

## **Fellowship in TB/Non-tuberculous Mycobacteria (TB/NTM)**

Name of Institution: McGill University Health Centre

Location: Montreal, Quebec

Type of Fellowship: Clinical (65%) and research (35%)

Number of positions: 1

Length: 12 months

Program Information (please append description):

- Number of fellowship positions requested: 1
- Academic affiliation: McGill University. Department of Medicine, Division of Infectious Diseases
- Name of hospitals involved in training: MUHC
- % time spent by the fellow in each institution: 100%

### **Background:**

Infections due to the tubercle bacillus (*Mycobacterium tuberculosis*) and related non-tuberculous mycobacteria (NTM) are globally prevalent, presenting diagnostic and therapeutic challenges due to their inherent and/or acquired resistance to antibiotics. Patients with TB / NTM infections require long and difficult to tolerate treatments, including prolonged home intravenous therapy. The goal of the fellowship program is to gain practical and theoretical understanding of the specific challenges associated with the management of TB and NTM infections.

The fellowship program strives to achieve excellence by concentrating on three main areas which include Clinical Care, Education and Research.

### **Clinical Care**

- Clinical care will be provided on the cardinal principles of availability, affordability and ability. An inpatient consult service is available for TB consults (managed by the division of Respiratory Medicine), throughout the year and with designated staff. There is also a dedicated weekly TB clinic where patients with TB / suspected TB / NTM infections are referred for evaluation and treatment. There is an emphasis on multidisciplinary collaboration to provide optimal patient-centered care in both the inpatient and outpatient settings.
- Clinical Practice Guidelines/Protocols have been created for the management of TB and NTM infections. These guidelines which are included in the Canadian TB Standards were authored / co-authored by the supervising faculty of this fellowship.
- The fellow will also gain experience in managing TB in vulnerable populations (housing unstable/homeless, migrants, Indigenous populations)

### **Education**

- Education is a corner stone of the program. Educational support is provided for each individual in the fellowship program tailored to individual objectives but also to ensure that clinical training meets a high standard of care and that physicians are well rounded with both clinical and research experience.

The program ensures that fellows will acquire the skills and expertise to develop guidelines for the prevention and management of TB and NTM infections, to minimize infection-related morbidity and mortality and to mitigate the public health consequences of disease.

- Our goal is to develop a world class TB / NTM Fellowship Program that provides advanced training in the clinical care and clinical investigation of these infections for people with prior residency training in Infectious Diseases or Respiratory Medicine.

### **Research**

The program will have a special emphasis on clinical research that enhances translational research in the field of TB / NTM infections. We plan to do so by developing a close collaboration with the program supervisors, many of whom run active research programs, spanning laboratory medicine, clinical trials and outcomes research.

Clinical research will focus on three main avenues:

1. Participating in randomized clinical trials assessing novel diagnostic or treatment strategies for TB / NTM infections.
2. Prospective cohort studies of TB / NTM infections
3. Clinical microbiologic evaluation of novel means of detecting mycobacterial infection and characterizing mycobacterial isolates.

Transitional research will include:

1. Forging links between clinic patients and researchers studying the genetic predisposition and/or immunology of mycobacterial infections.
2. The development of novel diagnostics assays for immediate detection of mycobacterial infections.
3. The evaluation of new tools to predict risk of progression from asymptomatic infection to clinical disease.

Research activity: The Divisions of Infectious Diseases and of Respiratory Medicine are home to numerous clinician-scientists who are experts in a broad array of topics that offer fellow unique opportunities to engage in research. Further information available at: <https://muhc.ca/med-infectious-diseases/page/research-and-innovation-8> and <https://www.mcgill.ca/respdiv/research>

### **Publications:**

Publications of Dr. Marcel Behr (TB/NTM Fellowship Program Director):

<https://pubmed.ncbi.nlm.nih.gov/?term=%28Behr%2C+Marcel%5BAu%5D+OR+%28Behr+MA%5BAu%5D+NOT+Philadelphia%5BAd%5D%29+OR+%28Behr+M%5BAu%5D+AND+%28%28McGill%5BAd%5D+OR+Stanford%5BAd%5D%29%29%29+AND+1992%3A2158%5Bdp%5D%29>

Publications of Dr. Faiz Ahman Khan (Resp lead, TB/NTM Fellowship Program Director):

<https://scholar.google.ca/citations?user=UKN-WRgAAAJ&hl=en>

### **Mission:**

The mission of the TB / NTM infection service is to promote research and education in the prevention, diagnosis, clinical consequences, and management of TB and NTM infections. The

TB / NTM fellowship program will prepare future physicians in providing state of the art patient care and advancing translational research in the field of TB and NTM infections.

