

MATERNAL-FETAL MEDICINE ROTATION OBJECTIVES 2017 (including Ultrasound Rotation) Canmeds 2015

Maternal-Fetal Medicine

Maternal Fetal Medicine involves the prevention, diagnosis and treatment of those conditions responsible for morbidity and mortality of the mother, fetus and early newborn. The rapidly expanding body of knowledge regarding maternal health and disease, as well as the continuing societal demands and expectations for mother and child continue to modify the nature of obstetrical care.

General Objectives

The overall objective of this rotation is to give residents in general obstetrics and gynaecology an overview of the subspecialty of maternal fetal medicine. It must be stated that it is not intended to train residents as maternal fetal medicine specialists.

Specific Objectives

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

1. Medical Expert / Clinical Decision-Maker

Two levels of knowledge and proficiency are referred to in this document:

An *extensive level* refers to an in-depth understanding of an area, from basic science to clinical application, and possession of skills to manage independently a problem in the area.

A *working level* indicates a level of knowledge sufficient for the clinical management of a condition, and/or an understanding of an approach or technique sufficient to counsel and recommend it, without having personally achieved mastery of that approach or technique.

a) General Objectives

On completion of his/her rotation, the maternal fetal medicine resident must demonstrate an understanding of the basic sciences relevant to maternal fetal medicine. The following are general objectives for the rotation:

- Knowledge of maternal, placental, fetal and newborn anatomy, embryology, genetics, pharmacology, biochemistry, endocrinology, microbiology, physiology and pathology.
- Evaluation and treatment of maternal, fetal and early newborn disorders
- An understanding of genetics, teratologic, metabolic, endocrine, immunologic and infectious disorders that relate to pregnancy.
- Diseases of fetal growth and development, abnormal placental and uterine function.
- Diseases of maternal systems and behavior disorders occurring in pregnancy.
- Diseases in neonates.
- Diagnostic and therapeutic skills for effective and ethical patient care
- The ability to access and apply relevant information to clinical practice
- Effective consultation services with respect to patient care, education, and legal opinions

- Recognition of personal limitations of expertise, including the need for appropriate patient referral and continuing medical education

b) Specific Objectives for Maternal Fetal Medicine

i. COGNITIVE SKILLS

The maternal fetal medicine resident must acquire an extensive knowledge for the following clinical conditions or problems encountered commonly in the practice of obstetrics and MFM. It is expected that the resident rotations in “Ultrasound” and “Obstetrics” at RAH will contribute to the core knowledge pertaining to MFM. Objectives for “general obstetrics” will not be covered in this document and will be listed elsewhere.

This list should be considered a minimum baseline, and not be considered as comprehensive for all disorders in the practice of this specialty.

The cognitive skills in MFM are broadly grouped under the following headings:

- Antenatal care
- Genetics/Prenatal screening and Diagnosis
- The Fetus and Fetal medicine
- Obstetrics and its complications
- Pre-existing Maternal Diseases
- Termination of Pregnancy

An extensive level of knowledge is required for the following:

a. Antenatal care

- Pregnancy induced maternal physiological changes
- Routine antepartum assessment of normal pregnancy
- The effects of underlying medical, surgical, social, and psychosocial conditions on maternal and fetal health, and appropriate management of such
- Knowledge and use of antepartum fetal surveillance in the normal and high-risk pregnancy
 - Fetal movement counting
 - Non-Stress testing
 - Contraction Stress testing
 - Biophysical profile
 - Doppler ultrasound (Umbilical vessels, Middle cerebral, Uterine artery, Venous dopplers)
 - Ultrasound for growth assessment and pregnancy dating
- Antenatal nutrition

b. Genetics/Prenatal Diagnosis

- The resident must be able to identify from history whether a patient is at risk of passing on a genetic disorder.
- Genetic counseling: conduct a proper genetic screening/history, testing and counseling, including the complications from invasive procedures like chorionic villus sampling and

amniocentesis, and the outcomes of pregnancies complicated by fetal anomaly(ies) or aneuploidy

