

**APRIL 2016**  
**VERSION 1.0**

*NOTE: Throughout this document, references to the patient's family are intended to include all those who are personally significant to the patient and are concerned with his or her care, including, according to the patient's circumstances, family members, partners, caregivers, legal guardians, and substitute decision makers.*

## **DEFINITION**

Adult Thrombosis Medicine is that area of enhanced competence within medicine concerned with the investigation, diagnosis, and medical management of patients with venous and arterial thromboembolic disease in a variety of clinical contexts.

## **ELIGIBILITY REQUIREMENTS**

The Area of Focused Competence (AFC) trainee must have Royal College certification or equivalent in Internal Medicine or Emergency Medicine, or enrolment in a Royal College accredited residency program in these areas (see requirements for these qualifications). All trainees must be certified in their primary specialty in order to be eligible to submit a Royal College certification portfolio in Adult Thrombosis Medicine.

## **GOALS**

Upon completion of training, an AFC diplomate is expected to function as a competent specialist in Adult Thrombosis Medicine, capable of an enhanced practice in this area of focused competence, within the scope of Internal Medicine or Emergency Medicine. The AFC trainee must acquire a working knowledge of the theoretical basis of the discipline, including its foundations in science and research, as it applies to medical practice.

The discipline of Adult Thrombosis Medicine includes responsibility for

- evaluation and management of patients with venous thromboembolism in the ambulatory clinic setting;
- evaluation and management of patients with venous thromboembolism in the inpatient setting;
- assessment of a patient's thromboembolic risk;
- management of periprocedural anticoagulation for patients who are on antithrombotic therapy;
- provision of consultation to other specialists regarding the risks and benefits of combination antiplatelet and anticoagulant therapies;

- engagement with members of other health care professions, administrators, and institutional leadership to improve care for patients with venous thromboembolism; and
- advancement of the discipline of Adult Thrombosis Medicine through scholarship.

Adult Thrombosis Medicine diplomates must demonstrate the requisite knowledge, skills, and behaviours for effective patient-centred care and service to a diverse population. In all aspects of specialist practice, the diplomate must be able to address ethical issues and issues of gender, sexual orientation, age, culture, beliefs, and ethnicity in a professional manner.

At the completion of training, the diplomate will have acquired the following competencies and will function effectively as a:

## **Medical Expert**

### ***Definition:***

As *Medical Experts*, Adult Thrombosis Medicine diplomates integrate all of the CanMEDS Roles, applying medical knowledge, clinical skills, and professional attitudes in their provision of patient-centred care. *Medical Expert* is the central physician Role in the CanMEDS framework.

### ***Key and Enabling Competencies: Adult Thrombosis Medicine diplomates are able to...***

#### **1. Function effectively as consultants, integrating all of the CanMEDS Roles to provide optimal, ethical, and patient-centred medical care**

- 1.1. Demonstrate use of all CanMEDS competencies relevant to Adult Thrombosis Medicine
- 1.2. Identify and appropriately respond to relevant ethical issues arising in patient care

#### **2. Establish and maintain clinical knowledge, skills, and behaviours appropriate to Adult Thrombosis Medicine**

- 2.1. Apply knowledge of the clinical, socio-behavioural, and fundamental biomedical sciences relevant to Adult Thrombosis Medicine to effectively and ethically manage patients with thromboembolic disorders
  - 2.1.1. Superficial and deep venous anatomy, including but not limited to iliofemoral veins, calf veins, the inferior vena cava, pulmonary arterial circulation, upper extremity veins, splanchnic circulation, spermatic/ovarian veins, and cerebral venous circulation
  - 2.1.2. Normal and disordered pathways of hemostasis, coagulation and fibrinolysis, including changes related to age
  - 2.1.3. Altered pathways of hemostasis, coagulation and fibrinolysis, as well as the pathophysiological mechanisms of venous and arterial thrombosis, in the pregnant and postpartum patient
  - 2.1.4. Pathophysiology of heparin-induced thrombocytopenia

