



2021 ANNUAL REPORT OF THE

McGill Department of Medicine



Thriving despite wave after wave of COVID



McGill



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I. Message from the Chair of Medicine

Dr. Marc Rodger



- What a treat it is to work every day with world-class scientists, teachers, providers, leaders, advocates and just plain world-class people. I hope you enjoy reading these pages and getting to know our DOM colleagues/crew as much as I have as we finalized our 2021 Annual Report. These pages are meant, in part and in whole, to be a historical record, a celebration of achievement and an introduction/re-introduction to our great Department.

I write these words overlooking the historical Lachine canal and Atwater market with Mont-Royal and the Montreal city scape as vibrant background. Christine and I are settling into Montreal nicely and are grateful for the warm welcome (despite COVID and its many

pleasures). Post-COVID (ish) we are finally able to enjoy the lively, cosmopolitan, and multi-cultural Montreal life I recall from my days growing up on the west-island and university life at McGill (if only my beloved Expos were still around...). I feel, and we should all feel, privileged to work at McGill and live in a great country like Canada, la Belle Province and la ville de Montreal. As Chair I get to meet many bright people who are considering positions within our DOM family, like I did 3 years back, and am struck by our shared experience of the drawing power of the rich history, reputation, and excellence of McGill in addition to the pull of the Montreal life and vibe.

Language/culture/identity/minority rights/indigenous rights are points of present-day tensions flaring just as we are just getting back on our feet after a grueling struggle with COVID. These local tensions are not helping us compete for the scarce health/academic work force faced with an unprecedented attrition in North America (aka the Great Resignation). Those who remain are exhausted but continue to pursue a Hero's journey in providing high quality care, advancing care through fundamental/translational/clinical/quality science and teaching our desperately needed next generation of healers and scientists. A testament to resilience, but also emphasizing the need to focus on our individual/collective wellness.

I hope you get the time to take a breath, enjoy a hot beverage and settle in to read/review our Annual Report. I'm sure you will be inspired, have a few "I did not know that" moments and create new connections. Enjoy!

—
Profile photo taken by Owen Egan

II.

Message from the Associate Chair of Medicine

Dr. Ernesto L. Schiffrin



- As we look back on 2021, it is evident that the year did not turn out as we expected. The pandemic was not behind us, but persisted ahead with repeated waves and new variants. The number of patients who fell sick with COVID-19, especially as Omicron hit in late November and early December 2021, was actually greater than in previous waves of the pandemic due to the transmissibility and immune evasiveness of the new variants and subvariants. This occurred despite the “miracle” of multiple doses of vaccines that were administered to most of the adult population in Quebec and Canada.

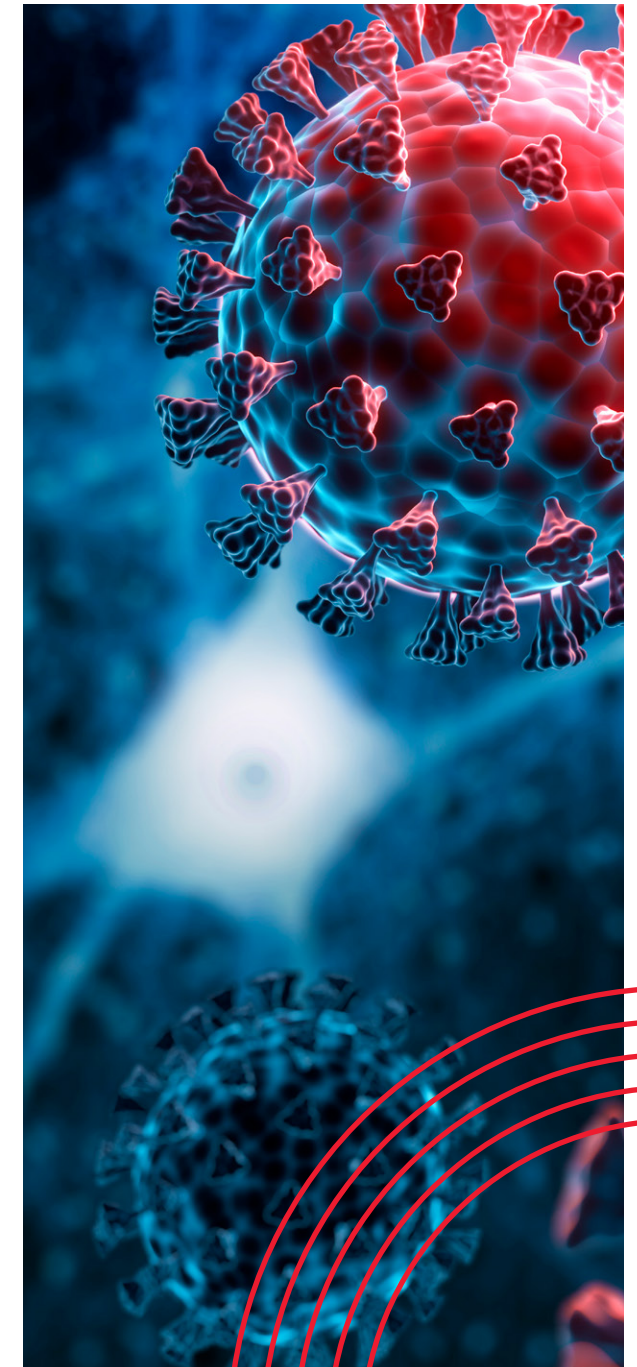
Fortunately, the variants seemed to produce less severe disease, in part, or perhaps mainly, thanks to vaccination and availability of antiviral medications that reduced the severity of COVID-19, but unfortunately did not impede infection in many cases of fully vaccinated individuals. So at least we did not have to go all year through the same effort to recruit volunteers to staff COVID wards, and their number was progressively reduced till now we do not need them anymore, and most COVID-19 patients are incidental, discovered to be COVID positive on arrival to the hospital for some other disease. Maybe we are seeing the beginning of the end of the pandemic, although we most likely will have to learn to live with the SARS CoV-2 coronavirus, and keep being cautious for the foreseeable future. How this will affect the daily life in the hospital and elsewhere of the members of our Department remains still unclear. But we are returning to a new normal, as meetings in person start to take place, travel resumes, and wearing of masks at least out of the hospital is no longer mandated in most environments. We must thank all members of the Department across the McGill Health System for their devotion to excellent and safe patient care and superb teaching, as well as cutting edge research during the difficult two years, and soon more, of the COVID-19 pandemic. At the same time, we have to start getting ready for PASC, or Post-Acute Sequelae of SARS CoV-2 infection, also known as “long COVID”, as many patients, including many who did not require hospitalization for COVID-19, present with persistent symptoms of cough, dyspnea, brain fog, chronic fatigue, diabetes post COVID, cardiovascular disease or other manifestations of PASC. Both the MUHC and the JGH have been designated to develop clinics for PASC, and we cannot predict how many patients will require follow-up in these clinics, likely

many. However, this may become an opportunity not only for caring for these patients but also for clinical research, and development of guidelines for the follow-up of these individuals.

Beyond the pandemic and our usual daily very busy activities, we have been certainly occupied by the Royal College of Physicians and Surgeons of Canada accreditation of the McGill program in Internal Medicine that took place on the week of May 16, 2022. The effort of all, but very specially that of Dr. Ning-Zi Sun, as well as Dr. How and the site program directors for the Internal Medicine Residency program, and others including the Chief Residents, who participated in many meetings and small committees, preparing for the surveyors’ visit, and making sure that all the areas for improvement were indeed improved upon, has been quite extraordinary. We have a huge debt of gratitude to all who collaborated in making sure that we were in the best position possible to ensure the full accreditation of the Internal Medicine core program by the Royal College. Thanks to all those who participated in this hopefully successful huge effort.

In closing for this Annual Report, I wish to thank all and everyone across our McGill Health System for your dedication, resilience, patience, and courage throughout 2021, whether you were at Saint Mary’s, the MUHC or the JGH. All sites experienced similar pressures from COVID-19, patient volumes, need to accelerate hospitalized patient turnover, while maintaining the quality of the educational environment, and carrying out your research. Bravo!

—
Profile photo taken by Felipe Arguez



III.

Message from the Director of Specialized Medicine, St. Mary's Hospital

Dr. Bruce Campbell



- The McGill Department of Medicine has 40 active members at St. Mary's Hospital, well known for its excellent community-based patient care, and its busy clinical teaching services.

The sequelae of the global crisis had a significant impact on the hospital and its patients in 2021. Constant effort included the staffing of active covid units, the doubling of our critical care beds (in an emergency expansion of the post anaesthesia care unit), and adaptation to the constant threat of outbreaks.

Department members were involved in uncountable meetings, task forces, and unplanned work as they dealt with disruptions in patient care, work life, and teaching. In 2021 the roots of another looming

crisis were taking hold: this time in the human resource management of our allied health professions, which will have lasting impacts into 2022 and beyond.

Despite the unprecedented upheavals of 2021, which included some tragic nosocomial spread, there were noticeable successes. The vaccination program, new options for treatment, and creative bed management and staffing helped maintain morale. The Department was also able to return to a more robust teaching schedule with a focus on better clinical exposure for our junior learners.

The year was a reactive one, lurching from one challenge to another, but some work was done on foundations for future growth. There was a welcome milestone in Ministry approval of the planned St. Mary's major infrastructure project. The CEO's task force for the future of St. Mary's was launched with a series of crucial planning meetings coming in 2022.

The Department has enlarged, with new members starting, or engaged, in gastroenterology, hematology and oncology, pulmonology, geriatrics and general internal medicine. New contract options for our senior members have allowed better career planning and the Department can expand further in 2022 while benefitting from the guidance of emeritus colleagues who can stay on with a reduced workload.

Highlights of 2021 included awards for many staff members. Dr. Michael Stein received the Osler Teaching Award, chosen by the graduating medical school class of

2021. Dr. Mathieu Walker received the Dr. George Fraser Memorial Award for 2021, in recognition of his teaching, dedication to patient care, and efforts at improving cardiology at St-Mary's and the MUHC.

St. Mary's has needed to draw on its community spirit and its deep reserves of collegiality. Strong links with the McGill Department of Medicine have also been helpful in maintaining the quality of our efforts in clinical care, quality improvement and medical education. Some examples include the DOM Mentorship Program, which has proved invaluable to many early career members. The *Four Pillars* wellness workshops were well attended and plans for development of Schwartz rounds are being made. Access to McGill-wide *Grand Grand Rounds*, more robust roles for McGill Division Chiefs, and ongoing personal outreach by the McGill Chair and Associates will help maintain links, foster professional growth, and promote career advancement.

