

**2024**  
**VERSION 1.0**

*Effective for residents who enter training on or after July 1, 2024.*

## **DEFINITION**

Medical Microbiology is the branch of laboratory and clinical medicine concerned primarily with the detection, diagnosis, treatment, and prevention of infectious diseases and the clinical direction and administration of related laboratory services.

## **MEDICAL MICROBIOLOGY PRACTICE**

Medical Microbiology includes five spheres of activity: scientific development, and administrative and clinical direction of a medical microbiology laboratory; medical microbiology and infectious disease consultations; infection prevention and control (IPAC); antimicrobial stewardship (AMS); and epidemiologic assessment of communicable diseases. Medical microbiologists provide these services for individuals of all ages and for populations who are at risk for, suspected to have, or diagnosed with an infectious disease.

Medical microbiologists provide leadership and medical oversight in the medical microbiology laboratory in all areas related to the screening, diagnosis, treatment, and monitoring of infectious diseases. They provide direction to technologists regarding the evaluation of specimens, identification of microorganisms, and performance of antimicrobial susceptibility testing. Medical microbiologists oversee the release of microbiology diagnostic test results for incorporation into patient care. They recognize and direct the further evaluation of pathogens with unusual patterns of growth or susceptibility, as well as pathogens of relevance to infection prevention and control and public health. Medical microbiologists advise clinicians on appropriate test selection and utilization, specimen collection and transport, and interpretation of results.

Medical microbiologists provide medical oversight of the microbiology laboratory, including appropriate test selection and utilization; the range of testing provided; quality management; and laboratory equipment/analyzer selection and management. They apply administrative and regulatory guidelines related to laboratory accreditation.

Medical microbiologists provide clinical consultation for the investigation, diagnosis, treatment, monitoring, and prevention of infectious diseases. They may provide longitudinal care for patients with primary and secondary immunodeficiencies and for patients with chronic infectious diseases. They may provide counselling and preventive care regarding

immunization, prophylaxis, and harm reduction.

Medical microbiologists incorporate principles of IPAC and AMS at the level of the individual patient, the health care setting, and the community, and for populations.

Medical microbiologists contribute to the understanding of the epidemiology of communicable diseases by observing and monitoring trends, assessing implications for the health care system, and performing risk assessments to determine the need for changes in policies, protocols, or procedures. This work contributes to laboratory resource planning, outbreak management, infection prevention and control, and public health initiatives.

Medical microbiologists work in academic health centres, community hospitals, community laboratories, public health laboratories, and centralized or regional laboratories. Their practice may include outpatient clinics or inpatient consultation to other services. Medical microbiologists may also be employed in public health laboratories, as consultants in government health agencies, or in private sector laboratories, developing tests, and performing other research.

## **MEDICAL MICROBIOLOGY COMPETENCIES**

### **Medical Expert**

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

As *Medical Experts*, medical microbiologists integrate all of the CanMEDS Roles, applying medical knowledge, clinical skills, and professional values in their provision of high-quality and safe patient-centred care. Medical Expert is the central physician Role in the CanMEDS Framework and defines the physician's clinical scope of practice.

#### ***Key and Enabling Competencies: Medical microbiologists are able to...***

### **1. Practise medicine within their defined scope of practice and expertise**

- 1.1. Demonstrate a commitment to high-quality care of their patients
- 1.2. Integrate the CanMEDS Intrinsic Roles into their practice of Medical Microbiology
- 1.3. Apply knowledge of the clinical and biomedical sciences relevant to Medical Microbiology

Clinical direction of the medical microbiology laboratory, including

- 1.3.1. Taxonomy, epidemiology, life cycle and pathology, and the principles of laboratory identification and speciation of clinically relevant and other important microorganisms
- 1.3.2. Laboratory diagnostic tools (the principles, use, evaluation, implementation, and clinical interpretation of current and new tests, methods, and technologies) and their application to organisms clinically relevant to medical microbiology, including
  - 1.3.2.1. Light microscopy, including staining principles
  - 1.3.2.2. Rapid diagnostic tests, including point-of-care testing

