

Diagnostic and Molecular Pathology Residency Program

OVERALL GOALS OF RESIDENCY PROGRAM and ROTATION SPECIFIC GOALS & OBJECTIVES - CBME

OVERALL GOALS

The overall goal of the training program in Diagnostic and Molecular Pathology is to provide residents with high quality training in all areas of diagnostic and molecular pathology through a competency based medical education program. In addition to receiving training in all major areas, residents will be afforded the opportunity to tailor the program to suit their individual career goals and will be encouraged to develop areas of scholarly interest. At the conclusion of the training period, residents will be competent in the skills necessary to pass the Royal College examination and function as effective and skilled consultants to their clinical colleagues.

As of July 2019, the program has adopted the competency based medical education initiative, called Competency by Design (CBD). The program uses time as a framework and is structured to take place over five years, based at the London Health Sciences Centre, University Hospital. The rotations are designed to ensure that residents are able to fulfill all of the goals and objectives of training and successfully complete the required Entrustable Professional Activities (EPAs) to acquire the necessary knowledge to practice as competent consultant pathologists.

For additional information see the *Royal College Entrustable Professional Activities for Anatomical Pathology, 2019, version 1.0; EDITORIAL REVISION – AUGUST 2022*

OBJECTIVES

Preamble

The rotation specific objectives that follow are arranged according to level of residency training. The objectives build upon each other i.e., objectives listed for an initial rotation are not re-listed for subsequent rotations, but are presumed to have been attained.

Residents should also be familiar with the Royal College's documents outlining the Objectives of Training, and Specialty Training Requirements, publically available on the Royal College website.

The objectives are organized according to the seven competencies of the CanMEDS roles, derived from the Royal College of Physicians and Surgeons of Canada's Canadian Medical Education Directions for Specialists. This delineates a competency framework to assist future specialists in responding to challenges as health-care providers — challenges that require specialists to function in a health-care system in a constant state of flux and facing increasing fiscal constraints — while still providing the best specialty care. The CanMEDS roles framework lies at the core of postgraduate medical education in Canada. The goal of the CanMEDS framework of competencies is to make objectives and strategies for learning more explicit by consolidating and organizing them into a uniform framework that can be modeled nationally, across the medical specialty curricula.

The following are the essential roles and key competencies for specialist physicians in Canada:

ROLES	KEY COMPETENCIES Physicians are able to:
Medical Expert	<ol style="list-style-type: none"> 1. Practise medicine within their defined scope of practice and expertise 2. Perform a patient-centred clinical assessment and establish a management plan 3. Plan and perform procedures and therapies for the purpose of assessment and/or management 4. Establish plans for ongoing care and, when appropriate, timely consultation 5. Actively contribute, as an individual and as a member of a team providing care, to the continuous improvement of health care quality and patient safety
Communicator	<ol style="list-style-type: none"> 1. Establish professional therapeutic relationships with patients and their families 2. Elicit and synthesize accurate and relevant information, incorporating the perspectives of patients and their families 3. Share health care information and plans with patients and their families 4. Engage patients and their families in developing plans that reflect the patient's health care needs and goals 5. Document and share written and electronic information about the medical encounter to optimize clinical decision-making, patient safety, confidentiality, and privacy
Collaborator	<ol style="list-style-type: none"> 1. Work effectively with physicians and other colleagues in the health care professions 2. Work with physicians and other colleagues in the health care professions to promote understanding, manage differences, and resolve conflicts 3. Hand over the care of a patient to another health care professional to facilitate continuity of safe patient care
Leader	<ol style="list-style-type: none"> 1. Contribute to the improvement of health care delivery in teams, organizations, and systems 2. Engage in the stewardship of health care resources 3. Demonstrate leadership in professional practice 4. Manage career planning, finances, and health human resources in a practice
Health Advocate	<ol style="list-style-type: none"> 1. Respond to an individual patient's health needs by advocating with the patient within and beyond the clinical environment 2. Respond to the needs of the communities or populations they serve by advocating with them for system-level change in a socially accountable manner
Scholar	<ol style="list-style-type: none"> 1. Engage in the continuous enhancement of their professional activities through ongoing learning

	<ol style="list-style-type: none"> 2. Teach students, residents, the public, and other health care professionals 3. Integrate best available evidence into practice 4. Contribute to the creation and dissemination of knowledge and practices applicable to health
Professional	<ol style="list-style-type: none"> 1. Demonstrate a commitment to patients by applying best practices and adhering to high ethical standards 2. Demonstrate a commitment to society by recognizing and responding to societal expectations in health care 3. Demonstrate a commitment to the profession by adhering to standards and participating in physician-led regulation 4. Demonstrate a commitment to physician health and well-being to foster optimal patient care

By the end of residency training, all physicians should have a grounding in each role and have the background to develop expertise as needed any time in their future careers.