The McGill Department of Medicine is essential to maintaining, and building on, the strength of St. Mary's clinical and educational missions.



IV.

Message from the Associate Chair, Advancement

Dr. Alain Bitton



- As Associate Chair of Advancement for the Department of Medicine (DOM), my mandate is to promote the goal of excellence in Research, Education and Clinical care.

For the first year, we were successful in establishing the McGill DOM “**Rising Star**” program with support from the various McGill hospital foundations and the McGill University Advancement Office. The objective of this program is to cultivate the success

and productivity of our clinician scientists or medical educators “rising stars” by providing salary and operational funding. Supporting our next generation of scientists and academic leaders early in their careers will pave the way for a strong research, education and clinical foundation for our Department, our McGill hospitals and University. The first “Rising Star” award competition has been launched and will be awarded in 2022. Our goal in the coming year is to initiate additional “Rising Star” competitions and awards across the McGill-wide network.

The upcoming year will be challenging as we strive to regain and maintain our academic momentum as we deal with the prolonged pandemic. The aim in the next year will be to help operationalize the strategic goals and priorities of the DOM and its divisions. These aspirations include the creation and consolidation of innovative clinical programs, research activities and educational initiatives which all have the potential to be impactful. This can be achieved through collaboration and philanthropic support obtained from the various foundations across all the McGill-affiliated hospitals and the University.

—
Profile photo taken by Owen Egan

V.

Message from the Associate Chair, Education

Dr. Annabel Chen-Tournoux



- The importance of **community** to our well-being and sense of purpose became increasingly apparent as the pandemic stretched into its second year. With lifelong learning and teaching inextricably engrained in the culture of academic medicine and representing commonalities shared by all of us, it was natural to try to strengthen our sense of community through advancing the educational mission of the Department with physicians in all phases of their career.

In the virtual universe, we inaugurated the McGill-wide Department of Medicine “*Grand*” Grand Rounds, featuring thought leaders discussing topics of real-world importance to all of us, no matter our specialty. We had the opportunity to hear from Cindy Blackstock speaking on the ongoing efforts needed to ensure equal rights to health services for Indigenous individuals; Kaveh Shojania on re-orienting the research enterprise to prioritize true societal benefit; Yoshua Bengio on the applications of machine learning in diagnostics, therapeutics and healthcare systems; Jillian Horton on sharing our stories as a powerful way to achieve system change; and David Naylor on how Medicine has evolved over the centuries while certain tensions persist, such as the one between treating individuals and treating populations. We look forward to continuing this new tradition next year.

We also launched *HKAP-DOM*, modeled after the *Helen Karounis Agora Program* established in the Department of Pediatrics, to engage retired faculty members as honorary members of the Department who volunteer to teach and mentoring students,

residents and fellows, and faculty. We are fortunate to benefit from the wisdom and experience of an illustrious first group of fellows: Kenneth Flegel, Phil Gold, Ingrid Hings, Barry Posner, Andrew Szilagyi and Joan Zidulka.

We developed measures to increase recognition, including in the Annual Performance Review, of education-related activities, whether in the form of formal didactic teaching sessions or leadership, committee, and advising/coaching work undertaken for the undergraduate and postgraduate programs.

Priorities for the year to come will include working on multiple levels to increase our capacity to grow education “champions” and education leaders within our Department, in the spheres of administration, innovation, and medical education scholarship, and continuing to improve the clinical learning/working environment for all the members of our community.

—
Profile photo taken by Felipe Argaez

VI.

Message from the Associate Chair, Quality & Safety

Dr. Emily G. McDonald



- While the pandemic marched on... 2021 was yet another impressive year for advancing Quality Improvement and Patient Safety (QI/PS) in the Department of Medicine. I was proud to see the many projects that were implemented across our divisions and hospitals despite the challenges we faced day to day from COVID-19.

One inspiring project I'd like to highlight is an initiative to improve Anticoagulation Stewardship; this is a cool QI collaboration that is co-led by Dr. Maral Koolian (Division of General Internal Medicine) and Mr. Ryan Kerzner (Clinical Pharmacist) at the Jewish General Hospital. The DOM also supported a number of scholarly quality projects with funds awarded to Dr. Emilie Trinh (Division of Nephrology; Implementing QI in Dialysis), Dr. Michael Goldfarb (Division of Cardiology; Improving Communication at the Bedside), and Drs. Susan Bartlett and Sara Ahmed (Division of Clinical Epidemiology; Creating a Toolkit for QI Implementation). We held the 6th Annual High Value Medical Care symposium (in virtual format) and featured award-winning research abstracts

related to QI/PS from trainees that addressed a broad range of topics. Some examples of projects included the evidence for non-opioid post-operative pain management, the lack of cost-effectiveness for oseltamivir for reducing hospitalizations from influenza, and standardizing care across Canada for post renal transplant recipients. Members of the Department published scholarly QI works in high impact journals. Two prime examples include Dr. Stephane Beaudoin's (Division of Respiriology) Teachable Moment in *JAMA Internal Medicine* on the management of malignant pleural effusions, and Dr. Jonathan Afilalo's (Division of Cardiology) commentary on the clinical utility of frailty scales in cardiovascular outcomes research in the *Journal Circulation: Cardiovascular Quality and Outcomes*. I had the privilege of meeting with Division directors from the Department of Medicine to discuss how we will grow our network of academic and clinician quality improvers over the next five years. Hiring staff with formal training in QI/PS is a priority area for recruitment and will ensure we become leaders in patient safety in Canada. Division directors were supportive of this, and many had current or future plans to hire members with formal training in QI. Directors were interested to learn about the growing number of fantastic graduate training programs in QI that are available in North America and abroad, and to learn more about how QI training (much like training in research or teaching) is a highly viable academic career trajectory. Next year, I'm looking forward to the 7th annual High Value Medical Care symposium, hopefully in a hybrid format. I also look forward to meeting with new DOM hires who have trained in QI/PS, and with trainees and early career staff who want to learn more about QI training opportunities. Finally, I'm looking forward to furthering the conversation with academic leadership with respect to growing our QI workforce. As always, my virtual door is open to anyone who is interested in chatting about QI/PS. Until then, take good care of yourselves, so you can take good care of your patients.

—
Profile photo taken by Owen Egan

VII.

Message from the Associate Chair, Research

Dr. Susan R. Kahn



- Despite the challenges of an ongoing pandemic, 2021 was a fruitful year in terms of the DOM's research mission and productivity - many examples are spotlighted in this Annual Report. In my role to help nurture and grow research excellence in our department, there were several notable developments in the past year.

In Spring 2021, we conducted a first ever survey of our 80 DOM PhD faculty to better understand and meet their needs and find ways to increase integration and a sense of affiliation of PhD researchers within DOM Divisions. The results of this survey have directly led to appointing two PhD faculty representatives to Council (Drs. Momar Ndao and Nitika Pai), and approval by Council of a plan and process to appoint all PhD faculty members to DOM divisions (to roll out in 2022).

Attesting to the high academic rigor of our DOM researchers, we had excellent results in the 2021-2022 FRQ-S competition, with 11 new career awards for a success rate of 61%, which exceeded success rates at McGill at large and "rest of Quebec".

In the fall, we held the 2021 Annual Research Symposium, with keynote speakers Dr. David Kass (Lucian awardee), Dr. Rhian Touyz and Dr. Stephen Robbins, additional excellent speakers representing the various sites and divisions of the DOM, and a special session to showcase our early career researchers. Although the Symposium was held virtually once again, attendance was high, and we received excellent feedback on the quality of our speakers and its content.

The Provostial Tenure Track position awarded to the DOM on racial disparities in chronic disease prevention, management and prognosis was posted in late 2021 and the search committee's work to select an outstanding candidate is now underway. A Working Group to develop a proposal for a Trials Innovation Platform at McGill to support researchers leading clinical trials and innovate in clinical trials methodology is in progress - we expect further advancement on this important dossier in 2022.

In advancing these and other projects, I have been grateful for the support of the DOM Research Advisory Committee, the DOM Executive, Dr. Marc Rodger, and our top-notch administrative team. I am amazed at the ingenuity, creativity, perseverance, and overall excellence of our researchers, and take great pride in our collective scientific accomplishments.

—
Profile photo taken by Felipe Argaez

VIII.

Message from the Associate Chair, Wellness

Dr. Natalie Dayan

- Recently, threats of the “Great Resignation” in healthcare prompted the Canadian Medical Association in partnership with the Canadian Nursing Association and the College of Family Physicians of Canada to put forth policy recommendations to the house of commons, focused on physician **retention incentives**; improving the **administrative burden** of health care workers; **primary care integration**; scaling of **virtual care**; among others. While it will take time for recommendations to translate into real change at home and in our daily practices, it is helpful to know that our collective concerns are being heard at the national level.



So what should individual institutions do to support faculty in the meantime? The Association of Faculties of Medicine (AFMC) Wellness Working Group, established in 2019, recently released a document outlining wellness recommendations for Faculties, setting a benchmark for Canadian institutions. Of the 10 key recommendations, we (the McGill DOM together with Faculty of Medicine and Health Sciences) have already successfully implemented several: the establishment

of formal mentorship programs, developing leadership in wellness, addressing mistreatment, and facilitating cross-site collaborations. Areas deserving focus in the coming years include wellness research; support for learners and faculty during key career or personal transitions; and tracking outcomes and reporting on wellness metrics such as physician engagement and professional fulfilment. Of course, the devil is in the implementation. I will sit on the newly formed national Okanagan charter working group as McGill representative, focused on implementation of AFMC recommendations, and hope to report next year on concrete action plans and deliverables. I will need your input to best inform these plans, so expect some “Taking the Pulse” surveys.

As I look back on the past year, the most significant “wellness” achievement is the establishment and growth of the software-enabled, DOM formal mentorship program – a testament to the commitment and support of the DOM Mentorship working group (**thank you** Drs. Chen-Tournoux, Elizov, Kahn, Smith, and Malhamé, and Bhinesha Seetaram). We have trained and recruited mentors with diverse backgrounds and academic careers, resulting in > 30 mentor-mentee “matches” thereby ensuring mentorship for all newly appointed



faculty. The program is now accredited for section 3 MOC. Mentees have expressed gratitude for the program. Similarly, mentors have found satisfaction in getting to know new colleagues and helping them transition to their academic practice. We have begun streamlining the process of recruiting new faculty into the program, and continually seek feedback to refine and improve the experience.