## MEDICAL MICROBIOLOGY COMPETENCIES (2024)

- 1.3.2.3. Common laboratory culture media and techniques
  - 1.3.2.4. Identification methods, including biochemical and non-biochemical tests
  - 1.3.2.5. Antimicrobial susceptibility testing methods
  - 1.3.2.6. Laboratory automation systems and analyzers
  - 1.3.2.7. Molecular techniques and technology
  - 1.3.2.8. Serology
  - 1.3.2.9. Histology and immunochemistry
  - 1.3.2.10. Immunofluorescence microscopy
  - 1.3.2.11. Electron microscopy
- 1.3.3. Elements of pre-analytic, analytic, and post-analytic phases of testing
- 1.3.4. Diagnostic test performance, including test accuracy, precision, sensitivity, specificity, and positive and negative predictive values
- Quality systems management of the medical microbiology laboratory, including
- 1.3.5. Components of laboratory safety, including Workplace Hazardous Materials Information System (WHMIS)
  - 1.3.6. Regulatory requirements for the Transportation of Dangerous Goods (TDG) for specimens and isolates
  - 1.3.7. Principles and applications of biosafety and biosecurity for different biocontainment levels
  - 1.3.8. Utilization of laboratory and other information systems for instrument interfaces; result reporting, storage, retrieval, and analysis; and security of personal health information
  - 1.3.9. Principles of selecting resource-efficient laboratory equipment
  - 1.3.10. Principles and practice of an effective laboratory quality management system, including
    - 1.3.10.1. Structure of a quality management team and the components of an effective quality management system
    - 1.3.10.2. Regulatory and accreditation requirements, including competency testing and internal and external proficiency testing
    - 1.3.10.3. Verification and validation of diagnostic systems, reagents, and media
    - 1.3.10.4. Selection, measurement, and monitoring of appropriate quality indicators
    - 1.3.10.5. Occurrence reporting and discordant result analysis
    - 1.3.10.6. Principles of quality improvement, including use of process improvement tools

Infectious disease

- 1.3.11. The nature, pathogenesis, and virulence factors of infecting microorganisms
- 1.3.12. Host susceptibility and responses to infection, innate and adaptive, including infections in the following:
  - 1.3.12.1. Immune-compromised patients
  - 1.3.12.2. HIV-infected patients
  - 1.3.12.3. Pregnant patients, including prenatal testing and screening at the time of labour and delivery
  - 1.3.12.4. Neonatal and pediatric patients
  - 1.3.12.5. Post-operative, critically ill, and burn injury patients
  - 1.3.12.6. Immigrants, refugees, and travellers
  - 1.3.12.7. Hospital patients
- 1.3.13. Clinical features of infectious diseases in all organ systems and syndromes
- 1.3.14. Pharmacologic and non-pharmacologic prevention, treatment, and management of infectious diseases
  - 1.3.14.1. Antimicrobial agents and their mechanisms of action and organism resistance, spectra of activity, pharmacokinetics and pharmacodynamics, adverse effects, and role in the treatment of infections
  - 1.3.14.2. Mechanisms of action and benefits and risks associated with immunizations
  - 1.3.14.3. Vaccine schedules and administration routes of immunization products

Infection prevention and control (IPAC)

- 1.3.15. Principles, practice, and implementation of an IPAC program, including
  - 1.3.15.1. Reporting relationships of IPAC
    - 1.3.15.1.1. Occupational health and safety
    - 1.3.15.1.2. Public health aspects of IPAC
  - 1.3.15.2. Legislation and regulatory requirements
  - 1.3.15.3. Detection, investigation, and control of infectious disease outbreaks
  - 1.3.15.4. Preparedness for and response to emerging infectious diseases
  - 1.3.15.5. Pandemic preparedness in the institutional setting

- 1.3.15.6. Policies and procedures for the prevention and control of infection
- 1.3.15.7. Strategies to prevent and manage airborne, blood and body fluid exposures

Antimicrobial stewardship (AMS)

- 1.3.16. Principles, practice, and implementation of an AMS program in all health care settings and the community
  - 1.3.16.1. Key elements of an AMS program
  - 1.3.16.2. Selective pressure and risks of development and spread of resistance

