McGill | Faculty of Medicine and Health Sciences | Faculté de médecine et des sciences de la santé

Committee for Oversight of Research Units

Annual Reporting for Faculty Supported Research Centres and Networks

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All Centres (provisional Centres; McGill Centres), Research groups and Networks that receive funding from the Faculty of Medicine and Health Sciences (FMHS) are required to provide an annual report to the Committee for Oversight of Research Units (CORU)

The reporting period is May 1, 2022 – April 30, 2023.

Please submit your report to the Research Office, Faculty of Medicine and Health Sciences (**ri-ac.med@mcgill.ca**) before the following deadline:

May 15, 2023

Continued support from the Faculty is contingent on:

1. the receipt of the reporting documents on time,
2. the evaluation of reported activities by the Faculty's Committee for Oversight of Research Units (CORU),
3. the availability of Faculty funds.

Your strong engagement in the Faculty's mission for continued research excellence and financial stewardship is truly appreciated.

Annual Report of Activities and Outcomes

Name of the Unit: McGill International Tuberculosis Centre (MTBC)/WHO Collaborating for Tuberculosis Research (WHO CC)

Name of Unit leader & email address: Dr. Dick Menzies, Director of the MTBC / WHO CC, dick.menzies@mcgill.ca, 514-934-1934 ext 32128.

If the Unit is **a Senate-approved** McGill Research Centre, indicate date of approval: December 3rd, 2014; Board of Governors approval February 2nd, 2015.

Mission statement of the Unit (~2 sentences):
Vision: To contribute to the elimination of TB in the world, especially in high-burden countries and among the most vulnerable population groups.

Mission: To help end TB, within **Canada and globally**, by:

- Doing innovative, interdisciplinary research that will result in the transformative new tools and strategies needed to help end TB.
- Strengthening training and capacity building that can support TB elimination, especially in high-burden countries and vulnerable population groups (indigenous, children, etc.).
- Forging equitable research partnerships with local and international partners.

Total number of Unit members: 42, including 27 Full members, 10 Foreign-based Associate members and 5 Community Advisory Board members with expertise spanning from basic biomedical research to clinical, epidemiological, social determinants of health and TB advocacy.

Number of members affiliated with McGill's FMHS:

Unit's website:

Please note the website needs to feature:

- all sources of funding support (including the FMHS logo),
- the list of Members and their institutional affiliation with appropriate links,
- the activities supported by the Unit,
- all previous Annual Reports.

Website address (URL): https://www.mcgill.ca/tb/

Please respect the page limits, where indicated.
(minimum font size of 11 pts, use lay language)

1. **Explain the significance of the Unit's mission at McGill and beyond** (1/2 page max.)

The MTBC/WHO CC has been working on the implementation of its **Strategic plan 2022-2025** in the priority areas identified:

1. Develop new research partnerships in Canada and globally, to strengthen the position of the MTBC and the FMHS as the focal point for all major TB research and training activities in Canada, and to increase our role and visibility globally (*Appendix B: Memorandum of understanding with REDE-TB and Section 3 on the top-5 accomplishments of the Unit*).
2. Develop new interdisciplinary research among MTBC members, and between investigators of the MTBC and other centres at McGill through greater collaboration. Enhance interdisciplinary research involving multiple members of the Centre will strengthen the innovation and impact of research, and enhance innovation, and productivity across centres in the Faculty.
3. Develop a recruitment plan for new investigators (*Appendix C: Recruitment plan*); the MTBC needs the reinvigoration and new directions provided by recruitment of new young investigators. This will also strengthen the FMHS, particularly since our plan is to work with the "basic science" departments who have potential for recruitment but may have other limitations in research mentoring and infrastructure which the MTBC can offer.
4. Create a community Advisory Board of former TB patients, community groups and NGOs (*See Section 3 on the top-5 accomplishments of the Unit*). This will advise the MTBC on research training priorities and will be unique for TB in Canada, and provide a valuable contribution to the FMHS, as a model for other centres and a resource for others to use as needed.

2. **Alignment with the Faculty's Strategic Research Plan** (1/2 page max.)

Our work aims to develop and evaluate new diagnostic tests and new treatment regimens for the control of TB and other mycobacterial diseases. MTBC investigators are leaders in each of the three aims laid out in the Faculty Mission Statement: **Education, Research , and Service**. In terms of research, the MTBC presents multiple opportunities for synergistic research interactions, both across disciplines and across institutions, thus contributing to the development of innovative research and academic programs. More specifically, MTBC investigators address "Biomedical & Health Sciences in the Age of Digital Data", by using genomic technologies to advance our study of microbes and their capacity to spread among different host populations (**Reed**). Additionally, studies of the host resistance to these microbial threats directly address Integrative genomics (**Schurr**), Molecular Medicine (**Behr**), Host-Pathogen interactions, and Infectious Disease Pathogenesis (**Behr, Divangahi**). The MTBC expertise has extended to epidemiology, including diagnostic test evaluations (**Pai, Alvarez, Behr, Menzies, Sulis**), and epidemiology of TB in Canada and abroad (**Menzies, Schwartzman, Benedetti, Campbell, Sulis**). In addition to its interest in "Key determinants of Health and Disease", the MTBC expertise is active in research of social determinants of TB (**Zwerling, Oxlade, Daftary, Oga-Omenka, Engels**) and emphasizes the importance of equity, diversity and inclusion throughout all aspects of research, from conception to implementation to healthcare application.

On April 25, 2023, the MTBC joined the McGill Interdisciplinary Initiative in Infection and Immunity (MI4) Dragon's Den Event and did a pitch on how to end TB by combining TB vaccine with preventive therapy. Finally, the MI4 launched a Seed Fund Grant program to support innovative approaches that address three broad thematic areas: **Pandemic threats, antimicrobial resistance, and microbes that shape human health**. 4 out of 5 investigators of winning projects include **Ahmad Khan, Divangahi, Nadir** and **Pai** from the MTBC https://rimuhc.ca/en/-/five-ri-muhc-researchers-receive-new-funding-from-mi4-1.

Planned activities in line with the FMHS Strategic Research Plan/MI4:

- Develop a strategy at the FMHS to recruit new investigators – clinician scientist and PhD scientists.
- Create learning opportunities for students and trainees: Develop an MTBC training plan (workshops series: primary data collection, field studies diagnostic studies, basic studies, training on leadership skills, grant writing courses, interdisciplinary course on TB research, etc.).
- Develop training that allow people in TB high-burden settings to improve TB prevention and care (clinical practice, testing, etc.).

- Sponsor post-doc students and support multi-year funding for trainee positions (co-supervision of a project) from low- and middle-income countries (LMICs).
- Develop on-line activities: Trainings, seminars, webinars, courses; consultation in research (design, execution, analysis, SAC and DSMB roles), consultation in clinical.

3. **Highlight the top-5 accomplishments of the Unit over the past 12 months** (1/2 page max., use bullets).

1) Redesignation of the McGill International Tuberculosis Centre, McGill University Health Centre, McGill University, as a PAHO/WHO Collaborating Centre for Tuberculosis Research

This designation is effective for a period of four years, beginning on 17 November 2022, and will end on 17 November 2026 (*Appendix A: Letter of redesignation*).

2) Signature of a Memorandum of understanding (MOU) and Joint funding from International Funding agency: TB reach project in Brazil

Among the main priorities of our Strategic Plan for 2022-2025, the development of new research partnerships in Canada and globally has been identified. An MOU was officially signed on October 10, 2022, between the MTBC/WHO CC, the RI-MUHC, and REDE TB (Brazilian NGO with a network of over 300 TB investigators) to strengthen our mutual collaboration and to facilitate the development of joint TB research projects and training activities. The objective of the technical cooperation is to promote activities in fields that will enhance both institutions "scientific, education ,and technical cooperation interests". 4 MOU areas of collaboration have been identified: 1) Research Projects, Implementation research ,and Service Delivery Programs; 2) Capacity building and Training; 3) Health Technology Development and Evaluation; 4) Exchange of Information, Related Materials ,and Inputs (*Appendix B: Memorandum of understanding with REDE-TB*).