Looking ahead to the coming academic year, we will be launching DOM-wide **Schwartz Rounds®** (www.theschwartzcenter.org) that will take place across all McGill DOM affiliated sites, offering an opportunity to connect, debrief, and discuss the practical challenges we face in our working environments.

Looking back and looking ahead as part of an annual reflection has helped to solidify purpose and meaning in this role. Ultimately, I am hopeful that each incremental improvement will result in a sustainable environment for all of us so that we may continue serving our community to the best of our abilities.

Profile photo taken by Owen Egan

IX.

Message from the Associate Director, Administration

Teresa Alper



- Well-functioning teams have a positive impact on the stability of complex organizations. And a strong bond of collegiality within groups helps to sustain them in good times, and as they traverse many a storm.

The past two + years have put the resiliency of teams, in every sphere of activity, to the test. As we all struggled through the pandemic, the extraordinary devotion of clinical and teaching faculty to their respective vocations, was a beacon of hope.

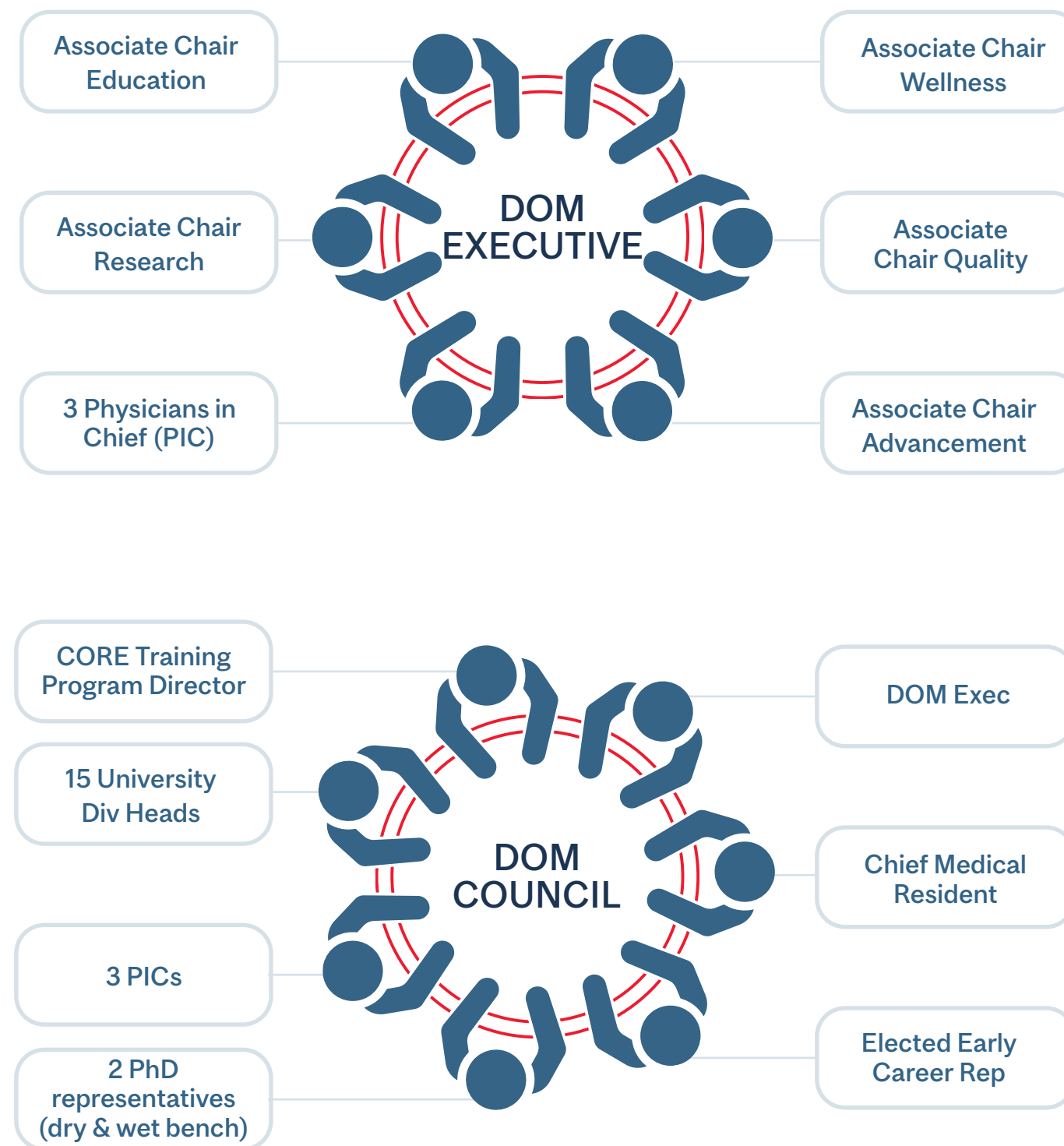
And, as team lead, my privilege was to bear witness to the exemplary level of commitment of the non-academic staff - university and hospital employees alike - who worked hard during the pandemic and continue to provide unwavering support to 1,000+ faculty members, dozens of postdocs, and hundreds of trainees in the Department of Medicine family.

To all, I offer my sincerest gratitude and wishes for good health, fulfillment and peace.

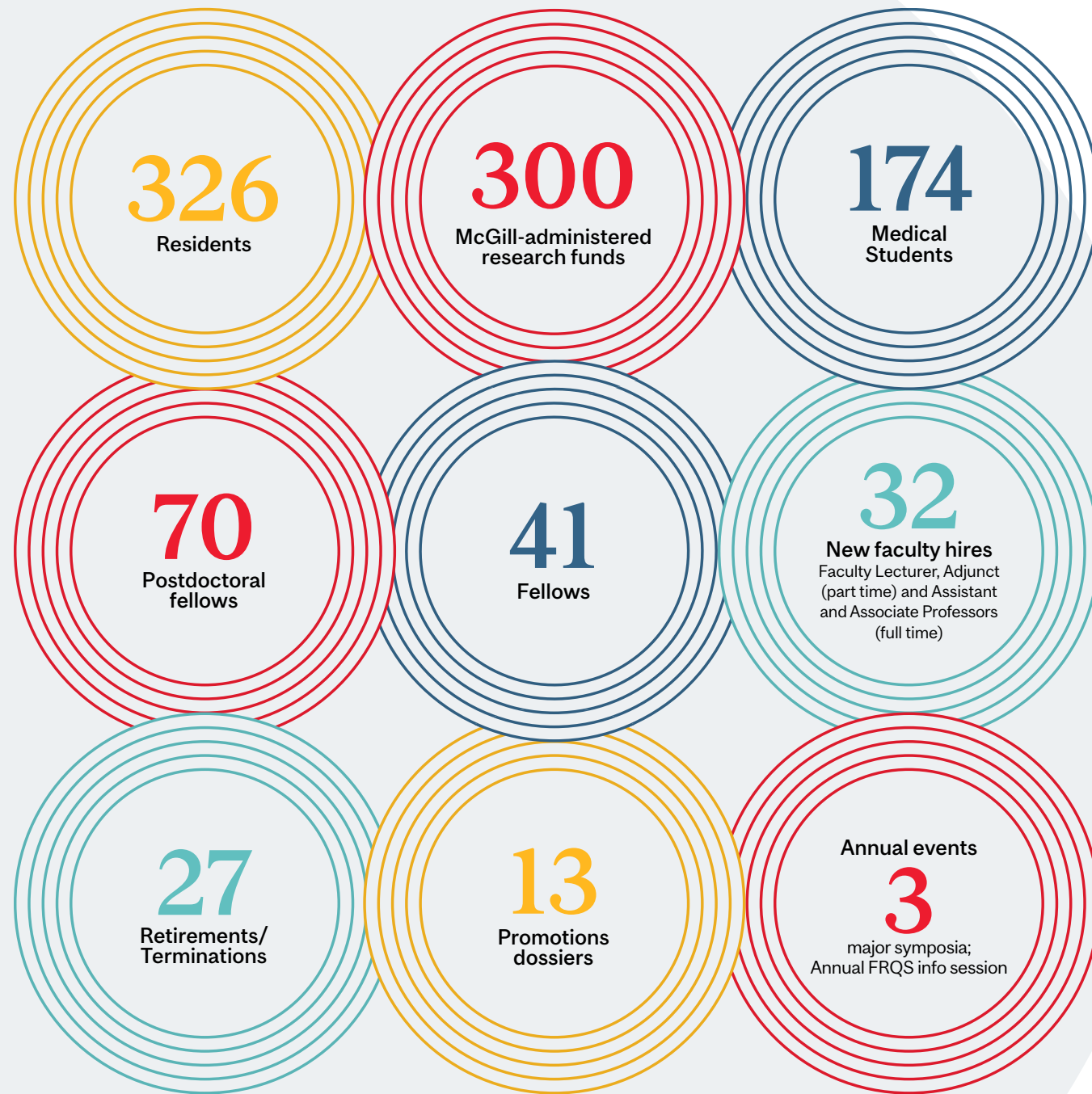
Profile photo taken by Owen Egan

X.

McGill DOM Governance



The number of “transactions” is significant and, in a given year, departmental administrative staff process and monitor the following (partial list):



- Once again, the administrative teams proved their resilience and professionalism in managing remote activities for our learners.

We said farewell to two Student Affairs colleagues who retired in 2021:

- Jay Bhat provided many years of excellent support to the Undergraduate Medical Education team.
- Maureen Dowd served as Program Administrator for the Core Internal Medicine Residency Training Program.

We send them both our thanks and best wishes.





XI. Top 30 H-indices for Full Time Faculty Members Holding Primary Appointments in DOM

- Below we use the H index metric as one measure of academic success of our members. The index is based on the set of the scientist's most cited papers and the number of citations that they have received in other publications. "The **h-index** is an author-level metric that measures both the productivity and citation impact of the publications of a scientist or scholar. The *h-index* correlates with obvious success indicators such as winning the Nobel Prize, being accepted for research fellowships and holding positions at top universities."^[1]

We obtain our H-index report from SciVal – a research analysis tool now being used at McGill – and the SciVal results are considered to be more 'conservative' as those gleaned from Google Scholar, for example, since the latter also includes non peer-reviewed articles and publications. As a result, the H-index from SciVal will be lower than the Google Scholar H-index.