Public health

- 1.3.17. Infectious diseases of public health importance
  - 1.3.18. Role and methods of contact tracing in the management of infectious diseases
  - 1.3.19. Indications and regimens for prophylaxis and pre-emptive treatment
  - 1.3.20. Role of surveillance and trend analysis for early identification and prevention of communicable diseases and emerging and re-emerging pathogens
  - 1.3.21. Principles of pandemic preparedness in the community setting
  - 1.3.22. Process of development of public policy
  - 1.3.23. Public policies that affect health, including immunization programs, disease surveillance, outbreak management, and AMS
  - 1.3.24. Impact of public policy on the health of populations
- 1.4. Perform appropriately timed clinical assessments with recommendations that are presented in an organized manner
  - 1.5. Carry out professional duties in the face of multiple competing demands
  - 1.6. Recognize and respond to the complexity, uncertainty, and ambiguity inherent in Medical Microbiology practice

**2. Perform a patient-centred clinical assessment and establish a management plan**

- 2.1. Prioritize issues to be addressed in a patient encounter
  - 2.1.1. Determine the acuity of the presentation
- 2.2. Elicit a history, perform a physical exam, select appropriate investigations, and interpret their results for the purpose of diagnosis and management, disease prevention, and health promotion
  - 2.2.1. Apply infection control practices during the patient interaction

- 2.2.2. Gather a clinical history, including the patient's risk factors for infectious disease
- 2.2.3. Generate a differential diagnosis, including infectious and non-infectious considerations
- 2.2.4. Collect samples for microbiologic testing and examination
- 2.2.5. Select and interpret the results of tests, including
  - 2.2.5.1. Hematologic and biochemical testing
  - 2.2.5.2. Microbiologic testing
  - 2.2.5.3. Histopathology and cytology examinations
  - 2.2.5.4. Medical imaging
- 2.2.6. Correlate the findings of investigations with the clinical presentation
- 2.3. Establish goals of care in collaboration with patients and their families<sup>1</sup>, which may include slowing disease progression, treating symptoms, achieving cure, improving function, and palliation
- 2.4. Establish a patient-centred management plan
  - 2.4.1. Advise physicians and other health care professionals regarding appropriate specimen collection and transport, selection of diagnostic testing, and interpretation of medical microbiology laboratory results
  - 2.4.2. Develop and implement plans for patient management
    - 2.4.2.1. Antimicrobial therapy, including selection, route of administration, duration of use, endpoints, and indications for reassessment
    - 2.4.2.2. Recommendations for immunization and post-exposure prophylaxis
    - 2.4.2.3. Recommendations for disease prevention and harm reduction through the use of primary, secondary, and tertiary prevention strategies
  - 2.4.3. Provide advice on appropriate utilization of antimicrobial agents
  - 2.4.4. Provide recommendations about infection control procedures, surveillance testing of potential contacts, and prophylaxis
  - 2.4.5. Investigate and manage outbreaks of infectious diseases

### **3. Plan and perform diagnostic assessments of clinical specimens**

- 3.1. Identify and address pre-analytical clinical and laboratory-based issues

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<sup>1</sup> 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 their care, including, according to the patient's circumstances, family members, partners, caregivers, legal guardians, and substitute decision-makers.

- 3.1.1. Assess specimen quality, adequacy, and fit for the stated indication
    - 3.1.1.1. Apply acceptance and rejection criteria
  - 3.2. Identify specimens that require urgent processing
  - 3.3. Select tests and perform diagnostic testing for the purposes of diagnosis and management, disease prevention, and health promotion
    - 3.3.1. Perform staining and microscopy
    - 3.3.2. Select and use
      - 3.3.2.1. Antimicrobial susceptibility methods
      - 3.3.2.2. Biochemical- and non-biochemical-based organism identification methods
      - 3.3.2.3. Laboratory culture media, including planting, interpretation, and other related techniques
      - 3.3.2.4. Molecular techniques
      - 3.3.2.5. Rapid diagnostic tests, including point-of-care tests
      - 3.3.2.6. Serology
    - 3.3.3. Select ancillary techniques in a resource-effective manner
      - 3.3.3.1. Molecular techniques
      - 3.3.3.2. Histology and immunochemistry
      - 3.3.3.3. Electron microscopy
    - 3.3.4. Determine if a specimen, isolate, or microorganism requires referral to a reference laboratory
  - 3.4. Interpret and provide results of microorganism identification and susceptibility testing
    - 3.4.1. Recognize when findings require urgent communication with the treating health care professional
    - 3.4.2. Recognize when findings require notification to IPAC, public health authorities, or other relevant authorities
- 4. Establish plans for ongoing care and, when appropriate, timely consultation**
- 4.1. Implement a patient-centred care plan that supports ongoing care, follow-up on investigations, response to treatment, and further consultation
    - 4.1.1. Ensure adequate follow-up is arranged for medical microbiology laboratory tests performed
    - 4.1.2. Adapt management plans based on response to therapy, adverse effects, and results of therapeutic drug monitoring