TRANSITION TO DISCIPLINE

INTRODUCTION TO PATHOLOGY

1. Medical Expert

- 1.1 Learn to use and care for a light microscope.
- 1.2 Start to acquire familiarity with normal histology and basic histopathological features.
- 1.3 Observe and assist pathologists, pathologist's assistants and/or residents with surgical dissection.
- 1.4 Under supervision, learn to describe some routine simple gross surgical specimens.
- 1.5 Begin to learn methods of tissue sampling for histology.
- 1.6 Examine slides for selected routine cases and review cases with residents and/or pathologists.
- 1.7 Observe the technique and approach to frozen section diagnosis.
- 1.8 Attend autopsies; observe and assist pathologist and/or resident with dissection.
- 1.9 Be able to recognize abnormal gross autopsy findings and to correlate with pathophysiology and cause of death.

2. Communicator

- 2.1 Learn what constitutes valid consent for autopsy.
- 2.2 Be able to review a patient chart and present a coherent summary prior to starting an autopsy or reviewing slides.

3. Scholar

- 3.1 Begin reading a standard basic pathology textbook, e.g., *Robbin's Pathologic Basis of Disease*.
- 3.2 Read around autopsy and surgical cases.

FOUNDATIONS OF DISCIPLINE

These objectives are divided into General and Rotation Specific objectives.

GENERAL OBJECTIVES

1. Medical Expert

The resident must:

- 1.1 Gain sufficient clinical knowledge and skills to allow them to make meaningful clinicopathologic correlations and form useful working relationships with clinical colleagues.

2. Communicator

The resident must:

- 2.1 Establish a sound and therapeutic relationship with patients and communicate well with families.
- 2.2 Establish a good working relationship with clinical and non-clinical colleagues, and allied health care workers.
- 2.3 Prepare written documentation that is accurate and legible.

3. Collaborator

The resident must:

- 3.1 Interact effectively with all members of the health care team.
- 3.2 Consult and delegate appropriately.
- 3.3 Be able to work effectively with community based care providers when appropriate.

4. Leader

The resident must:

- 4.1 Set priorities and manage time to integrate practice and personal life.
- 4.2 Understand the rationale for and approach to the ordering of laboratory tests; order tests with due regard to minimizing unnecessary testing.
- 4.3 Contribute to a culture that promotes patient safety.

5. Health Advocate

The resident must:

- 5.1 Understand the specialist's role in representing the patient's best interests with respect to disease prevention and advocating for socio-economic factors to improve health.
- 5.2 Understand the specialist's role in community intervention with regard to disease prevention.

6. Scholar

The resident must:

- 6.1 Accept responsibility for self-learning and self-evaluation.
- 6.2 Implement an effective personal learning strategy.
- 6.3 Understand and use information technology effectively, including the performance of literature searches; be able to appraise the literature critically.
- 6.4 Facilitate the education of more junior housestaff by providing guidance, feedback and mentorship.

7. Professional

The resident must:

- 7.1 Demonstrate integrity and respect when dealing with all peers, supervisors and other staff.
- 7.2 Demonstrate honesty in dealing with colleagues and others.
- 7.3 Demonstrate compassion for and employ tactful honesty with individuals and their families.
- 7.4 Be accountable for his/her personal actions.

- 7.5 Have a high degree of self-awareness and insight, and be able to evaluate himself/herself realistically and on a regular basis.
- 7.6 Be aware of personal and professional limitations and be willing to seek appropriate help when faced with these.
- 7.7 Maintain an appropriate balance between personal and professional roles.
- 7.8 Deal effectively with interpersonal disagreements and conflicts, working for harmonious outcomes.
- 7.9 Act as an appropriate role model for students and others.
- 7.10 Be reliable and conscientious in the discharge of professional responsibilities.
- 7.11 Be aware of the existence of cultural, ethnic and personality differences in his/her own and others' behaviour and responses to situations.
- 7.12 Be able to accept and evaluate criticism with equanimity and to take appropriate steps to improve as required.
- 7.13 Practice medicine in an ethically responsible manner that respects the medical, legal and professional obligations of belonging to a self-regulating body.
- 7.14 Know and understand the professional, legal and ethical codes to which physicians are bound.
- 7.15 Recognize, analyze and know how to deal with unprofessional behaviours in the practice of medicine, including but not exclusive to health problems such as dementing illness, psychiatric illness or substance abuse, taking into account local and provincial regulations.