As part of the new agreement with REDE-TB, the MTBC/WHO-CC was a partner in the application to TB Reach of Stop TB Partnership in 2022 (TB Reach Wave 10 Call for proposals). The project was entitled "Scaling up TPT in Brazil: a cascade of care approach. The way forward to reverse the pandemic setback" and was developed with the lead of **Anete Trajman** (MTBC Associate member), in collaboration with MTBC Members **Campbell**, and **Menzies**, with REDE-TB as the recipient of funds. This was funded by TB Reach and will advance the scale-up of TB infection testing and management in household contacts in Brazil. This is the first large scale project funded by an international funding agency in which the recipient is an organization in a high TB burden country, and the MTBC plays a key strategic role.

3) FRQS Salary awards

2 MTBC members received their FRQS Salary awards this year. Both applications were strengthened by being part of the TB Centre.

Senior Investigators Awards: Dr. Faiz Ahmad Khan

Title of Research: Research in partnership with communities to improve tuberculosis care and respiratory health in Nunavik. Award received: Clinician scholars

Junior 1 Investigators Awarda:Dr. Jonathon Campbell

Title of Research: Inform the design, cost, and implementation of TB elimination programs. Award received: Scientist scholars

4) Creation of the McGill International virtual Community Advisory Board (CAB)

In line with the implementation of our Strategic plan 2022-2025, we established an International CAB to support patient voice in TB research at McGill, in Canada, and around the world. The CAB serves as a patient advisory group to encourage greater patient involvement in the design and conduct of TB research, to help with knowledge translation, and to contribute to an international TB research network. This research advisory board advices on research protocols and results, including their dissemination, intending to improve TB research programs https://www.mcgill.ca/tb/investigators/international-community-advisory-board.

5) WHO guideline: Handbook on Diagnosis of TB infection

World Health Organization. (2022). WHO consolidated guidelines on tuberculosis. Module 3: diagnosis. Tests for TB infection. World Health Organization.

4. **Major joint publications over the past 12 months** (including shared software, data repositories; with links). Please only feature the article co-authored by at least two PI members of the Unit:

Peer reviewed publications 2022-2023

Allard-Gray A, Boakye I, Camara A, Eisenbeis L, Guimarães-Teixeira E, Sow O, Zielinski D**, Campbell JR, Menzies D**. Factors Associated with Discontinuation of Tuberculosis Preventive Treatment: Post-Hoc Analysis of Two Randomized Controlled Trials Clin Infect Dis. 2023 Mar 23:ciad164. doi: 10.1093/cid/ciad164. Epub ahead of print. PMID: 36949623.

Apriani L, Koesoemadinata RC, Bastos ML, Wulandari DA, Santoso P, Alisjahbana B, Rutherford ME, Hill PC, **Benedetti A, Menzies D, Ruslami R**. Implementing the 4R and 9H regimens for TB preventive treatment in Indonesia**.** Int J Tuberc Lung Dis. 2022 Feb 1;26(2):103-110. doi: 10.5588/ijtld.21.0318. PMID: 35086621

Apriani L, McAllister S, Sharples K, Nurhasanah H, Aini IN, Susilawati N, **Ruslami R**, Alisjahbana B, **Menzies D**, Hill PC**.** Tuberculosis infection control measures and knowledge in primary health centres in Bandung, Indonesia. J Infect Prev. 2022 Mar;23(2):49-58. doi: 10.1177/17571774211046880. Epub 2021 Dec 28. PMID: 35340927

Arbiv OA, Kim JM, Yan M, Romanowski K, **Campbell JR, Trajman A**, Asadi L, Fregonese F, Winters N, **Menzies D, Johnston JC**. High dose rifamycins in the treatment of TB: a systematic review and meta-analysis. Thorax. 2022 Dec;77(12):1210-1218. doi: 10.1136/thoraxjnl-2020-216497. Epub 2022 Jan 7. PubMed PMID: 34996847.

Bastos ML, **Oxlade O, Campbell JR**, Faerstein E, **Menzies D**, **Trajman A**. Scaling up investigation and treatment of household contacts of tuberculosis patients in Brazil: Scaling up investigation and treatment of household contacts of tuberculosis patients in Brazil: a cost-effectiveness and budget impact analysis**.** Lancet Reg Health Am. 2022 Jan 10; 8:100166. doi: 10.1016/j.lana.2021.100166. PMID: 36778732; PMCID: PMC9903685.

Campbell JR, Nsengiyumva P, Chiang LY, Jamieson F, Khadawardi H, Mah HK, **Oxlade O**, Rasberry H, Rea E, Romanowski K, Sabur NF, Sander B, Uppal A, **Johnston JC**, **Schwartzman K**, Brode SK: Costs of Tuberculosis at 3 Treatment Centers, Canada, 2010-2016 Emerg Infect Dis. 2022 Sep;28(9):1814-1823. doi: 10.3201/eid2809.220092. PMID: 35997366; PMCID: PMC9423918.

Campbell JR, Chan ED, Falzon D, **Trajman A**, Keshavjee S, Leung CC, Miller AC, Monedero-Recuero I, Rodrigues DS, Seo H, Baghaei P, Udwadia Z, Viiklepp P, Bastos M, **Menzies D**. Low Body Mass Index at Treatment Initiation and Rifampicin-Resistant Tuberculosis Treatment Outcomes: An Individual Participant Data Meta-Analysis Clin Infect Dis. 2022 Dec 19;75(12):2201-2210. doi: 10.1093/cid/ciac322.PMID: 35476134

Diefenbach-Elstob T, Rivest P, **Benedetti A**, Gordon C, Palayew M, **Menzies D, Schwartzman K, Greenaway C.** Patterns and characteristics of TB among key risk groups in Canada, 1993-2018 *International Journal of Tuberculosis and Lung Disease* 2022; 26:1041-1049.

Gamuchirai Tavaziva, Miriam Harris, Syed K Abidi, Coralie Geric, Marianne Breuninger, Keertan Dheda, Aliasgar Esmail, Monde Muyoyeta, Klaus Reither, Arman Majidulla, Aamir J Khan, **Jonathon R Campbell**, Pierre-Marie David, **Claudia Denkinger**, Cecily Miller, Ruvandhi Nathavitharana, **Madhukar Pai, Andrea Benedetti, Faiz Ahmad Khan**, Chest X-ray Analysis With Deep Learning-Based Software as a Triage Test for Pulmonary Tuberculosis: An Individual Patient Data Meta-Analysis of Diagnostic Accuracy

Geric C, Majidulla A, Tavaziva G, Nazish A, Saeed S, **Benedetti A**, Khan AJ, **Ahmad Khan F.** Artificial intelligence-reported chest X-ray findings of culture-confirmed pulmonary tuberculosis in people with and without diabetes. J Clin Tuberc Other Mycobact Dis. 2023 Mar 30; 31:100365. doi: 10.1016/j.jctube.2023.100365. PMCID: PMC10121442.

Giorgia Sulis, Gamuchirai Tavaziva, Genevieve Gore, **Andrea Benedetti**, Regan Solomons, Ronald van Toorn, Stephanie Thee, Jeremy Day, Sabine Verkuijl, Annemieke Brands, Kerri Viney, Tiziana Masini, **Faiz Ahmad Khan**, Silvia S Chiang. Comparative Effectiveness of Regimens for Drug-Susceptible Tuberculous Meningitis in Children and Adolescents: A Systematic Review and Aggregate-Level Data Meta-Analysis

Kaufmann, E., Khan, N., Tran, K. A., Ulndreaj, A., Pernet, E., Fontes, G., ... **Behr, M** & **Divangahi, M.** (2022). BCG vaccination provides protection against IAV but not SARS-CoV-2**.** *Cell Reports*, *38*(10), 110502.