- Basics of Mendelian genetic inheritance
- Components, indications and use of first and second trimester screening ultrasound, including limitations.
- Nuchal translucency Ultrasound
- Indications for transvaginal ultrasound in Pregnancy
- Second trimester genetic sonogram (soft markers for aneuploidy)
- Maternal serum marker screening (first and second trimester)
- Abnormalities of maternal serum screening
 - Unexplained Elevated MSAFP, hCG and DIA
 - Low PAPP-A
- Non invasive prenatal testing (cell free DNA)

c. The Fetus and Fetal medicine

- Fetal embryology and development
- Fetal physiology
- Prematurity – its risks and complications
- Classifications and Mechanisms of multiple gestations
- The fetus with anomalies: general approach and considerations
- Abnormalities of fetal growth or fluid.
 - IUGR – symmetric and asymmetric
 - Macrosomia
 - Poly / Oligohydramnios

d. Obstetrics and it's Complications

The pathophysiology, prevention, investigation, diagnosis, and/or management of:

- Abnormalities/disorders of placenta:
 - Placenta Previa and Vasa previa
 - Placenta accreta, increta, percreta
 - Abruption placenta
 - Chorioangioma
- Premature birth
 - Preterm labour including tocolytic therapy
 - Preterm birth prevention including use of progesterone
 - Antenatal corticosteroids
 - Magnesium sulfate for fetal neuroprotection
 - Preterm premature rupture of membranes
 - Incompetent cervix
 - Uterine anomalies
- Gestational hypertension and related areas
 - HELLP, Acute fatty liver, TTP
 - Severe pre-eclampsia/gestational hypertension
 - Eclampsia

- Prior adverse pregnancy outcomes
 - Previous stillbirth
 - Previous preterm birth
 - Previous gestational hypertension
 - Prior fetal anomalies
 - Previous IUGR
- Multiple gestations
 - Consequences, co-morbidity and mortality of mono-chorionic/-monoamniotic twinning
 - Discordant growth or anomalies
 - Prenatal screening in multiples
- Maternal pregnancy related conditions
 - Cholestasis of pregnancy
 - PUPP
 - Herpes Gestationalis
 - Maternal trauma
- Obstetrical Infections - The pathophysiology, investigation, diagnosis, and/or management of:
 - Group B streptococcus, Bacterial vaginosis
 - TORCH infections
 - Parvovirus
 - Chorioamnionitis
 - Endometritis

e. Pre-existing Maternal Diseases

Hypertension in Pregnancy

The resident should be able to describe, diagnose, and manage the hypertensive disorders of pregnancy, including:

- Etiology and pathophysiology of specific diseases
- Methods of prevention
- Pathologic changes in mothers and fetus
- Use and action of anticonvulsants and anti-hypertensive agents
- Complications of the disease
- Non-invasive techniques to monitor mother and fetus
- Prognosis for subsequent pregnancies

f. Termination of pregnancy (second and third trimester)

- Counseling patients with regards to termination methods
- Developing an awareness of the psychosocial aspects of termination and its impact on the patient, especially in the context of a wanted pregnancy being terminated for genetic or maternal medical complications.

A working level of knowledge is required for the following:

a. Genetics/Prenatal Diagnosis

- Common chromosomal abnormalities: Trisomy 21,13, 18, 45 XO
- Common inherited disorders such as thalassemia, tay-sachs, sickle cell anemia, cystic fibrosis

- Indications for and methods of prenatal diagnosis: non-invasive and invasive including CVS, amniocentesis, cordocentesis, maternal serum screening, non-invasive prenatal testing (NIPT), RAD, microarray, ultrasound, fetal echocardiography, fetal MRI
- Teratology
 - Common teratogens: Alcohol, Phenytoin, Valproic acid, Isotretinoin, Coumadin, Androgenic hormones, Thalidomide, Diethylstilbestrol, Opiates
 - Perinatal Infections: TORCH, Parvovirus, Syphilis
 - Radiation
 - Hyperthermia

b. The Fetus and Fetal medicine

The fetus with severe anomalies and/or abnormal physiology such as:

- Fetal hydrops –immune and non immune
- Fetal alloimmunization- pathophysiology, surveillance and management
 - Management and prevention of maternal isoimmunization
 - Antigen-antibody systems in fetal hemolysis
 - Laboratory tests including cell free fetal DNA testing of fetal RBC antigens
 - Indications for and techniques of non-invasive (Doppler) and invasive (amniocentesis, fetal blood sampling) evaluation
 - Timing and mode of delivery
- Fetal/Neonatal platelet alloimmunisation
- Fetal arrhythmias
- Major anomalies such as: chylothorax, congenital diaphragmatic hernia, sacrococcygeal teratoma, CCAM, pulmonary sequestration, skeletal dysplasia, duodenal atresia, hydrocephalus, open neural tube defects, abdominal wall defects and fetal cardiac abnormalities such as hypoplastic left and right heart syndrome.
- Minor anomalies such as clubfeet, cleft lip and palate

c. Obstetrics and its complications.

- Obstetric anesthesia including the risks and benefits of general anesthesia, spinal anesthesia, epidural anesthesia, pudendal nerve block, and narcotics
- Multiple pregnancies
 - Twin to twin transfusion syndrome
 - Triplets and other higher order multiples including a working knowledge of fetal reduction

d. Pre-existing Maternal Diseases and conditions.

- Endocrine
 - Diabetes
 - Hyper/Hypothyroidism
 - Prolactinoma
 - Pituitary, adrenal, parathyroid abnormalities
- Cardiovascular
 - Valvular heart disease: Mitral, aortic, tricuspid, pulmonary, valve replacement
 - Pulmonary hypertension
 - Atherosclerotic heart disease
 - Essential hypertension

- Cardiomyopathies
- Renal diseases
 - Acute and Chronic renal disease
 - Urinary tract infection
 - Nephrolithiasis
- Gastrointestinal
 - Viral hepatitis
 - Pancreatitis
 - Inflammatory bowel disease
 - GI bleeding
 - Cholecystitis/Cholelithiasis
- Respiratory
 - Asthma
 - Pneumonia
 - Cystic fibrosis
 - Chronic obstructive airways disease
- Musculo-skeletal/Connective tissue
 - Systemic lupus erythematosus (SLE)
 - Rheumatoid arthritis
 - Marfans syndrome
 - Antiphospholipid Antibody Syndrome
- Infectious disease
 - Viral hepatitis
 - HIV
 - Herpes
 - Syphilis
- Chemical dependency and addiction
 - Tobacco
 - Cocaine
 - Opiates
 - ETOH
 - Barbiturates, etc.
- Central Nervous system disorders
 - Cerebral vascular accident
 - Spinal cord injury
 - Multiple sclerosis
 - Epilepsy
 - Myasthenia Gravis
 - AV malformation
 - Intracerebral Hemorrhage
 - Increased intra-cranial pressure
- Malignancy in pregnancy
 - Hodgkin's disease and other hematological cancers
 - Breast cancer
 - Melanoma
 - Gynecological cancers – ovarian, cervical, etc.
- Transplantation medicine

- Hematological disorders
 - Von Willibrands Disease
 - Thrombophilias
 - Deep vein thrombosis / Pulmonary embolism
 - Hemoglobinopathies -Sickle cell anemia, Thalassemias
 - ITP
 - Fe deficiency anemia

e. Neonatal Care

- The principles of acute neonatal resuscitation
- The neonatal complications resulting from prematurity, macrosomia, birth asphyxia, assisted vaginal delivery, congenital anomaly(ies), and/or maternal medical complications, including their appropriate management and expected outcome

ii. TECHNICAL SKILLS

The maternal fetal medicine resident must acquire a wide variety of technical skills. The following is a list of required technical skills including surgical skills. This list should be considered in its totality and not be considered as exhaustive.

a. Diagnostic Procedures and Techniques

The maternal fetal medicine resident will demonstrate an understanding of the indications, risks and benefits, limitations and role of the following investigative techniques specific to the practice of MFM, and will be competent in their interpretation.

Imaging

Obstetric ultrasound: screening and targeted (in each trimester) and biophysical profile and Doppler flow studies.

In addition, the resident will be able to perform or determine: fetal lie and presentation, amniotic fluid assessments, M mode of heart rate, placentation, basic biometry and biophysical profile.