ROTATION SPECIFIC OBJECTIVES

GENERAL SURGERY

1. Medical Expert

- 1.1 Learn the clinical approach, differential diagnosis, and management of common problems in general surgery.
- 1.2 Observe the process of procuring tissue and cytological biopsies, including an understanding of the indications and contraindications of these.
- 1.3 Learn how to submit properly to pathology various specimen types e.g., specimens from the OR.

2. Communicator

- 2.1 Educate peers on the importance of accurate clinical information on requisition forms that accompany surgical specimens.

3. Collaborator

- 2.1 Review selected pathological specimens from surgical patients with the pathologist.
- 2.2 Attend rounds, particularly those with pathology input.
- 2.3 Observe any autopsies performed on the resident's patients; communicate findings to members of the clinical team and family where appropriate; participate in obtaining informed consent for hospital autopsy.

GENERAL INTERNAL MEDICINE (and/or Adult Medicine Subspecialty)

1. Medical Expert

- 1.1 Learn the clinical approach, differential diagnosis, and management of common problems in internal medicine.

- 1.2 Appreciate the role of pathology in the diagnosis and management of selected disorders. e.g., diseases of the respiratory tract and kidney, and take the opportunity to become familiar with pathogenesis and basic pathology in clinical cases encountered.

2. Collaborator

- 2.1 Review selected pathological specimens from medicine patients with the pathologist.
- 2.2 Attend medicine rounds.
- 2.3 Observe any autopsies performed on the resident's patients; communicate findings to members of the clinical team and family where appropriate; participate in obtaining informed consent for hospital autopsy.

GYNECOLOGICAL ONCOLOGY

1. Medical Expert

- 1.1 Learn the clinical approach, differential diagnosis, and management of gynecologic problems, particularly gynecological oncology.
- 1.2 Observe investigation and management of patients in the colposcopy clinic.
- 1.3 Be familiar with the correct methods of obtaining adequate cytological specimens, e.g., pap smears.

2. Collaborator

- 2.1 Appreciate the role of pathology in the diagnosis and management of gynecologic disorders and malignancies.
- 2.2 Review selected pathological specimens from gynecologic patients with the pathologist.
- 2.3 Attend weekly gynecology multidisciplinary meetings (Tumour Board) and rounds.
- 2.4 Observe any autopsies performed on the resident's patients; communicate findings to members of the clinical team and family where appropriate; participate in obtaining informed consent for hospital autopsy.

MEDICAL ONCOLOGY

1. Medical Expert

- 1.1 Learn the approach to, rationale for and complications of treatment of common malignancies.
- 1.2 Observe the procurement of biopsies and cytology specimens by oncologists.
- 1.3 Attend disease site clinics.

2. Collaborator

- 2.1 Review selected pathological specimens from oncology patients with the pathologist.
- 2.2 Attend weekly oncology rounds.
- 2.3 Observe any autopsies performed on the resident's patients; communicate findings to members of the clinical team and family where appropriate; participate in obtaining informed consent for hospital autopsy.

MEDICAL GENETICS/MOLECULAR PATHOLOGY

1. Medical Expert

- 1.1 Learn the clinical approach, differential diagnosis, and management of suspected genetic disorders.

- 1.2 Observe discussion of indications for and implications of genetic testing in the cancer clinic.
- 1.3 Obtain familiarity with genetic testing techniques.
- 1.4 Become familiar with the role of pathology in the diagnosis and management of genetic disorders.

2. Collaborator

- 2.1 Attend the molecular laboratory to discuss management of cases seen in the cancer clinic.
- 2.2 Review selected autopsies for suspected genetic disorder with the pathologist;
- 2.3 communicate findings to members of the clinical team; participate in obtaining informed consent for hospital autopsy.

HEAD AND NECK SURGERY

1. Medical Expert

- 1.1 Understand the clinical presentation of common otology conditions with particular emphasis on head and neck malignancies.
- 1.2 Be able to obtain a thorough patient history and be cognizant of the important relevant physical findings of common head and neck conditions.
- 1.3 Understand the indications for surgical intervention of common head and neck conditions with emphasis on malignancies.
- 1.4 Be knowledgeable about the clinicopathological staging systems and their importance in clinical decision making for common urological cancers at the following sites: thyroid, tongue, and larynx.
- 1.5 Observe the process of procuring tissue biopsies, including an understanding of the indications and contraindications of these.

2. Collaborator

- 2.1 Review selected pathological specimens with the pathologist.
- 2.2 Attend rounds.
- 2.3 Observe any autopsies performed on the resident's patients; communicate findings to members of the clinical team and family where appropriate; participate in obtaining informed consent for hospital autopsy.

3. Scholar

- 3.1 Perform a review of a head and neck topic with emphasis on clinicopathological aspects and present this at rounds.

