required. **(OTR Professional 1.2 and 1.3)**
6. Report clinical or scientific information with a high level of precision. **(OTR Professional 1.1 and 2.5)**
7. Demonstrate practical knowledge of the provincial and federal regulations with regards to the investigation and treatment of patients afflicted by a pleuropulmonary disorder, whether it is benign or malignant. **(OTR Professional 2.1)**
8. Maintain control of one's own emotions and opinions and identify personal reactions that could be

detrimental to the patient/surgeon relationship. Explore and even accept possible ways to change attitudes that may be perceived as damaging to the patient/surgeon relationship. **(OTR Professional 1.6, 2.1, and 2.4)**

9. Identify a colleague or another physician with whom it is possible to discuss personal objectives, conflicts, or stress. **(OTR Professional 3.1)**

B. Contents

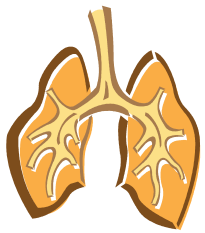
1. Demonstrate integrity, honesty, compassion. **(OTR Professional 1.1)**
2. Behave ethically and responsibly towards other health professionals. **(OTR Professional 3.3)**
3. Demonstrate excellence in the clinical practice of Thoracic Surgery and maintenance of competence. **(OTR Professional 1.2)**
4. Demonstrate awareness of the obligation to provide necessary information to the organizations responsible for regulating the profession. **(OTR Professional 2.2 and 2.3)**
5. Describe the principles and theories of bioethics and medico legal aspects of the practice of Thoracic Surgery. **(OTR Professional 1.7)**

8.3 RECOMMENDED LECTURES

1. Cerfolio RJ : Air leaks and the pleural space. Chest Surg Clinics, Vol. 12, No 3, August 2002
2. Demmy TL : Lung surgery complications : Prevention and management. Thoracic Surg Clinics, Vol. 16, No 3, August 2006
3. Deslauriers J, Mehran R : Handbook of peri operative care in general thoracic surgery. Elsevier 2005 (chapters 2.1, 3.1, 3.6, 3.8, 3.9, 7.0, 11.2, 11.3, 11.5-11.7, 11.11, 13.1)
4. Deslauriers J, Faber LP : Pneumonectomy Part I and II, Chest surg Clin of North AM 1999
5. Deslauriers J : Thoracic anatomy, Part I : Chest wall, airway, lungs. Thoracic Surgery Clinics, November 2007
6. Downey RJ : Current surgical management of pulmonary metastases. Thoracic Surg Clin, Vol. 16, No 2, May 2006
7. Franco K, Putnam JB : Advanced therapy in thoracic surgery. BC Decker Inc. 2005 (chapters 2, 4-6, 13, 16, 18-21, 23, 24)
8. Frank JR : Le cadre des compétences CanMEDSS 2005 pour les médecins. Le Collège Royal des médecins et chirurgiens du Canada
9. Ginsberg RJ, Ruckdeschel JC : Lung cancer : Past, present, and future, Part I and Part II. Chest Surg Clinics, Vol. 10, No 4, November 2000 and Vol. 11, No 1, February 2001
10. Kaiser LR, Kron IL, Spray TL : Mastery of cardio thoracic surgery, Second Edition. Lippincott, Williams, and Wilkins 2007 (part III (p87-99), Part V (p149-199))
11. Kaiser LR, Jamieson GG : Operative thoracic surgery. Hodder Arnold, Fifth Edition 2006 (chapters 6, 14, 15, 17, 18, 20-22, 24, 28, 31)
12. Landreneau RJ : Management of stage I non-small cell lung cancer. Thorac Surg Clinics, Vol. 17, No 2, 2007
13. Naunheim KS : Surgery for emphysema. Chest Surg Clinics, Vol. 13, No 4, November 2003
14. Pearson's Thoracic Surgery, Third Edition, Elsevier 2008 (chapters 35-97)
15. Rusch VW : Aggressive surgery for lung cancer, Thoracic Surgery Clinics, Vol. 12 No 2 May 2004
16. Shields T et al : General Thoracic Surgery, Sixth Edition, Lippincott, Williams, Wilkins 2005 (chapters 25-38; 54-69; 80-95; 98-121)
17. Sugarbaker DJ, Chang MY : Mesothelioma, Thorac Surg Clinics, Vol. 14, No 4, November 2004
18. Urschel HC, Cooper JD : Atlas of thoracic surgery, Churchill Livingstone, New York 1995 (Part V (p149-199), Part III (p 87-99))
19. Yang SC, Cameron DE : Current therapy in thoracic and cardiovascular surgery, Mosby 2004 (pp5-8; 76-78; 108-11; 142-250; 290-316)

SECTION IX:

MEDIASTINUM AND PERICARDIUM



9.1 SURGICAL COMPETENCIES

9.1.1 EMBRYOLOGY, ANATOMY, AND PHYSIOLOGY

A. Unit objectives

At the end of this unit, the resident must demonstrate knowledge of the embryology, anatomy, and physiology of the mediastinum and pericardium. The resident must also know the anatomical relationship of these structures with neighbouring organs and how to apply the results of investigations (invasive and non invasive) to the treatment of these patients. **(OTR Medical Expert 2.1.2)**

B. Learner specific objectives

Upon completion of this unit, the resident must:

1. Demonstrate knowledge of the embryology of mediastinal structures and that of the pericardium. The resident must also know the variants of normal embryogenesis and their anatomopathologic consequences. **(OTR Medical Expert 2.1.2 and 2.1.5)**
2. Demonstrate knowledge of the anatomic boundaries of the mediastinum and the anatomic classification of the various mediastinal compartments. The resident must also demonstrate knowledge of the anatomy of the structures located within the mediastinum and their relationship with neighbouring structures. **(OTR Medical Expert 2.1.2)**
3. Demonstrate knowledge of the anatomy of the pericardium and its relationship with neighboring structures. The resident must also demonstrate knowledge of the impact of pericardial pathologies upon cardiac physiology. **(OTR Medical Expert 2.1.2 and 2.1.5)**
4. Demonstrate knowledge of the imaging techniques that can be used to investigate the mediastinum including standard chest radiographs, CT scan, MRI, oesophageal studies, and angiography. **(OTR Medical Expert 3.4.4 and 3.4.5)**

C. Contents (OTR Medical Expert 2.1.2)

1. Anterior mediastinum
   a) Boundaries and divisions (superior, inferior)
   b) Structures located in the anterior mediastinum
   c) Techniques of investigation (invasive and non invasive)
2. Middle mediastinum
   a) Boundaries
   b) Structures located in the middle mediastinum
   c) Techniques of investigation (invasive and non invasive)
3. Posterior mediastinum (paravertebral sulcus)
   a) Anatomical boundaries
   b) Structures located in the posterior mediastinum
   c) Techniques of investigation (invasive and non invasive)

D. Clinical skills

During the training period, the resident must:

1. Interpret imaging studies of the mediastinum, more specifically standard chest radiographs, CT scaning, MRI, angiography (superior vena cava, aorta) and contrast studies of the oesophagus. **(OTR Medical Expert 3.4.4 and 3.4.5)**
2. Correlate knowledge of the anatomy with imaging and mediastinal pathologies. **(OTR Medical Expert 3.4.5, 3.4.5, and 3.5.1)**
3. Correlate knowledge of the physiology of the pericardium with pericardial pathologies, their repercussions on cardiac physiology, and the differential diagnosis between pericardial and myocardial pathologies. **(OTR Medical Expert 2.1.5 and 3.3)**

9.1.2 CONGENITAL ANOMALIES OF THE MEDIASTINUM

A. Unit objective

At the end of this unit, the resident must demonstrate knowledge of the congenital anomalies of the mediastinum. The resident must also investigate and treat them surgically and non-surgically. **(OTR Medical Expert 2.1.2)**

B. Learner specific objectives

Upon completion of this unit, the resident must:

1. Diagnose and classify mediastinal cysts. **(OTR Medical Expert 2.1.2)**
2. Demonstrate knowledge of the symptoms that can be associated with congenital anomalies of the mediastinum. **(OTR Medical Expert 3.1 and 3.2)**
3. Demonstrate knowledge of the surgical indications in the treatment of congenital anomalies of the mediastinum and the surgical approaches that can be used. **(OTR Medical Expert 5.2.1.4)**

C. Contents

1. Mediastinal cysts **(OTR Medical Expert 2.1.2)**
    a) Anterior mediastinum
        1) Cystic hygromas, lymphangiomas
    b) Middle mediastinum
        1) Pleuro pericardial cysts
        2) Bronchogenic cysts
    c) Posterior mediastinum
        1) Oesophageal and enterogenic cysts
        2) Oesophageal duplications
        3) Neuro-enteric cysts
2. Symptomatology related to congenital anomalies of the mediastinum **(OTR Medical Expert 3.2)**
3. Investigation techniques **(OTR Medical Expert 3.3, 3.4.4, and 3.4.5)**
4. Indications for surgical and non-surgical treatment **(OTR Medical Expert 3.3 and 5.2.1.4)**

D. Clinical skills

During the training period, the resident must:

1. Interpret the results of imaging techniques used for the investigation of congenital anomalies of the mediastinum including standard chest radiograph, CT scanning, MRI, angiography, and contrast studies of the oesophagus. **(OTR Medical Expert 3.4.1, 3.4.4, and 3.4.5)**
2. Diagnose and treat patients with congenital anomalies of the mediastinum. **(OTR Medical Expert 3.1, 3.2, and 3.3)**
3. Perform operations that are required for the treatment of congenital anomalies of the mediastinum. **(OTR Medical Expert 5.2.1.4)**

9.1.3 ACQUIRED DISEASES OF THE MEDIASTINUM

A. Unit objectives

At the end of this unit, the resident must demonstrate knowledge of the differential diagnosis of mediastinal masses, investigate them, and treat them (surgical, non-surgical, multi modality). **(OTR Medical Expert 2.1.2 and 5.2.1.4)**

B. Learner specific objectives

Upon completion of this unit, the resident must:

1. Demonstrate knowledge of the classification, etiology, and treatment of acute mediastinitis. **(OTR Medical Expert 2.1.2 and 5.2.2.7)**
2. Demonstrate knowledge of the classification, etiology, and treatment of chronic and fibrosing mediastinitis. **(OTR Medical Expert 2.1.2, 3.1, 3.2, and 3.3)**
3. Demonstrate knowledge of the classification of mediastinal masses and the techniques that can be used for investigation. **(OTR Medical Expert 2.1.2 and 3.3)**
4. Demonstrate knowledge of the anatomic location of the most important mediastinal masses. **(OTR Medical Expert 2.1.2)**
5. Demonstrate knowledge of the histology and classification of the most important mediastinal tumors. **(OTR Medical Expert 2.1.2)**
6. Evaluate and treat patients with myasthenia gravis (MG). **(OTR Medical Expert 2.1.2)**
   a) Relationship between MG and thymoma
   b) Symptomatology and grading
   c) Investigation by imaging and laboratory testing
   d) Surgical indications
   e) Perioperative treatment
   f) Surgical approaches and techniques
7. Demonstrate knowledge of the symptomatology, causes and principles of investigation of the patient who has a mediastinal syndrome. **(OTR Medical Expert 3.1, 3.2, and 3.3)**
8. Demonstrate knowledge of the symtomatology, causes, and principles of investigation of the patient with superior vena cava syndrome. **(OTR Medical Expert 3.1, 3.2, and 3.3)**
9. Describe the principles applicable to the surgical and non-surgical treatment of patients with mediastinal masses and the complications related to these treatments. **(OTR Medical Expert 3.3, 5.2.1.4, and 5.2.2.7)**
10. Demonstrate knowledge of the role of chemotherapy and radiotherapy in the treatment of mediastinal tumors. **(OTR Medical Expert 2.1.1 and 2.4)**

C. Contents

1. Acute mediatinitis **(OTR Medical Expert 2.1.2)**
   a) Classification and aetiologies
   b) Clinical presentation and investigation
   c) Principles of treatment surgical and non-surgical
   d) Systemic repercussions and prognosis
2. Fibrosing mediastinitis **(OTR Medical Expert 2.1.2)**
   a) Classification and aetiologies
   b) Clinical presentation and investigation
   c) Principles of treatment, surgical, non-surgical, and palliative
   d) Natural history and prognosis
3. Tumors and masses of the anterior mediastinum **(OTR Medical Expert 2.1.2 and 2.1.1)**
   a) Thymic tumors
      1) Histopathologic classification (thymomas, thymic carcinomas, lymphomas)
      2) Clinical presentation and investigation
      3) Relationship with myasthenia gravis
      4) Treatment and prognosis
   b) Thyroid masses
      1) Classification, histopathology, and anatomy
      2) Clinical presentation, investigation, and treatment
   c) Germ cell tumors
      1) Histopathologic and anatomic classification
      2) Clinical presentation, and investigation (markers, imaging, biopsy)
      3) Treatment and prognosis
   d) Lymphomas
      1) Histopathologic classification, clinical presentation, investigation (imaging, biopsy)
      2) Treatment and prognosis
   e) Mesenchymal tumors
      1) Histopathologic classification, clinical presentation, investigation (imaging, biopsy)
      2) Treatment and prognosis
4. Tumors and masses of the middle mediastinum **(OTR Medical Expert 2.1.1 and 2.1.2)**
   a) Pathologies of the lymph nodes
      1) Histopathologic classification (benign, malignant)
      2) Clinical presentation, investigation (imaging, biopsy techniques)
      3) Treatment according to etiology
5. Tumors and masses of the posterior mediastinum **(OTR Medical Expert 2.1.1 and 2.1.2)**
   a) Neurogenic tumors
      1) Histopathologic classification, clinical presentation, investigation (imaging, biopsy)
      2) Treatment and prognosis
      3) Dumbbell tumors
         a) Clinical presentation and investigation
         b) Surgical approaches and techniques used for their excision
6. Diagnostic studies **(OTR Medical Expert 3.4.4, 3.4.5, and 3.4.7)**
   a) Standard chest radiographs, CT scanning, MRI, contrast studies of the oesophagus, isotopic scans, PET scan, ultrasonography
   b) Biopsy techniques
      1) Transthoracic needle or trocar biopsy
      2) Mediastinoscopy, mediastinotomy, thoracoscopy
   c) Biochemistry
      1) Serologic markers
      2) Thyroid function tests

   d) Electromyography for the patient with MG
7. Surgical treatment **(OTR Medical Expert 5.2.1.4 and 5.2.2.7)**
   a) Surgical indications and approaches
   b) Excision techniques and complications