Jae Hyoung Lee, Tushar Garg, Jungsil Lee, Sean McGrath, Lori Rosman, Samuel G. Schumacher**, Andrea Benedetti,** Zhi Zhen Qin, Genevieve Gore, **Madhukar Pai** & Hojoon Sohn Impact of molecular diagnostic tests on diagnostic and treatment delays in Tuberculosis: A systematic review and meta-analysis." *BMC Infectious Diseases* 22, no. 1 (2022): 940.

MacLean, Emily L., Mikashmi Kohli, Lisa Köppel, Ian Schiller, Surendra K. Sharma, **Madhukar Pai, Claudia M. Denkinger**, and **Nandini Dendukuri.** Bayesian latent class analysis produced diagnostic accuracy estimates that were more interpretable than composite reference standards for extrapulmonary tuberculosis tests**.** *Diagnostic and Prognostic Research* 6, no. 1 (2022): 1-10.

Mannan, Shamim, **Charity Oga-Omenka,** Akhil Soman ThekkePurakkal, Lavanya Huria, Aakshi Kalra, Ravdeep Gandhi, Tunisha Kapoor,… & **Madhukar Pai**. Adaptations to the first wave of the COVID-19 pandemic by private sector tuberculosis care providers in India**.** *Journal of Clinical Tuberculosis and Other Mycobacterial Diseases* 28 (2022): 100327.

Oga-Omenka, C., Sassi, A., Vasquez, N. A., Baruwa, E., Rosapep, L., Daniels, B., ... & **Pai, M**. (2023). Tuberculosis service disruptions and adaptations during the first year of the COVID-19 pandemic in the private health sector of two urban settings in Nigeria—A mixed methods study **.** *PLOS Global Public Health*, *3*(3), e0001618.

MacLean, E.L.H., Villa-Castillo, L., Espinoza-Lopez, P., Caceres, T., **Sulis, G.,** Kohli, **M., Pai,** M. and Ugarte-Gil, C., 2023. Integrating tuberculosis and COVID-19 molecular testing in Lima, Peru: a cross-sectional, diagnostic accuracy study

Ndjeka N, **Campbell JR**, Meintjes G, Maartens G, Schaaf HS, Hughes J, Padanilam X, Reuter A, Romero R, Ismail F, Enwerem M, Ferreira H, Conradie F, Naidoo K, **Menzies D**. Treatment outcomes 24 months after initiating short, all-oral bedaquiline-containing or injectable-containing rifampicin-resistant tuberculosis treatment regimens in South Africa: a retrospective cohort study. Lancet Infect Dis. 2022 Jul;22(7):1042-1051. doi: 10.1016/S1473-3099(21)00811-2. Epub 2022 May 2. PubMed PMID: 35512718; PubMed Central PMCID: PMC9217754.

Nirma Khatri Vadlamudi, C. Andrew Basham, **James C. Johnston, Faiz Ahmad Khan**, Giovanni Battista Migliori, Rosella Centis, Lia D'Ambrosio, Waasila Jassat, Mary-Ann Davies, **Kevin Schwartzman, and Jonathon R. Campbell.** **The Association of SARS-CoV-2 Infection and Tuberculosis Disease with Unfavorable Treatment Outcomes: A Systematic Review**

Oxlade O, Benedetti A, Adjobimey M, Alsdurf H, Anagonou S, Cook VJ, Fisher D, Fox GJ, Fregonese F, Hadisoemarto P, Hill PC, **Johnston J, Khan FA**, Long R, Nguyen NV, Nguyen TA, Obeng J, **Ruslami R, Schwartzman K, Trajman A**, Valiquette C, **Menzies D**. Effectiveness and cost-effectiveness of a health systems intervention for latent tuberculosis infection management (ACT4): a cluster-randomised trial. Lancet Public Health. 2021 May;6(5):e272-e282. doi: 10.1016/S2468-2667(20)30261-9. Epub 2021 Mar 22. PMID: 33765453

Ortiz-Brizuela E, **Menzies D, Behr MA**.Testing and Treating Mycobacterium tuberculosis Infection Nov;106(6):929-947. doi: 10.1016/j.mcna.2022.08.001

Svadzian, Anita, Benjamin Daniels, **Giorgia Sulis,** Jishnu Das, **Amrita Daftary**, Ada Kwan, Veena Das, Ranendra Das, and **Madhukar Pai**. Do private providers initiate anti-tuberculosis therapy on the basis of chest radiographs? A standardised patient study in urban India

Tavaziva, Gamuchirai, Arman Majidulla, Ahsana Nazish, Saima Saeed, **Andrea Benedetti**, Aamir J. Khan, and **Faiz Ahmad Khan.** Diagnostic accuracy of a commercially available, deep learning-based chest X-ray interpretation software for detecting culture-confirmed pulmonary tuberculosis." *International Journal of Infectious Diseases* 122 (2022): 15-20.

Trajman A, Diallo T, **Menzies D**. Four months of rifampicin for tuberculosis prevention treatment in children**.** J Infect Chemother. 2023 Feb;29(2):235. doi: 10.1016/j.jiac.2022.10.016. Epub 2022 Nov 9. PMID: 36371047.

Trajman A, Adjobimey M, Bastos ML, Valiquette C, **Oxlade O**, Fregonese F, Affolabi D, Cordeiro-Santos M, Stein RT, **Benedetti A, Menzies D.** GeneXpert or chest-X-ray or tuberculin skin testing for household contact assessment (GXT): protocol for a cluster-randomized trial**.**Trials. 2022 Aug 2;23(1):624. doi: 10.1186/s13063-022-06587-0. PMID: 35918722; PMCID: PMC9344713.

Trajman A, Lachapelle-Chisholm S, Zikos T, Werneck GL, **Benedetti A.** Efficacy and effectiveness of SARS-CoV-2 vaccines for death prevention: A protocol for a systematic review and meta-analysis
. PLoS One. 2022 Jul 28;17(7): e0265414. doi: 10.1371/journal.pone.0265414. PMID: 35901091; PMCID: PMC9333202.

Vesga JF, Lienhardt C, Nsengiyumva P, **Campbell JR**, **Oxlade O**, den Boon S, Falzon D, **Schwartzman K**, Churchyard G, Arinaminpathy N, Prioritising attributes for tuberculosis preventive treatment regimens: a modelling analysis; 20(1):182. doi:10.1186/12916-022-02378-1. PMID: 35581650.

Winters N, Belknap R, **Benedetti A**, Borisov A, **Campbell JR**, Chaisson RE, Chan PC, Martinson N, Nahid P, Scott NA, Sizemore E, Sterling TR, Villarino ME, Wang JY, **Menzies D**. Completion, safety, and efficacy of tuberculosis preventive treatment regimens containing rifampicin or rifapentine: an individual patient data network meta-analysis Lancet Respir Med. 2023 Mar 23;. doi: 10.1016/S2213-2600(23)00096-6. [Epub ahead of print] PubMed PMID: 36966788.

Zimmer AJ, Ugarte-Gil C, Pathri R, Dewan P, Jaganath D, Cattamanchi A, **Pai M**, **Grandjean Lapierre S.** Making cough count in tuberculosis care. Commun Med (Lond). 2022 Jul 6; 2:83. doi: 10.1038/s43856-022-00149-w. PMID: 35814294; PMCID: PMC9258463.

WHO guidelines, statement and policies 2022-2023

Change in WHO guidelines on pediatric TB meningitis
Sulis, G., Tavaziva, G., Gore, G., **Benedetti, A.,** Solomons, R., van Toorn, R., ... & Chiang, S. S. (2022, June). Comparative Effectiveness of Regimens for Drug-Susceptible Tuberculous Meningitis in Children and Adolescents: A Systematic Review and Aggregate-Level Data Meta-Analysis**.** In *Open Forum Infectious Diseases* (Vol. 9, No. 6, p. ofac108). US: Oxford University Press.

New consolidated guideline on tests for TB infection
World Health Organization. (2022**).** WHO consolidated guidelines on tuberculosis. Module 3: diagnosis. Tests for TB infection. World Health Organization.