HEMATOLOGY/ONCOLOGY

1. Medical Expert

- 1.1 Become familiar with the clinical presentation of common nonneoplastic and neoplastic haematological conditions, and their management.
- 1.2 Receive an introduction to the laboratory analysis of blood smears and bone marrow aspirates.
- 1.3 Learn to correlate blood smear and bone marrow aspirate findings with clinical findings; ideally, there should also be correlation with bone marrow biopsies.
- 1.4 Gain exposure to haematological problems which arise in medical or surgical inpatients through consultations; whenever possible, follow the clinical course of these patients.

2. Collaborator

- 2.1 Appreciate the role of the pathology report in management decisions.
- 2.2 Participate in hematology rounds, and present a relevant topic.
- 2.3 Observe any autopsies performed on the resident's patients; communicate findings to members of the clinical team and family where appropriate; participate in obtaining informed consent for hospital autopsy.

3. Leader

- 3.1 Receive a general introduction to the operation of various areas of the haematology laboratory.

PEDIATRIC SURGERY

1. Medical Expert

- 1.1 Learn the clinical approach, differential diagnosis, and management of common problems in pediatric surgery.
- 1.2 Observe the process of procuring tissue and cytological biopsies, including an understanding of the indications and contraindications of these.
- 1.3 Learn how to submit properly to pathology various specimen types e.g., specimens from the OR.

Communicator

- a. Educate peers on the importance of accurate clinical information on requisition forms that accompany surgical specimens.

2. Collaborator

- 2.1 Review selected pathological specimens from pediatric patients with the pathologist.
- 2.2 Attend rounds and rotation specific teaching.
- 2.3 Observe any autopsies performed on the resident's patients; communicate findings to members of the clinical team and family where appropriate; participate in obtaining informed consent for hospital autopsy.

DIAGNOSTIC AND MOLECULAR PATHOLOGY

1. Medical Expert

- 1.1 Use and care for a light microscope.
- 1.2 Acquire competence with normal histology and basic histopathological features.
- 1.3 Describe and dissect routine simple gross surgical specimens.
- 1.4 Learn methods of tissue sampling for histology.
- 1.5 Examine slides for selected routine cases and review cases with residents and/or pathologists.
- 1.6 Observe the technique and approach to frozen section diagnosis.
- 1.7 Attend autopsies; observe and assist pathologist and/or resident with dissection.
- 1.8 Be able to recognize abnormal gross autopsy findings and to correlate with pathophysiology and cause of death.

2. Communicator

- 2.1 Learn what constitutes valid consent for autopsy.
- 2.2 Be able to review a patient chart and present a coherent summary prior to starting an autopsy or reviewing a case.

3. Scholar

- 3.1 Continue reading a standard basic pathology textbook, e.g., *Robbin's Pathologic Basis of Disease*.
 - 3.2 Read around autopsy and surgical cases.
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CORE OF DISCIPLINE

Core rotations are staggered throughout the 3 years of core, with increasing numbers of slides and complexity of grossing as the resident progresses.

1. Medical Expert

1.1 Autopsy Pathology

Residents are expected to perform at least 15 hospital (pediatric and/or adult) or coroner's autopsies per year. Residents should also observe and assist with medicolegal cases.

The resident must be able to (first rotation):

- 1.1.1 Extract relevant information from the clinical chart.
- 1.1.2 Summarize this information orally.
- 1.1.3 Use this information appropriately to plan the autopsy.
- 1.1.4 Assess the validity of consent for autopsy.
- 1.1.5 Perform the autopsy in a systematic manner.
- 1.1.6 Apply appropriate precautions for cases with infectious etiologies.
- 1.1.7 Cut and sample tissue/organs appropriately.
- 1.1.8 Describe orally the gross findings of specimens.
- 1.1.9 Photograph gross specimens. Understand the differences between pediatric and adult autopsy and special considerations required for pediatric cases.
- 1.1.10 Correlate autopsy findings with the clinical, radiological, laboratory and other data.
- 1.1.11 Produce accurate preliminary and final autopsy report within accepted turnaround time guidelines.

The resident must be able to (second rotation):

- 1.1.12 Remove organs in the most effective manner to demonstrate malformations in the fetus, neonate, infant and child.
- 1.1.13 Discuss the pathophysiology of the disease process in the particular patient being discussed.
- 1.1.14 Discuss the relationship of the autopsy findings to the cause of death.
- 1.1.15 Effectively communicate autopsy results to clinicians, including presentations at rounds.

The resident must be able to (senior rotations):

- 1.1.16 Perform routine hospital cases with minimal supervision.
- 1.1.17 Review slides and order appropriate ancillary tests prior to signout; autopsies should be largely completed or completed prior to signout with the supervising pathologist.
- 1.1.18 Remove the brain, spinal cord and pituitary gland at autopsy, including sampling appropriate peripheral nerves/nerve plexus/ganglia, skeletal muscles, autonomic nervous system, as appropriate.
- 1.1.19 Formulate findings and interpretations such that they are relevant to the medical-legal implications of forensic cases (*the resident should attend court with one of the forensic pathologists; a minimum of two times is recommended*).