The resident should have a working level of knowledge for transvaginal scanning for placental localization.

The maternal fetal medicine resident should have a working level of knowledge of fetal blood sampling and intravascular transfusion (cordocentesis) including the technique, immediate and long terms risks of the procedure and disorders amenable to diagnosis and indications.

Cytology and Histopathology

- Amniocentesis and chorionic villi sampling

The maternal fetal medicine resident should have a working level of knowledge of chorionic villus sampling and amniocentesis. The maternal fetal medicine resident should have an in depth understanding of the techniques, the maternal and fetal risks and the limitations of the techniques.

Serology and Microbiology

- Maternal serum screening for aneuploidy and neural tube defects
- Screening for Group B Streptococcus in pregnancy
- TORCH screen to identify possible congenital viral infections
- Culture and serology for sexually transmitted diseases
- Wet mount of vaginal discharge
- Urinalysis, urine microscopy and urine culture

Molecular Genetic Analysis

The maternal fetal medicine resident should have a working knowledge and an understanding of:

- gene structure
- gene probes
- linkage and recombination
- direct detection of mutations and deletions
- principles of relevant laboratory techniques, e.g., southern blotting, polymerase chain reactions

Other Investigations

The maternal fetal medicine resident should possess the skills to independently perform fetal assessment: non-stress test, biophysical profile score, contraction stress test, fetal scalp pH and interpretation

b. Surgical Skills

The list of surgical skills is divided into categories reflecting the frequency with which these procedures are encountered during residency training in obstetrics and gynaecology as well as in the general practice of the specialty. The categorized list also reflects the level of technical skill competency for each surgical procedure expected after completion of a residency training program in obstetrics and gynaecology. The resident must be able to discuss with the patient the risks, benefits, and complications of these surgical treatments (A, B) as well as any available non-surgical treatment alternatives and the consequences of the absence of surgical treatment

Surgical Procedures List A

The fully trained resident must be competent to *independently* perform the following procedures in List A. He/she should be able to manage a patient prior to, during and after all of the following procedures:

Not applicable in this rotation

Surgical Procedures List B

The following procedures in List B are those that the fully trained resident in MFM will understand and may be able to perform (although it is not expected that they can perform), though he/she may not have actually acquired sufficient skill in residency to *independently* perform them.

Obstetric Procedures:

- first trimester therapeutic abortion
- dilation and evacuation in the second trimester

Surgical Procedures List C

The following procedures in List C are those that the fully trained resident in MFM will understand but *not* be expected to be able to perform. He/she should be able to describe the principles of these procedures, the indications for referral and the perioperative management and complications.

Obstetric Procedures

- Chorionic villus sampling
- Second trimester amniocentesis
- Amniocentesis for the assessment of fetal lung maturity
- Cordocentesis and intrauterine transfusion
- Decompression amniocentesis/diagnostic amnioinfusion.
- Fetal shunting (bladder, chest, abdomen, etc)
- Laser ablation for twin to twin transfusion syndrome
- RFA or bipolar cord ligation for selection reduction/ termination in monochorionic twins
- First trimester therapeutic abortion
- Dilation and evacuation in the second trimester

2. Communicator

Definition

To provide humane, high-quality care, obstetricians and gynaecologists establish effective relationships with patients, other physicians, and other health professionals. Communication skills are essential for obtaining information from, and conveying information to patients and their families. Furthermore, these abilities are critical in eliciting patients' beliefs, concerns, and expectations about their illnesses, and for assessing key factors impacting on patients' health.