World Health Organization. (2023). WHO standard: universal access to rapid tuberculosis diagnostics. World Health Organization.

Cost-effectiveness analysis related to TPT expansion (commissioned by WHO)
Nsengiyumva NP, **Campbell JR**, **Oxlade O,** Vesga JF, Lienhardt C, **Trajman A**, Falzon D, Den Boon S, Arinaminpathy N, **Schwartzman K**. Scaling up target regimens for tuberculosis preventive treatment in Brazil and South Africa: An analysis of costs and cost-effectiveness; 19(6):e1004032. PMID: 35696431

One million lives saved per year: A cost-benefit analysis of the Global Plan to End TB, 2023–2030 and beyond**.** Arinaminpathy, Nim, Sandip Mandal, Suvanand Sahu, **Madhukar Pai**, Roland Mathiasson, Copenhagen Consensus Center, and Brad Wong. "Best investments for the sdg s."

5. **Major joint research projects funded over the past 12 months** (involving at least two PI members of the Unit:

For 2022-2023, our members received more than 10 million dollars in grant funding, including Foundation awards from the Canadian Institutes of Health Research, the Biosciences Research Infrastructure Fund, the

Centre for Disease Control and Prevention, the World Health Organization Global TB Programme and Stop TB Partnership. The TB Centre also trains over 75 students and fellows.

Major research projects

Differential virulence within the Mycobacterium tuberculosis complex (2023-2028)
Funding Sources: Canadian Institutes of Health Research (CIHR)
Total Funding: $1,147,500 CAD
MTBC Co-investigator: Erwin Schurr
MTBC Applicant: Marcel Behr

CL3 Capacity for Innovative Research and Training on Emerging and Reemerging Pathogens (2023-2028)
Funding Sources: CFI-Biosciences Research Infrastructure Fund (BRIF 1)
Total Funding: $1.5M MSSS, $0.9M MEEQ, $1.0M Partners
MTBC Co-investigator: Maziar Divangahi
MTBC Applicant: Marcel Behr

Scaling up TPT in Brazil: a cascade of care approach. The way forward to reverse the pandemic setback (2022-2024)
Funding Sources: Stop TB Partnership
Total Funding: $600,000 USD
MTBC Co-investigators: Anete Trajman, Dick Menzies and Jonathon Campbell
MTBC Applicant: REDE-TB

The return on investment of tuberculosis screening and prevention (2023)
Funding Sources: World Health Organization Global TB Programme
Total Funding: $54,890 USD
MTBC Investigators: Kevin Schwartzman
MTBC Applicant: Jonathon Campbell

The Influence of SARS-CoV-2 on Tuberculosis Disease Treatment Outcomes: A Systematic Review (2022)
Funding Sources: World Health Organization Global TB Programme
Total Funding: $30,864 USD
MTBC Investigators: Dick Menzies, Kevin Schwartzman, Faiz Ahmad Khan, James Johnston
MTBC Applicant: Jonathon Campbell

Resilient Responses to Protect Lung Health in Nunavik (2022-2025)
Funding Sources: Inuit Tapiriit Kanatami, UK Research & Innovation, POLAR, Fonds de Recherche Quebec, NRC-CNR Canada Canada-Inuit Nunangat-United Kingdom Arctic Research Programme
Total Funding: $600,000 CAD
MTBC Co-investigator: Kevin Schwartzman
MTBC Applicant: Faiz Ahmad Khan

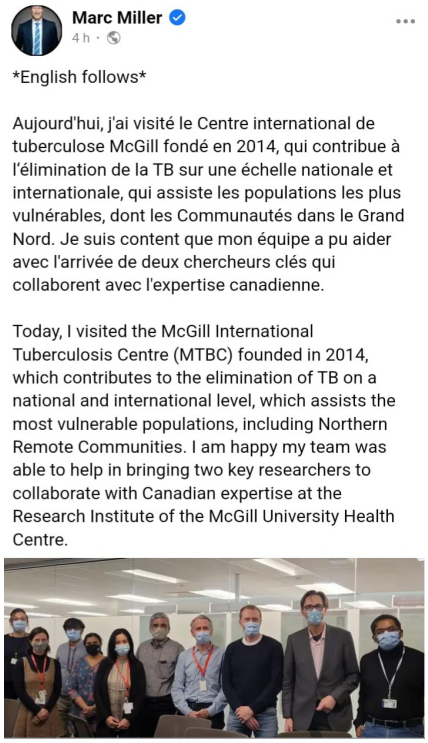
Chest Radiography and TB Elimination in Nunavik: novel solutions to fill gaps and strengthen regional capacity (2022-2025)
Funding Sources: Canadian Institutes of Health Research (CIHR)
Total Funding: $393,000 CAD
MTBC Co-investigators: Kevin Schwartzman, Andrea Benedetti, Marcel Behr
MTBC Applicant: Faiz Ahmad Khan

Community-partnered infectious disease modeling to inform COVID-19 policies and advocacy in Nunavik (2022-2023)
Funding Sources: Canadian Institutes of Health Research (CIHR)
Total Funding: $249,000 CAD
MTBC Co-investigator: Robyn Lee
MTBC Applicant: Faiz Ahmad Khan

Artificial intelligence-based analysis of cough for COVID-19 screening in Montreal (2021-2024)
Funding Sources: Canadian Institutes of Health Research (CIHR)
Total Funding: $449,926 CAD
MTBC Co-investigators: Madhukar Pai and Simon Grandjean Lapierre

Tuberculosis Trials Consortium Clinical Research Services (2020-2030)
Funding Sources: Centers for Disease Control and Prevention (CDC)
Total Funding: $17.2 million CAD
MTBC Co-investigators: Marcel Behr, Kevin Schwartzman, Faiz Ahmad-Khan, James Johnston and Gregory Fox
MTBC Applicant: Dick Menzies

6. **Major outreach activities** (e.g., seminar series, general public events):



On January 12, 2023, the MTBC met the Member of Parliament Marc Miller, Minister of Crown-Indigenous Relations and his team to present the MTBC and to explore potential collaboration.

- On January 25, 2023, the MTBC and the Global Health Programs co-organized a Seminar on the "Lessons from our journey in clinical medicine and public health in India" with Dr. Anurag Bhargava**,** a visiting professor from India (*Appendix D: Joint TB Seminar*).
- A total of **7 TB Seminars** with presentations by MTBC members or international TB researchers, brought together members, students and the TB network with an average of 45 attendees (April 1, 2022: Leonardo Martinez; May 20, 2022: Rada Savic; October 20, 2022: Mario Raviglione and Simone Villa; November 11, 2022: Silvia Chang; Jan 20, 2023: Anurag Bhargava; March 17, 2023: David Dowdy; April 21, 2023: Molly Franke).
- A total of **7 TB Journal Clubs** with presentations by trainees and students were held (June 3, 2022: Ori Solomon; October 14, 2022: Mayara Lisboa Bastos; November 4, 2022: Miranda Zary; December 16, 2022: Michael Onotera; January 27, 2023: Claire Trudel; March 17, 2023: Fajri Gafar; April 28, 2023: Alexandra Zimmer).
- General public events: **10th Annual TB Research Day 2023** was held on March 24, 2023– **Over 90 participants** attended the event, including opening remarks from the **Executive Director of the RI-MUHC**, 3 keynote speakers from the University of Dublin, Médecins sans Frontières and the McGill international CAB. **8 McGill students and trainees** were awarded prizes for best posters presented at the meeting, and best publications in 2022 (*Appendix E: TB Research Day program*).
- **Media:** MTBC Members have been in external media and newsletters at least 180 times (TB-related and COVID-related). We are continually sought by national and international media organizations

based on our collective expertise. The MTBC also sends out a monthly TB newsletter to all its members and TB network.