- 4.1.3. Determine the need for and timing of referral to another physician or other health professional
- 4.1.4. Arrange appropriate follow-up care services for a patient and their family

**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**

- 5.1. Recognize and respond to harm from health care delivery, including patient safety incidents
  - 5.1.1. Resolve issues related to specimen misidentification or diagnostic errors
  - 5.1.2. Resolve issues related to discordant results
  - 5.1.3. Recognize and respond to adverse reactions to antimicrobials
- 5.2. Adopt strategies that promote patient safety and address human and system factors
  - 5.2.1. Apply and adhere to biosafety and biosecurity measures in the laboratory
  - 5.2.2. Apply and adhere to quality management processes throughout the pre-analytic, analytic, and post-analytic phases

**Communicator**

**Definition:**

As *Communicators*, medical microbiologists form relationships with patients and their families that facilitate the gathering and sharing of essential information for effective health care.

**Key and Enabling Competencies: Medical microbiologists are able to...**

**1. Establish professional therapeutic relationships with patients and their families**

- 1.1. Communicate using a patient-centred approach that encourages patient trust and autonomy and is characterized by empathy, respect, and compassion
  - 1.1.1. Respect patient autonomy, privacy, and confidentiality
- 1.2. Optimize the physical environment for patient engagement, comfort, dignity, privacy, and safety
- 1.3. Recognize when the perspectives, values, or biases of patients, patients' families, physicians, technologists, or other health care professionals may have an impact on the quality of care, and modify the approach to the patient accordingly
  - 1.3.1. Elicit a patient's beliefs, concerns, expectations, and illness experience
  - 1.3.2. Respect diversity and difference, including the impact of gender identity, sexual orientation, religion, and cultural beliefs on decision-making



- 1.4. Respond to a patient's non-verbal behaviours to enhance communication
- 1.5. Manage disagreements and emotionally charged conversations
- 1.6. Adapt to the unique needs and preferences of each patient and to the patient's clinical condition and circumstances
  - 1.6.1. Communicate effectively with patients when there are communication and language barriers
    - 1.6.1.1. Communicate effectively through the use of an interpreter

**2. Elicit and synthesize accurate and relevant information, incorporating the perspectives of patients and their families**

- 2.1. Use patient-centred interviewing skills to effectively gather relevant biomedical and psychosocial information
- 2.2. Provide a clear structure for and manage the flow of an entire patient encounter
- 2.3. Seek and synthesize relevant information from other sources, including the patient's family, with the patient's consent

**3. Share health care information and plans with patients and their families**

- 3.1. Share information and explanations that are clear, accurate, and timely, while assessing for patient and family understanding
  - 3.1.1. Assist patients in their understanding of laboratory findings
  - 3.1.2. Provide clear instructions for self or assisted collection of specimens to optimize specimen quality
  - 3.1.3. Convey significant results to patients in a timely and clear manner
- 3.2. Disclose harmful patient safety incidents to patients and their families
  - 3.2.1. Identify the circumstances in which patient notification is required
  - 3.2.2. Provide a clear and honest explanation that is understandable to the patient and formulate an appropriate plan

**4. Engage patients and their families in developing plans that reflect the patient's health care needs and goals**

- 4.1. Facilitate discussions with patients and their families in a way that is respectful, non-judgmental, and culturally safe
- 4.2. Assist patients and their families to identify, access, and make use of information and communication technologies to support their care and manage their health
- 4.3. Use communication skills and strategies that help patients and their families make informed decisions regarding their health

**5. Document and share written and electronic information about the medical encounter to optimize clinical decision-making, patient safety, confidentiality, and privacy**