D. Clinical skills

During the training period, the resident must:

1. Classify and understand the pathologic anatomy of mediastinal masses. **(OTR Medical Expert 2.1.2)**
2. Investigate patients with mediastinal masses, including the use of imaging and biopsy techniques. **(OTR Medical Expert 3.4.4 and 3.4.5)**
3. Establish the differential diagnosis of mediastinal tumors and masses according to their location. **(OTR Medical Expert 2.1.2)**
4. Recommend the appropriate treatment in a patient with a mediastinal mass. **(OTR Medical Expert 3.3)**
5. Recognize the indications for chemotherapy or radiotherapy as primary or adjuvant treatment. **(OTR Medical Expert 2.1.1)**
6. Perform the surgical resection of mediastinal tumors and masses. **(OTR Medical Expert 5.2.1.4)**
7. Diagnose and treat patients with acute mediastinitis. **(OTR Medical Expert 3.1, 3.2, 3.3, and 5.2.2.7)**
8. Diagnose and treat patients with chronic fibrosing mediastinitis. **(OTR Medical Expert 3.1, 3.2, 3.3, and 5.2.1.4)**

9.1.4 CONGENITAL AND ACQUIRED DISEASES OF THE PERICARDIUM

A. Unit objectives

At the end of this unit, the resident must demonstrate knowledge of the diseases of the pericardium, and the surgical and non-surgical treatment of these diseases. **(OTR Medical Expert 2.1.2 and 2.1.5)**

B. Learner specific objectives

Upon completion of this unit, the resident must:

1. Demonstrate knowledge of the pathophysiology of pericardial effusions, and its consequences on cardiac physiology, their investigation, and the principles applicable to their treatment. **(OTR Medical Expert 2.1.5)**
2. Classify and treat malignant pericardial effusions. **(OTR Medical Expert 2.1.5)**
3. Demonstrate knowledge of the classification and histopathology of pericardial tumors. **(OTR Medical Expert 2.1.5)**
4. Demonstrate knowledge of the etiology and consequences of acute cardiac tamponnade. **(OTR Medical Expert 2.1.5)**
5. Demonstrate knowledge of the etiology and consequences of constrictive pericarditis. **(OTR Medical Expert 2.1.5)**
6. Demonstrate knowledge of the techniques of investigation that can be used in patients with pericardial diseases including standard chest radiographs, CT scan, ultrasonography, heart catheterization, pericardiocentesis, and biopsy. **(OTR Medical Expert 3.3, 3.4.4, 3.4.5 and 3.5.1)**

C. Contents (OTR Medical Expert 2.1.5)

1. Pericardial effusion
   a) Etiology : benign, malignant
   b) Diagnosis : imaging, pericardiocentesis
   c) Treatment surgical and non-surgical
2. Constrictive pericarditis
   a) Etiology, postoperative and infectious
   b) Diagnostic tests and differential diagnosis with restrictive syndromes
   c) Surgical and non-surgical treatment
3. Pericardial tumors and cysts
   a) Pleuro pericardial cysts
   b) Benign and malignant tumors
   c) Surgical and non-surgical treatment

D. Clinical skills

During the training period, the resident must:

1. Diagnose diseases of the pericardium using knowledge of the physiology and pathophysiology of the pericardium. **(OTR Medical Expert 2.1.5)**
2. Evaluate patients with pericardial effusions including performing pericardiocentesis **(OTR Medical Expert 2.1.5, 3.3, and 3.5.1)**
3. Evaluate and treat patients with malignant pericardial effusions using thoracoscopic approaches and pericardial windows. **(OTR Medical Expert 5.2.1.1)**
4. Evaluate and treat patients with pleuropericardial cysts or pericardial neoplasms. **(OTR Medical Expert 3.3 and 5.2.1.4)**
5. Treat and use the appropriate diagnostic tests for patients with cardiac tamponnade, pericardial effusion, and constrictive pericarditis. **(OTR Medical Expert 3.3 and 5.2.1.4)**

9.2 CanMEDS COMPETENCIES

9.2.1 COMMUNICATOR

A. Unit objectives

Upon completion of this segment, the resident must:

1. Present to colleagues in a clear and precise manner knowledge about the evaluation and treatment of the patient afflicted by a disorder of the mediastinum and pericardium. **(OTR Communicator 3.1, 5.1, and 5.2)**
2. Discuss with the patient, family, and paramedical personnel the main complications that can be associated with surgery done for mediastinal or pericardial disorders and their treatment. **(OTR Communicator 1.1, 1.2.1, and 3.1)**

B. Contents

1. Demonstrate confidence and ethics in the relationship between Thoracic Surgeon and patient. **(OTR Communicator 1.1 and 1.5)**
2. Establish a therapeutic relationship with the patient, family, and other participants (medical and non medical). **(OTR Communicator 1.2)**
3. Establish mutual comprehension and understanding of the patient's needs. **(OTR Communicator 1.2, 2.1, and 3.1)**
4. Collect and summarize pertinent information regarding the Thoracic Surgical patient afflicted by a

disorder of the mediastinum or pericardium including clinical history, physical examination, differential diagnosis, and therapeutic options. **(OTR Communicator 2.1 and 2.2)**
5. Provide oral and written communication of information pertinent to the patient afflicted by a disorder of the mediastinum and pericardium. **(OTR Communicator 3.1, 5.1, 5.2, and 5.3)**
6. Respect the diversity and pay attention to the psychosocial aspects of the patient during the immediate postoperative period. **(OTR Communicator 3.1.2 and 4.2)**
7. Report mistakes and undesirable side effects. **(OTR Communicator 4.5, 5.1, and 5.2)**

9.2.2 COLLABORATOR

A. Unit objectives

Upon completion of this segment, the resident must:

1. Collaborate with the chest physician, cardiologist, oncologist, anaesthetist, and other health professionals with regards to the optimal evaluation and choice of treatment of the patient afflicted by a disorder of the pericardium or mediastinum. **(OTR Collaborator 1.1, 1.3.1, and 1.4)**
2. Determine with the help of these consultants the best methods to investigate and treat patients afflicted by a disorder of the pericardium or mediastinum and what precautions should be taken to prevent complications. **(OTR Collaborator 1.2, 1.2.1, and 1.7)**

B. Contents

1. Share knowledge, information, and decision making processes. **(OTR Collaborator 1.6)**
2. Delegate appropriately and encourage team work **(OTR Collaborator 1.2.1 and 2.3)**
3. Respect other members of the multidisciplinary team. **(OTR Collaborator 1.3, 1.8, and 2.6)**
4. Provide inter and multiprofessionnal care of the thoracic surgical patient afflicted by a disorder of the mediastinum or pericardium. **(OTR Collaborator 1.5 and 1.6)**
5. Identify, manage, prevent, and resolve conflicts. **(OTR Collaborator 2.2, 2.3, and 2.4)**
6. Recognize one's own role within the multidisciplinary team and recognize one's own limitations. **(OTR Collaborator 1.1, 2.4, and 2.5)**

9.2.3 MANAGER

A. Unit objective

Upon completion of this segment, the resident must:

Appreciate the relationship between costs, benefits, and results as it applies to the investigation and treatment of the patient afflicted by a disorder of the mediastinum or pericardium. **(OTR Manager 3.1 and 3.2)**

B. Contents

1. Describe the role and responsibilities of the Thoracic Surgeon in the health care system and more specifically in the care of the patient afflicted by a disorder of the mediastinum or pericardium. **(OTR Manager 1.1)**
2. Demonstrate leadership, supervision, and administration within the health care system. **(OTR Manager 1.3)**
3. Describe the organization, structure, and financing of the health care system. **(OTR Manager 1.4 and 3.2)**
4. Manage time in the context of clinical work. **(OTR Manager 2.2 and 4.3)**
5. Manage financial aspects of the medical practice and negotiations. **(OTR Manager 1.4, 2.2, and 2.3)**

6. Demonstrate knowledge of career evolution. **(OTR Manager 4.1, 4.2, and 4.3)**

9.2.4 HEALTH ADVOCATE

A. Unit objectives

Upon completion of this segment, the resident must:

1. Appreciate the environmental health hazards that could be associated with disorders of the pericardium and mediastinum especially those disorders that are likely to require a surgical intervention. **(OTR Health Advocate 1.2.3)**
2. Recognize the importance of taking control over the investigation and treatment of the patient afflicted by a disorder of the mediastinum or pericardium. **(OTR Health Advocate 2.1.1)**

B. Contents

1. Demonstrate knowledge of patient and their background. **(OTR Health Advocate 1.1 and 1.2.1)**
2. Promote health and integrate concepts of preventive medicine. **(OTR Health Advocate 2.1.3 and 2.1.4)**
3. Identify risk factors for postoperative complications after mediastinal or pericardial surgery including psychological, biological, sociological, cultural, and economic factors. **(OTR Health Advocate 1.2.2, 2.1.2, and 3.1)**
4. Describe the role of the Thoracic Surgeon within the community and responsible use of authority and influences. **(OTR Health Advocate 2.2)**
5. Adapt one's personal practice according to patient's needs. **(OTR Health Advocate 2.3 and 4.5)**
6. Ensure the security of patients. **(OTR Health Advocate 3.1 and 4.6)**

9.2.5 SCHOLAR

A. Unit objectives

Upon completion of this segment, the resident must:

1. Critically assess the medical literature pertinent to the care of the thoracic surgical patient afflicted by a disorder of the mediastinum or pericardium. **(OTR Scholar 1.2, 1.6, and 2.3)**
2. Critically assess the methods and techniques that can be used to prevent postoperative complications. **(OTR Scholar 2.2)**

B. Contents

1. Maintain and enhance knowledge. **(OTR Scholar 1.2 and 4.4)**
2. Demonstrate moral and professional obligation to maintain and improve competencies. **(OTR Scholar 1.1, 1.9, and 4.4)**
3. Perform self-evaluation and identification of the need to improve one's own knowledge and level of competence. **(OTR Scholar 1.2, 1.3, 1.4, and 1.8)**
4. Access available information and critically evaluate the literature. **(OTR Scholar 1.6 and 4.5)**
5. Demonstrate willingness to learn and use modern learning techniques. **(OTR Scholar 1.3, 1.7, 3.5, 3.6, and 3.7)**
6. Demonstrate research and scientific curiosity. **(OTR Scholar 1.5, 1.10, 2.1.1, and 4.3)**
7. Demonstrate knowledge of ethics and research, human subjects and relationship with industry. **(OTR Scholar 4.1 and 4.2)**
8. Contribute academically to the teaching of undergraduate students and paramedical personnel. **(OTR Scholar 3.1 and 4.1)**
9. Identify and report conflicts of interest. **(OTR Scholar 4)**

9.2.6 PROFESSIONAL

A. Unit objectives

Upon completion of this segment, the resident must:

1. Provide high level care with integrity, honesty, and compassion to the patient afflicted by a disorder of the mediastinum or pericardium. **(OTR Professional 1.1)**
2. Ensure optimal professional conduct (individual and multidisciplinary) with regards to the patient afflicted by a disorder of the mediastinum or pericardium. **(OTR Professional 1.2)**
3. Practice Thoracic Surgery according to the principles of deontology, and according to the obligations of the surgeon involved in the investigation and treatment of patients afflicted by a disorder of the mediastinum or pericardium. **(OTR Professional 1.2 and 1.3)**
4. Demonstrate a high level of responsibility towards the postoperative thoracic surgical patient by being available, respecting confidentiality, and respecting the physical and emotional needs of each patient. **(OTR Professional 1.5)**
5. Work with integrity and according to best practice guidelines, specifically by referring or consulting other health professionals when required. **(OTR Professional 1.2 and 1.3)**
6. Report clinical or scientific information with a high level of precision. **(OTR Professional 1.4 and 2.5)**
7. Demonstrate practical knowledge of the provincial and federal regulations as they apply to the investigation and treatment of patients afflicted by a disorder of the mediastinum or pericardium. **(OTR Professional 2.1)**
8. Maintain control of one's own emotions and opinions and identify personal reactions that could be detrimental to the patient/surgeon relationship. Explore and even accept possible ways of changing attitudes that may be perceived as damaging to the patient/surgeon relationship. **(OTR Professional 1.6, 2.4 and 3.2.1)**
9. Identify a colleague or another physician with whom it is possible to discuss personal objectives, conflicts, or stress. **(OTR Professional 3.1)**