7. **Major training activities** (e.g., summer schools, co-supervision of trainees, practical workshops):

Training Course in Systematic Reviews and Meta-Analysis offered to LMICs (May 2-13, 2022)
Led by **Menzies**, including **Ahmad Khan; Campbell and Schwartzman**, this course provided a detailed description of the systematic review process, discussed the strengths and limitations of the method, and provided step-by-step guidance on how to perform a systematic review (15 participants in person).

McGill Global Health Summer Institutes
In conjunction with the McGill Global Health Summer Institutes, the MTBC/WHO CC held three TB Research courses and one Research course in global infectious diseases, led by **MTBC members/ Associate members as course faculty.**

- *TB research methods*, led by **Menzies**, including 6 MTBC members: **Alvarez; Benedetti; Campbell; Daftary; Johnston; Zwerling** and 1 Associate member: **Fox** (23 participants in person, 44 participants online, June 6-10, 2022);
- *Advanced TB diagnostics research*, led by **Pai**, including 3 MTBC members: **Grandjean Lapierre; Schwartzman; Zwerling**; 2 Associate members: **Denkinger; Engel** and 1 CAB member: **Kunor** (199 participants, on-line June 13-17, 2022);
- *Quality of TB care*, led by **Pai**, including 1 MTBC member: **Daftary**; 1 Associate member: **Bhargava** and 2 CAB members: **Enkh-Amgalan; Sifumba** (119 participants, online June 13-17, 2022);
- *Qualitative methods in global infectious diseases research*, led by **Daftary and Engel**, including 1 MTBC member: **Oga-Omenka** (128 participants on-line, June 6-10, 2022).

To improve capacity building for researchers in developing countries, the courses were held virtually, allowing more participation than usual by researchers from LMICs. New sets of material were developed to facilitate the virtual presentations.

Fee waivers were offered to LMICs and Indigenous communities interested in TB related courses (11 participants applied for these):
- TB research methods (3 participants);
- Advanced TB diagnostics research (2 participants);
- Quality of TB care (6 participants).

Online training workshop on implementation research for digital technologies in support of tuberculosis care / Session on health economics (June 13-17, 2022)
Led by **Campbell** and **Schwartzman**, this workshop provided training on how to conduct implementation research (IR) when novel digital technologies are introduced or scaled up. Participants received hands-on training on all elements of the IR toolkit with specific application to digital technologies, starting with principles of implementation science through identifying problems, developing the IR question, finding the right IR method to study the question, planning studies and running the research. The workshop had a particular focus on CAD for TB screening and is being jointly organized by TDR, GTB and WHO / EURO region (> 30 participants from national TB programs, in the WHO Euro region).

2nd Virtual training Courses in Economic Research Methods offered in LMICs (June 27-30, 2022)
Led by **Campbell** and **Merle** from TDR, including **Schwartzman** and **Menzies**, this workshop provided training on the relevance of economic analysis to public health research by developing a rigorous protocol for an economic analysis of a public health research question and identifying accurate sources of data on costs needed for a specific research question, within a coherent framework. Participants received hands-on training on the use of « top-down » and « bottom-up » costing approaches to obtain suitable data, collate and analyze the collected costs (> 30 participants from Senegal, Togo, Tchad, Mali, Liberia, Guinea, Burkina Faso, Ivory Coast, and Pakistan).

8. If applicable, **list new members** who joined the Unit in the past 12 months
(indicate: Name, title, full/associate member, affiliation):

In 2022, we recruited **3** new members (full members), **1** associate member and **5** Community Advisory Board (CAB) members.

New members (3)

- Jonathon Campbell, Assistant professor, Department of Medicine and Department of Global and Public Health, McGill University: https://www.mcgill.ca/tb/jonathon-campbell-0
- Charity Oga Omenka, Assistant professor, School of Public Health Sciences/Faculty of Health, University of Waterloo: https://www.mcgill.ca/tb/charity-oga-omenka
- Giorgia Sulis, Assistant professor, School of Epidemiology and Public Health, University of Ottawa: https://www.mcgill.ca/tb/giorgia-sulis

New Associate member (1)

Rovina Ruslami, Professor of Pharmacology Faculty of Medicine, Universitas Padjadjaran (UNPAD), Bandung, Indonesia: https://www.mcgill.ca/tb/investigators/associate-members

New CAB members (5)

- Priya Amin (Canada): Educator, TB advocate for children and youth
- Tenzin Kunor (USA): TB advocate, Case manager/Dean of student at University of Wisconsin
- Handaa Rea (Mongolia): Public speaker, Writer – published the book "A Stigmatized Mongolian girl's journey from stigma and illness to empowerment
- Zolelwa Sifumba (South Africa): HBNU Fogarty Global Health Fellow, Clinical Research Fellow, Companion to the healer, Medical Doctor, Global health advocate
- Nandita Venkatesan (India): Data journalist – Mint, Policy advocate, studying public policy at University of Oxford

https://www.mcgill.ca/tb/investigators/international-community-advisory-board

9. If applicable, **list members who have left the Unit** in the past 12 months
(indicate: Name, title, full/associate member, affiliation): NA.

Financial report & forecast

Expenses	2022/23 report	2023/24 budget
Total salaries	41,658.41	43,000
Training		2,300
Stipends		6,000
Outreach – TB research day	998.63	4,000
Publications	3,700	4,200
Other **(Licence)** (detail in #10 below)	513.75	500
Total expenses	46,870.79$	60,000$

Revenues	2022/23 report	2023/24 budget
Carryover		3,129.21
FMHS	50,000	60,000
User fees	0	0
Other sources (detail in #10 below)	0	0
Total revenues	50,000$	63,129.21$

10. Budget justification and details (e.g., itemize if multiple salaries, detail other sources of funding):

Justification for Budget requested for 2023-2024 from FMHS:

Salaries: $43,000

- The majority of salary requested is for the **MTBC Manager** whose main responsibilities are the oversight and administration of the MTBC/WHO CC (this position is also supported by funds from the RI-MUHC), the implementation of the MTBC/WHO CC Strategic Plan for 2022-2025, the development of new collaborations and partnerships, the coordination of the activities − Annual TB Research Day, TB Seminars and Executive committee meetings − the financial management of all the expenses related to MTBC accounts, the branding of the TB Centre and the daily communications.
  For the 2023-2024 year, we plan on expanding the activities of the MTBC through the implementation of the Strategic plan. Action plans will be developed for each priority and the development of specific activities will require a Manager salary support of **$40,000** (expansion of contracts with universities in LMICs, fostering interdisciplinary projects, writing grants, development of training courses, networking, writing policy briefs to Health Canada/Global Affairs Canada, etc.). Although the MTBC receives financing from other sources, salary support is frequently overlooked for these kinds

of development efforts, emphasizing the vital need of the FMHS funding. An increase in salary from the FMHS would allow us extend MTBC's activities and projects, recruit a manager on an almost full-time basis, and strengthen our strategic positioning in Canada and globally.

- A part-time **Clerical Assistant** salary support of **$3,000** is also needed – their primary responsibilities would involve maintaining the MTBC website, preparing and promoting the MTBC Newsletter and updating the list of members.

Training: $2,300

In line with our Strategic plan, we plan to strengthen capacity building activities for trainees from Canada and LMICs as well as Indigenous communities:

- **Travel awards to research trainees** for Graduate students and Postdoctoral fellows from LMICs and Indigenous communities (we did not receive co-sponsorship from McGill GHP in 2022-2023) to defray the costs for participating in new MTBC courses/trainings (registration fees and travel expenses):
  - **A new interdisciplinary course on TB research for research trainees at McGill**
    The MTBC will identify the main topics to cover (primary data collection, field studies diagnostic studies, basic studies, training on leadership skills, grant writing courses., etc.) and develop the training material. Accreditation process should also be completed.
  - **New training opportunities targeted to different groups in Canada (Indigenous academics and leaders) and globally (research trainees and National TB programs in LMICs)**
    The MTBC will identify the training needs and develop specific trainings (for Indigenous trainees: research methods and operational research/for National TB programs: implementation research and capacity-building for delivery). The development of fully on-line courses and/or on-line (asynchronized) research training courses will also require simultaneous interpretation and a translation budget.