Ref (1) Bornmann, Lutz; Daniel, Hans-Dieter (July 2007). "What do we know about the h-index?". *Journal of the American Society for Information Science and Technology*. **58** (9): 1381–1385. doi:10.1002/asi.20609.

*Includes faculty with joint appointments to another McGill department, but primary in Medicine.

Top 30 H-indices - 2021

Name	H-Index	Name	H-Index	Name	H-Index
Touyz, Rhian M.	110	Behr, Marcel A.	57	Karaplis, Andrew C.	45
Schiffrin, Ernesto L.	102	Richard, Stéphane	56	Yale, Jean François	44
Foulkes, William David	96	Olivier, Martin	53	Therrien, Judith	44
Menzies, Richard I.	76	Mayo, Nancy E.	52	Marelli, Ariane J.	44
Kahn, Susan R.	76	Bates, Jason H.T.	52	Fitzcharles, Mary Ann	44
Goltzman, David	74	Baron, Murray	52	Filion, Kristian B.	44
Muller, William J.	73	Tamblyn, Robyn M.	51	Dewar, Ken	44
Barkun, Alan N.G.	70	Dendukuri, Nandini	51	Tonin, Patricia N.	43
Rodger, Marc Alan	67	Bitton, Alain M.	51	Olivenstein, Ron	43
Eisenberg, Mark Jeffrey	65	Verma, Atul	50	Schwartzman, Kevin J.	42
Pilote, Louise	64	Petrof, Basil J.	50	Grover, Steven A.	42
Bourbeau, Jean C.	64	Benedetti, Andrea L.	50	Tellier, Raymond	41
Sladek, Robert	62	Bartlett, Susan J.	50	Schurr, Erwin	41
Lakatos, Péter László	62	Wolfson, Christina M.	49	Sasseville, Denis A.	41
Goldberg, Mark S.	62	Hutchinson, Tom A.	49	Alaoui-Jamali,	
Yang, Xiangjiao	60	Hussain, Sabah N.A.	49	Moulay Abdellah	41
Piazza, Nicoló	60	Daskalopoulou, Stella S.	48	Weiss, Karl A.	40
Beauchet, Olivier	60	Brophy, James M.	48	Rabbani, Shafaat Ahmed	40
Routy, Jean Pierre G.	59	Rahme, Elham	47	Johnson, Nathalie A.	40
Bernatsky, Sasha R.	59	Siegel, Peter Michael	46	Hudson, Marie Anne R.	40
Sniderman, Allan David	58	Ward, Brian James	45	Engert, James C.	40
Martin, James G.	57	Sheppard, Donald C.	45		
		Morais, José A.	45		

Spotlight on Early Career faculty's research impact

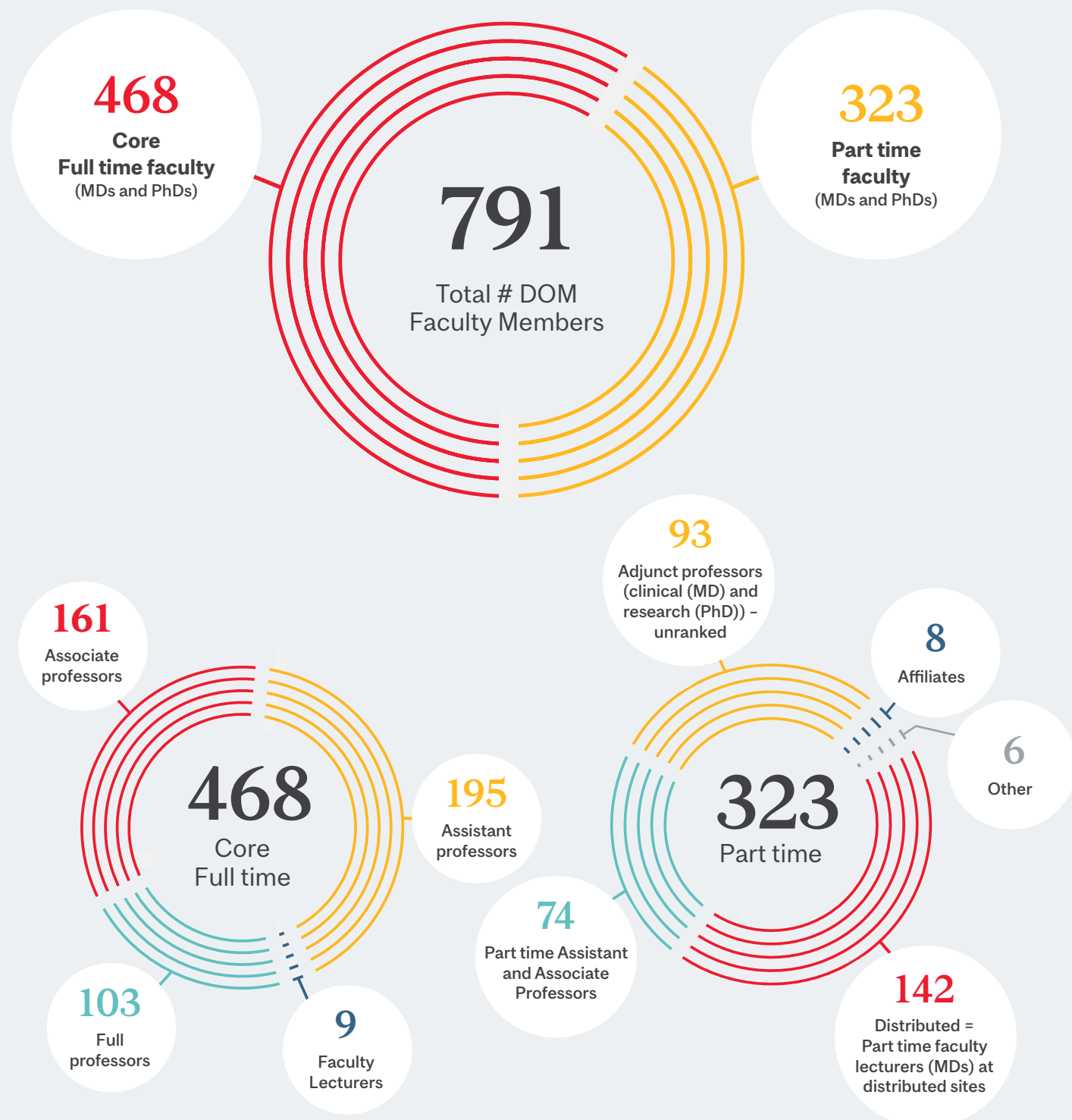
As the H-index increases with years of active publication, we thought it would be of interest to highlight the top 10 H-indices among our recent Early Career faculty (defined for this analysis as hired (whether full-time or part-time) since 2016 and age < 40):

Name	H-Index	Name	H-Index
Cheng, Matthew P.	22	Joza, Jacqueline	12
Liberman, Daniel	21	Lefrançois, Philippe	11
Netchiporouk, Elena	21	Peters, Tricia M.	11
Launay, Cyrille Patrice	20	Messas, Nathan	9
Sharma, Abhinav	20	Sabatini, Paul V.	9
Douros, Antonios	17	Tardio, Natacha	9
Spaziano, Marco	17	Malhamé, Isabelle	8
Assayag, Deborah	14	Trinh, Emilie	8
Fonseca, Gregory J.	14		
Ding, Jun	13		
Goldfarb, Michael	12		

XII.

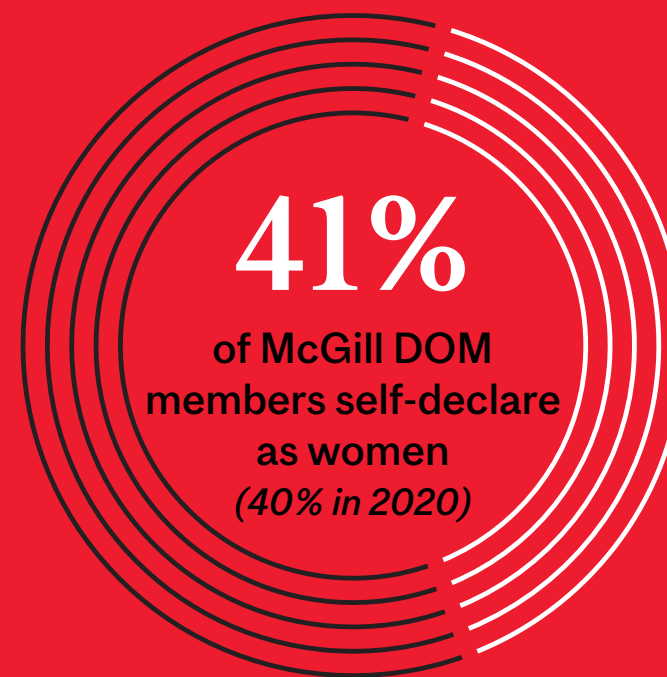
DOM by Numbers

- DOM is one of the largest departments at McGill. It is a vibrant, diverse and top performing unit, with members who pursue scholarly work that contributes to the advancement of knowledge across a vast spectrum of inquiry and who provide excellent clinical care across a vast swath of the Quebec territory.



Sex distribution

From a total of 691 part time AND full time ranked faculty (Assistant, Associate, Faculty Lecturer and Professor)



Women are

- 52%** are Faculty Lecturers (same proportion as in 2020)
- 57%** are Assistant Professors (up from 43% in 2020)
- 42%** are Associate Professors (up from 34% in 2020)
- 25%** are Full Professors (24% in 2020)

Women in DOM leadership positions:

- 33%** MUHC Division Directors
- 14%** JGH Division Directors
- 27%** SMH Division Directors
- 67%** DOM Associate Chairs

Overall 35% (decrease from 2020)

DOM has been sponsoring leadership courses for full time faculty (through CMA) and we hope this will result in better representation of women in leadership positions in DOM.

Other opportunities to network and develop leadership experience exist - as of July 2022, the Montreal chapter of the Federation of Medical Women of Canada (FMWC) did not have a representative - it could be you!!

fmwc.ca/about-us/local-branches/#III



XIII.