- 5.1. Document clinical and laboratory encounters in an accurate, complete, timely, and accessible manner, in compliance with regulatory and legal requirements
  - 5.1.1. Ensure that microbiology reports follow a standardized format and approved guidelines
  - 5.1.2. Provide accurate, timely, clear, concise and appropriate reporting of outbreaks, reportable pathogens, nosocomial infections, and biosafety issues to public health, occupational health and safety, and/or IPAC teams
- 5.2. Communicate effectively using a written health record, electronic medical record, or other digital technology
- 5.3. Share information with patients and others in a manner that enhances understanding and that respects patient privacy and confidentiality

**Collaborator**

**Definition:**

As *Collaborators*, medical microbiologists work effectively with other health care professionals to provide safe, high-quality, patient-centred care.

**Key and Enabling Competencies: Medical microbiologists are able to...**

**1. Work effectively with physicians and other colleagues in the health care professions**

- 1.1. Establish and maintain positive relationships with physicians and other colleagues in the health care professions to support relationship-centred collaborative care
- 1.2. Negotiate overlapping and shared responsibilities with physicians and other colleagues in the health care professions in episodic and ongoing care
  - 1.2.1. Describe the roles and responsibilities of laboratory technologists, infection prevention and control practitioners, public health officials, and other professionals within the health care team
  - 1.2.2. Recognize and respect the diversity of roles, responsibilities, and competencies of other professionals and organizations in relation to their own and delegate appropriately
  - 1.2.3. Work effectively with laboratory staff and provide guidance to resolve diagnostic challenges
  - 1.2.4. Work effectively with administrative personnel and managers of technical staff
- 1.3. Engage in respectful shared decision-making with physicians and other colleagues in the health care professions

- 1.3.1. Work effectively with clinical colleagues to assist in the interpretation of laboratory findings in the clinical context
- 1.3.2. Provide advice to clinical colleagues regarding procurement and handling of specimens, appropriate use of antimicrobial therapy, and effective laboratory utilization
- 1.3.3. Convey information from the clinical or diagnostic assessment in a manner that enhances patient care
- 1.3.4. Synthesize, present, and discuss cases effectively at multidisciplinary rounds

**2. Work with physicians and other colleagues in the health care professions to promote understanding, manage differences, and resolve conflicts**

- 2.1. Show respect toward collaborators
- 2.2. Implement strategies to promote understanding, manage differences, and resolve conflict in a manner that supports a collaborative culture

**3. Hand over the care of a patient to another health care professional to facilitate continuity of safe patient care**

- 3.1. Determine when care should be transferred to another physician or health care professional
- 3.2. Demonstrate safe handover of care, using both oral and written communication, during a patient transition to a different health care professional, setting, or stage of care

**Leader**

***Definition:***

As *Leaders*, medical microbiologists engage with others to contribute to a vision of a high-quality health care system and take responsibility for the delivery of excellent patient care through their activities as clinicians, administrators, scholars, or teachers.

***Key and Enabling Competencies: Medical microbiologists are able to...***

**1. Contribute to the improvement of health care delivery in teams, organizations, and systems**

- 1.1. Apply the science of quality improvement to systems of patient care
  - 1.1.1. Identify patient safety quality indicators in microbiology
  - 1.1.2. Identify opportunities for improvement based on a continuous quality improvement initiative
  - 1.1.3. Follow occurrence management processes, perform root cause analysis, and recommend preventive and remedial actions

- 1.1.4. Take corrective actions when errors are identified
- 1.1.5. Apply an understanding of different process improvement tools and when to use them, such as Lean Six Sigma and Plan-Do-Study-Act (PDSA)

1.2. Contribute to a culture that promotes patient safety

- 1.2.1. Provide guidance on adherence to legislative regulations relevant to clinical laboratories
- 1.2.2. Develop infection prevention and control policies
- 1.2.3. Develop antimicrobial stewardship policies

1.3. Analyze patient safety incidents to enhance systems of care

- 1.3.1. Follow-up on patient safety issues to address root causes and prevent recurrence

1.4. Use health informatics to improve the quality of patient care and optimize patient safety

- 1.4.1. Use the laboratory information system and other health information systems to generate antibiograms and support stewardship initiatives and quality management activities