B. Contents

1. Demonstrate integrity, honesty, compassion. **(OTR Professional 1.1)**
2. Behave ethically and responsibly towards other health professionals. **(OTR Professional 3.3)**
3. Demonstrate excellence in the clinical practice of Thoracic Surgery and maintenance of competence. **(OTR Professional 1.2)**
4. Demonstrate awareness of the obligation to provide necessary information to the organizations responsible of regulating the profession. **(OTR Professional 2.2 and 2.3)**
5. Describe the principles and theories of bioethics and medico legal aspects of the practice of Thoracic Surgery. **(OTR Professional 1.7)**

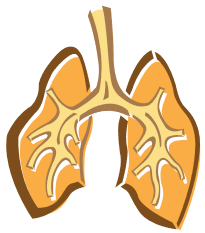
9.3 RECOMMENDED LECTURES

1. Deslauriers J, Mehran R : Handbook of peri operative care in general thoracic surgery. Elsevier 2005 (chapters 3.2, 5.3)
2. Franco KL, Putnam JB : Advanced therapy in thoracic surgery. BC Decker Inc. 2005 (chapters 33-36)
3. Frank JR : Le cadre des competencies CanMEDSS 2005 pour les médecins. Le Collège Royal des médecins et chirurgiens du Canada
4. Kaiser LR, Kron IL, Spray TL : Mastery of cardiothroracic surgery, Second Edition. Lippincott, Williams, and Wilkins, 2007 (chapters 13-15, 29)
5. Kaiser LR, Jamieson GG : Operative thoracic surgery, Fifth Edition, Hodder Arnold 2006 (chapters 4, 5, 25, 29, 30)
6. Kesler KA : Primary and metastatic germ cell tumors. Chest Surg Clin Vol.2 No 4 November 2002

7. Kirschner PA : The thymus. Chest Surg Clin Vol.11 No 2 May 2001
8. Pearson's Thoracic Surgery, Third Edition, Elsevier 2008 (chapters 122-142)
9. Shields T et al : General Thoracic Surgery, Sixth Edition, Lippincott, Williams, and Wilkins 2005 (chapters 154-197)
10. Shields TW : Mediastinal surgery. Lea and Fesiger, Philadelphia 1991
11. Urschel HC, Cooper JD : Atlas of thoracic surgery. Churchill Livingstone 1995 (Part II (pp68-87))
12. Yang SC, Cameron DE : Current therapy in thoracic and cardiovascular surgery. Mosby 2004 (pp321-339; 530-536)

SECTION X:

DIAPHRAGM



10.1 SURGICAL COMPETENCIES

10.1.1 EMBRYOLOGY, ANATOMY, PHYSIOLOGY

A. Unit objective

At the end of this unit, the resident must demonstrate knowledge of the embryology, anatomy, and physiology of the diaphragm. The resident must also demonstrate knowledge of the anatomic relationship between the diaphragm and neighbouring structures. Finally, the resident must demonstrate knowledge of and use imaging techniques as they apply to the diaphragm. **(OTR Medical Expert 2.1.2, 3.3, 3.4.4, and 3.4.5)**

B. Learner specific objectives

Upon completion of this unit, the resident must:

1. Demonstrate knowledge of the embryology of the diaphragm. **(OTR Medical Expert 2.1.2)**
2. Demonstrate knowledge of the anatomy of the diaphragm and that of its relationships with neighboring structures. **(OTR Medical Expert 2.1.2)**
3. Demonstrate knowledge of the vascular supply and innervation of the diaphragm and the possible consequences associated with loss of innervation. **(OTR Medical Expert 2.1.2 and 2.4)**
4. Demonstrate knowledge of the imaging techniques that can be used to investigate diaphragmatic diseases and how to interpret the results of these tests. **(OTR Medical Expert 3.3, 3.4.4, and 3.4.5)**
5. Demonstrate knowledge of the consequences of incisions made in the diaphragm and the consequences of diaphragmatic paralysis. **(OTR Medical Expert 5.2.1.6)**
6. Demonstrate knowledge of the congenital anomalies of the diaphragm and their embryogenesis. **(OTR Medical Expert 2.1.2)**

C. Contents

1. Normal anatomy of the diaphragm **(OTR Medical Expert 2.1.2)**
   a) Origin, insertion, innervation and vascular supply (anatomy of the phrenic nerve)
   b) b) Diaphragmatic openings (oesophagus, aorta, inferior vena cava)
2. Adjacent structures **(OTR Medical Expert 2.1.2)**
   a) Heart and lungs
   b) Intra abdominal organs
3. Imaging of the diaphragm **(OTR Medical Expert 3.4.4 and 3.4.5)**
   a) Standard radiographs, fluoroscopy
   b) CT scan, MRI
   c) Ultrasonography

D. Clinical skills

During the training period, the resident must:

1. Evaluate and treat diaphragmatic abnormalities using knowledge of diaphragmatic anatomy and physiology. **(OTR Medical Expert 2.1.2 and 2.1.3)**
2. Evaluate and treat congenital abnormalities of the diaphragm using knowledge of diaphragmatic embryology. **(OTR Medical Expert 2.1.2)**
3. Evaluate and interpret imaging studies of the diaphragm including standard radiographs, fluoroscopy, CT scan, and MRI. **(OTR Medical Expert 3.3, 3.4.4, and 3.4.5)**

10.1.2 CONGENITAL ANOMALIES

A. Unit objectives

At the end of this unit, the resident must recognize and classify the congenital abnormalities of the diaphragm. The resident must also diagnose them and demonstrate knowledge of the pathophysiologic consequences of these anomalies. Finally, the resident must be able to recommend and perform the surgical and non-surgical treatments. **(OTR Medical Expert 2.1.2, 5.2.1.1 and 5.2.2.11)**

B. Learner specific objectives

Upon completion of this unit, the resident must:

1. Demonstrate knowledge of the embryogenesis and anatomy of congenital diaphragmatic hernia. **(OTR Medical Expert 2.1.2)**
2. Demonstrate knowledge of the clinical presentation of congenital diaphragmatic hernia in adult populations. **(OTR Medical Expert 3.1, 3.2, and 3.3)**
3. Recognize the pathophysiologic consequences or these hernias. **(OTR Medical Expert 3.3)**
4. Investi gate and diagnose congenital diaphragmatic hernias in the adult. **(OTR Medical Expert 3.3, 3.4.4, and 3.4.5)**
5. Demonstrate knowledge of the surgical indications and the complications related to these types of surgery. **(OTR Medical Expert 5.2.1.1 and 5.2.2.11)**

C. Contents

1. Congenital diaphragmatic hernia **(OTR Medical Expert 2.1.2)**
   a) Embryogenesis and classification
   b) Clinical presentation and investigation by standard radiographs, contrast studies of the oesophagus, CT scan, and MRI
   c) Differential diagnosis
   d) Cardiovascular, pulmonary, and gastro-intestinal consequences
   e) Treatment and complications of corrective surgery

D. Clinical skills

During the training period, the resident must:

1. Evaluate newborns with congenital diaphragmatic hernia. **(OTR Medical Expert 3.1 and 3.2)**
2. Perform or participate in the surgery of the repair of congenital diaphragmatic hernia in infants. **(OTR Medical Expert 3.3 and 5.2.2.11)**
3. Participate in the pre or and postoperative care of infants with congenital diaphragmatic hernia. **(OTR Medical Expert 3.5.3)**
4. Perform or participate in the surgery of the repair of congenital eventrations in infants. **(OTR**

Medical Expert 5.2.2.11)

5. Perform the surgery of the repair of a congenital diaphragmatic hernia diagnosed in the adult. **(OTR Medical Expert 5.2.2.11)**

10.1.3 ACQUIRED DISORDERS

A. Unit objectives

At the end of this unit, the resident must demonstrate knowledge of the acquired disorders of the diaphragm including the neoplasms. The resident must also demonstrate knowledge of the consequences of diaphragmatic paralysis and how to treat these problems. **(OTR Medical Expert 2.1.1 and 2.1.2)**

B. Learner specific objectives

Upon completion of this unit, the resident must:

1. Demonstrate knowledge of the methods of investigation used for the diagnosis of infectious processes located adjacent to the diaphragm (above or below). **(OTR Medical Expert 2.1.3, 3.3, 3.4.4, and 3.4.5)**
2. Demonstrate knowledge of the etiology, classification, clinical presentation, techniques of investigation and treatment of acquired non traumatic diaphragmatic hernias. **(OTR Medical Expert 2.1.2)**
3. Demonstrate knowledge of the etiology, clinical presentation, techniques of investigation, and treatment of diaphragmatic paralysis. **(OTR Medical Expert 2.1.2 and 3.3)**
4. Familiarize themselves with the pathophysiologic consequences of diaphragmatic paralysis. **(OTR Medical Expert 3.3)**
5. Demonstrate knowledge of the etiology, classification, clinical presentation, investigation, and treatment of diaphragmatic eventrations. **(OTR Medical Expert 2.1.2 and 3.3)**
6. Demonstrate knowledge of the anatomopathologic classification of primary neoplasms of the diaphragm. **(OTR Medical Expert 2.1.2)**
7. Demonstrate knowledge of the surgical techniques that can be used to reconstruct the diaphragm. **(OTR Medical Expert 5.2.2.11)**
8. Familiarize themselves with plication techniques of the diaphragm. **(OTR Medical Expert 5.2.2.11)**

C. Contents (OTR Medical Expert 2.1.2)

1. Periphrenic abscesses
   a) Causes, clinical presentation and physiologic consequences
   b) Surgical indications, approaches and techniques used for drainage
2. Non traumatic acquired diaphragmatic hernia
   a) Classification, etiology, clinical presentation and pathophysiologic consequences
   b) Surgical indications, approaches, and techniques used for repair
3. Eventration and diaphragmatic paralysis
   a) Classification, etiology
   b) Clinical presentation, differential diagnosis, and pathophysiologic consequences
   c) Treatment
4. Neoplasms of the diaphragm
   a) Anatomopathologic classification
   b) Origin (mesenchymatous, neurogenic, invasion from a tumor in a neighboring organ)
   c) Investigation and treatment

D. Clinical skills

During the training period, the resident must:

1. Interpret imaging studies of the diaphragm including standard radiographs, CT scan, MRI, fluoroscopy, and contrast studies of the oesophagus and stomach. **(OTR Medical Expert 3.3 and 3.4.4)**
2. Familiarize themselves with the physiologic investigation of the diaphragm (electromyography). **(OTR Medical Expert 3.4.4 and 3.4.5)**
3. Perform diagnostic maneuvers such as pneumoperitoneum, surgical biopsies, video thorascoscopy. **(OTR Medical Expert 5.2.1.1)**
4. Perform surgery to repair acquired diaphragmatic hernias. **(OTR Medical Expert 5.2.2.11)**
5. Reconstruct the diaphragm **(OTR Medical Expert 5.2.2.11)**
6. Recognize the indications for surgery and perform the repair of diaphragmatic eventrations (thoracoscopic or open). **(OTR Medical Expert 5.2.2.11)**
7. Mobilize the diaphragm to expose the aorta and rachis. **(OTR Medical Expert 5.2.1.4)**
8. Perform surgical excision of diaphragmatic tumors. **(OTR Medical Expert 5.2.2.11 and 5.2.1.4)**

10.2 CanMEDS COMPETENCIES

10.2.1 COMMUNICATOR

A. Unit objectives

Upon completion of this segment, the resident must:

1. Present to colleagues in a clear and precise manner knowledge concerning the evaluation and treatment of the thoracic surgical patient afflicted by a disorder of the diaphragm whether it is congenital or acquired. **(OTR Communicator 3.1.1, 5.1, and 5.2)**
2. Discuss with the patient, family, and paramedical personnel the main complications that can occur after diaphragmatic surgery as well as their prevention and treatment. **(OTR Communicator 1.1, 1.2, and 3.1)**

B. Contents

1. Demonstrate confidence and ethics in the relationship between Thoracic Surgeon and patient. **(OTR Communicator 1.1 and 1.5)**
2. Establish a therapeutic relationship with the patient, family, and other participants (medical and non medical). **(OTR Communicator 1.2)**
3. Establish mutual comprehension and understanding of the patient's needs. **(OTR Communicator 2.1. and 3.1.2)**
4. Collect and summarize pertinent information regarding the patient afflicted by a diaphragmatic disorder. **(OTR Communicator 2.1 and 2.2)**
5. Provide oral and written communication of pertinent information regarding the patient afflicted by a disorder of the diaphragm, including clinical history, physical examination, differential diagnosis, and therapeutic options. **(OTR Communicator 3.1, 5.1, 5.2 and 5.3)**
6. Respect the diversity and pay attention to the psychosocial aspects of the patient during the immediate postoperative period. **(OTR Communicator 3.1.2 and 4.2)**
7. Report mistakes and undesirable side effects. **(OTR Communicator 4.5, 5.1, and 5.2)**

10.2.2 COLLABORATOR

A. Unit objectives

Upon completion of this segment, the resident must:

1. Collaborate with the chest physician, anaesthetist, and other health professionals with regards to the evaluation and choice of therapy of the thoracic surgical patient afflicted with a disorder of the diaphragm whether it is congenital or acquired. **(OTR Collaborator 1.1, 1.3 and 1.4)**
2. Determine with the help of these consultants the best methods to investigate these patients as well as what precautions should be taken to prevent complications. **(OTR Collaborator 1.2, 1.2.1, and 1.7)**