- 1.1.20 Express findings and interpretations such that they are understood by persons without medical training, such as lawyers, or legal professionals, and the lay public.

1.2 Surgical Pathology

The resident is expected to become competent in the gross examination of all specimens listed in the portfolio log, with a suggested timeline determined by the subspecialty team leaders. The resident is expected to complete the Introductory Program in Histotechnology (Wednesdays, July-August, PGY1).

The resident must be able to (junior rotations):

- 1.2.1 Describe gross findings orally.
- 1.2.2 Describe gross findings in writing.
- 1.2.3 Appropriately cut and sample surgical specimens.
- 1.2.4 Apply appropriate precautions for dealing with surgical specimens with established or suspected infectious etiologies.
- 1.2.5 Handle instruments including sharps safely.
- 1.2.6 Demonstrate knowledge of the commonly used routine and special histochemical stains.
- 1.2.7 Operate and maintain a light microscope.
- 1.2.8 Adequately describe microscopic findings orally.
- 1.2.9 Use word-processing, database, graphics and presentation programs.
- 1.2.10 Demonstrate familiarity with the applications of computers to laboratory medicine in general and anatomical pathology in particular.
- 1.2.11 Understand the principles of tissue fixation, the types of fixatives used and their indications in the practice of surgical pathology, for both light and electron microscopy.
- 1.2.12 Understand the principles of tissue processing.
- 1.2.13 Know the principles of, and be able to perform paraffin sectioning.
- 1.2.14 Understand the basic principles involved in the routine and special stains used in surgical pathology.
- 1.2.15 Understand the principles of electron microscopy.
- 1.2.16 Take photomicrographs and incorporate these into a case presentation.
- 1.2.17 Demonstrate an ability to produce a surgical pathology report with an interpretation appropriate to the clinical setting.
- 1.2.18 Correlate findings with the known clinical, radiologic, laboratory and other data.
- 1.2.19 Provide accurate pathological diagnoses.
- 1.2.20 Discuss the pathophysiology of the disease process as it applies to that particular patient.
- 1.2.21 Recommend any further investigations that may be helpful, based on the biopsy findings.

The resident must be able to (senior rotations):

- 1.2.22 Be proficient in the making of smears and touch preparations.
- 1.2.23 Be proficient in the embedding of fresh tissue, and the cutting and staining of frozen sections.
- 1.2.24 Appropriately sample surgical specimens for rush and intraoperative diagnosis.
- 1.2.25 Effectively communicate the rush diagnosis to the operating surgeon.
- 1.2.26 Understand the basis of immunohistochemical staining techniques (*during training, residents are expected to make the time to personally perform the*

immunohistochemistry on two separate cases, and to follow these through to reporting).

- 1.2.27 Understand the utility of the immunohistochemical stains used in surgical pathology.
- 1.2.28 Understand the basis of immunofluorescence staining techniques.
- 1.2.29 Understand the utility of the immunofluorescent stains used in surgical pathology.
- 1.2.30 Understand the basis of flow cytometry (*during training, residents are expected to make the time to become familiar with the technique of flow cytometry by following two separate cases from submission through to reporting (during lymph node / hematopathology rotation).*)
- 1.2.31 Understand the utility of flow cytometry in surgical pathology.
- 1.2.32 Understand the basis of molecular biological procedures.
- 1.2.33 Understand the utility of molecular biological procedures used in surgical pathology.
- 1.2.34 Select the appropriate stains and molecular biological procedures in the work up of cases.
- 1.2.35 Interpret the normal, abnormal and artifactual microscopic findings demonstrated by each of these stains in tissue sections.
- 1.2.36 Operate the electron microscope.
- 1.2.37 Take electron micrographs suitable for a case presentation.
- 1.2.38 Run a conference with colleagues in the discussion of routine, interesting, and difficult cases.
- 1.2.39 Be familiar with quality control programs for tissue processing and staining.
- 1.2.40 Be familiar with quality control for rush and intraoperative diagnosis - final diagnosis comparisons for surgical pathology specimens.
- 1.2.41 Interpret the normal, abnormal and artifactual findings demonstrated by use of molecular biological procedures in tissue specimens.
- 1.2.42 Describe ultrastructural findings.
- 1.2.43 Correlate electron microscopic findings with the gross, light microscopic, clinical, radiologic, laboratory and other data.