New Full-Time Faculty Appointments (2021)

- Dr. Elie Akl
Cardiology
- Dr. David Bélanger
General Internal Medicine
- Dr. Teresa Cafaro
General Internal Medicine
- Dr. Stéphanie-Kim Cérat
General Internal Medicine
- Dr. Jun Ding
Respiratory Diseases
- Dr. Claire Godard-Sebillotte
Geriatric Medicine
- Dr. Philippe Lefrançois
Dermatology
- Dr. Yidan Lu
Gastroenterology & Hepatology
- Dr. Natasha Nathoo
General Internal Medicine
- Dr. Daphnée Perron-Couture
General Internal Medicine
- Dr. Paul Sabatini
Endocrinology & Metabolism
- Dr. Sana Swaleh
Respiratory Diseases
- Dr. Stephen Tsoukas
Gastroenterology & Hepatology

XIV.

Promotions (Granted in 2021)

Full Professor Promotions

- Dr. Thierry Alcindor
- Dr. Paul Brassard
- Dr. Christina Greenaway

Associate Professor Promotions (Full time)

- Dr. Vicky Baffis
- Dr. Annabel Chen-Tournoux
- Dr. Natalie Dayan
- Dr. Elise Levinoff
- Dr. Shaifali Sandal
- Dr. Cedric Yansouni

Assistant Professor Promotions (Full time)

- Dr. Chantal Cassis



Education

- The DOM is responsible for 16 residency training programs and for the delivery of the internal medicine component of the undergraduate medical education curriculum.

We are grateful to our Education leaders for their role in the development of the next generation of McGill-trained health care providers, who supervise, guide and mentor approximately 170 medical students, 325 residents and 40 fellows each year.

And we are grateful to our Education leaders for their role in the development of the next generation of McGill-trained scientists, who teach and supervise approximately 300 graduate students each year.

Directors of Postgraduate Residency Training Programs (PGME)

Allergy & Immunology

- Dr. Michael Fein (current Acting)
- Dr. Natacha Tardio (term ended January 2022)

Cardiology - Co-Directors

- Dr. Negareh Mousavi, MUHC
- Dr. Maude Peretz-Larochelle, JGH

Core Internal Medicine (R1-R3)

- Dr. Ning-Zi Sun, Program Director
- Dr. Jonathan How, McGill Assistant Program Director
- Dr. Maxime Cormier, Glen Site Director
- Dr. Khue Ly, MGH Site Director
- Dr. Elise Levinoff, JGH Site Director

Critical Care (under the new Department of Critical Care as of November 2021)

- Dr. Dev Jayaraman

Dermatology

- Dr. Khue Nguyen

Endocrinology & Metabolism

- Dr. Vanessa Tardio
- Dr. Natasha Garfield (Acting from August 2021 to January 2022)

Gastroenterology

- Dr. Dean Soulellis

Geriatric Medicine

- Dr. Julia Chabot
- Dr. Dan Liberman, Assistant Program Director

Hematology

- Dr. Chantal Cassis

Medical Microbiology & Infectious Diseases

- Dr. Makeda Semret

General Internal Medicine (R4-R5)

- Dr. Patrick Willemot

Medical Biochemistry

- Dr. Brian Gilfix

Medical Genetics

- Dr. Laura Russell

Nephrology

- Dr. Catherine Weber

Respiratory Medicine

- Dr. Linda Ofiara

Rheumatology

- Dr. Elizabeth Hazel (term ended June 2021)
- Dr. Fares Kalache (as of July 2021)



Undergraduate Medical Education (UGME) Internal Medicine component

Chair, UGME Committee

- Dr. Nathalie Saad

Clerkship Course Director

- Dr. Nathalie Saad (term ended April 2021)
- Dr. Ratna Samanta (as of May 2021)

Clerkship Course Site Directors

- Dr. Tianyan Chen (Glen)
- Dr. Nathalie Saad (JGH, term ended June 2021)
- Dr. Jill Pancer (JGH - as of July 2021)
- Dr. Ratna Samanta (MGH)
- Dr. Les Meissner (SMH)
- Dr. Erica Rubin (Gatineau)

Transition to Clinical Practice (TCP) Course Director

- Dr. Nathalie Saad (term ended June 2021)
- Dr. Andrea Blotsky (as of July 2021)

TCP Course Site Directors

- Dr. Shaifali Sandal (Glen, term ended December 2021)
- Dr. Tianyan Chen (Glen, current Interim)
- Dr. Jason Agulnik (JGH, term ended July 2021)
- Dr. Lama Sakr (JGH, as of August 2021)
- Dr. Nan Zhao (JGH, Interim as of October 2021 while Dr. Sakr is on leave)
- Dr. David Shannon (MGH, term ended January 2022)
- Dr. Les Meissner (SMH)
- Dr. Moez Tajdin (Gatineau)

Graduate Studies Program (Experimental Medicine)

- Dr. Anne-Marie Lauzon, Graduate Program Director
- Dr. Elizabeth Fixman, Associate Program Director



XVI.

Strength in Numbers

*Profile of Marie Hudson
by Ashley Rabinovitch*

For Dr. Marie Hudson, collaboration holds the key to improving quality of life for patients with systemic autoimmune rheumatic diseases.

“There is an art to rheumatology,” says Dr. Marie Hudson. “For the most part, we don’t have diagnostic tests. Making the right diagnosis requires spending time with the patient and putting together the 5000-piece puzzle they throw at you.”

As an associate professor in the Department of Medicine at McGill University and the former associate director for clinical research at the Lady Davis Institute, Dr. Hudson is at the forefront of treating and researching rheumatic diseases, which affect not only the joints, but also the skin, muscles, lungs, and other organs.

Coming from a large family of scientists, it might have seemed like a foregone conclusion for her to pursue a career in medicine and research. But the Saguenay, Québec, native initially decided to take her career in a different direction. While her twin sister attended medical school, Dr. Hudson attended law school with the aim of practicing commercial law. “I ended up loving my studies but felt that actual practice was not for me,” she remembers. “By the time my sister was an internal medicine resident, I realized I should have taken that path.”

Changing course, Dr. Hudson enrolled in medical school. She intended to go into family medicine, but in the course of her studies, she realized two things: First, there was a budding scientist in her that wanted to combine clinical care and research to increase her impact. Second, she found her sister’s specialty, rheumatology, so fascinating that she decided to follow in her footsteps once again.

In an unlikely twist of fate, Dr. Hudson’s sister moved away from Montreal and transferred her practice to Dr. Hudson. “We are identical twins, and some patients didn’t even realize there was a change,” Dr. Hudson says. “They experienced excellent continuity of care!”

Shedding Light on Scleroderma

For the past 15 years, Dr. Hudson has conducted leading-edge clinical research in rheumatic diseases. In this time period, she has both witnessed and participated in remarkable advances in the treatments available for patients living with these diseases.

When she was a resident, there was only one biologic drug available to treat rheumatoid arthritis. When she entered practice in 2006, there were two. Today, there are dozens of biologics, not only for rheumatoid arthritis, but for many other rheumatic diseases. “New drugs have really expanded our ability to improve patient outcomes,” she says. “Without them, our patients would be chronically ill and develop significant complications. Now you wouldn’t even know that someone has a chronic rheumatic disease.”

While Dr. Hudson treats patients with a range of conditions, she has a specialty in scleroderma lung disease, a rare autoimmune disease characterized by inflammation and scarring of the skin and lungs. If left untreated, the build-up of scar tissue can lead to respiratory failure. She first encountered scleroderma while pursuing her rheumatology fellowship. “I met a lot of very sick patients with unmet needs in terms of understanding their disease,” she remembers. “If you can’t understand a disease, you can’t treat it.”

A naturally empathetic person, Dr. Hudson resolved to alleviate the suffering she witnessed in scleroderma patients through a life of research. But she knew she couldn’t do it alone. Most rheumatologists will only see a handful of scleroderma patients over the course of their career—not a useful sample size for research purposes. “Scleroderma is a heterogeneous disease, so you can study 20 patients, but the next 20 you line up will be different,” Dr. Hudson explains. While scleroderma usually presents in women in their 40s and 50s, it can range from so benign that it goes undetected for 40 years or more to so severe that someone can die months after diagnosis. Because of the many forms it can take, researchers need

to study hundreds or thousands of people in order to understand the disease.

While still a rheumatology fellow, Dr. Hudson co-founded the Canadian Scleroderma Research Group (CSRG), a CIHR-funded, multi-centre group of researchers from across Canada who track a combined 1700 scleroderma patients. Since then, she has published landmark studies that make sense of the data gathered from this larger group of patients, identifying the diverse presentation of scleroderma and, among other things, the benefits of early treatment.

In the absence of a cure for scleroderma, physicians turn to the next best thing: stem cell transplant. Several large international trials have demonstrated the positive impact of stem cell transplant on survival rates in patients with scleroderma. During a sabbatical, Dr. Hudson travelled to Paris to spend time with researchers who conducted those trials. Together, they decided to examine the quality of life of scleroderma patients undergoing stem cell transplant. “We realized it’s not enough just to survive,” she said. “We want our patients to feel and function better overall. This is what stem cell transplant can accomplish.”

While the overall impact of stem cell transplant on scleroderma patients is positive, stem cell transplant can be highly toxic. Dr. Hudson is now working on other types of cell therapies as an alternative treatment for scleroderma. She is currently conducting a Phase 1/2 trial of mesenchymal stromal cells and is optimistic that these, too, can improve the quality of life of her patients.

Casting A Wide Net

When she's not conducting scleroderma research, Dr. Hudson is engaged in a host of other research endeavours. One study she is running is geared toward understanding how immune checkpoint inhibitors that are used to treat cancer can actually trigger autoimmune diseases. For another study, she is working with a team of scientists to understand interstitial lung across rheumatic and other fibrotic lung diseases, including COVID-19.

Dr. Hudson has not tired of long hours of research over the years. If anything, she's only picked up steam. "I'm highly motivated by working in an academic institution where we don't just apply knowledge but create knowledge," she says. "My patients are always asking me questions that I use as an opportunity to take back to the bench and push the boundaries of knowledge. It's an exciting process to answer questions nobody else has ever answered."

At the same time, she recognizes that no one can answer research questions alone. She is quick to give credit to the dozens of trainees she has supervised and her colleagues across the globe for their contributions to the work of improving the lives of people living with rheumatic diseases. "When we put a man on the moon, we needed a whole lot of people with a wide range of skills," she reflects. "The same is true in science. We can't accomplish much by ourselves, but together we can discover lasting solutions to longstanding problems."