B. Contents

1. Share knowledge, information, and decision making processes. **(OTR Collaborator 1.6)**
2. Delegate appropriately and encourage team work **(OTR Collaborator 1.2.1 and 2.3)**
3. Respect other members of the multidisciplinary team. **(OTR Collaborator 1.3, 1.8, and 2.6)**
4. Provide inter and multiprofessionnal care of the thoracic surgical patient afflicted by a disorder of the diaphragm. **(OTR Collaborator 1.5 and 1.6)**
5. Identify, manage, prevent, and resolve conflicts. **(OTR Collaborator 2.2, 2.3, and 2.4)**
6. Recognize one's own role within the multidisciplinary team and recognize one's own limitations. **(OTR Collaborator 1.1, 2.5, and 2.4)**

10.2.3 MANAGER

A. Unit objective

Upon completion of this segment, the resident must:

Appreciate the relationship between costs, benefits, and results in the care of the thoracic surgical patient afflicted by a disorder of the diaphragm. **(OTR Manager 3.1 and 3.2)**

B. Contents

1. Describe the role and responsibilities of the Thoracic Surgeon in the health care system and more specifically in the care of the patient afflicted by a disorder of the diaphragm. **(OTR Manager 1.1)**
2. Demonstrate leadership, supervision, and administration within the health care system. **(OTR Manager 1.3)**
3. Describe the organization, structure, and financing of the health care system. **(OTR Manager 1.4 and 3.2)**
4. Manage time in the context of clinical work. **(OTR Manager 2.2 and 4.3)**
5. Manage financial aspects of the medical practice and negotiations. **(OTR Manager 1.4, 2.2, and 2.3)**
6. Demonstrate knowledge of career evolution. **(OTR Manager 4.1, 4.2, and 4.3)**

10.2.4 HEALTH ADVOCATE

A. Unit objective

Upon completion of this segment, the resident must:

Recognize the importance of taking over the evaluation and management of the patient afflicted by a diaphragmatic disorder. **(OTR Health Advocate 2.1.1)**

B. Contents

1. Demonstrate knowledge of patient and their background. **(OTR Health Advocate 1.1 and 1.2.1)**
2. Promote health and integrate concepts of preventive medicine. **(OTR Health Advocate 2.1.3 and 2.1.4)**
3. Identify risk factors for postoperative complications including psychological, biological, sociological, cultural, and economic factors. **(OTR Health Advocate 1.2.2, 2.1.2, and 3.1)**
4. Describe the role of the Thoracic Surgeon within the community and responsible use of authority and influences. **(OTR Health Advocate 2.2)**
5. Adapt one's personal practice according to patient's needs. **(OTR Health Advocate 4.5 and 2.3)**
6. Ensure the security of patients. **(OTR Health Advocate 3.1 and 4.6)**

10.2.5 SCHOLAR

A. Unit objectives

Upon completion of this segment, the resident must:

1. Critically assess the medical literature pertinent to the evaluation and management of diaphragmatic disorders whether they are congenital or acquired. **(OTR Scholar 1.6 and 2.3)**
2. Critically assess the methods and techniques that can be used to prevent postoperative complications. **(OTR Scholar 2.2)**

B. Contents

1. Maintain and enhance knowledge. **(OTR Scholar 1.2 and 4.5)**
2. Demonstrate moral and professional obligation to maintain and improve competencies. **(OTR Scholar 1.1, 1.9, and 4.4)**
3. Perform self-evaluation and identification of the need to improve one's own knowledge and level of competence. **(OTR Scholar 1.2, 1.3, 1.4, and 1.8)**
4. Access available information and critically evaluate the literature. **(OTR Scholar 1.6 and 4.5)**
5. Demonstrate willingness to learn and use modern learning techniques. **(OTR Scholar 1.3, 1.7, 3.5, 3.6, and 3.7)**
6. Demonstrate research and scientific curiosity. **(OTR Scholar 2.1.1, 1.10, 1.5, 4.1, and 4.2)**
7. Demonstrate ethics and research, human subjects and relationship with industry. **(OTR Scholar 4.3)**
8. Contribute academically to the teaching of undergraduate students and paramedical personnel. **(OTR Scholar 3.1 and 3.4.1)**
9. Identify and report conflicts of interest. **(OTR Scholar 4)**

10.2.6 PROFESSIONAL

A. Unit objectives

Upon completion of this segment, the resident must:

1. Provide high level care with integrity, honesty, and compassion to the patient afflicted by a diaphragmatic disorder. **(OTR Professional 1.1)**
2. Ensure optimal professional conduct (individual and multidisciplinary) with regards to the investigation and treatment of the patient afflicted by a diaphragmatic disorder. **(OTR Professional 1.2)**
3. Practice Thoracic Surgery according to the principles of deontology, and according to the obligation of the surgeon involved in the care of the patients afflicted by a diaphragmatic disorder. **(OTR Professional 1.2 and 1.3)**
4. Demonstrate a high level of responsibility towards the postoperative thoracic surgical patient by being available, respecting confidentiality, and respecting the physical and emotional needs of each patient. **(OTR Professional 1.5)**
5. Work with integrity and according to best practice guidelines, specifically by referring or consulting other health professionals when required. **(OTR Professional 1.2 and 1.3)**
6. Report clinical or scientific information with a high level of precision. **(OTR Professional 1.1 and 2.5)**
7. Demonstrate practical knowledge of the provincial and federal regulations with regards to the investigation and treatment of diaphragmatic disorders. **(OTR Professional 2.1)**
8. Maintain control of one's own emotions and opinions and identify personal reactions that could be detrimental to the patient/surgeon relationship. Explore and even accept possible ways of changing attitudes that may be perceived as damaging to the patient/surgeon relationship. **(OTR Professional 1.6, 2.4, and 3.2.1)**
9. Identify a colleague or another physician with whom it is possible to discuss personal objectives, conflicts, or stress. **(OTR Professional 3.1)**

B. Contents

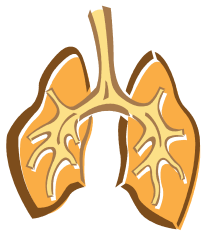
1. Demonstrate integrity, honesty, compassion. **(OTR Professional 1.1)**
2. Behave ethically and responsibly towards other health professionals. **(OTR Professional 3.3)**
3. Formulate excellence in the clinical practice of Thoracic Surgery and maintenance of competence. **(OTR Professional 1.2)**
4. Demonstrate awareness of the obligation to provide necessary information to the organizations responsible for regulating the profession. **(OTR Professional 2.2 and 2.3)**
5. Describe the principles and theories of bioethics and medico legal aspects of the practice of Thoracic Surgery. **(OTR Professional 1.7)**

10.3 RECOMMENDED LECTURES

1. Deslauriers J., Mehran R : Handbook of peri operative care in general thoracic surgery. Elsevier 2005 (chapter 3.4)
2. Frank JR : Le cadre des compétences CanMEDSS 2005 pour les médecins. Le Collège Royal des médecins et chirurgiens du Canada
3. Kaiser LR, Kron IL, Spray TL : Mastery of cardio thoracic surgery, Second Edition. Lippincott, Williams, and Wilkins, 2007 (chapter 27)
4. Pearson's Thoracic Surgery, Third Edition, Elsevier 2008 (chapters 113-121)
5. Shields T et al : General Thoracic Surgery, Sixth Edition, Lippincott, Williams, and Wilkins, 2005 (chapters 48-53)
6. Yang SC, Cameron DE : Current therapy in thoracic and cardiovascular surgery. Mosby 2004 (pp90-94; 452-456)

SECTION XI:

THE OESOPHAGUS



11.1 SURGICAL COMPETENCIES

11.1.1 EMBRYOLOGY, ANATOMY, PHYSIOLOGY

A. Unit objective

At the end of this unit, the resident must demonstrate knowledge of the embryology, anatomy and physiology of the oesophagus as well as the investigation methods pertinent to the oesophagus, normal and abnormal. **(OTR Medical Expert 2.1.2 and 2.1.3)**

B. Learner specific objectives

Upon completion of this unit, the resident must:

1. Demonstrate knowledge of the embryology of the oesophagus. The resident must also demonstrate knowledge of the anatomy of the oesophagus including innervation, vascular supply, and lymphatic drainage, and topographic relationship with neighbouring structures. **(OTR Medical Expert 2.1.2)**
2. Demonstrate knowledge of the physiology of the pharynx, body of the oesophagus, and gastro-oesophageal junction. **(OTR Medical Expert 2.1.4)**
3. Demonstrate knowledge of the methods (physiologic, imaging) that can be used to investigate the oesophagus. **(OTR Medical Expert 2.1.4, 3.4.1, and 3.4.4)**

C. Contents

1. Anatomy of the oesophagus **(OTR Medical Expert 2.1.2)**
   a) General anatomy including topography, location, and relationships with neighboring structures
   b) Histology including microscopic and macroscopic structure of the oesophageal muscle
   c) Innervation, vascular supply, and lymphatic drainage
   d) Anatomy of the oropharynx
   e) Anatomy of oesophageal sphincters
2. Physiology of the oesophagus **(OTR Medical Expert 2.1.4)**
   a) Normal peristaltism
   b) Hormonal and nervous interactions
3. Investigation of the oesophagus **(OTR Medical Expert 3.4.1, 3.4.4, and 3.4.5)**
   a) Contrast radiologic studies
   b) Manometry and pH studies
   c) Isotopic studies
   d) Endoscopy
   e) Ultrasonography (endoluminal)
   f) CT scanning, and MRI

D. Clinical skills

During the training period, the resident must:

1. Interpret imaging studies of the oesophagus including standard radiographs, contrast studies, CT

scan, MRI, and endo-oesophageal ultrasonography. **(OTR Medical Expert 3.4.1, 3.4.4, and 3.4.5)**
2. Evaluate the physiology of the oesophagus by manometry and pH studies. **(OTR Medical Expert 3.4.1)**
3. Perform flexible and rigid endoscopy of the oropharynx and oesophagus. **(OTR Medical Expert 5.1.2)**

11.1.2 CONGENITAL ANOMALIES

A. Unit objectives

At the end of this unit, the resident must demonstrate knowledge of the congenital anomalies of the oesophagus including tracheo-oesophageal fistulas and oesophageal duplications. The resident must also be familiar with the principles applicable to their treatment surgical and non-surgical. **(OTR Medical Expert 2.1.2)**

B. Learner specific objectives

Upon completion of this unit, the resident must:

1. Demonstrate knowledge of the classification and clinical presentation of congenital anomalies of the oesophagus. The resident must also investigate these anomalies and treat oesophageal atresia and tracheo-oesophageal fistulas. **(OTR Medical Expert 2.1.2)**
2. Demonstrate knowledge of the clinical presentation of oesophageal duplications and their treatment. **(OTR Medical Expert 3.1, 3.2, and 3.3)**

C. Contents (OTR Medical Expert 2.1.2)

1. Oesophageal atresia and congenital TE fistulas.
   a) Varieties and classification, embryogenesis
   b) Clinical presentation and diagnosis
   c) Principles of treatment surgical and non-surgical
2. Oesophageal duplications
   a) Varieties and classification, embryogenesis
   b) Clinical presentation
   c) Diagnosis and differential diagnosis
   d) Surgical indications and principles

D. Clinical skills

During the training period, the resident must:

1. Evaluate patients with oesophageal atresia and tracheo-oesophageal fistulas and recommend the appropriate treatment. **(OTR Medical Expert 3.1, 3.2, and 3.3)**
2. Interpret diagnostic studies used in the investigation of theses patients. **(OTR Medical Expert 3.4.1, 3.4.4, and 3.4.5)**
3. Participate in surgical procedures to correct theses anomalies. **(OTR Medical Expert 5.2.1.7)**
4. Perform surgery to treat oesophageal duplications. **(OTR Medical Expert 5.2.1.7)**

11.1.3 NON NEOPLASTIC ACQUIRED DISORDERS

A. Unit objectives

At the end of this unit, the resident must demonstrate knowledge of the causes and types of non neoplastic acquired diseases of the oesophagus. The resident must also demonstrate knowledge of the investigation techniques that can be used and the principles applicable to their treatment. **(OTR Medical Expert 2.1.2 and 2.1.4)**

B. Learner specific objectives

Upon completion of this unit, the resident must:

1. Demonstrate knowledge of the pathophysiology, diagnostic methods, and complications pertinent to gastro-oesophageal reflux. **(OTR Medical Expert 2.1.4)**
2. Describe the principles of non-surgical treatment of gastro-oesophageal reflux. **(OTR Medical Expert 3.3)**
3. Demonstrate knowledge of the indications for surgery in gastro-oesophageal reflux (non complicated or complicated) and the surgical approaches and surgical principles applicable to this disease. **(OTR Medical Expert 3.3 and 5.2.2.6)**
4. Demonstrate knowledge of the pathophysiology, classification, diagnostic methods and complications related to para-oesophageal hernias. **(OTR Medical Expert 2.1.4)**
5. Demonstrate knowledge of the indications for surgery in para-oesophageal hernias (non complicated and complicated) and the surgical approaches and surgical principles applicable to this disease. **(OTR Medical Expert 2.1.4 and 5.2.2.6)**
6. Demonstrate knowledge of the clinical presentation, classification, etiology, complications and describe theprinciples of surgical and non-surgical treatment as it applies to motility disorders of the oesophagus and crico-oesophageal dysfunctions. **(OTR Medical Expert 2.1.2 and 2.1.4)**
7. Demonstrate knowledge of the pathophysiology of these conditions and describe the principles applicable to their management whether it is non-surgical (pharmacologic, dilatation) or surgical (approaches and techniques). **(OTR Medical Expert 5.2.2.6)**
8. Demonstrate knowledge of the classification, pathophysiology, clinical presentation, and investigation of diverticulum of the oesophagus. The resident must also describe the principles applicable to their treatment, surgical indications, and surgical approaches and techniques. **(OTR Medical Expert 2.1.4 and 5.2.2.1)**
9. Demonstrate knowledge of how to classify oesophageal perforations and their causes. **(OTR Medical Expert 2.1.4)**
10. Demonstrate knowledge of the clinical presentation of oesophageal perforations, how to investigate them and the systemic consequences that can occur in these patients. **(OTR Medical Expert 2.1.4, 3.3, and 3.4.4)**
11. Demonstrate knowledge of the surgical indications and techniques as they apply to oesophageal perforations. **(OTR Medical Expert 5.2.1.7)**
12. Demonstrate knowledge of the clinical presentation, investigation, and treatment of patients with caustic injuries to the oesophagus. **(OTR Medical Expert 2.1.4)**
13. Demonstrate knowledge of the indications, surgical approaches and techniques used for oesophageal replacement. **(OTR Medical Expert 5.2.1.7**)
14. Demonstrate knowledge of the clinical presentation, investigation, and treatment of patients presenting with oesophageal foreign bodies. **(OTR Medical Expert 2.1.4, 3.4.4, and 5.1.2)**
15. Demonstrate knowledge of the clinical presentation, investigation, and principles of treatment as they apply to oesophageal infections (candida). **(OTR Medical Expert 2.1.4, 3.4.4, and 5.1.2)**
16. Demonstrate knowledge of the surgical complications that can be associated with the surgery of non neoplastic acquired diseases of the oesophagus as well as those pertinent to oesophageal replacement. **(OTR Medical Expert 3.5.3)**
17. Describe the treatment principles as they apply to mediastinitis secondary to oesophageal

perforations and to those secondary to oesophageal surgery. **(OTR Medical Expert 3.3 and 5.2.2.7)**

C. Contents

1. Gastro oesophageal reflux **(OTR Medical Expert 2.1.4)**
   a) Etiology and pathologic anatomy (histologic changes)
   b) Clinical presentation, diagnosis, and evaluation
   c) Surgical and non-surgical treatment
   d) Complications and management of these complications (haemorrhage, Barrett's oesophagus, strictures, short oesophagus)
2. Barrett's oesophagus **(OTR Medical Expert 2.1.4)**
   a) Etiology, anatomopathology, classification, and natural histology
   b) Clinical presentation, diagnosis, evaluation
   c) Principles of treatment, surgical and non-surgical
3. Para oesophageal hernias **(OTR Medical Expert 2.1.4)**
   a) Etiology, classification, and natural history
   b) Diagnosis, evaluation, surgical indications
   c) Diagnosis and treatment of their complications
4. Motor disorders of the oesophagus (classification, etiology, clinical presentation, evaluation, complications, and principles of treatment surgical and non-surgical) **(OTR Medical Expert 2.1.4)**
   a) Motor disorders of the cricopharynx and cricopharyngeal dysphagia
   b) Achalasia
   c) Diffuse spasm
   d) Oesophageal diverticulum
5. Perforation of the oesophagus **(OTR Medical Expert 2.1.4)**
   a) Etiology and classification according to causes and location
   b) Clinical presentation, diagnosis
   c) Treatment including surgical techniques used for repair
6. Oesophageal replacement (organs used, indications, techniques, complications) **(OTR Medical Expert 5.2.1.7)**
   a) Stomach, jejunum, colon
   b) Free jejunum
7. Foreign bodies **(OTR Medical Expert 2.1.2)**
   a) Clinical presentation
   b) Treatment including techniques used for removal
8. Video thoracoscopy and laparoscopy in the treatment of non neoplastic diseases of the oesophagus **(OTR Medical Expert 5.2.1.1)**
   a) Indications and approaches
   b) Technology and techniques
9. Candida (moniliasis) infections of the oesophagus **(OTR Medical Expert 2.1.2)**
   a) Risk factors, diagnosis and evaluation
   b) Principles applicable to their treatment
10. Rings and webs of the oesophagus **(OTR Medical Expert 2.1.2)**
    a) Etiology and classification
    b) Diagnosis, evaluation, and management
11. Diverticulum **(OTR Medical Expert 2.1.2)**
    a) Etiology and classification (types, location)
    b) Diagnosis, evaluation, and management

D. Clinical skills

During the training period, the resident must:

1. Interpret the results of investigations of patients with benign acquired diseases of the oesophagus including imaging (standard chest radiographs, contrast studies, CT scan, MRI, physiologic tests, manometry, pH studies, isotope scans) and endo-oesophageal ultrasonography. **(OTR Medical Expert 3.4.1, 3.4.4, 3.4.5, and 5.1.2)**
2. Perform oesophageal endoscopies with or without biopsy, with or without dilatation and with or without foreign body extraction. **(OTR Medical Expert 5.1.2)**
3. Familiarize themselves with the techniques of pneumatic dilatation and with complications related to these techniques. **(OTR Medical Expert 5.1.2 and 5.2.1.3)**
4. Familiarize themselves with the various surgical approaches pertinent to the surgery of acquired benign disorders of the oesophagus (indications, advantages) and perform these operations. **(OTR Medical Expert 5.2.1.7)**
5. Perform surgery for gastro-oesophageal reflux and for complications of reflux. **(OTR Medical Expert 5.2.2.1 and 5.2.2.6)**
6. Perform surgery for the correction of motor disorders of the oesophagus (myotomies, surgery for diverticulum). **(OTR Medical Expert 5.2.2.6)**
7. Perform surgical resections for benign oesophageal disorders including mobilisation of the replacement organ and reconstruction. **(O**TR Medical Expert 5.2.2.1, 5.2.2.6, and 5.2.1.7)
8. Treat patients with oesophageal perforation including the treatment of the systemic consequences. **(OTR Medical Expert 5.1.2, 5.2.1.7, 5.2.2.6, and 5.2.2.7)**
9. Treat (short term and long term) patients with caustic burns of the oesophagus. **(OTR Medical Expert 5.1.2 and 3.3)**
10. Recognize and treat the postoperative complications pertinent to the surgery of non neoplastic benign disorders of the oesophagus. **(OTR Medical Expert 2.1.4 and 3.3)**
11. Treat acquired non neoplastic disorders of oesophagus using videothoracoscopic and laparoscopic techniques. **(OTR Medical Expert 5.2.1.1)**

11.1.4 NEOPLASMS OF THE OESOPHAGUS

A. Unit objectives

At the end of this unit, the resident must demonstrate knowledge of the pathology of benign and malignant oesophageal tumors, their classification, staging, and treatment. The resident must also treat these neoplasms surgically and non-surgically. **(OTR Medical Expert 2.1.2, 2.1.4, 3.3, 5.2.1.3, and 5.2.1.7)**

B. Learner specific objectives

Upon completion of this unit, the resident must:

1. Demonstrate knowledge of the pathology of oesophageal tumors, classify them, evaluate them clinically and use available techniques of investigation. This knowledge applies to benign as well as to malignant tumors. **(OTR Medical Expert 2.1.2)**
2. Demonstrate knowledge of the TNM staging system as it applies to oesophageal cancer including the techniques that are necessary to clinically stage the disease (CT scan, endo-oesophageal ultrasonography, thoracoscopy, laparoscopy). **(OTR Medical Expert 2.1.2)**
3. Demonstrate knowledge of the surgical indications as well as the role of chemotherapy and radiotherapy in the adjuvant mode. **(OTR Medical Expert 2.1.1 and 5.2.1.7)**
4. Demonstrate knowledge of the indications for non-surgical and palliative treatment. **(OTR Medical Expert 3.3)**
5. Demonstrate knowledge of the various surgical approaches and techniques that can be used in the

surgical treatment of oesophageal tumors for resection and reconstruction of the oesophagus. **(OTR Medical Expert 5.2.1.7 and 5.2.2.8)**
6. Demonstrate knowledge of the complications associated to this type of surgery as well as their prophylaxis and treatment. **(OTR Medical Expert 3.5.3)**
7. Describe the principles applicable to the nutrition of patients with oesophageal cancer. **(OTR Medical Expert 3.3, 4.2, and 6.2)**
8. Familiarize themselves with the follow-up (short and long term) of patients who underwent resection of a malignant tumor of the oesophagus. **(OTR Medical Expert 4.2.1 and 6.3)**

C. Contents (OTR Medical Expert 2.1.2)

1. Benign tumors of the oesophagus
   a) Classification and pathology
   b) Investigation, surgical indications, and treatment
2. Malignant tumors of the oesophagus
   a) Classification and pathology
   b) Diagnosis and staging (investigative methods and TNM staging)
   c) Principles of treatment and role of adjuvant therapies
   d) Surgical indications and techniques of resection
   e) Principles applicable to non-surgical and palliative treatment
3. Malignant tracheo-oesophageal fistulas
   a) Etiology, classification
   b) Clinical evaluation and treatment
   c) Principles of treatment

D. Clinical skills

During the training period, the resident must:

1. Evaluate patients with benign and malignant oesophageal tumors and recommend the appropriate treatment, including adjuvant therapies. **(OTR Medical Expert 3.2 and 3.3)**
2. Evaluate patients to determine the clinical TNM stage, including recommending the appropriate staging techniques. **(OTR Medical Expert 3.2 and 3.3)**
3. Perform oesophagectomies through various surgical approaches. **(OTR Medical Expert 5.2.1.7)**
4. Perform the reconstruction of the alimentary canal after oesophageal resection. **(OTR Medical Expert 5.2.1.7)**
5. Take responsibility for the postoperative care of the oesophagectomy patient including the diagnosis and treatment of complications. **(OTR Medical Expert 3.5.3)**
6. Evaluate the nutritional status of these patients and be responsible for the correction of deficiencies if required. **(OTR Medical Expert 3.3)**
7. Familiarize themselves with all palliative techniques including the palliation of dysphagia (stents, laser) and that of patients with malignant tracheo-oesophageal fistulas. The resident must also perform the surgical techniques applicable to those patients. **(OTR Medical Expert 3.3)**
8. Recommend the appropriate therapy (surgical or non-surgical) in cases of advanced or recurrent disease. **(OTR Medical Expert 3.3 and 4.2)**

11.2 CanMEDS COMPETENCIES

11.2.1 COMMUNICATOR

A. Unit objectives

Upon completion of this segment, the resident must:

1. Present to colleagues in a clear and precise manner knowledge concerning the evaluation and treatment of patients afflicted with oesophageal diseases. **(OTR Communicator 3.1.1, 5.1, and 5.2)**
2. Discuss with the patient, family, and paramedical personnel the main complications that can occur after oesophageal surgery as well as their prevention and treatment. **(OTR Communicator 1.1, 1.2.1, and 3.1)**

B. Contents

1. Demonstrate confidence and ethics in the relationship between Thoracic Surgeon and patient. **(OTR Communicator 1.1 and 1.5)**
2. Establish a therapeutic relationship with the patient, family, and other participants (medical and non medical). **(OTR Communicator 1.2)**
3. Establish mutual comprehension and understanding of the patient's needs. **(OTR Communicator 2.1 and 3.1.2)**
4. Collect and summarize pertinent information regarding the patient afflicted with an oesophageal disorder. **(OTR Communicator 2.1 and 2.2)**
5. Provide oral and written communication of information pertinent to the care of the thoracic surgical patient afflicted by an oesophageal disorder including clinical history, physical examination, differential diagnosis, and therapeutic options. **(OTR Communicator 3.1, 5.1, 5.2, and 5.3)**
6. Respect the diversity and attention to the psychosocial aspects of the patient undergoing surgery for an oesophageal disorder. **(OTR Communicator 3.1.2 and 4.2)**
7. Report mistakes and undesirable side effects. **(OTR Communicator 4.5, 5.1, and 5.2)**

11.2.2 COLLABORATOR

A. Unit objectives

Upon completion of this segment, the resident must:

1. Collaborate with the gastroenterologist, intensivist and other health professionals with regards to the evaluation and choice of therapy of the patient afflicted by an oesophageal disorder. **(OTR Collaborator 1.1, 1.3.1, and 1.4)**
2. Determine with the help of these consultants the best methods to monitor the patient during the postoperative period after an oesophageal surgery as well as what precautions should be taken to prevent complications. **(OTR Collaborator 1.2, 1.2.1, and 1.7)**

B. Contents

1. Share knowledge, information, and decision making processes. **(OTR Collaborator 1.6)**
2. Delegate appropriately and encourage team work **(OTR Collaborator 1.2.1 and 2.3)**
3. Respect other members of the multidisciplinary team. **(OTR Collaborator 1.3, 1.8, and 2.6)**
4. Provide inter and multiprofessionnal care of the thoracic surgical patient during the immediate postoperative period. **(OTR Collaborator 1.5 and 1.6)**
5. Identify, manage, prevent, and resolve conflicts. **(OTR Collaborator 2.2, 2.3, and 2.4)**

6. Recognize one's own role within the multidisciplinary team and recognize one's own limitations. **(OTR Collaborator 1.1, 2.4, and 2.5)**

11.2.3 MANAGER

A. Unit objective

Upon completion of this segment, the resident must:

Appreciate the relationship between costs, benefits, and results with regards to the investigation and treatment of the patient afflicted by an oesophageal disorder. **(OTR Manager 3.1 and 3.2)**

B. Contents

1. Describe the role and responsibilities of the Thoracic Surgeon in the health care system and more specifically in the overall care of the patient afflicted by an oesophageal disorder. **(OTR Manager 1.1)**
2. Demonstrate leadership, supervision, and administration within the health care system. **(OTR Manager (1.3 and 3.2)**
3. Describe the organization, structure, and financing of the health care system. (**OTR Manager 1.4 and 3.2)**
4. Manage time in the context of clinical work. **(OTR Manager 2.2 and 4.3)**
5. Manage financial aspects of the medical practice and negotiations. **(OTR Manager 1.1, 2.2, and 2.3)**
6. Demonstrate knowledge of career evolution. **(OTR Manager 4.1, 4.2, and 4.3)**