1.3 **Cytopathology**

The resident must (junior rotation):

- 1.3.1 Begin to understand the principles of cytology specimen fixation and processing including the procurement of fine needle aspiration biopsies.
- 1.3.2 Begin to develop a familiarity with the cytopreparatory and screening processes in the cytology laboratory.
- 1.3.3 Begin to acquire knowledge of cervical cancer screening including the principles of the screening process as well as the cytopathological features of preneoplastic diseases of the cervix.
- 1.3.4 Begin to acquire knowledge of the cytopathological features of normal and neoplastic cells, as seen in common exfoliative and fine needle aspiration biopsy specimens.

The resident must be able to (senior rotations):

- 1.3.5 Understand the basis of the routine stains and special stains used in cytopathology.
- 1.3.6 Understand the basis of immunocytochemical staining techniques.
- 1.3.7 Understand the utility of the immunocytochemical stains used in cytopathology.
- 1.3.8 Understand the basis of molecular biological procedures.
- 1.3.9 Understand the utility of molecular biological procedures used in cytopathology.
- 1.3.10 Select the appropriate stains and molecular biological procedures (as appropriate) relevant to the problem based on the gross, histological, clinical, radiologic, laboratory and other data available.

- 1.3.11 Interpret the normal, abnormal and artifactual microscopic findings demonstrated by each of these stains (and molecular biological procedures, as appropriate).
- 1.3.12 Be able to organize the work-up and sign-out of cytopathology case material in a timely and cost- effective manner.
- 1.3.13 Organize case material, special stains and additional studies in a timely fashion.
- 1.3.14 Understand the basis of cytomorphometry.
- 1.3.15 Screen slides and make appropriate diagnoses on a broad range of cytological cases.
- 1.3.16 Demonstrate a knowledge of criteria for satisfactory and unsatisfactory specimens.
- 1.3.17 Work cooperatively with cytotechnologists and support staff in evaluating cytopathology specimens.
- 1.3.18 Have a high degree of self-awareness in terms of sign-out and appropriate referral of difficult cases.
- 1.3.19 Review a large number of routine cases in order to re-establish and refine diagnostic criteria.
- 1.3.20 Review teaching set material of gynecologic and nongynecological cytology in order to better understand diagnostic criteria and pitfalls associated with unusual cases.
- 1.3.21 Demonstrate an understanding of quality assurance procedures and cytotechnologist work flow at a level appropriate for a staff pathologist.

1.4 **Molecular Pathology and Cytogenetics**

The resident must (junior rotation):

- 1.4.1 Read the relevant section in Robbins on Molecular Genetics
- 1.4.2 Understand the terminology used in molecular biology and cytogenetics applicable to pathological diagnoses.
- 1.4.3 Understand general principles of molecular and cytogenetics biological methods as applied to pathological diagnosis.
- 1.4.4 Formulate ideas for a research project that could incorporate molecular and/or cytogenetics methods.

The resident must (senior rotation):

- 1.4.5 Show understanding of the terminology used in molecular biology and cytogenetics as applied to pathological diagnosis.
- 1.4.6 Demonstrate understanding of general principles of molecular biological and cytogenetics methods as applied to pathological diagnosis.
- 1.4.7 Be able to correlate microscopic findings with information obtained from molecular and cytogenetics, including the principles and practices of personalized medicine studies.
- 1.4.8 Be able to extract and quantify DNA, RNA from tissues.
- 1.4.9 Be able to set up a PCR and a RT-PCR reaction
- 1.4.10 Be able to run gels with PCR products and interpret the results.
- 1.4.11 Be able to interpret results of common molecular pathology tests (PCR- and RT-PCR-based, sequencing).
- 1.4.12 Understand of the process of cell culture and chromosome preparation.
- 1.4.13 Be familiar with the routine techniques of chromosome analysis, i.e., G-banding and karyotyping.
- 1.4.14 Understand the basic concepts in cytogenetic nomenclature.
- 1.4.15 Be familiar with the most common chromosomal aberrations in cancer.
- 1.4.16 Develop knowledge of cytogenetic techniques, such as FISH and microarray analysis and their clinical applications.

1.5 **Pediatric and Lung Pathology**

The resident is expected to read the Pediatric pathology section of Robbins at the beginning of this rotation, then use additional texts for cases seen in this rotation.