Stipends: $6,000

- **Community Advisory Board members** will receive compensation and recognition for their patient involvement/input into research design – **$3,000** for 4 online meetings/year x $150 x 5 participants.
- Guest lecturers and speakers will receive compensation – **$1,500** for speaking engagements in MTBC events, $500 x 3 participants – and for supporting travel expenses – **$1500**.
- **MOU implementation with REDE-TB:** student exchanges and sandwich programs for Brazilian and Canadian graduate students for Graduate and post-doc students' scholarships/sponsorships (co-sponsored with faculties and local institutions) will contribute to support multi-year funding for trainee positions from LMICs – **$0** –

Outreach: $4,000

- Organize the 11th Annual TB Research Day: **$1,000** for multimedias service and catering.
- MOU implementation with REDE-TB: organize a scientific conference in Rio with REDE-TB members and McGill investigators in May 2024 – **$3,000** for travels.
- Participate in series of meetings with the Public Health Agency of Canada, Health Canada and the Canadian Thoracic society to enhance access to TB drugs for Canadians – **$0** –

Publications: $4,200

During the Annual TB Research Day, multiple **prizes and awards** are given to students. They include poster prizes – **$1,200** – for the best oral presentation, as well as publication prizes for the Best Paper in Biomedical Research, Clinical Research and Health Outcomes Research – **$3,000**.

Other: $500

An amount of $500 will be used for materials and supplies.

Other Funding Sources

The MTBC plans on renewing its funding requests to the RI-MUHC (WHO CC). The RI-MUHC provides infrastructure support for the WHO Collaborating Centre (since November 17th, 2018), of the MTBC, to be used **toward research, knowledge translation ,and educational activities** that are integral parts of the Centre.

We continue to search for other sources of funding. Recently, we partnered with REDE-TB, university-basedTB program investigators in Brazil to apply for TB Reach funding, administered by STOP TB partnership, and we were awarded. We are exploring other funding sources for TB-related research activities (UNITAID, Global Affairs Canada, Indigenous Services Canada, International Development Research Centre, etc.). In a nutshell, we are planning to broaden our base of research income beyond that of traditional Canadian sources.

11. Explain why continued support from the FMHS is crucial to Unit (½ page max):

The FMHS funding is essential for building infrastructures needed to implement the MTBC/WHO CC Strategic plan for 2022-2025. The MTBC is at a critical juncture; in fact, over the last few years, we have formed a large group of investigators. However, the impact of the MTBC − within McGill, Quebec, Canada and globally − is not necessarily more than the individual investigators contributions. The goal is not to diminish the contributions made by these individuals, but to establish the MTBC as a leading research and training centre for TB in Canada and as the "go-to" institution for TB related issues, we feel our partnerships must be strengthened both locally and internationally. This can include fostering relationships with the Montreal Public Health Unit, organizing events with the Canadian Thoracic Society to disseminate the new Canadian TB standards, and submitting policy briefs to Health Canada to facilitate access to new TB treatments and diagnostics that are recommended in the Canadian TB standards but are currently unavailable in Canada. Additionally, formalizing partnerships with other significant TB networks is important. Médecins sans Frontières, Interactive Research and Development (IRD Pakistan) that is currently a highly successful multinational research NGO, and the Centre for Research Excellence at the University of Sydney, which is active in one of the six WHO regions, have all expressed a strong interest in doing so. We also intend to establish formal connections with several universities in developing countries with high TB burden. At present, several universities have expressed interest, so the next steps are to select, negotiate, and establish MOU and/or formal agreements. The infrastructure funding from the FMHS is crucial to this foundational work because establishing agreements, which involves initiating contact, developing relationships, holding meetings, and exchanging correspondence, takes a significant amount of time and resources that we believe are not possible with typical research funding, like that from CIHR.

12. Provide suggestions about how the Faculty could do better to support the Unit and research efforts in general (**no page limit but please be specific and unleash your creativity!**)

In order to support the Unit in implementing its Strategic plan, and to support the Units' research efforts in general, the FMHS could provide support for:

- The development of formal relationships with LMICs, especially universities (a central resource on how to achieve these from the FMHS could be needed).
- Fully on-line courses and assistance in accreditation by McGill notably for accreditation from McGill Continuing Professional Development Office, and technical support by a core IT group at McGill.
- The development of scholarships and research training programmed with PHAC.
- Expansion of Knowledge translation activities, as an activity part of research − this is an academic need − shared by all groups, and a new academic field. The FMFHS should develop academic expertise in this new field. Specific activities could include:
    - Advocating for scientific advances to be implemented in public health practices in Canada (Health Canada, Public Health Agency of Canada) and globally (WHO).
    - Write policy briefs to present research and recommendations to specific audiences. Informing Global Affairs Canada why Canada should invest in global health and TB programs, and informing CIHR why Canada should invest in global health and TB research?

Appendix A: Letter of predesignation

IN REPLY REFER TO: CAN-101

4 November 2022

Dr. Christopher Manfredi
Interim Principal and Vice-Chancellor
McGill University
Room 506, James Admin. Bldg.
845 Sherbrooke Street West
Montréal, Quebec, H3A 0G4
Canada

Dear Dr. Manfredi:

I would like to thank you for the valuable work carried out by your institution as a Pan American Health Organization/World Health Organization (PAHO/WHO) Collaborating Centre.

I am pleased to inform you that we have redesignated the McGill International Tuberculosis Centre, McGill University Health Centre, McGill University, as a PAHO/WHO Collaborating Centre for Tuberculosis Research, under WHO's reference number CAN-101. As previously agreed, Dr. Richard Menzies will act as Director of the Centre. Kindly inform us without delay if there is any change in the future.

This designation is effective for a period of four years, beginning on 17 November 2022, and will automatically end on 17 November 2026, unless a redesignation has been approved before that date. During the period of designation, either party may revoke the agreement at any time by giving three months advance notice in writing.

We wish to emphasize that institutions are expected to implement the attached terms of reference and work plan in a timely manner and with the highest possible standard of quality. Any issue that may affect the implementation of the work plan should be brought to the attention of the WHO responsible officer, Dr. Dennis Falzon, falzond@who.int.

For information on administrative matters, please visit: https://www.who.int/about/who-we-are/structure/collaborating-centres.

Further, please note that Centres must also comply with the *Terms and Conditions for WHO Collaborating Centres*. The PAHO/WHO name and emblem may only be used by a Centre as described in those terms and conditions.

./..

525 Twenty-third St., NW, Washington, DC 20037-2895 www.paho.org Tel.: 202.974.3000 Fax: 202.974.3663

Finally, institutions must complete a short online progress report form once a year. On the anniversary of the designation date, details will be sent to the e-mail address of the Head of the Centre specified in the designation form.

Again, I would like to express my gratitude for your past work and I look forward to a continued successful collaboration.

Yours sincerely,

Dr. Carissa F. Etienne
Director

Attachment

cc: Dr. Richard Menzies

MEMORANDUM OF UNDERSTANDING

BETWEEN

DR. DICK MENZIES, ON BEHALF OF THE MCGILL INTERNATIONAL TUBERCULOSIS CENTRE / WORLD HEALTH ORGANIZATION COLLABORATING CENTRE FOR TUBERCULOSIS RESEARCH

AND

THE RESEARCH INSTITUTE OF THE MCGILL UNIVERSITY HEALTH CENTRE ("RI-MUHC")

AND

REDE BRASILEIRA DE PESQUISAS EM TUBERCULOSE ("REDE-TB")

Each is hereinafter collectively referred to as "Parties" or individually as "Party".