11.2.4 HEALTH ADVOCATE

A. Unit objectives

Upon completion of this segment, the resident must:

1. Recognize environmental hazards and those associated with diets that could be associated with the occurence of oesophageal disorders. **(OTR Health Advocate 1.2.3)**
2. Recognize the importance of managing and taking over the investigation and treatment of patients afflicted by an oesophageal disorder. **(OTR Health Advocate 2.1.1)**

B. Contents

1. Demonstrate knowledge of patient and their background. **(OTR Health Advocate 1.1 and 1.2.1)**
2. Promote health integrate concepts of preventive medicine. **(OTR Health Advocate 2.1.4 and 2.1.3)**
3. Identify risk factors for postoperative complications including psychological, biological, sociological, cultural, and economic factors. **(OTR Health Advocate 2.1.2, 1.2.2, and 3.1)**
4. Describe the role of the Thoracic Surgeon within the community and responsible use of authority and influences. **(OTR Health Advocate 2.2)**
5. Adapt one's personal practice according to patient's needs. **(OTR Health Advocate 2.3 and 4.5)**
6. Ensure the security of patients. **(OTR Health Advocate 3.1 and 4.6)**

11.2.5 SCHOLAR

A. Unit objectives

Upon completion of this segment, the resident must:

1. Critically assess the medical literature pertinent to the care of the thoracic surgical patient afflicted by an oesophageal disorder. **(OTR Scholar 1 and 2.3)**
2. Critically assess the methods and techniques that can be used to prevent complications after oesophageal surgery. **(OTR Scholar 2.2)**

B. Contents

1. Maintain and enhance knowledge. **(OTR Scholar 1.2 and 4.4)**
2. Demonstrate moral and professional obligation to maintain and improve competencies. **(OTR Scholar 1.1, 1.9, and 4.4)**
3. Perform self-evaluation and identification of the need to improve one's own knowledge and level of competence. **(OTR Scholar 1.2, 1.3, 1.4, and 1.8)**
4. Access available information and critically evaluate the literature. **(OTR Scholar 1.6 and 4.5)**
5. Demonstrate willingness to learn and use modern learning techniques. **(OTR Scholar 1.3, 1.7, 3.5, 3.6, and 3.7)**
6. Demonstrate research and scientific curiosity. **(OTR Scholar 1.5, 1.10, 2.1.1, and 4.3)**
7. Demonstrate knowledge of ethics and research, human subjects and relationship with industry. **(OTR Scholar 4.1 and 4.2)**
8. Contribute academically to the teaching of undergraduate students and paramedical personnel. **(OTR Scholar 3.1 and 4.1)**
9. Identify and report conflicts of interest. **(OTR Scholar 4)**

11.2.6 PROFESSIONAL

A. Unit objectives

Upon completion of this segment, the resident must:

1. Provide high level care with integrity, honesty, and compassion to the patient afflicted by an oesophageal disorder. **(OTR Professional 1.1)**
2. Ensure optimal professional conduct (individual and multidisciplinary) with regards to the evaluation and treatment of the patient afflicted by an oesophageal disorder. **(OTR Professional 1.2)**
3. Practice Thoracic Surgery according to the principles of deontology, and according to the obligation of the surgeon involved in the evaluation and treatment of the patient afflicted by an oesophageal disorder. **(OTR Professional 1.2 and 1.3)**
4. Demonstrate a high level of responsibility towards the postoperative thoracic surgical patient by being available, respecting confidentiality, and respecting the physical and emotional needs of each patient. **(OTR Professional 1.5)**
5. Work with integrity and according to best practice guidelines, specifically by referring or consulting other health professionals when required. **(OTR Professional 1.2 and 1.3)**
6. Report clinical or scientific information with a high level of precision. **(OTR Professional 1.1 and 2.3)**
7. Demonstrate practical knowledge of the provincial and federal regulations with regards to the evaluation and treatment of patients afflicted by an oesophageal disorder. **(OTR Professional 2.1)**
8. Maintain control of one's own emotions and opinions and identify personal reactions that could be detrimental to the patient/surgeon relationship. Explore and even accept possible ways to change

attitudes that may be perceived as damaging to the patient/surgeon relationship. **(OTR Professional 1.6, 2.4, and 3.2.1)**

9. Identify a colleague or another physician with whom it is possible to discuss personal objectives, conflicts, or stress. **(OTR Professional 3.1)**

B. Contents

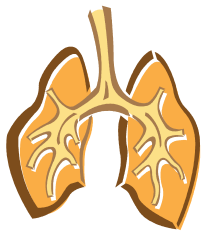
1. Demonstrate integrity, honesty, compassion. **(OTR Professional 1.1)**
2. Behave ethically and responsibly towards other health professionals. **(OTR Professional 3.3)**
3. Demonstrate excellence in the clinical practice of Thoracic Surgery and maintenance of competence. **(OTR Professional 1.2)**
4. Demonstrate awareness of the obligation to provide necessary information to the organizations responsible for regulating the profession. **(OTR Professional 2.2 and 2.3)**
5. Desribe the principles and theories of bioethics and medico legal aspects of the practice of Thoracic Surgery**. (OTR Professional 1.7)**

11.3 RECOMMENDED LECTURES

1. Deschamps C : Advances in the management of gastro-oesophageal reflux disease. Thorac Surg Clin Vol.15 No3, August 2005
2. Deslauriers J, Mehran R : Handbook of peri operative care in general thoracic surgery. Elsevier 2005 (chapters 3.7, 5.9, 8.0, 11.9, 11.10, 13.2)
3. Duranceau A, Pera M : Barrett's Oesophagus. Chest Surg Clinics, Vol. 12, No 1, February 2002
4. Ferraro P, Duranceau A : Gastro-oesophageal reflux disease. Chest Surg Clinics, Vol. 11, No 3, August 2001
5. Franco KL, Putnam JB : Advanced therapy in thoracic surgery. BC Decker Inc. 2005 (chapters 38-44)
6. Frank JR : Le cadre des compétences CanMEDSS 2005 pour les médecins. Le Collège Royal des médecins et chirurgiens du Canada
7. Kaiser LR, Kron IL, Spray TL : Mastery of cardio thoracic surgery, Second Edition. Lippincott, Williams, and Wilkins, 2007 (chapters 16-22)
8. Kaiser LR, Jamieson GG : Operative Thoracic Surgery, Fifth Edition. Hodder Arnold 2006 (chapters 33-48)
9. Krasna MJ : Oesophageal cancer. Chest Surg Clinics, Vol. 10, No 3, August 2000
10. Pearson's Oesophageal Surgery, Third Edition, Elsevier 2008
11. Shields TW et al : General Thoracic Surgery, Sixth Edition, Lippincott, Williams and Wilkins 2005 (chapters 122-153)
12. Wright CD : Complication of oesophageal surgery. Thorac Surg Clin Vol.16, No 1, May 2006
13. Yang SC, Cameron DE : Current therapy in cardiovascular surgery. Mosby 2004 (pp81-86; 94-104; 339-456)

SECTION XII:

TRANSPLANTATION



12.1 SURGICAL COMPETENCIES

12.1.1 LUNG TRANSPLANTATION

A. Unit objective

At the end of this unit, the resident must describe the basic principles applicable to lung preservation and immuno suppression. He also must demonstrate knowledge of the indications for lung transplantation and how to do the operation. Finally, the resident must demonstrate knowledge of the follow-up of transplanted patients and how to diagnose rejection. **(OTR Medical Expert 2.1.1 and 5.2.3)**

B. Learner specific objectives

Upon completion of this unit, the resident must:

1. Demonstrate knowledge of the historical context of lung transplantation, including experimental and clinical transplantation. **(OTR Medical Expert 2.1.1)**
2. Demonstrate knowledge of the indications for lung transplantation, including emphysema, interstitial diseases, pulmonary hypertension, and cystic fibrosis. **(OTR Medical Expert 2.1.1 and 5.2.3)**
3. Demonstrate knowledge of the indications for double lung transplantation. **(OTR Medical Expert 2.1.1 and 5.2.3)**
4. Demonstrate knowledge of the contra-indications for lung transplantation. **(OTR Medical Expert 2.1.1 and 5.2.3)**
5. Evaluate and treat donor lungs including the approaches and techniques used for harvesting the lung and preserving it. **(OTR Medical Expert 2.1.1 and 5.2.3)**
6. Demonstrate knowledge of the pathophysiology of ischemic and re-perfusion injuries including epithelial and endothelial dysfunction, reperfusion oedema and the solutions used for lung preservation. **(OTR Medical Expert 2.1.1)**
7. Describe the principles of immuno suppression in the transplanted patient and the complications associated with these therapies. **(OTR Medical Expert 3.5.3 and 5.2.3)**
8. Demonstrate knowledge of the physiology of the transplanted lung. **(OTR Medical Expert 2.1.3)**
9. Demonstrate knowledge of the pathophysiology of acute rejection and of bronchiolitis obliterans and the treatment of these conditions. **(OTR Medical Expert 2.1.1 and 5.2.3)**
10. Demonstrate knowledge of the surgical approaches and techniques for unilateral or bilateral lung transplantation. **(OTR Medical Expert 5.2.3)**
11. Familiarize themselves with the techniques and complications of bronchoscopy of the transplanted lung. **(OTR Medical Expert 5.1.1)**
12. Demonstrate knowledge of the immediate postoperative care of the transplanted patient including ventilation, oxygenation, hemodynamics, indications for NO and prostaglandins, treatment of pneumonia and septic episodes, indications and techniques of ECMO, and management of fluid balance and renal function. **(OTR Medical Expert 3.5.3)**

C. Contents

1. Indications and contra-indications for lung transplant **(OTR Medical Expert 2.1.1)**
   a) Patient evaluation, and selection for surgery
   b) Preparation and consent
2. Evaluation of the donor **(OTR Medical Expert 2.1.1)**
   a) Clinical history and selection
   b) Physiology, radiology
3. Preparation of the donor and harvesting **(OTR Medical Expert 2.1.1)**
   a) Brain death, medicolegal issues, patient's family
   b) Harvesting and preservation of the donor lung
   c) Pharmacology and technical aspects of harvesting
4. Surgical techniques for unilateral and bilateral lung transplantation **(OTR Medical Expert 5.2.3)**
   a) Approaches (thoracotomy, median or transverse sternotomy)
   b) Pneumonectomy in the patient being transplanted (right, left)
   c) Right and left lung transplant (tracheo bronchial anastomosis and vascular anastomosis
   d) Volume reduction of the donor lung
   e) Techniques of extracorporeal circulation used during transplantation, including indications and technologies
5. Immediate postoperative care **(OTR Medical Expert 3.5.3 and 5.2.3)**
   a) Maintenance of ventilation and oxygenation including the use of NO or ECMO
   b) Maintenance of fluid balance, renal function, and hemodynamics
   c) Indications for prostaglandins
6. Immuno suppression and complications **(OTR Medical Expert 2.1.1)**
   a) Drug selection, mechanisms of action, side effects, and complications
   b) Follow-up, short and long-term
7. Postoperative complications (prophylaxis, diagnosis, treatment) **(OTR Medical Expert 2.1.1)**
   a) Infections and septic episodes
   b) Acute rejection and reperfusion oedema
   c) Complications of surgical techniques (vascular or airway anastomosis)
8. Rejection and bronchiolitis obliterans **(OTR Medical Expert 2.1.1, 3.3, and 5.2.3)**
   a) Signs and symptoms
   b) Imaging, bronchoscopy (endobronchial biopsies, broncho-alveolar lavage)
   c) Histo pathologic evaluation
   d) Treatment
9. Postoperative care (short term) **(OTR Medical Expert 3.5.3)**
   a) Immuno suppression
   b) Functional capacity and physiotherapy
   c) Prophylaxis against infections
   d) Primary dysfunction of the transplanted lung, rejection
   e) Right ventricular dysfunction
10. Long-term follow-up **(OTR Medical Expert 5.2.3, 5.5, 4.2.1, and 6.3)**
    a) Follow-up and monitoring
    b) Natural history

D. Clinical skills

During the training period, the resident must:

1. Participate or perform the donor evaluation and treatment. **(OTR Medical Expert 5.2.3)**
2. Participate or perform the harvesting of the donor lung including the use of preservation solutions. **(OTR Medical Expert 5.2.3)**
3. Participate in the selection of the patient in need of lung transplant including their evaluation, indications, and preparation **(OTR Medical Expert 2.1.1)**

4. Participate or perform a lung transplant. **(OTR Medical Expert 5.2.3)**
5. Provide postoperative care of transplanted patients including respiratory therapies, immuno suppression, and prevention and treatment of complications. **(OTR Medical Expert 3.5.3)**
6. Provide follow-up of the transplanted patient including monitoring of rejection and bronchiolitis obliterans. **(OTR Medical Expert 4.2.1, 5.2.3, 5.5, and 6.3)**
7. Perform bronchoscopic examinations of the transplanted patient and participate or perform the techniques of transbronchial biopsy and broncho-alveolar lavage. **(OTR Medical Expert 5.1.1)**

12.1.2 Heart-lung transplantation

A. Unit objectives

At the end of this unit, the resident must describe the basic principles applicable to preservation of harvested heart-lungs and to immuno suppression. The resident must also know the indications for heart-lung transplantation. Finally, the resident must know how to follow these patients up as well as know how to recognize acute rejection episodes. **(OTR Medical Expert 2.1.1 and 5.2.3)**