- 2.1.5. Pathophysiological mechanisms of cancer-associated thrombosis, including its impact on morbidity and mortality
- 2.1.6. Genetics relevant to thromboembolic disease
- 2.1.7. Epidemiology of venous and arterial thromboembolic disease, including incidence, prevalence, population characteristics, and modifiable and nonmodifiable risk factors
- 2.1.8. Natural history of deep vein thrombosis and pulmonary embolism, including but not limited to short- and long-term complications such as post-thrombotic syndrome and chronic thromboembolic pulmonary hypertension
- 2.1.9. Principles of laboratory testing relevant to thromboembolic disease, including but not limited to coagulation assays, D-dimer testing, investigations for thrombophilia, and tests for heparin-induced thrombocytopenia
- 2.1.10. Indications, principles, limitations, and risks and benefits of invasive and noninvasive imaging studies for the evaluation of deep venous thrombosis and pulmonary embolism
- 2.1.11. Mechanisms of action, pharmacokinetics, toxicity profiles, costs, and risks of anticoagulant, thrombolytic, and antiplatelet agents used to treat and prevent venous and arterial thromboembolic disease
- 2.1.12. Mechanisms of action, pharmacokinetics, toxicity profiles, costs, and risks of agents, including but not limited to blood products and antidotes used to reverse anticoagulant, thrombolytic, and antiplatelet medications
- 2.2. Describe the CanMEDS framework of competencies relevant to Adult Thrombosis Medicine
- 2.3. Integrate the available best evidence and best practices to enhance the quality of care and patient safety in Adult Thrombosis Medicine

### **3. Perform a complete and appropriate assessment of a patient**

- 3.1. Identify and effectively explore issues to be addressed in a patient encounter, including the patient's context and preferences
- 3.2. Elicit a history that is relevant, concise, and accurate to context and preferences for the purposes of diagnosis, management, health promotion, and disease prevention, relevant to Adult Thrombosis Medicine
  - 3.2.1. Assessment of appropriate thrombosis prophylaxis
  - 3.2.2. Deep vein thrombosis, including atypical sites
  - 3.2.3. Pulmonary embolism
  - 3.2.4. Catheter-related thrombosis
  - 3.2.5. Superficial thrombophlebitis
  - 3.2.6. Post-thrombotic syndrome
  - 3.2.7. Chronic thromboembolic pulmonary hypertension

- 3.3. Perform a focused physical examination that is accurate and relevant to Adult Thrombosis Medicine, for the purposes of diagnosis, management, health promotion, and disease prevention
  - 3.3.1. Assessment of appropriate thrombosis prophylaxis
  - 3.3.2. Deep vein thrombosis, including atypical sites
  - 3.3.3. Pulmonary embolism
  - 3.3.4. Catheter-related thrombosis
  - 3.3.5. Superficial thrombophlebitis
  - 3.3.6. Post-thrombotic syndrome
  - 3.3.7. Chronic thromboembolic pulmonary hypertension
  
- 3.4. Select medically appropriate investigations in a resource-effective and ethical manner, including but not limited to coagulation assays, D-dimer testing, imaging studies, and thrombophilia assays
  - 3.4.1. Demonstrate knowledge and appropriate use of D-dimer testing in the diagnosis of deep vein thrombosis and pulmonary embolism
  - 3.4.2. Select the appropriate imaging studies for diagnosis of first and recurrent deep vein thrombosis and pulmonary embolism, as well as for chronic thromboembolic pulmonary hypertension
  - 3.4.3. Ensure appropriate informed consent is obtained for diagnostic tests, including genetic assays and invasive imaging
    - 3.4.3.1. Analyze and explain the risks and benefits associated with diagnostic tests
  
- 3.5. Demonstrate effective clinical problem solving and judgment to address a patient's problems, including interpreting available data and integrating information to generate differential diagnoses and management plans
  - 3.5.1. Diagnose patients appropriately using currently accepted diagnostic criteria
    - 3.5.1.1. Apply clinical prediction rules and the concept of pretest probability to support diagnostic decisions
  
- 3.6. Apply knowledge of validated scores used to determine risk of thrombosis, bleeding and severity of disease
  
- 3.7. Diagnose the following conditions in a timely, logical, ethical, and appropriate manner, including the special considerations in pregnant patients, and patients with cancer or renal insufficiency:
  - 3.7.1. Deep vein thrombosis: first, recurrent, provoked, unprovoked, calf vein thrombosis, iliofemoral, and upper extremity
  - 3.7.2. Pulmonary embolism: first, recurrent, provoked unprovoked, incidental, isolated subsegmental, and submassive and massive