**Outline how intended fellowship will enhance residency training**

The Tuberculosis fellowship will enhance the current residency training programs in Infectious Disease and Respiratory Medicine as follows:

- (1) Unique clinical expertise: The fellowship will focus on the attainment of clinical expertise in the evaluation, diagnosis, and management of patients of TB and NTM infections, over and above the competencies of specialty or subspecialty residency.
- (2) Research: The fellowship will provide trainees opportunities to engage in a broad range relevant research and will strongly encourage academic productivity in the field of of TB and NTM infections.

**Name of the Fellowship Program Director:** Dr. Marcel Behr

**Names of the Teaching Faculty**

Name of Faculty	Role	Summary of clinical practice	Major strengths
Marcel Behr	Professor Clinician-scientist. Medical Director, Mycobacteria lab	Internal Medicine (1990-1993; Montreal General Hospital). Infectious Diseases & Medical Microbiology (1993-1996; McGill University). MSc Epidemiology & Biostatistics (1993-1995; McGill University). Post-doctoral fellowship (1996-1998; Stanford, Dr. Peter Small)	Clinical expertise in mycobacterial infections. Lab expertise in detection and characterization of mycobacteria. Research expertise in genomic methods to study the epidemiology and pathogenesis of mycobacterial infections.
Faiz Ahmad Khan	Associate Professor, Director TB Clinical Services Montreal Chest Institute	Internal Medicine residency (2005-2008; RVH) Respirology residency (2008-2010; MUHC & JGH) MPH, Epidemiology (Columbia U 2011-2013) Post-doctoral fellowship (Harvard Medical School, 2013-2015)	Experience in TB management Experience in MDR-TB management Research on TB

**Academic Facilities**

- The fellow will be on clinical service at the McGill University Health Center (MUHC) and perform research at the Research Institute of the MUHC.
- The fellow will have access to the McGill University libraries, as well as the library of the MUHC. In

addition, key textbooks relevant to fellowship training will be loaned to the fellow at the onset of fellowship training.

- The fellow will be encouraged to attend weekly TB case conferences, Interhospital Infectious Diseases Rounds, Respiratory Rounds and monthly meetings of the McGill International TB Centre.

### **Fellow Duties and Responsibilities**

- Call responsibilities (8 am to 6 pm, weekdays) to cover the TB service for a minimum of 8 periods during the first year of training.
- All clinical activities would occur at the McGill University Health Centre
- The fellow is expected to attend one half-day of clinic per week
- While on the TB service, the fellow is expected to provide teaching to the rotating residents
- The fellow is expected to participate in divisional journal club as well as present once at each of the Interhospital Infectious Diseases Rounds, Respiratory Rounds, per year.
- The fellow will have access to support staff, including the program coordinator and the research teams of the supervising faculty.
- The fellow will be encouraged to attend ID / Resp / TB conferences.
- The fellow is expected to partake in at least one scholarly activity per year of training that will be presented at a conference or published in a peer-reviewed journal
- The fellow is expected to participate in ad hoc TB screening activities that may arise due to outbreaks. These would include screening clinics based at the MCI, or outside the hospital (work place investigations, mobile van screening of homeless populations)

### **Curriculum:**

- The fellow is expected to manage a list of 3-5 patients per week while on service
- The fellow is expected to play an active role in the management of all cases of drug-resistant TB followed at the MCI. DR-TB is rare in Quebec and Canada, so it will be advantageous for the fellow to gain experience on management while at the MCI which is a referral centre (we have about on average, 3 patients with MDR-TB per year). Moreover, the MITBC has played a central role in generating evidence for WHO, ATS/IDSA guidelines on DR-TB treatment.
- Approximately 60% of cases will involve TB, more latent infection than active TB. Approximately 40% of cases will involve NTM, including pulmonary infection and other infections, such as post-surgical.
- The fellow will be presented with a suitable list of reading material, including key textbooks and a collection of relevant articles, at the onset of fellowship.
- The fellow will be expected to attend and participate in weekly case rounds where patients of interest are presented and discussed
- Fellows without prior experience in mycobacteriology lab work will spend 1-2 months at the MUHC mycobacteriology lab and the LSPQ
- Fellows will have the opportunity to arrange a 1 month elective with Departement Sante Publique de Montreal for experience in contact tracing and other central public health activities. The fellow will spend time with community outreach organizations working with vulnerable populations at risk of TB in Montreal in order to broaden insight into the social determinants of TB in urban settings and the importance of expanded multidisciplinary team work