B. Learner specific objectives

Upon completion of this unit, the resident must:

1. Evaluate and manage the donor in cases of heart lung transplantation. **(OTR Medical Expert 2.1.1)**
2. Demonstrate knowledge of the indications and contra-indications for heart-lung transplantation. **(OTR Medical Expert 2.1.1)**
3. Demonstrate knowledge of the surgical approaches and techniques as they apply to heart-lung transplantation, including the techniques of harvesting the donor heart and lungs. **(OTR Medical Expert 5.2.3)**
4. Describe the principles of immuno suppression in patients with heart-lung transplantation. **(OTR Medical Expert 2.1.1)**
5. Describe the principles applicable to the postoperative care of patients with heart-lung transplant. **(OTR Medical Expert 3.5.3)**
6. Demonstrate knowledge of the signs and symptoms indicative of graft rejection in patients with heart-lung transplant as well as the evaluation of these patients, confirmation of diagnosis, and treatment. **(OTR Medical Expert 3.3 and 5.2.3)**
7. Demonstrate knowledge of the techniques of monitoring applicable to the follow-up of patients with heart-lung transplant including bronchoscopy of the transplanted lungs. **(OTR Medical Expert 5.1.1)**
8. Demonstrate knowledge of the natural history of the patient with heart-lung transplant including immediate postoperative care and short and long-term evolution **(OTR Medical Expert 3.5.3, 5.2.3, and 6.3)**

C. Contents

1. Evaluation of the donor **(OTR Medical Expert 2.1.1)**
   a) Clinical history
   b) Physiology and radiologic evaluation
2. Evaluation of the patient receiving heart-lung transplant **(OTR Medical Expert 2.1.1)**
   a) Indication for surgery
   b) Evaluation and preoperative preparation
3. Preparation of the donor and harvesting **(OTR Medical Expert 2.1.1)**
   a) Brain death, medicolegal issues, and family
   b) Harvesting and preservation of the heart and lungs
   c) Pharmacology and technical aspects of harvesting the heart and lungs

4. Techniques of heart lung transplant **(OTR Medical Expert 5.2.3)**
   a) Approaches
   b) Pneumonectomy and cardiectomy in the recipient
   c) Technique of heart-lung transplant (vascular and airway anastomosis)
5. Rejection after heart-lung transplantation **(OTR Medical Expert 2.1.1, 3.3, and 5.2.3)**
   a) Signs and symptoms
   b) Incidence of cardiac rejection and indications for endomyocardial biopsies
   c) Diagnostic techniques for acute rejection used in the heart-lung transplant patient
   d) Histologic evaluation of the transplanted lungs
   e) Management of acute and chronic rejection in a recipient of heart-lung transplantation
6. Immuno suppression **(OTR Medical Expert 2.1.1 and 5.2.3)**
   a) Medications including pharmacology, mechanisms of action, and side effects.
   b) Treatment by monoclonal or polyclonal antibodies including mechanisms of action and side effects.
   c) Complications

D. Clinical skills

During the training period, the resident must:

1. Participate in the evaluation and treatment of donors before heart-lung transplantation. **(OTR Medical Expert 5.2.3)**
2. Participate in the evaluation and preparation of recipients of heart-lung transplantation. **(OTR Medical Expert 5.2.3)**
3. Perform the harvesting of the heart-lung. **(OTR Medical Expert 5.2.3)**
4. Perform heart-lung transplantation. **(OTR Medical Expert 5.2.3)**
5. Provide immediate postoperative care of the heart-lung transplanted patient. **(OTR Medical Expert 3.5.3)**
6. Participate in the management of the immuno suppression of patients who have received heart-lung transplantation. **(OTR Medical Expert 4.2.1, 5.2.3, and 6.3)**
7. Provide follow-up of recipients of heart-lung transplant and be involved in the evaluation of rejection **(OTR Medical Expert 4.2.1, 5.2.3, 5.5, and 6.3)**
8. Perform the endobronchial, thoracoscopic, and endomyocardial biopsies to monitor or document rejection. **(OTR Medical Expert 5.1.1 and 5.2.1.1)**

12.2 CanMEDS COMPETENCIES

12.2.1 COMMUNICATOR

A. Unit objectives

Upon completion of this segment, the resident must:

1. Present to colleagues in a clear and precise manner knowledge concerning the evaluation and treatment of the thoracic surgical patient requiring lung or heart-lung transplantation. **(OTR Communicator 3.1.1, 5.1, and 5.2)**
2. Discuss with patients, family, and paramedical personnel the main complications that could occur during the immediate postoperative period of the patient who underwent a lung or heart-lung transplantation. **(OTR Communicator 1.1, 1.2.1, and 3.1)**

B. Contents

1. Demonstrate confidence and ethics in the relationship between Thoracic Surgeon and patient. **(OTR Communicator 1.1 and 1.5)**

2. Establish a therapeutic relationship with the patient, family, and other participants (medical and non medical). **(OTR Communicator 2.1 and 3.1.2)**
3. Establish mutual comprehension and understanding of the patient's needs. **(OTR Communicator 2.1 and 2.2)**
4. Collect and summarize pertinent information regarding the patient during the immediate postoperative period after lung or heart-lung transplantation. **(OTR Communicator 2.1 and 2.2)**
5. Provide oral and written communication of information pertinent to the care of post transplant thoracic surgical patient, including clinical history, physical examination, differential diagnosis and therapeutic options. **(OTR Communicator 3.1, 5.1, 5.2, and 5.3)**
6. Respect the diversity and pay attention to the psychosocial aspects of the patient during the immediate postoperative period after lung or heart lung transplantation. **(OTR Communicator 3.1.2 and 4.2)**
7. Report mistakes and undesirable side effects. **(OTR Communicator 4.5, 5.1, and 5.2)**

12.2.2 COLLABORATOR

A. Unit objectives

Upon completion of this segment, the resident must:

1. Collaborate with the chest physician, intensivist, infectious disease specialist, and other health professionals with regards to the evaluation and surgery for lung and heart-lung transplantation. **(OTR Collaborator 1.1, 1.3.1, and 1.4)**
2. Determine with the help of these consultants the best methods to do the evaluation and treatment of the patient in need of a lung or heart-lung transplantation. **(OTR Collaborator 1.2, 1.2.1, and 1.7)**

B. Contents

1. Share knowledge, information, and decision making processes. **(OTR Collaborator 1.6)**
2. Delegate appropriately and encourage team work **(OTR Collaborator 1.2.1 and 2.3)**
3. Respect other members of the multidisciplinary team. **(OTR Collaborator 1.3, 1.8, and 2.6)**
4. Provide inter and multiprofessionnal care of the thoracic surgical patient during the immediate postoperative period after lung or heart-lung transplantation. **(O**TR Collaborator 1.5 and 1.6)
5. Identify, manage, prevent, and resolve conflicts. **(OTR Collaborator 2.2, 2.3, and 2.4)**
6. Recognize one's own role within the multidisciplinary team and recognize one's own limitations. **(OTR Collaborator 1.1, 2.4, and 2.5)**

12.2.3 MANAGER

A. Unit objective

Upon completion of this segment, the resident must:

Appreciate the relationship between costs, benefits, and results in the care of the thoracic surgical patient who requires lung or heart-lung transplantation. **(OTR Manager 3.1 and 3.2)**

B. Contents

1. Describe the role and responsibilities of the Thoracic Surgeon in the health care system and more specifically in the care of the thoracic surgical patient requiring lung or heart-lung transplantation. **(OTR Manager 1.1)**
2. Demonstrate leadership, supervision, and administration within the health care system. **(OTR Manager 1.3)**

3. Describe the organization, structure, and financing of the health care system. **(OTR Manager 1.4 and 3.2)**
4. Mange time in the context of clinical work. **(OTR Manager 2.2 and 4.3)**
5. Manage financial aspects of the medical practice and negotiations. **(OTR Manager 1.4, 2.2, and 2.3)**
6. Demonstrate knowledge of career evolution. **(OTR Manager 4.1, 4.2, and 4.3)**

12.2.4 HEALTH ADVOCATE

A. Unit objectives

Upon completion of this segment, the resident must :

1. Appreciate the health hazards associated with smoking and exposure to other polluants on chronic respiratory illnesses specially those that are likely to require transplantation. **(OTR Health Advocate 1.2.3)**
2. Recognize the importance of managing and taking over the surgical treatment of the patient in need of lung or heart-lung transplantation. **(OTR Health Advocate 2.1.1)**

B. Contents

1. Demonstrate knowledge of patient and their background. **(OTR Health Advocate 1.1 and 1.2.1)**
2. Promote health and integrate concepts of preventive medicine. **(OTR Health Advocate 2.1.3 and 2.1.4)**
3. Identify risk factors for postoperative complications after lung or heart-lung transplantation, including psychological, sociological, cultural, and economic factors. **(OTR Health Advocate 1.2.2, 2.1.2, and 3.1)**
4. Describe the role of the Thoracic Surgeon within the community and responsible use of authority and influences. **(OTR Health Advocate 2.2)**
5. Adapt one's personal practice according to patient's needs. **(OTR Health Advocate 2.3 and 4.5)**
6. Ensure the security of patients. **(OTR Health Advocate 3.1 and 4.6)**

12.2.5 SCHOLAR

A. Unit objectives

Upon completion of this segment, the resident must:

1. Critically assess the medical literature pertinent to lung and heart-lung transplantation. **(OTR Scholar 1 and 2.3)**
2. Critically assess the methods and techniques that can be used to prevent postoperative complications after lung or heart-lung transplantation. **(OTR Scholar 2.2)**

B. Contents

1. Maintain and enhance knowledge. **(OTR Scholar 1.2 and 4.4)**
2. Demonstrate moral and professional obligation to maintain and improve competencies. **(OTR Scholar 1.1, 1.9, and 4.4)**
3. Perform self-evaluation and identification of the need to improve one's own knowledge and level of competence. **(OTR Scholar 1.2, 1.3, 1.4, and 1.8)**
4. Access available information and critically evaluate the literature. **(OTR Scholar 1.6 and 4.5)**
5. Demonstrate willingness to learn and use modern learning techniques. **(OTR Scholar 1.3, 1.7, 3.5, 3.6, and 3.7)**
6. Demonstrate research and scientific curiosity. **(OTR Scholar 1.10, 1.5, 2.1.1, and 4.3)**

7. Demonstrate ethics and research, human subjects and relationship with industry. **(OTR Scholar 4.1 and 4.2)**
8. Contribute academically to the teaching of undergraduate student and paramedical personnel. **(OTR Scholar 3.1 and 3.4.1)**
9. Identify and report conflicts of interest. **(OTR Scholar 4)**

12.2.6 PROFESSIONAL

A. Unit objectives

Upon completion of this segment, the resident must:

1. Provide high level perioperative care with integrity, honesty, and compassion to the transplanted patient. **(OTR Professional 1.1)**
2. Ensure optimal professional conduct (individual and multidisciplinary) with regards to the thoracic surgical patient in the immediate postoperative period of lung or heart-lung transplantation. **(OTR Professional 1.2)**
3. Practice Thoracic Surgery according to the principles of deontology, and according to the obligations of the surgeon involved in the care of transplanted patients. **(OTR Professional 1.2 and 1.3)**
4. Demonstrate a high level of responsibility towards the postoperative thoracic surgical patient by being available, respecting confidentiality, and respecting the physical and emotional needs of each patient. **(OTR Professional 1.5)**
5. Work with integrity and according to best practice guidelines, specifically by referring or consulting other health professional when required. **(OTR Professional 1.2 and 1.3)**
6. Report clinical or scientific information with a high level of precision. **(OTR Professional 1.1 and 2.5)**
7. Demonstrate practical knowledge of the provincial and federal regulations with regards to the practice of Thoracic Surgery and transplantation. **(OTR Professional 2.1)**
8. Maintain control of one's own emotions and opinions and identify personal reactions that could be detrimental to the patient/surgeon relationship. Explore and even accept possible ways to change attitudes that may be perceived as damaging to the patient/surgeon relationship. **(OTR Professional 1.6, 2.4, and 3.2.1)**
9. Identify a colleague or another physician with whom it is possible to discuss personal objectives, conflicts, or stress. **(OTR Professional 3.1)**

B. Contents

1. Demonstrate integrity, honesty, compassion. **(OTR Professional 1.1)**
2. Behave ethically and responsibly towards other health professionals. **(OTR Professional 3.3)**
3. Demonstrate excellence in the clinical practice of Thoracic Surgery and maintenance of competence. **(OTR Professional 1.2)**
4. Demonstrate awareness of the obligation to provide necessary information to the organizations responsible for regulating the profession. **(OTR Professional 2.2 and 2.3)**
5. Describe the principles and theories of bioethics and medico legal aspects of the practice of Thoracic Surgery. **(OTR Professional 1.7)**

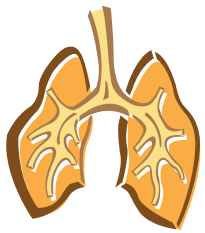
12.3 RECOMMENDED LECTURES

1. Franco KL, Putnam JB : Advanced therapy in thoracic surgery. BC Decker 2005 (chapters 26-33)
2. Frank JR : Le cadre des compétences CanMEDSS 2005 pour les médecins. Le Collège Royal des médecins et chirurgiens du Canada
3. Kaiser LR, Kron IL, Spray TL : Mastery of cardio thoracic surgery, Second Edition. Lippincott, Williams, and Wilkins, 2007 (chapters 23,61)