- 3.7.3. Thrombosis in atypical sites: splanchnic veins, cerebral sinus, spermatic/ovarian veins, renal vein, and vena cava
- 3.7.4. Catheter-related deep vein thrombosis
- 3.7.5. Superficial thrombophlebitis
- 3.7.6. Chronic thromboembolic pulmonary hypertension
- 3.7.7. Post-thrombotic syndrome
- 3.7.8. Anticoagulant-related bleeding
- 3.7.9. Heparin-induced thrombocytopenia
- 3.7.10. Antiphospholipid antibody syndrome
- 3.7.11. Thrombotic complications of systemic conditions, including but not limited to cancer, thrombotic thrombocytopenic purpura, disseminated intravascular coagulation, hemoglobinopathies, autoimmune disorders, and inflammatory disorders
  - 3.7.11.1. Tumour thrombus
- 3.7.12. Asymptomatic thrombophilia

#### **4. Use preventive and therapeutic interventions effectively**

- 4.1. Implement a management plan in collaboration with a patient, the patient's family, and the care team
  - 4.1.1. Demonstrate an understanding of the impact of cognitive, psychological, and psychiatric impairment on the implementation of management plans
- 4.2. Demonstrate appropriate and timely application of preventive and therapeutic interventions relevant to Adult Thrombosis Medicine
  - 4.2.1. Thrombosis prophylaxis, including anticoagulant, antiplatelet, and mechanical prophylaxis
  - 4.2.2. Periprocedural bridging, including but not limited to patients anticoagulated for venous or arterial indications, and patients with mechanical heart valves
  - 4.2.3. Antithrombotic, antiplatelet, and thrombolytic therapy for management of thromboembolism, including in patients at high risk of bleeding, pregnant patients, patients at extremes of body weight, patients with cancer, trauma patients, and patients with renal insufficiency or hemostatic defects
  - 4.2.4. Reversal of antithrombotic therapies
  - 4.2.5. Use of blood products and/or specific antidotes in the management of bleeding related to antithrombotic or thrombolytic therapy
  - 4.2.6. Therapies for heparin-induced thrombocytopenia

- 4.2.7. Appropriate and timely recommendation for insertion and removal of inferior vena cava (IVC) filters
- 4.2.8. Anticoagulant monitoring
- 4.2.9. Acute and chronic symptom management, including but not limited to compression stockings and pain management
- 4.3. Obtain appropriate informed consent for therapies and preventive measures
  - 4.3.1. Analyze and explain the risks associated with preventive and therapeutic interventions
- 4.4. Ensure appropriate followup for preventive and therapeutic interventions

**5. Seek appropriate consultation from other health professionals, recognizing the limits of their own expertise**

- 5.1. Demonstrate insight into their own limits of expertise
- 5.2. Demonstrate effective, appropriate, and timely consultation of another health professional, as needed for optimal patient care
- 5.3. Arrange appropriate followup care services for patients and their families

**Communicator**

**Definition:**

As *Communicators*, Adult Thrombosis Medicine diplomates effectively facilitate the doctor-patient relationship and the dynamic exchanges that occur before, during, and after the medical encounter.

**Key and Enabling Competencies: Adult Thrombosis Medicine diplomates are able to...**

**1. Develop rapport, trust, and ethical therapeutic relationship with patients and families**

- 1.1. Recognize that being a good communicator in the role of a consultant is a core clinical skill for Adult Thrombosis Medicine physicians, and that effective physician-patient communication can foster patient satisfaction, physician satisfaction, adherence, and improved clinical outcomes
- 1.2. Establish positive therapeutic relationships with patients and their families in the role of a consultant that are characterized by understanding, trust, respect, honesty, and empathy

**2. Accurately elicit and synthesize relevant information and perspectives of patients and families, colleagues, and other professionals**

- 2.1. Gather information about a disease, and about a patient's beliefs, concerns, expectations, and illness experience

- 2.2. Seek out and synthesize relevant information from other sources, such as a patient's family, and other professionals, while respecting individual privacy and confidentiality

**3. Convey relevant information and explanations accurately to patients and families, colleagues, and other professionals**

- 3.1. Provide education and counselling to a patient and family, colleagues, and other professionals in a humane manner and in such a way that it is understandable and encourages discussion and participation in decision-making

**4. Develop a common understanding on issues, problems, and plans with patients, families, and other professionals, including pharmacists, nurses, and collaborating physicians, to develop a shared plan of care**

**5. Convey oral, written, and/or electronic information effectively about a medical encounter**

- 5.1. Maintain clear, concise, accurate, and appropriate records of clinical encounters and plans
- 5.2. Present oral reports of clinical encounters and plans
- 5.3. Convey medical information appropriately to ensure safe transfer of care

**6. Present medical information effectively to the public or media about Adult Thrombosis Medicine issues, including awareness of thromboembolic disorders and prevention strategies**

**Collaborator**

***Definition:***

As *Collaborators*, Adult Thrombosis Medicine diplomates work effectively within a health care team to achieve optimal patient care.