During this rotation the resident is responsible for:

- 1.5.1 Grossing all pediatric surgical specimens, under the supervision of the on-call pathologist.
- 1.5.2 Dealing with emergent issues, including organizing tumour protocols, participating in pediatric frozen sections, as well as handling/triaging fresh tissue. If there is a Hirschsprung's case at Victoria Hospital, the resident should attend.
- 1.5.3 Reviewing the department teaching sets that include common and rare cases in pediatric pathology that have been assembled from LHSC archives. The residents are required to review the teaching slides and topics during this rotation.
- 1.5.4 Attendance at the following mandatory rounds during the pediatric rotation: Perinatal Morbidity and Mortality Rounds (monthly), Pediatric Mortality Rounds (monthly), Pediatric Grand Rounds (monthly), as well as attending the regular mandatory department rounds (e.g. Gross rounds, Anatomical Pathology grand rounds). If there is a conflict the pediatric rounds take precedence. The resident will be responsible for presenting at the interdisciplinary rounds when relevant, as well as preparing and presenting a topic during their rotation.
- 1.5.5 The resident will participate in pediatric autopsy consultations, as they arise during their rotation. During this rotation they will get exposure to Pediatric autopsy topics, including; congenital abnormalities, metabolic disorders, as well as a wide range of infectious, neoplastic and inflammatory pathology. Residents will also get exposure to medicolegal cases (under supervision), covering such topics as SIDS, abuse and trauma.

1.6 **Neuropathology**

1.6.1 Autopsy pathology

The resident must be able to:

- 1.6.1.1 Remove the brain, spinal cord, eyes, peripheral nerves, and muscles without damage.
- 1.6.1.2 Know when special procedures are indicated prior to fixation of the brain (e.g., subarachnoid hemorrhage).
- 1.6.1.3 Know the risks of conventional infectious agents and prions, and the appropriate precautions.
- 1.6.1.4 Select and procure appropriate samples for histological examination.
- 1.6.1.5 Recognize the histological appearance of all parts of the brain and spinal cord.
- 1.6.1.6 Diagnose all common lesions and be able to classify less common lesions into the appropriate category.

1.6.2 Surgical pathology

The resident must be able to:

- 1.6.2.1 Handle neurosurgical specimens appropriately, including obtaining smears, frozen sections, preparing tissue for culture or flow cytometry, and fixing samples for electron microscopy.
- 1.6.2.2 Provide an appropriate gross and microscopic description.
- 1.6.2.3 Be familiar with the technical principles for special stains in neuropathology and their diagnostic significance.
- 1.6.2.4 Know the pitfalls of the different antigenic markers used in immunoperoxidase, immunofluorescence, and lectin immunohistochemistry.

- 1.6.2.5 Interpret microscopic findings in light of clinical and radiological information, and incorporate this process into a written comment.
- 1.6.2.6 Diagnose all common conditions, and recognize uncommon conditions.
- 1.6.2.7 Understand the role of electron microscopy in neuropathological diagnosis, and be able to use the electron microscope.
- 1.6.2.8 Be familiar with normal and abnormal CSF cytology.

1.7 Knowledge Base

Junior rotations - The resident should focus on a standard textbook of Pathology such as Robbins with completion of this textbook during the first year of core.

The resident should also read around current autopsy and surgical cases in a book such as Robbins in addition to a standard surgical pathology textbook, such as Sternberg.

The resident must have knowledge of:

- 1.7.1 Normal gross anatomy.
- 1.7.2 Normal histology.
- 1.7.3 The mechanisms of cellular injury and repair.
- 1.7.4 Inflammation.
- 1.7.5 Immunity and immune mediated diseases.
- 1.7.6 How specific derangements, focal or general, in tissue structure and/or function leads to specific clinical, physiologic, radiological and laboratory abnormalities.
- 1.7.7 Genetics and the molecular basis of cell function and dysfunction.
- 1.7.8 Neoplasia.
- 1.7.9 Systemic nutritional and metabolic disorders.
- 1.7.10 Influences of environmental and toxic factors on the body.
- 1.7.11 Infectious diseases - bacterial, fungal, viral and parasitic - and their effect on the body.

The resident must begin to acquire knowledge of the disorders of the following:

- 1.7.12 Heart and blood vessels.
- 1.7.13 Haematopoietic system, lymph nodes and the mechanisms of thrombosis.
- 1.7.14 Respiratory system.
- 1.7.15 Head and neck.
- 1.7.16 Gastrointestinal tract, liver, biliary tract and pancreas.
- 1.7.17 Kidneys and genitourinary tract.
- 1.7.18 Breast.
- 1.7.19 Endocrine system.
- 1.7.20 Integument.
- 1.7.21 Skeletal system and connective tissues.
- 1.7.22 Nervous system.
- 1.7.23 Gynecological tract.

Senior rotations - The resident should begin reading a comprehensive surgical pathology textbook such as that by Sternberg.

The resident must have knowledge of:

- 1.7.24 Types of disorders which affect the fetus, infant, and child, including a general knowledge of embryologic development and its relationship to malformations, the molecular biology and genetics associated with malformations.