4. Kaiser LR, Jamieson GG : Operative Thoracic Surgery, Fifth Edition. Hodder Arnold 2006 (chapter 26)
5. Patterson GA : Lung transplantation. Chest Surg Clin, Vol.13, No 3, August 2003
6. Pearson's Thoracic Surgery, Third Edition, Elsevier 2008 (chapter 54)
7. Shields TW et al : General Thoracic Surgery, Sixth Edition, Lippincott, Williams and Wilkins, 2005 (chapter 95)
8. Urschel HC, Cooper JD : Atlas of thoracic surgery. Churchill Livingstone, New York 1995 (Part VI (pp199-223))

SECTION XIII:

RESEARCH



13.1 SURGICAL COMPETENCIES

A. Unit objective

At the end of this unit, the resident must demonstrate knowledge of the scientific methods applicable to the practice of Thoracic Surgery. The resident must also learn how to describe and conceive problems in terms of research and find solutions to these problems. Finally, the resident must learn how to critically interpret the thoracic surgical literature. **(OTR Medical Expert 1.2, 1.3, 2.2, 2.3, and 2.4)**

B. Learner specific objectives

Upon completion of this unit, the resident must:

1. Demonstrate knowledge of the scientific method as it applies to basic and clinical research. **(OTR Medical Expert 1.2, 2.2, 2.3, 2.4, and 4.3)**
2. Access literature, including the use of conventional and computerized methods. **(OTR Medical Expert 1.2, 2.2, 2.3, 2.4, and 4.3)**
3. Critically interpret the literature. **(OTR Medical Expert 1.2, 2.2, 2.3, 2.4, and 4.3)**
4. Demonstrate knowledge of statistical methods used to validate hypotheses, including understanding the basic statistics used in the thoracic literature. The resident must also know the limitations and deficiencies of these tests. **(OTR Medical Expert 1.2, 2.2, 2.3, 2.4, and 4.3)**
5. Demonstrate knowledge of the concepts of power and the meaning of statistical tests in the interpretation of scientific data. **(OTR Medical Expert 1.2, 2.2, 2.3, 2.4, and 4.3)**
6. Demonstrate knowledge of the technicalities involved in starting a basic or clinical research study. **(OTR Medical Expert 1.2, 2.2, 2.3, 2.4, and 4.3)**
7. Solve a problem in a scientific manner. **(OTR Medical Expert 1.2, 2.2, 2.3, 2.4, and 4.3)**

C. Contents (OTR Medical Expert 1.2, 1.3, 1.6, 1.7, 2.3, 2.4, 6.1, and 5.4)

1. Literature review
   a) Techniques applicable to literature review
   b) Critical analysis of publications
2. Scientific basis of surgical practice
   a) Basis of current knowledge and popular beliefs
   b) Acquisition of new knowledge
   c) Validation of comparisons
   d) Conclusions based on scientific data
3. Scientific methods
   a) Identification and description of a clinical problem that could warrant analysis and study
   b) Formulation of a hypothesis that could be tested
   c) Data collection and analysis
   d) Validation of a research hypothesis by proven research methods

D. Clinical skills

During the training period, the resident must:

1. Read published scientific material and be able to make a critical analysis of this material. **(OTR Medical Expert 1.2)**
2. Show his/her understanding of the scientific method and of the steps that have to be taken in preparing, writing, and submitting a manuscript for publication in a peer-reviewed journal. The resident must also present at scientific meetings (in or out of the hospital). **(OTR Medical Expert 2.4)**
3. Improve one's level of scientific knowledge through critiques from teachers. **(OTR Medical Expert 6.1)**
4. Demonstrate scientific curiosity by: **(OTR Medical Expert 1.3, 1.6, 2.3, and 2.4)**
   a) Defining a problem which could be analysed and studied
   b) Performing an appropriate literature review
   c) Analysing and synthesizing the available data
   d) Formulating a clear and well informed discussion
5. Demonstrate ability to use and understanding of statistical tests that could be applied to solve a problem. **(OTR Medical Expert 2.4)**
6. Demonstrate a clear understanding of the statistical tests that are commonly used in research like univariate and multivariate analysis, variance analysis, level of confidence etc. **(OTR Medical Expert 1.2 and 2.4)**
7. Critically analyze published research papers that may have an impact on practicing as a Thoracic Surgeon. **(OTR Medical Expert 1.2, 2.2, and 2.3)**
8. Use knowledge of the scientific method and of research to design, implement, and complete at least one research project during the years as a resident including: **(OTR Medical Expert 1.2, 2.2, and 2.3)**
   a) Writing of a research protocol with literature review, objectives, inclusions, and exclusions.
   b) Complete the research project
      1) Retrospective analysis
      2) Survival analysis in a cohort of patients
      3) Prospective study with or without randomization
   c) Interpretation of results.

13.2 CanMEDS COMPETENCIES

13.2.1 COMMUNICATOR

A. Unit objectives

Upon completion of this segment, the resident must:

1. Present to colleagues in a clear and precise manner knowledge about research in the practice of Thoracic Surgery. **(OTR Communicator 3.1.1, 5.1, and 5.2)**
2. Discuss with the patient, family, and paramedical personnel the scientific information pertinent to the practice of Thoracic Surgery. **(OTR Communicator 1.1, 1.2.1, and 3.1)**

B. Contents

1. Demonstrate confidence and ethics in the relationship between research in Thoracic Surgery and patient. **(OTR Communicator 1.1 and 1.5)**
2. Establish a therapeutic relationship with the patient, family, and other participants (medical and non medical). **(OTR Communicator 1.2)**
3. Establish mutual comprehension and understanding of the patient's needs. **(OTR Communicator**

2.1 and 3.1.2)
4. Collect and summarize the pertinent information with regard to research in Thoracic Surgery. **(OTR Communicator 2.1 and 2.2)**
5. Provide oral and written communication of information pertinent to research in Thoracic Surgery. **(OTR Communicator 3.1, 5.1, 5.2, and 5.3)**
6. Respect the diversity and pay attention to the psychosocial aspects of the patient during the immediate postoperative period. **(OTR Communicator 3.1.2 and 4.2)**
7. Report mistakes and undesirable side effects. **(OTR Communicator 4.5, 5.1, and 5.2)**

13.2.2 COLLABORATOR

A. Unit objectives

Upon completion of this segment, the resident must:

1. Collaborate with the chest physician, intensivist and other health professionals with regards to the scientific methods applicable to the practice of Thoracic Surgery. **(OTR Collaborator 1.1, 1.3.1, and 1.4)**
2. Determine with the help of these consultants the best ways to critically interpret the medical literature. **(OTR Collaborator 1.2, 1.2.1, and 1.7)**

B. Contents

1. Share knowledge, information, and decision making processes. **(OTR Collaborator 1.6)**
2. Delegate appropriately and encourage team work **(OTR Collaborator 1.2.1 and 2.3)**
3. Respect other members of the multidisciplinary team. **(OTR Collaborator 1.3, 1.8, and 2.6)**
4. Provide inter and multiprofessionnal care of the thoracic surgical patient during the immediate postoperative period. **(OTR Collaborator 1.5 and 1.6)**
5. Identify, manage, prevent, and resolve conflicts. **(OTR Collaborator 2.2, 2.3, and 2.4)**
6. Recognize one's own role within the multidisciplinary team and recognize one's own limitations. **(OTR Collaborator 1.1, 2.4, and 2.5)**

13.2.3 MANAGER

A. Unit objective

Upon completion of this segment, the resident must:

Appreciate the relationship between costs, benefits, and results in the research activities of the practising Thoracic Surgeon. (OTR Manager 3.1 and 3.2)

B. Contents

1. Describe the role and responsibilities of the Thoracic Surgeon in the health care system and more specifically in clinical and basic research. **(OTR Manager 1.1)**
2. Demonstrate leadership, supervision, and administration within the health care system. **(OTR Manager 1.3)**
3. Describe the organization, structure, and financing of the health care system. **(OTR Manager 1.4 and 3.2)**
4. Manage time in the context of research activities. **(OTR Manager 2.2 and 4.3)**
5. Manage financial aspects of the medical practice and negotiations. **(OTR Manager 1.5, 2.2, and 2.3)**
6. Demonstrate knowledge of career evolution. **(OTR Manager 4.1, 4.2, and 4.3)**

13.2.4 HEALTH ADVOCATE

A. Unit objectives

Upon completion of this segment, the resident must:

1. Appreciate the health hazards associated with smoking and exposure to other polluants on lung cancer and other respiratory illnesses specially those that are likely to require research. **(OTR Health Advocate 1.2.3)**
2. Recognize the importance of managing research projects applicable to the practice of thoracic surgery. **(OTR Health Advocate 2.1.1)**

B. Contents

1. Demonstrate knowledge of patient and their background. **(OTR Health Advocate 1.1 and 1.2.1)**
2. Promote health and integrate concepts of preventive medicine. **(OTR Health Advocate 2.1.3 and 2.1.4)**
3. Identify determinants helpful to solve a problem scientifically. **(OTR Health Advocate 1.2.2, 2.1.2, and 3.1)**
4. Describe the role of the scientist thoracic surgeon within the community and responsible use of authority and influences. **(OTR Health Advocate 2.2)**
5. Adapt one's personal practice according to patient's needs. **(OTR Health Advocate 2.3 and 4.5)**
6. Ensure the security of patients. **(OTR Health Advocate 3.1 and 4.6)**

13.2.5 SCHOLAR

A. Unit objectives

Upon completion of this segment, the resident must:

1. Critically assess the medical literature pertinent to basic and clinical research in Thoracic Surgery. **(OTR Scholar 1 and 2.3)**
2. Critically assess the methods and techniques that can be used to solve problems in a scientific manner. **(OTR Scholar 2.2)**

B. Contents

1. Maintain and enhance knowledge. **(OTR Scholar 1.2 and 4.4)**
2. Demonstrate moral and professional obligation to maintain and improve competencies. **(OTR Scholar 1.1, 1.9, and 4.4)**
3. Perform self-evaluation and identification of the need to improve knowledge and level of competence. **(OTR Scholar 1.2, 1.3, 1.4, and 1.8)**
4. Access available information and critically evaluate the literature. **(OTR Scholar 1.6 and 4.5)**
5. Demonstrate willingness to learn and use modern learning techniques. **(OTR Scholar 1.3, 1.7, 3.5, 3.6, and 3.7)**
6. Demonstrate research and scientific curiosity. **(OTR Scholar 1.10, 1.5, 2.1.1, and 4.3)**
7. Demonstrate knowledge of ethics and research, human subjects and relationship with industry. **(OTR Scholar 4.1 and 4.2)**
8. Contribute academically to the teaching of undergraduate students and paramedical personnel. **(OTR Scholar 3.1 and 4.1)**
9. Identify and report conflicts of interest. **(OTR Scholar 4)**

13.2.6 PROFESSIONAL

A. Unit objectives

Upon completion of this segment, the resident must:

1. Demonstrate knowledge of the scientific method as it applies to the practice of Thoracic Surgery. **(OTR Professional 1.1)**
2. Ensure optimal professional conduct (individual and multidisciplinary) with regards to research in Thoracic Surgery. **(OTR Professional 1.2)**
3. Practice Thoracic Surgery according to the principles of deontology, and according to the obligations of the surgeon involved in research. **(OTR Professional 1.2 and 1.3)**
4. Demonstrate a high level of responsibility towards research in Thoracic Surgery by being available, respecting confidentiality, and respecting the physical and emotional needs of each patient. **(OTR Professional 1.2, 1.3, and 1.5)**
5. Work with integrity and according to best practice guidelines, specifically in the area of research. **(OTR Professional 1.2 and 1.3)**
6. Report clinical or scientific information with a high level of precision. **(OTR Professional 1.1 and 2.5)**
7. Demonstrate practical knowledge of the provincial and federal regulations with regards to research in the practice of Thoracic Surgery. **(OTR Professional 2.1)**
8. Maintain control of one's own emotions and opinions and identify personal reactions that could be detrimental to the patient/surgeon relationship. Explore and even accept possible ways to change attitudes that may be perceived as damaging to the patient/surgeon relationship. **(OTR Professional 1.6, 2.4, and 3.2.1)**
9. Identify a colleague or another physician with whom it is possible to discuss personal objectives, conflicts, or stress. **(OTR Professional 3.1)**

B. Contents

1. Demonstrate integrity, honesty, compassion. **(OTR Professional 1.1)**
2. Behave ethically and responsibly towards other health professionals. **(OTR Professional 3.3)**
3. Demonstrate excellence in the clinical practice of Thoracic Surgery and maintenance of competence. **(OTR Professional 1.2)**
4. Demonstrate awareness of the obligation to provide necessary information to the organizations responsible for regulating the profession. **(OTR Professional 2.2 and 2.3)**
5. Describe the principles and theories of bioethics and medico legal aspects of the practice of Thoracic Surgery. **(OTR Professional 1.7)**

13.3 RECOMMENDED LECTURES

1. Frank JR : Le cadre des compétences CanMEDS 2005 pour les médecins. Le Collège Royal des médecins et chirurgiens du Canada
2. Rocco G : Risk prediction and outcome analysis in Thoracic Surgery. Thoracic Surg Clinics, Vol. 17, No 3, August 2007
3. Sade RM : Ethical issues in thoracic surgery. Thoracic Surg Clin, Vol. 15, No 4, November 2005
4. Shields TW et al : General Thoracic Surgery, Sixth Edition, Lippincott, Williams, and Wilkins, 2005 (chapters 96, 97).