General Objectives

The fully-trained obstetrician and gynaecologist must be able to:

- establish therapeutic relationships with patients and their families characterized by understanding, trust, empathy, and confidentiality
- obtain and synthesize relevant history from patients, families, and/or community
- discuss appropriate information with the patient, her family, and other health care providers that facilitates optimal health care. This also implies the ability to maintain clear, accurate, timely and appropriate records

Specific Objectives

To achieve these objectives as a communicator, the resident must demonstrate:

- the ability to obtain informed consent for medical and surgical therapies, including discussing the risks, benefits and complications of surgical versus non-surgical treatments as well as the consequences of non-treatment.
- the ability to record accurately and succinctly data collected from patients, laboratory tests and radiological studies and to communicate (oral or written) conclusions based on these data to patients and their families, referring physicians and other involved health care personnel
- evidence of good interpersonal skills when working with patients, families, and other members of the health care team
- an awareness of the unique personal, psychosocial, cultural and ethical issues that surround individual patients with obstetric problems
- the ability to prepare and present information to colleagues and other trainees (if applicable) both informally (e.g., ward rounds) and formally (e.g., Grand Rounds, scientific meetings)
- the ability to provide information to the general public and media about areas of local concern relevant to the practice of maternal fetal medicine

The MFM resident will enhance themselves within these objectives by:

- *Being responsible for preparing and presenting perinatal rounds at the RAH.*
- *The resident will conduct, record and dictate consultations on complex maternal fetal medicine referrals, which are reviewed by the attending consultant for accuracy, legibility and completeness.*

3. Collaborator

Definition

The Canadian model closely integrates primary health care providers and midwives with obstetricians and gynaecologists in the provision of health care for women. This underlies the need for residents to develop excellent skills as collaborators. They also must learn to effectively and respectfully work with specialists in other fields, including emergency room physicians, anesthesia, diagnostic radiology, pathology, neonatology-pediatrics, internal medicine including endocrinology, general surgery, and urology.

General Objectives

The fully-trained obstetrician and gynaecologist must be able to:

- consult effectively with other physicians
- consult effectively with other health care providers
- contribute effectively to a multidisciplinary health care team

Specific Objectives

To achieve these objectives as a collaborator, the resident must be able to:

- function competently in the initial management of patients with conditions that fall within the realm of other medical or surgical specialties
- demonstrate the ability to function effectively and, where appropriate, provide leadership, in a multidisciplinary health care team, showing respect, consideration and acceptance of other team members and their opinions while contributing personal specialty-specific expertise
- identify and understand and respect the significant roles, expertise, and limitations of other members of a multidisciplinary team required to optimally achieve a goal related to patient care, medical research, medical education or administration

The MFM resident will gain collaborative skills through active participation in:

- *complex care maternity case conferences –including but not limited to pediatric surgical and cardiac surgical multi-disciplinary meetings*
- *our weekly multidisciplinary clinic meetings*
- *inpatient consultations on the antenatal ward and the labour and delivery suite*
- *working closely in a team based approach with members of the Perinatal Clinic Team including Nurses, Sonographers, Genetic Counselors, Social Workers and Unit Clerks*

4. Leader

Definition

Obstetricians and gynaecologists function as leaders when they make everyday practice decisions involving resources, coworkers, tasks, policies, and their personal lives. They do this in the settings of individual patient care, practice organizations, and in the broader context of the health care system. Thus, specialists require the abilities to prioritize and effectively execute tasks through teamwork with colleagues, and make systematic decisions when allocating finite health care resources. Obstetricians and gynaecologists can also assume a managerial role through involvement in health care administration and in professional organizations.

General Objectives

The fully-trained obstetrician and gynaecologist should be able to:

- manage resources effectively to balance patient care, learning needs and outside activities
- allocate finite health care resources wisely
- work effectively and efficiently in a health care organization
- utilize information technology to optimize patient care, life-long learning and practice administration

Specific Objectives

To achieve these objectives as a leader, the resident should:

- be able to effectively manage a clinical practice, including the follow up of normal and abnormal test results and triage of emergency problems
- demonstrate an understanding of the principles of quality assurance in the practice of obstetrics
- demonstrate an understanding of population-based approaches to the provision of medical care, including the costs and benefits of the various screening tests available for prenatal diagnosis

- demonstrate an understanding of how health care governance influences patient care, research and educational activities at the local, provincial and national level
- be able to function effectively in local, regional and national specialty associations (professional or scientific) to promote better health care for women

5. Health Advocate

Definition

Obstetricians and gynaecologists must recognize the importance of advocacy activities in responding to the challenges represented by those social, environmental, and biological factors that determine the health of patients and society. Health advocacy is an essential and fundamental component of health promotion that occurs at the level of the individual patient, the practice population, and the broader community. Health advocacy is appropriately expressed both by the individual and collective responses of obstetricians and gynaecologists in influencing public health and policy.