**2. Engage in the stewardship of health care resources**

2.1. Allocate health care resources for optimal patient care

- 2.1.1. Contribute to the development of microbiology testing algorithms and appropriate utilization strategies

2.2. Apply evidence and management processes to achieve cost-appropriate care

- 2.2.1. Apply evidence-based laboratory best practices to microbiology utilization
- 2.2.2. Identify opportunities for AMS
- 2.2.3. Justify introduction of new technology on the basis of improving patient care

**3. Demonstrate leadership in health care systems**

3.1. Demonstrate leadership skills to enhance health care

- 3.1.1. Provide scientific development and administrative and clinical direction of the medical microbiology laboratory
  - 3.1.1.1. Apply knowledge as it relates to laboratory medicine and Medical Microbiology, including the role and structure of community and hospital-based, provincial/public health, and reference medical microbiology laboratories

- 3.1.1.2. Develop quality processes for the selection of a reference laboratory and processes to monitor a reference laboratory's service delivery
- 3.1.1.3. Develop and maintain standardized operating procedures and policies and test algorithms
- 3.1.1.4. Provide medical input into the development of laboratory procedures and policies
- 3.1.1.5. Assess and critically evaluate new diagnostic laboratory technologies and prepare business cases for the introduction of a new test or change to current laboratory practice
- 3.1.1.6. Direct and interpret quality control and assurance testing of media, reagents, laboratory instrumentation, and other materials used in the medical microbiology laboratory
- 3.1.1.7. Provide guidance on how to establish and sustain a quality management system in a medical microbiology laboratory
- 3.1.1.8. Apply assessment, accreditation, and audit processes
- 3.1.1.9. Develop and monitor screening and surveillance programs for organisms and infections of significance for public health and infection control
- 3.1.1.10. Implement processes and procedures for addressing patients' and other stakeholders' input, including concerns about laboratory services

- 3.1.2. Represent Medical Microbiology in management-level meetings, such as IPAC, pharmacy and therapeutics, and antibiotic stewardship committees

3.2. Facilitate change in health care to enhance services and outcomes

#### **4. Manage career planning, finances, and health human resources in personal practice(s)**

4.1. Set priorities and manage time to integrate practice and personal life

4.2. Manage personal professional practice(s) and career

- 4.2.1. Engage with mentors to discuss career and practice advancement

4.3. Implement processes to ensure personal practice improvement

## Health Advocate

### **Definition:**

As *Health Advocates*, medical microbiologists contribute their expertise and influence as they work with communities or patient populations to improve health. They work with those they serve to determine and understand needs, speak on behalf of others when required, and support the mobilization of resources to effect change.

### **Key and Enabling Competencies: Medical microbiologists are able to...**

#### **1. Respond to an individual patient's health needs by advocating with the patient within and beyond the clinical environment**

- 1.1. Work with patients to address determinants of health that affect them and their access to needed health services or resources
  - 1.1.1. Describe the determinants of health, including psychological, biological, social, cultural, environmental, educational, and economical, as well as barriers to access to care and resources at the level of the individual patient
  - 1.1.2. Identify the health needs of an individual patient, including appropriate and timely access to
    - 1.1.2.1. Laboratory services
    - 1.1.2.2. Antimicrobial therapies, including outpatient antimicrobial therapy (OPAT)
    - 1.1.2.3. Immunization agents
  - 1.1.3. Advocate for addressing identified needs and mobilize system resources, working in partnership with the patient and family
  - 1.1.4. Address safety concerns from the patient and family that affect their access to care and preventative services
- 1.2. Work with patients and their families to increase opportunities to adopt healthy behaviours
  - 1.2.1. Work with patients to increase their health system literacy and raise awareness of important health issues
- 1.3. Incorporate disease prevention, health promotion, and health surveillance into interactions with individual patients
  - 1.3.1. Advocate for vaccination
  - 1.3.2. Advocate for appropriate test selection and equitable access to laboratory services
  - 1.3.3. Recognize evidence of child, intimate partner, and elder abuse and sexual violence and respond appropriately