***Key and Enabling Competencies: Adult Thrombosis Medicine diplomates are able to...***

**1. Participate effectively and appropriately in an interprofessional health care team**

- 1.1. Describe the Adult Thrombosis Medicine specialist's roles and responsibilities to other professionals
- 1.2. Describe the roles and responsibilities of other professionals within the Adult Thrombosis Medicine team, including but not limited to nurses and pharmacists
- 1.3. Recognize and respect the diverse roles, responsibilities, and competencies of other professionals in relation to their own

- 1.4. Work with others to assess, plan, provide, and integrate care for individual thrombosis patients or groups of patients when anticoagulation therapy affects other treatments or interventions
- 1.5. Work collaboratively with other disciplines and members of the interprofessional team, including but not limited to nurses, pharmacists, and research assistants, in ambulatory, inpatient, and research settings
- 1.6. Work collaboratively with other members of the interprofessional team in outpatient anticoagulation monitoring programs

## **2. Work with other health professionals effectively to prevent, negotiate, and resolve interprofessional conflict**

### **Manager**

#### ***Definition:***

As *Managers*, Adult Thrombosis Medicine diplomates are integral participants in health care organizations, organizing sustainable practices, making decisions concerning the allocation of resources, and contributing to the effectiveness of the health care system.

#### ***Key and Enabling Competencies: Adult Thrombosis Medicine diplomates are able to...***

### **1. Participate in activities that contribute to the effectiveness of their health care organizations and systems**

- 1.1. Work collaboratively with others in their organizations, including health care professionals in the emergency department, blood bank, and coagulation laboratory, to manage patient care in a cost-effective and efficient manner
- 1.2. Participate in systemic quality process evaluation and improvement, including patient safety initiatives
- 1.3. Describe the structure and function of the health care system as it relates to Adult Thrombosis Medicine practice, including the roles of physicians and the provincial and territorial ministries of health
- 1.4. Demonstrate an understanding of the elements of outpatient practice management, including the administration of ambulatory thrombosis clinics and anticoagulant clinics

### **2. Allocate finite health care resources appropriately**

- 2.1. Demonstrate an understanding of the importance of just allocation of health care resources, balancing effectiveness, efficiency, and access with optimal patient care, particularly with high cost diagnostic tests, laboratory assays, therapies, and blood products
- 2.2. Demonstrate appropriate and efficient use of health care resources in the prophylaxis, diagnosis, and management of thromboembolic disease and complications of treatment, including for individual patients and at a systems level



## **Health Advocate**

### **Definition:**

As *Health Advocates*, Adult Thrombosis Medicine diplomates use their expertise and influence responsibly to advance the health and well-being of individual patients, communities, and populations.

**Key and Enabling Competencies: Adult Thrombosis Medicine diplomates are able to...**

### **1. Respond to the health needs and issues of individual patients**

- 1.1. Identify the health needs of an individual patient as it relates to thromboembolic disease
- 1.2. Identify opportunities for advocacy, health promotion, and disease prevention with individuals to whom they provide care, including access to drugs
  - 1.2.1. Educate patients on the importance of anticoagulant monitoring, of taking anticoagulants as prescribed, and the risks of noncompliance
  - 1.2.2. Encourage the promotion of patient involvement in decision-making
  - 1.2.3. Prescribe thrombosis prophylaxis
  - 1.2.4. Assist patients in accessing costly medications
- 1.3. Demonstrate an appreciation of the possibility of competing interests between individual advocacy issues and the community at large

### **2. Respond to the health needs of the communities that they serve**

- 2.1. Describe the practice communities that they serve
- 2.2. Identify opportunities for advocacy, health promotion, and disease prevention in the communities that they serve, and respond appropriately
  - 2.2.1. Thrombosis prophylaxis
  - 2.2.2. Monitoring of antithrombotic therapy
  - 2.2.3. Bleeding associated with antithrombotic therapy