General Objectives

The fully-trained obstetrician and gynaecologist will:

- identify the important determinants of health affecting patients
- contribute effectively to improved health of patients and communities
- recognize and respond to those issues where advocacy is appropriate

Specific Objectives

In order to achieve these objectives as an advocate, the resident should be able to:

- identify the important determinants of health for an individual patient, highlight which determinants are modifiable, and adapt the treatment approach accordingly
- make clinical decisions for an individual patient, when necessary balancing her needs against the needs of the general population and against the available resources
- participation in the transfer of high risk pregnant women to centres with the appropriate level of care for their particular needs and those of the fetus
- facilitate medical care for patients even when that care is not provided personally or locally or when that care is not readily accessible (e.g., therapeutic abortion)
- advise patients about the local and regional resources available for support, education and rehabilitation
- provide direction to hospital administration regarding compliance with national clinical and surgical practice guidelines
- discuss the important function and role of various professional organizations, including the Society of Obstetricians and Gynaecologists of Canada (SOGC) in the support of obstetricians and gynaecologists in this country and in the provision and maintenance of optimal health care for Canadian women

6. Scholar

Definition

Obstetricians and gynaecologists must engage in a lifelong pursuit of mastery of their domain of professional expertise. They recognize the need to be continually learning and model this for others. Through their scholarly activities, they contribute to the appraisal, collection, and understanding of health care knowledge for women, and facilitate the education of their students, patients, and others.

General Objectives

The fully-trained obstetrician and gynaecologist must:

- develop, implement, and monitor a personal continuing education strategy
- be able to critically appraise sources of medical information
- facilitate patient and peer education
- try to contribute to the development of new knowledge in the field of obstetrics and gynaecology

Specific Objectives

In order to achieve these general objectives as a scholar, the resident must:

- develop a habit of life-long learning, utilizing information technology for referencing cases, literature review and participation in basic or applied clinical research
- identify gaps in personal knowledge and skill, and develop strategies to correct them by self-directed reading, discussion with colleagues, and ongoing procedural experience
- understand the principles of basic and applied clinical research, including biostatistics
- be able to critically appraise and summarize the literature on a given subject, and judge whether a research project or publication is sound, ethical, unbiased and clinically valuable

The MFM resident will enhance their competencies in these areas by:

- *Participation in the obstetrical residency and obstetrical medicine program Journal Club*
- *Presenting at Perinatal Rounds*
- *Attend weekly Perinatal and Grand Rounds.*

7. Professional

Definition

Obstetricians and gynaecologists have a unique societal role as professionals with a distinct body of knowledge, skills, and attitudes dedicated to improving the health and well-being of women. They are committed to the highest standards of excellence in clinical care and ethical conduct, and to continually perfecting mastery of their discipline.

General Objectives

The fully-trained obstetrician and gynaecologist must:

- deliver the highest quality of medical care with integrity, honesty, compassion, and respect
- exhibit appropriate personal and interpersonal professional behaviours
- practice medicine in a way that is consistent with the ethical obligations of a physician

Specific Objectives

In order to achieve these general objectives in the role of a professional, the resident must:

- foster a caring, compassionate and respectful attitude towards patients, families, and other members of the health care team
- provide medical care that is ethical, and seek advice or second opinion appropriately in ethically difficult situations
- monitor patients appropriately and provide appropriate follow up medical care, particularly after starting a new treatment or following a surgical procedure
- maintain patient confidentiality at all times
- complete reports, letters and summaries in a timely fashion and maintain medical records that are consistently accurate, informative and legible.
- understand medical protective procedures and the role of the Canadian Medical Protective Association in areas of patient-physician dispute
- be able to deal with professional intimidation and harassment
- show self-discipline, responsibility and punctuality in attending to ward duties, in the operating room, and at meetings and other activities, and be a moral and ethical role model for others
- be able to appropriately delegate clinical and administrative responsibilities