**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**

- 2.1. Work with a community or population to identify the determinants of health that affect them
  - 2.1.1. Identify the determinants of health of the population, as well as opportunities for advocacy, including barriers to access to care and resources, as they relate to the burden of illness from infectious diseases
  - 2.1.2. Identify patient groups at risk for particular infectious diseases in order to develop and target primary and secondary prevention strategies, including HIV, sexually transmitted infections, tuberculosis, vaccine-preventable diseases, and infections associated with injection drug use
- 2.2. Improve clinical practice by applying a process of continuous quality improvement to disease prevention, health promotion, and health surveillance activities
  - 2.2.1. Respond to the needs of hospitals and communities, including the need for screening, detection, and control of infectious diseases, and outbreak investigation and management
  - 2.2.2. Evaluate laboratory practices and test selection to ensure they meet community needs
  - 2.2.3. Advocate for timely and appropriate implementation of new laboratory methodologies, technologies, and equipment to increase operational efficiencies and diagnostic accuracy
- 2.3. Contribute to processes to improve health in the community or population they serve
  - 2.3.1. Advocate for appropriate infection prevention and control measures, including hand hygiene, to prevent disease transmission
  - 2.3.2. Apply epidemiological analysis for advocacy purposes and prevention of communicable disease outbreaks
  - 2.3.3. Apply knowledge of the role of public health and social services in the prevention and management of infectious diseases, including HIV, sexually transmitted infections, tuberculosis, vaccine-preventable diseases, and infections associated with injection drug use
  - 2.3.4. Employ the principles of public health in the detection, surveillance, and prevention of infectious diseases of public health importance
  - 2.3.5. Share antibiograms and local epidemiology information to support hospital and public health programs

**Scholar**

**Definition:**

As *Scholars*, medical microbiologists demonstrate a lifelong commitment to excellence in practice through continuous learning, and by teaching others, evaluating evidence, and contributing to scholarship.

**Key and Enabling Competencies: Medical Microbiologists are able to...**

**1. Engage in the continuous enhancement of their professional activities through ongoing learning**

- 1.1. Develop, implement, monitor, and revise a personal learning plan to enhance professional practice
  - 1.1.1. Reflect on personal performance and identify areas for improvement
  - 1.1.2. Identify personally successful learning strategies
  - 1.1.3. Conduct personal practice audits, peer-review audits, or audits of practice
  - 1.1.4. Describe the principles of maintenance of competence
- 1.2. Identify opportunities for learning and improvement by regularly reflecting on and assessing their performance using various internal and external data sources
  - 1.2.1. Integrate new learning into practice through different modalities, such as clinical rounds, literature reviews, and participation in relevant conferences
  - 1.2.2. Evaluate the impact of any change in practice on the laboratory or patient care
  - 1.2.3. Document the learning process
- 1.3. Engage in collaborative learning to continuously improve personal practice and contribute to collective improvements in practice

**2. Teach students, residents, the public, and other health care professionals**

- 2.1. Recognize the influence of role modelling and the impact of the formal, informal, and hidden curriculum on learners
- 2.2. Promote a safe and respectful learning environment
  - 2.2.1. Describe the principles of ethics with respect to teaching
  - 2.2.2. Ensure occupational safety and biosafety for learners in their professional environment
- 2.3. Ensure patient safety is maintained when learners are involved
- 2.4. Plan and deliver learning activities
  - 2.4.1. Identify the learning needs and desired learning outcomes of others
  - 2.4.2. Select effective teaching strategies and content at the appropriate level to facilitate others' learning
- 2.5. Provide feedback to enhance learning and performance
- 2.6. Assess and evaluate learners, teachers, and programs in an educationally appropriate manner



### **3. Integrate best available evidence into practice**

- 3.1. Recognize practice uncertainty and knowledge gaps in clinical and other professional encounters and generate focused questions that can address them
- 3.2. Identify, select, and navigate pre-appraised resources
- 3.3. Critically evaluate the integrity, reliability, and applicability of health-related research and literature
  - 3.3.1. Conduct a systematic search for evidence
  - 3.3.2. Access and interpret the relevant evidence and results to clinical and laboratory practice
- 3.4. Integrate evidence into decision-making in their practice