### **3. Identify the determinants of health for the populations that they serve**

- 3.1. Identify the determinants of health of the population, including barriers to access to thrombosis care and resources, including but not limited to financial barriers
- 3.2. Identify vulnerable or marginalized populations within those served and respond appropriately

#### **4. Promote the health of individual patients, communities, and populations**

- 4.1. Describe an approach to implementing a change in a determinant of health of the populations they serve
- 4.2. Describe how public policy impacts on the thrombosis health of the populations served at the hospital, ambulatory clinic, and anticoagulant clinic levels
  - 4.2.1. Promote awareness of thrombosis prophylaxis and appropriate management of thromboembolic disease to patients, other health care professionals, and others in the institutions in which they work
- 4.3. Demonstrate an appreciation of the possibility of conflict inherent in their role as health advocate for a patient or community with that of manager or gatekeeper

#### **Scholar**

##### ***Definition:***

As *Scholars*, Adult Thrombosis Medicine diplomates demonstrate a lifelong commitment to reflective learning, as well as the creation, dissemination, application, and translation of medical knowledge.

***Key and Enabling Competencies: Adult Thrombosis Medicine diplomates are able to...***

#### **1. Maintain and enhance professional activities through ongoing learning**

- 1.1. Access and interpret the relevant evidence
- 1.2. Integrate new learning into practice

#### **2. Critically evaluate medical information relevant to Adult Thrombosis Medicine and apply this appropriately to practice decisions**

- 2.1. Critically appraise landmark and new trial results, and drug information in order to address a clinical question
- 2.2. Integrate critical appraisal conclusions safely and appropriately to the management of patients with thromboembolic disease

#### **3. Facilitate the learning of patients, families, students, residents, other health professionals, the public, and others on issues about thromboembolic disease and anticoagulant management, as appropriate**

- 3.1. Identify collaboratively the learning needs and desired learning outcomes of others
- 3.2. Select effective teaching strategies and content to facilitate others' learning
- 3.3. Deliver effective lectures or presentations
- 3.4. Assess and reflect on teaching encounters
- 3.5. Provide effective feedback

3.6. Describe the principles of ethics with respect to teaching

**4. Contribute to the development, dissemination, and translation of new knowledge and practices**

4.1. Participate in a scholarly research, quality assurance, or educational project relevant to Adult Thrombosis Medicine, demonstrating primary responsibility for at least one of the following elements of the project:

- development of the hypothesis, which must include a comprehensive literature review
- development of the protocol for the scholarly project
- preparation of a grant application
- development of the research ethics proposal
- interpretation and synthesis of the results

**Professional**

***Definition:***

As *Professionals*, Adult Thrombosis Medicine diplomates are committed to the health and well-being of individuals and society through ethical practice, profession-led regulation, and high personal standards of behaviour.

***Key and Enabling Competencies: Adult Thrombosis Medicine diplomates are able to...***

- 1. Demonstrate a commitment to their patients, profession, and society through ethical practice**
- 2. Demonstrate a commitment to their patients, profession, and society through participation in profession-led regulation**
- 3. Demonstrate a commitment to physician health and sustainable practice**

**REQUIRED TRAINING EXPERIENCES**

1. Evaluate patients in the ambulatory care setting, including but not limited to those referred for risk assessment and acute management of thromboembolism, and those presenting for ongoing monitoring and followup
2. Evaluate patients for suspected venous thromboembolism
3. Act as a consultant to the emergency department and to inpatient medical, surgical, and critical care services for the management of patients with thrombotic and anticoagulation issues

4. Observe activities in a laboratory setting, which must include
  - inherited thrombophilia testing
  - antiphospholipid antibody testing
  - antithrombotic drug monitoring assays
5. Teach on topics relevant to Adult Thrombosis Medicine, including but not limited to critical review of the literature and ongoing research
6. Participate in a scholarly research, quality assurance, or educational project that is relevant to Adult Thrombosis Medicine and congruent with the AFC trainee's goals of training

### **RECOMMENDED TRAINING EXPERIENCES**

1. Observe procedures and review images in the medical imaging department in order to facilitate a broader understanding of the indications, challenges, and limitations of medical imaging studies as they pertain to thromboembolic disease
2. Assist in or observe the management of an anticoagulation monitoring clinic
3. Attend a conference relevant to Adult Thrombosis Medicine
4. Complete a clinical experience at another recognized academic thrombosis centre
5. Attend teaching session(s) regarding the use of blood products and reversal agents in transfusion medicine

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