In the spirit of collaboration, Dr. Hudson stepped up to serve as co-director of the McGill Interdisciplinary Initiative in Infection and Immunity (MI4), a network of over 200 scientists across McGill engaged in a broad spectrum of infection and immunity research ranging from molecules to populations. Since its founding in 2018, MI4 has already raised over \$33M in funding for 130+ projects, many of which relate to the understanding and treatment of COVID-19. Once again, Dr. Hudson is quick to point at MI4's scientific and donor community as its greatest asset to tackle grand challenges and have lasting impact.



Like most clinician-scientists, her greatest day-to-day challenge is time. Between clinical work, research, and teaching, there are never enough hours in the day. On her longest, most tiring days, her patients keep her moving forward. "My commitment to my patients is what gets me out of bed in the morning," she says. "If my time can make a difference for them, then it is time well spent."

"We can't accomplish much by ourselves, but together we can discover lasting solutions to longstanding problems."

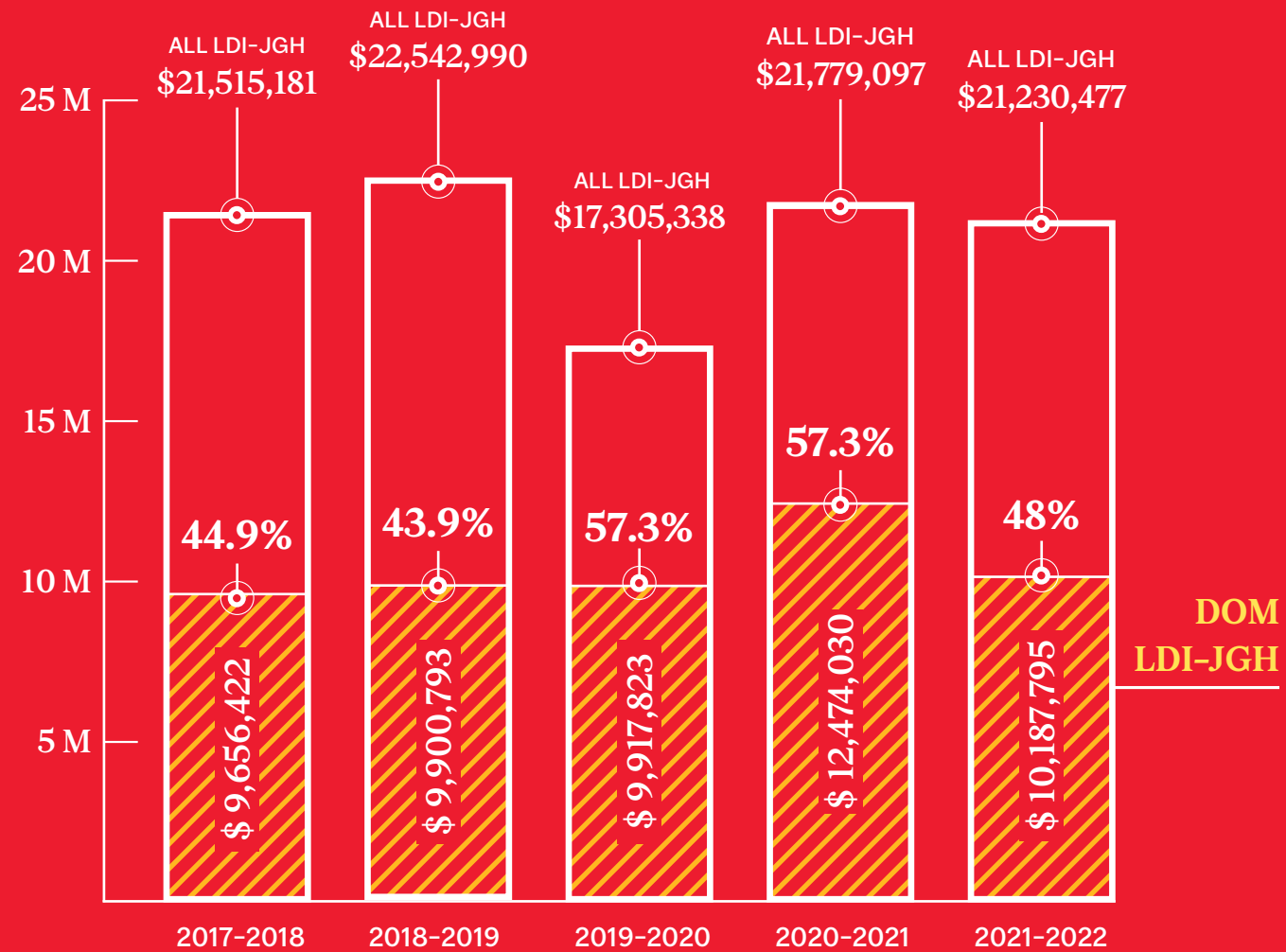
DR. MARIE HUDSON



XVII.

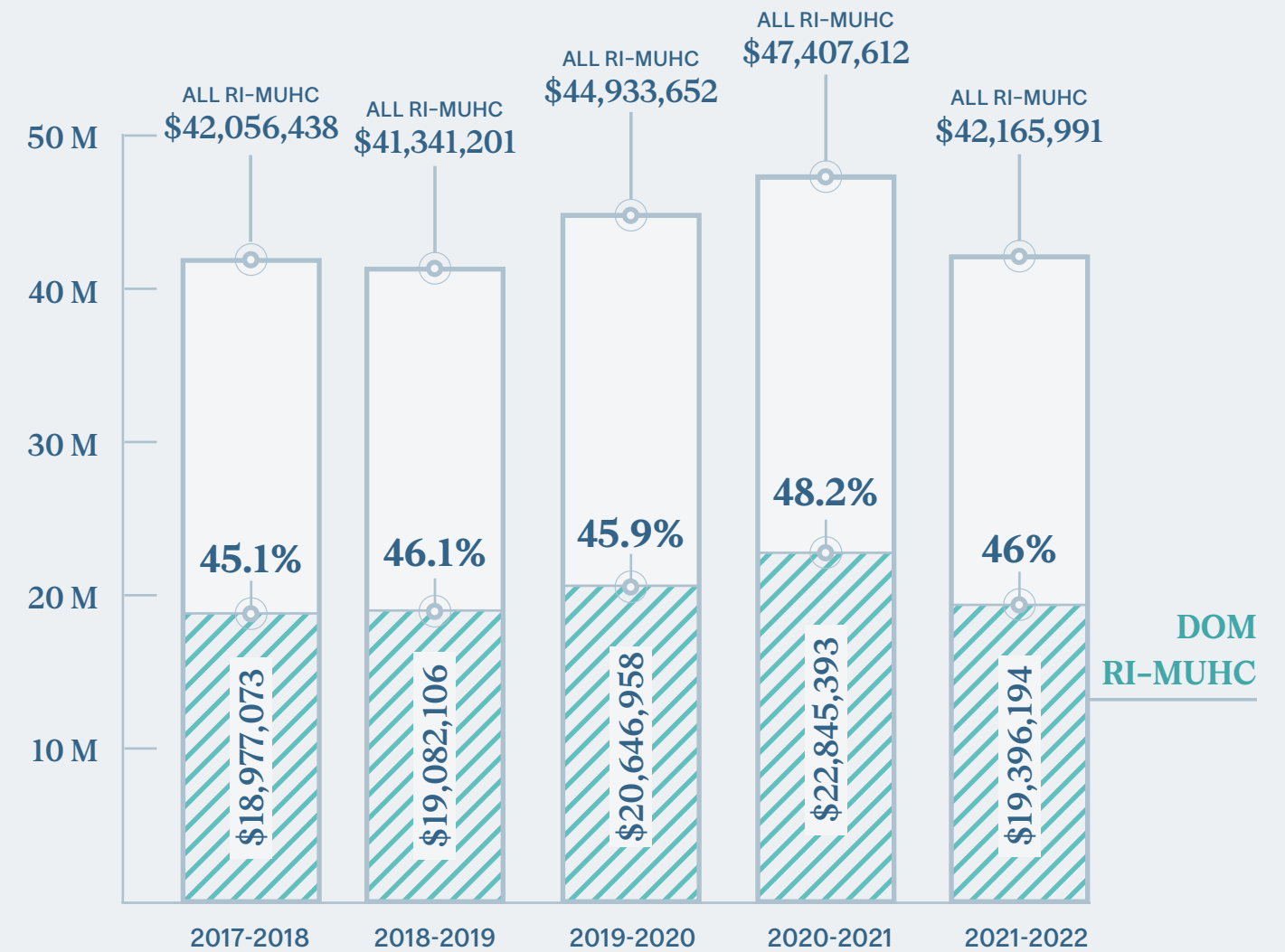
CIHR Operating Grants (Full time DOM members)

DOM punching above
our weight at the LDI-JGH



Reference period: LDI-JGH April 1-March 31

DOM punching above
our weight at the RI-MUHC



Reference period: RI-MUHC April 1-March 31

XVIII.

Year over year DOM FRQS Success

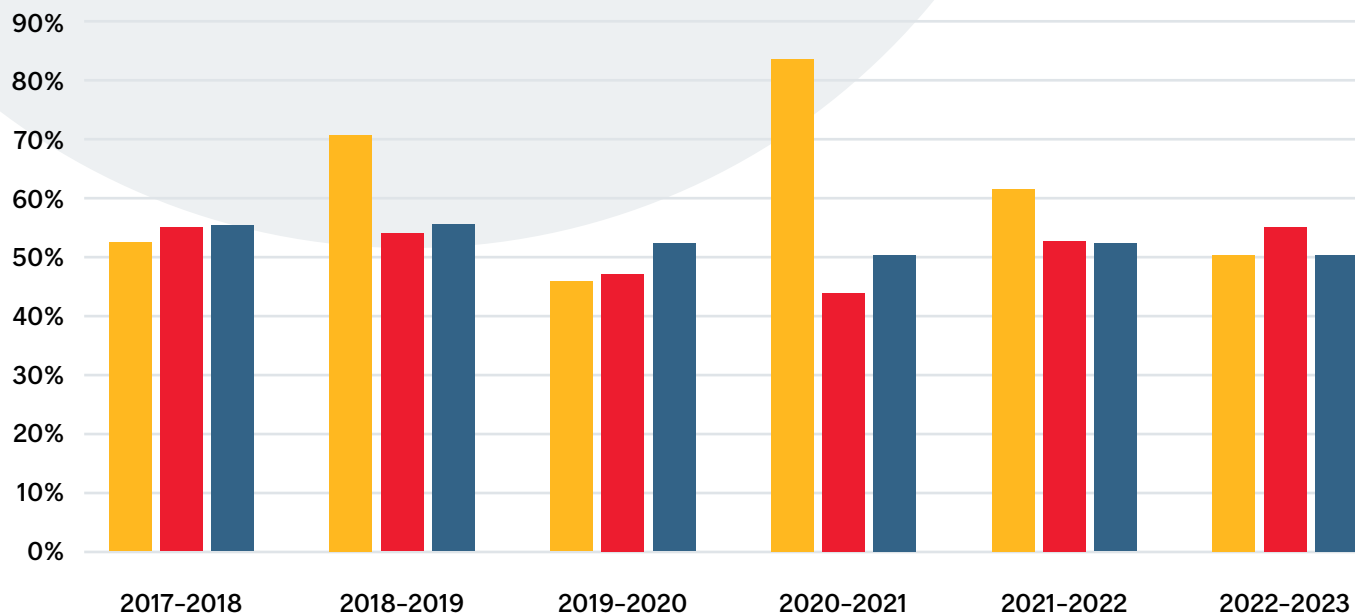
- DOM has a strong tradition of batting at or well above average in FRQS Scientist/Clinician Scientist applications when compared with the rest of McGill and the rest of the province.