### **4. Contribute to the creation and dissemination of knowledge and practices applicable to health**

- 4.1. Demonstrate an understanding of the scientific principles of research and scholarly inquiry and the role of research evidence in health care
- 4.2. Identify ethical principles for research and incorporate them into obtaining informed consent, considering potential harms and benefits, and considering vulnerable populations
- 4.3. Contribute to the work of a research program
- 4.4. Pose questions amenable to scholarly investigation and select appropriate methods to address them
- 4.5. Summarize and communicate to professional and lay audiences, including patients and their families, the findings of relevant research and scholarly inquiry
  - 4.5.1. Convey information to patients, the public, and the media using plain language

## **Professional**

### **Definition:**

As *Professionals*, medical microbiologists are committed to the health and well-being of individual patients and society through ethical practice, high personal standards of behaviour, accountability to the profession and society, physician-led regulation, and maintenance of personal health.

**Key and Enabling Competencies: Medical microbiologists are able to...**

**1. Demonstrate a commitment to patients by applying best practices and adhering to high ethical standards**

- 1.1. Exhibit appropriate professional behaviours and relationships in all aspects of practice, demonstrating honesty, integrity, humility, commitment, compassion, respect, altruism, respect for diversity, and maintenance of confidentiality
  - 1.1.1. Demonstrate insight into one's own limits of expertise
  - 1.1.2. Demonstrate responsibility in timely communication and respect for deadlines
  - 1.1.3. Ensure consent is obtained, as required, and patient identifiers are removed when presenting or publishing patient information
  - 1.1.4. Retain or dispose of patient records in a confidential manner
  - 1.1.5. Serve as an example of safe laboratory practice at all times
- 1.2. Demonstrate a commitment to excellence in all aspects of practice
  - 1.2.1. Adhere to laboratory standards and best practice guidelines
- 1.3. Recognize and respond to ethical issues encountered in practice
  - 1.3.1. Adhere to the principles of biomedical ethics
  - 1.3.2. Adhere to research ethics guidelines
- 1.4. Recognize and manage conflicts of interest
  - 1.4.1. Manage conflicts of interest, including relationships with the pharmaceutical industry and laboratory suppliers
  - 1.4.2. Balance the responsibility of ensuring optimal resource utilization while maintaining quality patient care
- 1.5. Exhibit professional behaviours in the use of technology-enabled communication
  - 1.5.1. Adhere to privacy legislation in all forms of communication
  - 1.5.2. Obtain consent prior to photographing patients and avoid storing patient images on personal devices
  - 1.5.3. Ensure security of patient information when sharing laboratory results electronically or by fax
  - 1.5.4. Ensure security and confidentiality of sensitive data, such as passwords and other access codes

**2. Demonstrate a commitment to society by recognizing and responding to societal expectations in health care**

- 2.1. Demonstrate accountability to patients, society, and the profession by responding to societal expectations of physicians
  - 2.1.1. Support AMS, IPAC, and public health programs

2.2. Demonstrate a commitment to patient safety and quality improvement

**3. Demonstrate a commitment to the profession by adhering to standards and participating in physician-led regulation**

3.1. Fulfil and adhere to professional and ethical codes, standards of practice, and laws governing practice

3.1.1. Personal privacy legislation and policy

3.1.2. Relevant legislation and regulations governing the operation of laboratories

3.1.3. Recognized standards of workplace safety

3.1.4. Regulations governing transportation of dangerous goods, human pathogens, and toxins

3.1.5. Regulations regarding retention and disposal of specimens and the retention of records

3.1.6. Regulations regarding mandatory reporting of communicable diseases

3.1.7. Regulations regarding the reporting of critical results to treating physicians and other health care professionals

3.2. Recognize and respond to unprofessional and unethical behaviours in physicians and other colleagues in the health care professions

3.3. Participate in peer assessment and standard setting

3.3.1. Participate in audits to assess laboratory practices

**4. Demonstrate a commitment to physician health and well-being to foster optimal patient care**

4.1. Exhibit self-awareness and manage influences on personal well-being and professional performance

4.2. Manage personal and professional demands for a sustainable practice throughout the physician life cycle

4.3. Promote a culture that recognizes, supports, and responds effectively to colleagues in need

This document is to be reviewed by the Specialty Committee in Medical Microbiology by January 31, 2026.

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