## **Evaluations**

The fellow will be evaluated formally at least every 3 months by the fellowship director. These evaluations will be based on

- Formal evaluation by supervising faculty at the clinic
- Formal evaluation by supervising faculty on the TB service
- Written feedback provided by TB clinic team members (doctors, nurses) on the fellows' performance in the TB/NTM clinic;
- Written feedback provided by members of the ID division for presentations given during Interhospital ID rounds
- Completion of a research project related to TB/NTM

The fellow who will have satisfactorily met the requirements of training will receive a Certificate for the TB/NTM fellowship, conferred by the division of Infectious Diseases of McGill University.

**Junior Attending in TB/NTM (clinical Fellowship)**  
**McGill University**

**Postgraduate Training program in Infectious Diseases**

**Rotation Goals and Objectives**

**McGill University Health Centre (MUHC)**

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**GENERAL INFORMATION**

**Rotation overview:**

Clinical Fellows are expected to do a total of 8 one-month rotations in the Adult TB consultation service in the role of Junior Attending, and attend one half-day per week of dedicated TB clinics (where patients with TB/suspected TB/NTM infections are referred for evaluation and treatment) throughout their fellowship. During these rotations, the fellow will be expected to function at the level of an independent ID/Resp consultant with respect to management, interaction with other health care providers, teaching and patient care, and will have the opportunity to further develop the medical expert, leader and scholar roles in TB/NTM.

While developing the core competencies of the TN/NTM subspeciality, the fellow will actively supervise, teach and evaluate ID-Med Micro trainees on Mycobacteriology rotation in close consultation with the attending supervisor. They will independently collaborate with individuals and teams of healthcare professionals in the teaching hospital setting, including the Respiriology service, the in-patient ID services and the ambulatory ID service (including CVIS and tropical medicine), the Microbiology Laboratory, and other clinical services such as pharmacy.

**Learning context:**

**Training Site(s)**

- Royal Victoria Hospital (Glen site, McGill University Health Center)

**Rotation specific objectives**

At the end of this rotation, the fellow should be able to:

**MEDICAL EXPERT**

General Requirements:

- Demonstrate diagnostic and therapeutic skills in TB/NTM

- Demonstrate effective consultation services with respect to patient care, education and legal opinions.

#### Specific Requirements:

##### Knowledge

- Demonstrate knowledge in specific risk factors, clinical manifestation and management of pulmonary and extrapulmonary TB and NTM
- Understand and utilize microbiological and clinical laboratory testing for diagnosis of TB / NTM, including limitations of such testing
- Demonstrate expert knowledge on susceptibility testing to antimycobacterial drugs
- Demonstrate expert knowledge and understanding of drugs used for treatment of TB/NTM, including drugs used in suspected treatment failure or relapse of disease and management of “latent” TB infection
- Demonstrate expert knowledge in the management of drug-resistant TB
- Understand and apply the principles and practice of prevention of infection as related to TB

##### Skills

- Provide expert TB/NTM consultation with comprehensive, precise and practical written recommendations to physicians within the institution, as well as in referrals from remote regions, emphasizing patient safety and public health
- Anticipate short and long-term complications of therapy and establish contingency plans
- Appropriately deliver patient/family education using the above-mentioned knowledge.
- Demonstrate insight into his/her own limitations.

#### COMMUNICATOR

#### General Requirements:

- Establish therapeutic relationships with patients/families.
- Establish clear communication within the consultation team
- role model effective communication to junior trainees in the team

#### Specific Requirements:

- Formulate impressions and plans that answer the question asked, and that clearly relay the current diagnosis and proposed management, as well as the degree of uncertainty associated with these, if any.
- Role model effective communication to other members of the team
- Demonstrate the skills to impart TB/NTM-related knowledge to patients, colleagues, hospital staff and the general public.
- Gather information about patient's beliefs, concerns and expectations about their illness, in a sensitive and caring manner, and communicate to others involved in the care.