There are many reasons for our success including that we recruit the best/brightest and we support them during the crucial early years of their careers. Of course, the benefits of this success are many

and include: 1) protecting our FRQS-funded scientists' time for research, which is a cornerstone of research productivity that reflects well collectively on the DOM and 2) FRQS-funded DOM members go "hors PEM" allowing us to recruit another faculty member (which leads to a net increase in clinical full time equivalents). We all win by ensuring/supporting/encouraging DOM FRQS success!

Also notable that the proportion of DOM's FRQS awards relative to the total number at McGill has remained stable at 23.8% since 2017-18 (not shown on the graph).

DOM performance *relative to McGill and relative to Quebec*



● DOM SUCCESS RATE
 ● MCGILL SUCCESS RATE
 ● QUEBEC SUCCESS RATE
 Source: Research Office, Faculty of Medicine and Health Sciences (Total DOM awards removed from McGill and Quebec totals, to show relative success)



XIX.

FRQS Salary Awards (Spring 2021)

- Congratulations to DOM members who were successful in obtaining salary awards for applications submitted in 2020!

What a sweep! 11 of Department of Medicine-appointed faculty received awards, for a success rate of 61%. These awards attest to the quality of the support our Department/institutional partners and to the excellence of the researchers and their research programs.

Chercheur Boursier de mérite

- Brent Richards

Chercheur Boursier Junior 2

- Ivan Litvinov

Chercheur Boursier Clinicien Senior

- Jonathan Afilalo
- Giada Sebastiani

Chercheur Boursier Clinicien Junior 2

- Faiz Ahmad Khan
- Cecilia Costiniuk
- Todd Lee

Chercheur Boursier Clinicien Junior 1

- Michael Goldfarb
- Isabelle Malhamé
- Thomas Mavrakanas
- Tricia Peters

DOM Events (2021)

- The Department organizes three major events each year (see below) and collaborates with the Research Office of the Faculty of Medicine and Health Sciences for an information session on submitting FRQS salary award applications. Despite yet another year affected by the ongoing COVID-19 pandemic, DOM faculty and staff
- organized two well-attended high quality events, again in the virtual format.

I. 2021 McGill Department of Medicine Research Symposium

The Annual Research Symposium was held in virtual format on November 9th, 10th and 11th, 2021 and attendance averaged 110 participants per day. The audience learned of current research led by members in the Department and benefitted from presentations by outstanding world-renowned keynote speakers.

Dr. Marc Rodger delivered the opening remarks and moderated the day one of the Symposium, introducing the first keynote speaker, Rhian Touyz, MBBCH, MSc, PhD, Professor, Department of Medicine and Family Medicine and Executive Director and Chief Scientific Officer, Research Institute at the McGill University Health Centre. The title of Dr. Touyz's keynote address was: *Oxidative Stress and Hypertension - Molecular Mechanisms and Clinical Implications*. The post-symposium survey revealed that participants gained valuable insight into the pathophysiology. Dr. Sarit Assouline and Dr. Ines Colmegna, Associate Professors of Medicine, followed with talks in their areas of expertise: *Progress in the Management of Chronic Myelogenous Leukemia*; and *Prepare and Prevent, Don't Repair and Repent: Vaccines in Immune-mediated Inflammatory Diseases (IMDs)*, respectively.

Dr. Susan Kahn, Associate Chair Research opened the second day of the Symposium and Dr. James Martin acted as Moderator for the 2nd Keynote Speaker session, which was delivered by Dr. David Kass, Abraham and Virginia Weiss Professor of Cardiology and Professor of Medicine in the Departments of Medicine, Biomedical Engineering, Pharmacology and Molecular Sciences and

Cellular and Molecular Medicine and Pathobiology at Johns Hopkins. Dr. Kass delivered a scholarly presentation on *Heart Failure with an Ejection Fraction That Seems to be OK*. Dr. George Fantus, McGill Professor of Medicine and Dr. Cedric Yansouni, McGill Associate Professor of Medicine, delivered talks on *Glucose Toxicity, Diabetes Complications and Parkinson's Disease: Common Effector Mechanisms?*; and *Adventures in Rapid Testing for Infectious Diseases*, respectively.

Dr. Ernesto Schiffrin, Physician-in-Chief, Sir Mortimer B. Davis-Jewish General Hospital, Director, Hypertension and Vascular Research Unit, Lady Davis Institute for Medical Research, Distinguished James McGill Professor and Associate Chair, Department of Medicine, McGill University moderated the third and final day of the Symposium. The Keynote talk was delivered by Stephen Robbins, PhD, Professor, McGill Department of Oncology and Director of the Lady Davis Institute for Medical Research (LDI), presenting on *A Basic Scientist's Unexpected Journey into Translational Research*. Dr. Isabelle Malhamé moderated the Early Career Session which included talks by McGill Department of Medicine Assistant Professors: Deborah Assyag, speaking on *Gender-based disparities on the care of patients with interstitial lung disease*; Antonios Duros, presenting on *Drug Interactions with Sulfonylureas and the Risk of Severe Hypoglycemia*; and Abhinav Sharma, informing participants of advances in *Leveraging Digital Health in Cardiovascular Disease*.

We extend thanks to the presenters and to Ms. Caroline Alcaraz, for the work done in organizing the event.



Dr. David Kass

II. The Louis and Artur Lucian Award

The 2020 winner of the prestigious Artur and Louis Lucian Award in Cardiovascular Science was **Dr. David Kass**. Due to the ongoing COVID-19 situation, the visit to McGill of Dr. Kass – originally scheduled for the fall of 2021, was postponed to May 2022.

As mentioned in the previous section, DOM had the pleasure of welcoming Dr. Kass as keynote speaker for the Annual Research Symposium and, during his visit, Dr. Kass gave a Grand Rounds presentation shared between the McGill University Health Centre (MUHC) and the Jewish General Hospital (JGH) and a Lucian Lecture to a university-wide audience. Additionally, Dr. Kass animated several workshops that included researchers at the JGH, MUHC, Department of Pharmacology and the Montreal Heart Institute. Dr. Kass's topics addressed various aspects of the pathogenesis of heart failure with a preserved ejection fraction. He showed exciting new data on the potential therapy of the condition with a phosphodiesterase inhibitor.

We look forward to an exciting visit from **Dr. Ramachandran**, the 2021 Lucian awardee to happen in the Fall – well, more information on that in the near future!

III. The 6th Annual Department of Medicine Clinical Research Symposium on High Value Care

This year's high value healthcare symposium took place on April 7th, 2022. Once again, we hosted the event virtually, due to the pandemic. This was made possible because of the incredible support provided by Caroline Alcaraz and the DoM. Attendance was high with close to 120 participants tuning in for keynote speeches.

This year we learned about "Hospital at Home" programs, and were privileged to have keynote speakers Dr. David Levine and Dr. Robert Boxer (both of Brigham and Women's Hospital and Harvard) share their experience. Locally, we heard from Dr. Lawrence Rudski and Erin Cook, MSN who gave an overview of how they successfully established a COVID-19 hospital at home in under 72-hours for the JGH/CCOMTL.

Dr. David Brown presented a fascinating talk that contained a historical perspective and an overview of the evidence for (and against) evaluation and management of stable angina. He provided interesting examples of outdated paradigms that remain established practice. Nisha Almeida demystified the term "clinical pertinence" for us and Charlie Bouchard, our very first patient partner to present, gave an overview of how patients can be meaningfully involved in all steps of research. We had over 20 trainees present their amazing high value medical research abstracts at an online asynchronous evening event, which turned out to be a fun way to hear about research, practice presenting an oral abstract, and to receive feedback. Thank you to co-organizers Drs. Maral Koolian and Arielle Mendel for attending and providing insightful and constructive feedback. Charbel El-Kefraoui took home first place for his abstract slam presented live at the Symposium (*Opioid Versus Opioid-Free Analgesia after Surgical Discharge: A Systematic Review and Meta-Analysis of Randomised Controlled Trials*).

Thanks to all those who attended this year and who helped organize the symposium. We look forward to seeing you all at next year's event and hope to have it in-person!

Teaching the Teacher

Profile of Dr. Linda Snell
by Ashley Rabinovitch



- *Dr. Linda Snell is redefining the way medical professionals learn to teach.*

Are teachers born or made? According to Dr. Linda Snell, that's the wrong question to ask. Whether or not teaching comes naturally, what matters is the commitment to do better.

Born in England and raised in Edmonton, Dr. Snell thinks she might have become a restaurant chef or a marine biologist in another life. But from a young age, she knew she was destined to become a physician. She earned undergraduate and medical degrees from the University of Alberta before relocating to Montreal, where a short stint turned into a permanent move.

She can't remember a time when she didn't teach in some capacity. In high school and university, she taught swimming and tutored classmates. In her second year of medical school, she accepted an invitation to join a curriculum committee, an opportunity that piqued her interest in the educational framework that provided structure for her program. Then, as a chief resident of internal medicine at McGill, she spent long hours thinking about how to make the learning of her fellow residents more effective.