2. Communicator

The resident must be able to:

- 2.1 Communicate effectively with technical and other support staff in the laboratory.
- 2.2 Communicate effectively both verbally and in writing with clinical colleagues.
- 2.3 Present autopsy findings at and participate effectively in rounds.
- 2.4 Present surgical pathology at and participate effectively in rounds.

3. Collaborator

The resident must be able to:

- 3.1 Consult with clinicians to obtain clinical data, clinicopathological correlation, and suggest appropriate investigations.
- 3.2 Recognize the expertise, roles and opinions of other members of the health care team, and work effectively with them.
- 3.3 Consult with other residents and with pathologists when needed.
- 3.4 Understand the role of the anatomical pathologist as a member of the health care team, providing timely, high quality service to patients and clinicians.
- 3.5 Understand the role of intra- and extra-departmental review of diagnostic material.
- 3.6 Understand the principles relating to tissue acquisition for research.

4. Leader

The resident must be able to:

- 4.1 Use discretion in ordering special stains and special techniques to optimize resource utilization and minimize waste.
- 4.2 Effectively utilize information technology such as the Pathology LIS and for self-learning activities.
- 4.3 Understand the roles and responsibilities of laboratory physicians.
- 4.4 Have a general understanding of medical informatics and pathology information systems.
- 4.5 Understand principles of laboratory management and administration.
- 4.6 Understand methods used in quality control and principles of quality assurance in the laboratory.
- 4.7 Understand the principles of workload measurement within the laboratory.
- 4.8 Demonstrate knowledge of laboratory safety.
- 4.9 Demonstrate knowledge of regulations pertaining to the retention of gross specimens, tissue blocks, slides and reports.

5. Health Advocate

The resident must be competent to:

- 5.1 Understand criteria for notification of the coroner.
- 5.2 Identify populations at risk for specific disease entities.
- 5.3 Understand the pathologist's role in providing information pertaining to public health issues, especially infectious diseases.
- 5.4 Act as a patient advocate by virtue of timely and accurate completion of pathology reports.

6. Scholar

The resident must be able to:

- 6.1 Understand and commit to the need for continuous learning, implementing an on-going and effective personal learning strategy. Demonstrate the ability to identify gaps in knowledge and expertise.
- 6.2 Incorporate an attitude of scientific inquiry and the use of evidence into the process of making pathologic diagnoses.

- 6.3 Teach pathological principles to students, other residents and health professionals, at rounds, conferences and other forums.
 - 6.4 Pose a research question, formulate a plan to answer the question and carry out the research appropriately.
 - 6.5 Be able and willing to apply new knowledge to his/her practice of anatomical pathology.
 - 6.6 Apply the principles of critical appraisal to sources of medical information.
 - 6.7 Keep current with the evidence-based literature pertinent to the practice of anatomical pathology.
 - 6.8 Provide constructive feed-back to others in the learning process.
 - 6.9 Acquire skills in the development of guidelines relevant to the practice of anatomical pathology.
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TRANSITION TO PRACTICE

TTP residents will be the chief resident(s), and are expected to supervise junior residents, off-service residents and medical students. They will be responsible for organizing daily and on-call schedules, and rounds. This supervisory role has an important teaching component, whereby senior residents are expected to teach more junior residents.

Transition to practice will allow resident flexibility in determining rotations, depending their career goals and identified areas of learning need. There will be a dedicated teaching rotation, where they will be expected to take on a major supervisory role for the Foundations residents during their grossing block. Other acceptable rotations will include any surgical pathology rotation, cytopathology, molecular pathology, neuropathology, forensic pathology, plus a clinical rotation if applicable.

1. Medical Expert

1.1 Senior Surgical Pathology Rotations

At this level, residents are expected to be able to handle a large volume of cases, similar to that of a junior surgical pathologist.

At this level, residents are expected to produce reports on most cases without direct supervision, with the completed case to be reviewed by the supervising pathologist at their discretion.

A high level of diagnostic accuracy is expected.

2. Communicator

The resident must be able to:

- 2.1 Liaise with the departmental management team.
- 2.2 Handle scheduling conflicts.
- 2.3 Mentor junior residents.
- 2.4 Liaise with the Program Director / RPC re required / desired policy changes.
- 2.5 Understand the principles of presentation of evidence in court (if a forensic pathology rotation is performed)

3. Health Advocate

The resident must:

- 3.1 Understand the importance of promoting and reinforcing to the public and the profession the essential contribution of laboratory medicine to health.

4. Professional

The resident must:

- 4.1 Use appropriate strategies to maintain and advance professional competence in Diagnostic and Molecular Pathology.

Reviewed & Updated by AP Residency Program Committee –

May 31, 2017

May 29, 2018

Oct 20, 2019

May 2020

Pending 2023