- Succinctly present key information to patients and families in a manner that enables them to be active participants in decision-making related to the infectious diseases affecting them, as well as to other health professionals.
- Know the basic principles that guide the provision of information to the general public and media about issues of local concern. Such issues may apply (but are not limited to) to drug-resistance, outbreaks, inappropriate resource utilization, etc.

## COLLABORATOR

### General Requirements:

- Consult effectively with other physicians and health care professionals including laboratory personnel and pharmacy
- Contribute effectively to other interdisciplinary team activities.

### Specific Requirements:

- Convey relevant content-expertise clearly and decisively to other stakeholders and assist in collective decision-making.
- Accept, consider and respect the opinions of other team members while assuming a decisive role within the team

## LEADER

### General Requirements:

- Utilize 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 other activities.

### Specific Requirements:

- Demonstrate an understanding of the structure; financing and operation of organ Transplant services in the Quebec healthcare system
- Demonstrate the ability to organize the TB/NTM consultation service such that (i) timely and effective patient care be consistently provided, (ii) appropriate exposure and graded responsibility to ID-Med micro and Respiriology residents potentially rotating through the service
- Prioritize new consultation requests and patient follow up in an organized and safe fashion.
- Access and apply a broad base of information to the care of patients in ambulatory care, including knowledge of the most cost-effective laboratory procedures;

- Make and defend clinical decisions and judgments based on sound clinical evidence for the benefits of individual patients and the population served;
- Use information technology as a tool in patient management.

## HEALTH ADVOCATE

### General Requirements:

- 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 Requirements:

- Demonstrate knowledge and understanding of determinants of health as these relate to the burden of illness from diseases caused directly or indirectly by micro-organisms
- Identify biologic, psychosocial, cultural, environmental and economic determinants of health and use this information in a management plan; ensuring that the patient accesses the relevant public health and social services required to manage their particular transplant-related disease(s). The Fellow will learn to identify areas in which they must advocate for their patients such that they are consistently providing optimal care.

## SCHOLAR

### General Requirements:

- Develop, implement and monitor a personal continuing education strategy.
- Critically appraise sources of medical information.
- Facilitate learning of patients, house staff/students and other health professionals.
- Contribute to development of new knowledge.

### Specific Requirements:

- Recognize and identify gaps in knowledge and expertise around clinical question pertinent to TB/NTM and formulate a plan to fill the gap;
- Conduct appropriate literature searches and access the relevant literature, based on identified clinical questions and present findings to the team
- Critically read and analyze identified articles, including identifying their strengths and limitations
- Identify practice areas for research
- Conduct educational sessions for the consultation team, demonstrating an understanding of preferred learning methods when dealing with junior trainees

## PROFESSIONAL

### General Requirements:

- Deliver highest quality care with integrity, honesty and compassion.
- Exhibit appropriate personal and interpersonal professional behaviours.
- Practice medicine ethically consistent with obligations of a physician.

### Specific Requirements:

- Display attitudes commonly accepted as essential to professionalism;
- Advance professional competence
- Evaluate continually own abilities, recognize limitations in professional competence and demonstrate willingness to call upon others with special expertise wherever appropriate
- Strive to resolve conflicts as they arise
- Demonstrate flexibility and a willingness to adjust based on changing circumstance
- Know and understand the professional, legal and ethical codes to which infectious diseases physicians are bound (confidentiality issues, appropriate conduct when interacting with industry including the manufacturers and distributors of antimicrobials and diagnostics products...)
- Understand and be able to apply relevant legislation that relates to the health care system in order to guide one's clinical practice
- Recognize, analyze and develop an approach to managing unprofessional behaviours in clinical practice, taking into account local and provincial regulations

### Recommended resources:

- Recent reviews and other scientific publications based on cases seen during consultation service, e.g. obtained through PubMed or Scopus
- Canadian Tuberculosis Standards
- Tuberculosis textbooks, e.g. Rom & Garay, Schaaf & Zumla
- Expect to attend an international meeting on tuberculosis during the fellowship, e.g. North American Region meeting of the International Union against TB & Lung Disease

### Trainee Assessment:

The fellowship director will provide assessment using the specific ITER for junior attending TB/NTM based on feedback from all supervising faculty at the clinic, supervising faculty at on the TB service and feedback provided by TB clinical team members (including nurses)