This Memorandum Of Understanding ("Memorandum" or "MOU") is made and entered into, by and between the McGill International Tuberculosis Centre / World Health Organization Collaborating Centre for Tuberculosis Research (hereinafter referred to as "MTBC / WHO CC") affiliated with McGill University and the Research Institute of the McGill University Health Centre, represented by the Principal Investigator, Dr. Dick Menzies, RI-MUHC and REDE-TB and its subsidiaries (hereinafter collectively referred to as "REDE-TB"), represented by the President, Dr. Ethel Maciel, establishing the basis of cooperation between the MTBC / WHO CC and REDE-TB in accordance with the following clauses:

Whereas:

The MTBC / WHO CC and REDE-TB have common interests in carrying out and facilitating the development of innovative and interdisciplinary TB research projects (new drugs, new vaccines and new diagnostic tests), research implementation (new control strategies and tools), strengthening health systems (information health systems), integrated health service delivery programs (delivery of effective, safe, high-quality, and accessible health interventions to vulnerable groups – access to care), and technologies for health (digital health tools) for reducing TB incidence and mortality and improving universal health coverage.

Now Therefore the Parties Hereby Agree:

Clause One - Purpose of the Memorandum of Understanding

The purpose of the present Memorandum is to establish the terms and conditions under which the MTBC / WHO CC and REDE-TB shall provide mutual cooperation in their respective activities and exchange information and expertise towards conducting TB research, implementation research and integrated service delivery for, but not limited to, the prevention and control of TB; the management and prevention of TB; improving access to care and health technologies, as appropriate.

Clause Two - Interpretation of the Memorandum of Understanding

The present Memorandum shall be interpreted in accordance with the Constitution of the World Health Organization, opened for signature 22 July 1946, as amended, as well as in accordance with generally accepted principles of international law, and in the light of the general purpose that the present Memorandum is intended to serve.

Clause Three - Objectives and Description of the Technical Cooperation, and Joint Commitments of the Parties

The objective of the technical cooperation contemplated in the present Memorandum is to promote activities in fields that will enhance both institutions scientific, education and technical cooperation interests. These activities include, but need not be limited to the following:

a. *Research Projects, Implementation research and Service Delivery Programs*
The MTBC / WHO CC and REDE-TB may develop and implement joint TB research projects and service delivery programs for the control and prevention of TB and other topics of common interest. Common activities and work may include exchange of expertise and collaboration with professionals from the MTBC / WHO CC, REDE-TB and their respective networks, within the limits of budgets and the terms of specific projects. As an example, this could include research activities to better understand issues and problems causing major losses in the cascade of care and identifying local solutions, as well as knowledge translation activities. The WHO implementation Handbook for TB infection diagnosis could also serve as a reference for local action plans on TB prevention and control.

b. *Capacity building and Training*
This activity may involve trainees from either institution working for variable periods of time at the other institution or partner sites. Specific programs, including funding, would be determined on an individual basis for each trainee, according to the availability of funds, and faculty preceptors. As an example, this could include exchange programs for graduate and undergraduate students in Canada and / or in Brazil, including field work, research technics and data analysis, as well as courses attendance at McGill University or at the Brazilian universities affiliated with REDE-TB. Exchange programs with students will be specified by specific sub-agreements.

c. *Health Technology Development and Evaluation*
This activity may involve the exchange of technical expertise and the development of technologies for health research projects and service delivery programs. As an example, this could include the development, implementation and evaluation of an evidence-based program for introduction of new health technologies and clinical practices in local settings, such as digital health tools (mTST and computer aided diagnosis) to improve TB diagnostics and treatment. This could also include the validation of these new health technologies, before their commercialization in Brazil or in Canada and/or their implementation in the TB Control Programs.

d. *Exchange of Information, Related Materials and Inputs*
This activity may take the form of an exchange of open-source software, digital radiological images, other technological and process innovations, and of research information, where deemed appropriate and with prior written mutual agreement and approval.

Clause Four - Commitments of REDE-TB

REDE-TB will assist the MTBC / WHO CC in fulfilling the legal requirements imposed on the MTBC / WHO CC by donors for specific projects, including administrative matters for purposes of technical cooperation under the terms of the present Memorandum. Said assistance may include, but is not limited to, invitation letters, local administrative support for supplies and shipment, facilitation of financial transactions, fulfilling requirements of the MTBC / WHO CC's financial and audit reports, human resource recruitment, and so forth. Funding for such support activities and consequent undertaking of such activities will depend on resources available at the time under specific sub-agreements.

Clause Five - Commitments of the MTBC / WHO CC

The MTBC / WHO CC will assist REDE-TB in fulfilling the legal requirements imposed on REDE-TB by donors for specific projects, including administrative matters for purposes of technical cooperation under the terms of the present Memorandum. Said assistance may include, but is not limited to, invitation letters, local administrative support for supplies and shipment, facilitation of financial transactions, fulfilling requirements of REDE-TB's financial and audit reports, human resource recruitment, and so forth. Funding for such support activities and consequent undertaking of such activities will depend on resources available at the time and will be specified under specific sub-agreements.

Clause Six - Execution of the Technical Cooperation Program

It is understood that the responsibilities and obligations of each Party will be identified in specific project sub-agreements, which will be developed jointly by members of each Party and will be subject to the approval of the Principal Investigator of the MTBC / WHO CC, the lawful representative of the RI-MUHC and the President of REDE-TB. If the specific sub-agreement involves human subject research, ethical approval of the RI-MUHC and/or REDE-TB, and other recognized the MTBC / WHO CC of the collaborator or country will be mandatory.

Clause Seven - Financial Provisions

The MTBC / WHO CC may function as the primary financial administrator of activities if so designated by donors, helping to facilitate the MTBC / WHO CC and REDE-TB relationship. Likewise, REDE-TB may function as the primary financial administrator of activities if so designated by donors, helping to facilitate the REDE-TB and MTBC / WHO CC relationship. The financial support received by either Party should serve as needed to carry out specific projects arising from this Memorandum. The limitations of budget and restriction of activities will follow the guidelines of the funding Institution of each project. Supplies and equipment will be in accordance with stipulations of the donor agency's disposition. It is expressly agreed that the host Party accepting a guest employee from another Party assumes no financial responsibilities for that person's employment, compensation, travel costs, living accommodation or other expenses incident to the visit unless prior written approval of the Parties involved has been granted.

Clause Eight. – Publications, Intellectual Property

a. Publications – The MTBC / WHO CC as well as REDE-TB shall be entitled to publish, announce and otherwise make public the findings and results with no obligations to pay royalties of any kind. The publishing Party shall provide the other Parties with this proposed publication or presentation and the non-publishing Parties will have a period of time from receipt, to be defined in the sub-agreement, to review such proposed manuscripts. Each Party must always state the sources of such findings and results and acknowledge the contribution of others, where appropriate, in accordance with customary scientific standards. If either Party is provided with knowledge of grant proposals, technical information, intellectual property or other information identified in writing as confidential by another Party, such information shall be kept confidential unless otherwise agreed to in writing. No personally identifiable information from research subjects will be included in any publication(s) or presentation(s). Sub-agreements will be developed for specific projects.

b. Intellectual Property Rights - Each Party retains ownership and all rights, title and interest in its own know-how. None of the Parties shall be entitled to file unilateral applications or to unilaterally acquire any other intellectual property right directly or indirectly as a result of a joint project formed in terms of this MOU, unless the other Parties have given previous written permission to do so. If one of the Parties files patent applications, the other Parties shall have the right to be licensed to use the patent for research-purposes, training/teaching and/or commercial purposes, unless the Parties agree otherwise in writing. Sub-agreements will be developed for specific projects.

Clause Nine - Confidentiality

Each Party and its subsidiaries and related companies undertakes in favor of the others that:

- it shall keep in the strictest confidence any information, technical data, intellectual property, know-how, which has been and is disclosed to it by another Party and which is stated to be or by its nature to be confidential, including, but not limited

to, information relating to research protocols, data and results, publications, products, services, development, inventions, processes, designs, product specifications, plans, drawings, customers, pricing, business strategies, new business opportunities and ventures, agreements and other data or information whether of a financial, technical, labor related, medical, marketing, administrative, strategic or accounting nature ("Confidential Information");

- it shall not disclose the Confidential Information to any third party for any reason, benefit or purpose whatsoever without the prior written consent of the disclosing Party, other than in accordance with the terms and conditions of this MOU;

- it shall not use the Confidential Information, for its own or anyone's benefit, without the prior written consent of the disclosing Party;

- it shall obtain written measures from its officers and employees in form and content satisfactory to the disclosing Party, prior to disclosing any Confidential Information to such officers and employees, and that they agree to be bound by the terms and conditions of this MOU and will maintain the secrecy and confidentiality required by this MOU and that the recipient shall take all steps to enforce these assurances as and when necessary;

- it shall only disclose the Confidential Information to its responsible officers and employees and then only to those officers and employees to whom such disclosure is reasonably necessary and only to the extent that such disclosure is reasonably necessary; and the recipient warrants that none of its officers and employees to whom Confidential Information is disclosed will in turn disclose any of the Confidential Information to anyone else;

- if it is uncertain about whether any information is to be treated as confidential, it shall treat it as such until written confirmation is obtained from the disclosing Party; and

- it shall ensure that any owner, holding company, subsidiary company, or collaborating organization of the receiving Party, which may receive or have access to the Confidential Information on a need-to-know basis shall be made aware of and shall agree to be bound by the terms and conditions of this MOU.

The Parties agree and acknowledge that all Confidential Information disclosed by one Party to the others shall at all times remain the property of the disclosing Party and that such disclosure shall not confer on the other Parties any rights of any nature whatsoever in or to such Confidential Information.

Clause Ten - Logos, Images, Product or Project Information and Publications

Any use of logos, images, product or project information, or publications related to the technical cooperation under present Memorandum shall be agreed or prepared in joint consultation with due

credit to participating institutions and be subject to the review of the Principal Investigator of the MTBC / WHO CC and the President of REDE-TB.

Clause Eleven - Final Provisions

The present Memorandum shall enter into effect upon its last signature and be valid for a period of five (5) years. Renewal for another three-year period may be negotiated during the final year of the period of this MOU, if thought mutually desirable.

The present Memorandum shall be subject to the modifications by mutually written and signed agreement or amendment at any time by either Party. Revision of the present Memorandum shall not affect activities already in progress as of said date of agreement or amendment.

In Witness Thereof, the duly authorized representatives of the contracting Parties sign this Memorandum of Understanding in three originals of equal content and validity, on the dates indicated below.

MTBC / WHO CC

DocuSigned by:
Dick Menzies
E7DEF4704A6C46E...

Dr. Dick Menzies

Director

Title

8/8/2022

Date

REDE-TB

DocuSigned by:
Ethel Maciel
8C12702F1E0B45B...

Dr. Ethel Maciel

President

Title

8/10/2022

Date

RI-MUHC

DocuSigned by:
Gilbert Tordjman
7951830A66F248A...

Gilbert Tordjman, CPA

Chief Operating and Development Officer

Title

8/8/2022

Date

Appendix C: Recruitment plan for new investigators

McGill International TB Centre
Recruitment Planning
2022 Notes
Marcel Behr

At the time of writing, the MITC has 27 Full members (https://www.mcgill.ca/tb/investigators). Of these, 16 have a faculty appointment at McGill. Other primary and associate members are based elsewhere but are not considered for the purpose of this document, because we cannot recruit to other universities. That said, inviting members from other universities serves as a valuable mechanism to broaden our base, in Canada and abroad.

Of the 16 people Full Members with a McGill Primary appointment, the demographics are estimated from member CVs as follows: median age 57; 80 % men / 20% women (12:3); 8 PhD / 7 MD; 5 (33%) doing fundamental versus 10 (67%) Clin / Epi / Public Health research. From this, one can find strengths (numbers of primary members, breadth across research pillars, balanced PhD:MD ratio). And one can see areas for development. With no further recruitment, by the year 2030 the median age will be ~65 and the youngest member will be 50.

Priorities for recruitment need to be based on McGill principles of EDI, and to a) build new research programs, and b) ensure faculty renewal. Recruitment priorities also need to be based on the MITC priorities, elaborated after membership consultation in 2021.

MD recruitment: Most of the MDs are in the Department of Medicine, and many have benefited from the FRQ-based salary support programs, including the more recently developed Remuneration Recherche Program. It is expected that this recruitment avenue will remain attractive to DoM divisions, including Resp and ID, such that there will be opportunities to foster promising clinical fellows, encourage training through FRQ / CIHR / other fellowship opportunities, and recruit back to McGill. This said, I am unaware of anyone who has been identified as an MD recruit to the TB Centre in the coming 3 years. The most recent MD recruit is based at the CHUM. One area for potential future development is to increase our network around the Island of Montreal and throughout Quebec. Another possibility is to target a mid-career established investigator - who can be expected to help lead the MITC in new directions.

PhD recruitment: This appears to be a greater challenge. The Faculty of Medicine has a hiring freeze for tenure-track slots so a more promising avenue is through CAS hires, supported by funding from Foundations / alternative sources. If the DoM does not plan to hire PhD scientists, the most obvious routes are the School of Population and Global Health (SPGH) and the School of Biomedical Sciences (SBMS). In epidemiology / public health research, the priorities are implementation

science (operational research), qualitative research, and knowledge translation research; these are all areas that are now weak (we have no-one). In fundamental research, there is both need for faculty renewal and a need to identify a new Director of the CL3 labs, since this has been led by one person since 2005. The niche that has not to date been well developed is drug discovery, since we have ongoing research on molecular epidemiology, genetics, immunology and bacterial pathogenesis. Diagnostics research could also be accommodated, including biomarker development / validation. A niche that has not been fully developed is translational research (bench to bedside). While this could be a PhD interacting with the clinical colleagues, it might be preferable for this to recruit an MD (previous paragraph) with broad training and a strong clinical base.

Summary points:

- We have strength and breadth across research domains
- We are relatively old with no planned recruits, as of now
- We should encourage MD / Clinician Scientists interested in TB and explore CAS recruits through SPGH and SBMS

Appendix D: Joint TB Seminar

Centre international de TB McGill | McGill International TB Centre

A PAHO/WHO Collaborating Centre for Tuberculosis Research

McGill | GLOBAL HEALTH PROGRAMS | PROGRAMMES DE SANTÉ MONDIALE

Wednesday, January 25th, 2023 | 11:30am-12:30pm

Lessons from our journey in clinical medicine and public health in India

Please register! Free pizza and samosas for those attending in-person

Hybrid event
In-person location: School of Population and Global Health, 2001 McGill College Avenue, Room 1140
Zoom link: to be sent to those registered

We will cover our journey in clinical medicine and public health in India, across the areas of service provision, research, and advocacy in the presentation. This will include the transformative experience of co-founding a rural health programme and a low-cost rural hospital in a district in India. Our research agenda emerged from the felt-needs of patients and communities and shaped our observational and interventional research in tuberculosis, nutrition and acute infectious diseases, and have resulted in policy developments at the national level. Our advocacy has been in the areas of access to affordable medicines, comprehensive patient-centred care in TB, and the critical role of nutrition across the life span. We will summarize the lessons, both the learnings and the un-learnings, of this journey.

Anurag Bhargava is currently a Professor in the Department of Internal Medicine at Yenepoya Medical College, Mangalore and also associated with the Center for Nutrition Studies, Yenepoya University. He has worked on the interface of clinical medicine and public health in diverse settings across India, including as a rural physician for 10 years. He serves on advisory committees for organisations like the National TB Elimination Programme, WHO SEAR, WHO Geneva. He too has been involved in the RATIONS trial for the past 3 years.

Madhavi Bhargava is currently an Associate Professor in the Department of Community Medicine at the Yenepoya Medical College in Mangalore, and associated with the Center of Nutrition Studies, at Yenepoya University. Madhavi worked initially as a primary care physician and surgeon in rural central India for 10 years, and later trained in public health and research. She is passionate about teaching under-graduate and post graduate students. She has been involved in the large RATIONS trial of nutritional support to reduce TB incidence in India.

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Appendix E: TB Research Day program