In many ways, Dr. Snell was a typical resident. She elected to pursue a career in internal medicine because she savored the challenge and variety of diagnosing and treating diverse conditions. "From a clinical perspective, it's hard to get bored with internal medicine," she reflects. But as her passion for medical education emerged alongside her passion for clinical care, she found herself wading deeper into lonelier waters.

"Education has always been a poor sister to clinical work, research, and our other responsibilities as physicians," she says. "Historically, it has been on the back burner." Fortunately, the McGill ecosystem brought her in contact with leaders who shared her interest in medical education, including Dr. Richard Cruess, former Dean of the Faculty of Medicine, and Dr. W. Dale Dauphinee, who served as an Associate Dean of Medicine (Medical Education) and the Director of the McGill Center for Medical Education Research. Through mentors like these, she became familiar with the national and international structures undergirding the medical education she had experienced. With their enthusiastic support, she earned a master's degree in medical education at the University of Illinois through distance learning.

Her master's thesis focused on teaching residents how to teach—a given today but a novelty in those years. The perspective of most of her peers was that if they learned their trade, they could teach it without further training. "It was expected that residents would teach in some capacity, but no one was enabling them to learn how to do it better," Dr. Snell reflects.

By showing residents how to elicit actionable feedback on their teaching or assess the teaching skills of others, she helped them build proficiency in teaching, whatever their aptitude at the beginning of their training. Many of the first trainees to participate in those resident-as-teacher programs are now well-known teachers and senior staff members in the McGill Department of Medicine.

Raising Up a New Generation

By the time Dr. Snell finished her master's degree, she was the expert in the room when it came to medical education. While maintaining a robust clinical practice, she gradually moved to the forefront of medical education and educational scholarship at McGill and beyond.

The Latin root for doctor and teacher is the same, Dr. Snell points out: "docere." There is a longstanding expectation that to be a physician is to be a teacher. Her efforts are geared toward producing two categories of teachers: clinician-teachers and clinician-educators—similar but distinct groups. A clinician-teacher spends most of their time doing clinical work, which may involve teaching residents, medical students, fellows, and other medical professionals. They may deliver lectures, run simulation programs, or participate in education research or curriculum development. "In the context of medicine, every clinician is a clinician-teacher," explains Dr. Snell.

A clinician-educator takes their teaching role to the next level and leverages advanced training in education to lead curriculum and assessment development simulations and conduct education research. They use leading theories of education to inform everything they do, and they often act as a consultant to others in the medical education space.

Dr. Snell, the consummate clinician-educator, aspires to raise up the next generation of clinician-teachers and clinician-educators, with a special focus on the latter. "It's much harder to produce clinician-educators than clinician-teachers," she observes. "Even 10 or 15 years ago, few could recognize the need for clinician-educators. That is changing, as the need for people with one foot in the clinical world and the other in education becomes more pronounced, but until recently, I felt a bit lonely in my field."

Becoming a skilled teacher requires years of hard work and commitment, but those who stay the course discover a lifelong ally in Dr. Snell. Over the past three decades, she has equipped clinician-teachers and clinician-educators in more ways to count. She has served as Vice Chair of Education in the Department of Medicine, Associate Physician-in-Chief at the McGill University Health Centre, Director of the McGill Division of General Internal Medicine, Associate Dean for Continuing Medical Education, Director of the Undergraduate Internal

Medicine program, and Program Director of the General Internal Medicine Fellowship. If there is a medical education program, initiative, or idea at the McGill Faculty of Health Sciences, Dr. Snell has probably played a role in its success.

Always one to embrace a full, varied schedule, Dr. Snell pours her time and energy into advancing medical education in three different ways: faculty development, longitudinal programs, and graduate degrees.

Faculty development conjures images of inviting staff members to a series of workshops or retreats to build new skills. While these kinds of formal efforts have value, Dr. Snell believes that informal interactions are just as worthwhile. Whether it is observing the teaching of others or volunteering to help develop educational materials with another faculty member, smaller moments of unstructured learning can add up to major shifts in perspective.

Dr. Snell has also played a role in longer programs and courses at McGill and elsewhere. Using foundational theories of education—like deliberate practice, which focuses on getting regular feedback, and situated learning, which emphasizes learning in a communal setting—teachers and educators learn how to design, deliver, and evaluate innovative programs. "We encourage them to approach this work in a scholarly way, with the classroom as their laboratory," says Dr. Snell.

In 2007, Dr. Snell spearheaded the creation of McGill's master's program in Health Professions Education. Aimed at physicians, nurses, dentists, veterinarians, and other

health professionals, the program equips between five and ten students per year with the leadership, curriculum development, assessment, and educational research skills needed to become clinician-educators in their respective fields. Their research projects run the gamut of emerging issues in medical education, from gauging the impact of coaching and evaluating the effectiveness of online teaching to understanding international differences in building resilience. “After finishing this program, participants join a community of people who speak a similar language,” says Dr. Snell.

The scope of Dr. Snell’s work goes far beyond McGill’s walls. When she is not organizing an international conference, she is helping the medical profession shift towards competency-based education as a senior clinician educator at the Royal College of Physicians and Surgeons. The Royal College’s new Competence by Design initiative is geared toward setting standards for the outcomes residents must attain. “There was once a time when a resident could show up to work and skate by if they didn’t mess up anything too badly,” she reflects. Now, they must demonstrate mastery of key skills and competencies before moving on to the next phase of their career. By raising the bar for physicians across Canada, Dr. Snell is playing a central role in improving the quality of medical education and patient care on a national scale.

Ground to Cover

Dr. Snell’s appetite for growth and variety is just as voracious outside of work. She is an avid reader, traveler, and all-season athlete who cycles in the summer, skis and snowshoes in the winter, and swims competitively. A self-described foodie and wine lover, she enjoys cooking with friends and teaching wine tasting on occasion.

She is now “pre-retirement,” although you would never know it by observing her schedule. Every day is a different blend of clinical work, working with residents and master’s students, and leadership duties. A deep commitment to education is the common thread that ties it all together. After nearly three decades of teaching in diverse settings, Dr. Snell still finds satisfaction in the proverbial lightbulb moments she witnesses daily.

While medical education has come a long way since Dr. Snell was a newly minted resident in search of advanced training, she is keenly aware of how much ground is left to cover. “We still have work to do to ensure that education is viewed as a valid academic pursuit that deserves just as much academic recognition and grant funding as other types of academic activities,” she says. “Changing the way we do things is hard. It’s always easier not to change. But we can, and must, do better.”



“Changing the way we do things is hard. It’s always easier not to change. But we can, and must, do better.”

DR. LINDA SNELL

XXII.

2021 Kudos

McGill University Honours and Awards

Dr. Jonathan Afilalo received the Principal’s Prize for Outstanding Emerging Researcher.

Dr. Laurence Green is the recipient of the 2021 Transition to Clinical Practice (TCP) Internal Medicine Teaching Award.

Dr. Matthew Oughton was awarded the Changemaker Prize as part of the Principal’s Prize for Public Engagement through Media.

Dr. Don Sheppard was awarded the Prize for Established Academics as part of the Principal’s Prize for Public Engagement through Media.

Dr. Michael Stein is the recipient of the Osler Teaching Award for teaching excellence.

Dr. Ning-Zi Sun was named to the 2021-2022 Faculty Honour List for Educational Excellence.

Dr. Rita Suri was appointed to the prestigious Catherine McLaughlin Hakim Chair in Medicine.

External Honours and Awards

Dr. Jean Bourbeau has been elected as Fellow into the Canadian Academy of Health Sciences.

Dr. Julia Chabot was recognized for her outstanding contribution during the Covid-19 pandemic by the Fédération des médecins spécialistes du Québec.

Dr. Matthias Friedrich has been attributed the 2021 Gold Medal, the highest honour distributed by the Society for Cardiovascular Magnetic Resonance.

Dr. Carolyn Jack received the Hakim Family Innovation prize.

Dr. Susan Kahn was recognized as THE world leading expert (Top 0.0014%) in venous thrombosis on World Thrombosis Day.

Dr. Nadine Kronfli received the 2021 New Investigator Award from the Association of Medical Microbiology and Infectious Diseases Canada.

Dr. Jean-Jacques Lebrun’s team won the 2021 Québec Science Discovery of the Year Award for uncovering the genetic mechanisms at work in triple-

negative breast cancers and finding a promising therapy.

Dr. Todd Lee has been awarded the 2021 Dr. John M. Embil Mentorship Award in Infectious Diseases by the Canadian Foundation for Infectious Diseases.

Dr. Suzanne Morin is co-recipient of the Osteoporosis Canada’s 2021 Eleanor Mills Award.

Dr. Louise Pilote has been awarded the Society of Hypertension Award of Excellence for Research in Cardiovascular Health and Disease in Women for 2021.

Dr. Lawrence Rudski has been selected to receive the 2021 Canadian Society of Echocardiography Annual Achievement Award.

Dr. Shaifali Sandal received the New Investigator Lectureship Award 2021 from the Canadian Society of Nephrology.

Dr. Ernesto L. Schiffrin has been awarded has awarded he ISH Franz Volhard Award and Lectureship for

Outstanding Research for 2021 by the International Society of Hypertension (ISH). In addition, Dr. Schiffrin has been selected by the American Heart Association as 2021 Distinguished Scientist of AHA.

Dr. Adel Schwertani is co-recipient of the 2021 Tomoh Masaki Award presented by the Endothelin International Advisory Board during the American Physiological Society’s Seventeenth International Conference.

Dr. Don Sheppard is the inaugural recipient of The Legge Orr M14 Leadership Award from the McGill University Health Centre Foundation.

Dr. Murray Vasilevsky was awarded the 2021 Distinguished Service Award by the Canadian Society of Nephrology.

Dr. Don Vinh has been name as a member of the first cohort of individuals recognized as Fellows of the Clinical Immunology Society.



XXIII.

Division Heads and Division and Unit Reports

- Divisions are the life-blood of an academic Department of Medicine. Almost all clinical service, research and teaching are done at the Division level. Our Department highly values and seeks to support the work done by our Divisions and of all members throughout the Department. We hope you enjoy reading
- these reports as much as we did!

The McGill Department of Medicine comprises 13 clinical divisions, encompassing all aspects of internal medicine and its subspecialties. The Division of Experimental Medicine provides graduate students with supervision and training in collaboration with Graduate and Postdoctoral Studies.

Clinical Allergy & Immunology

Leadership

- Dr. Christos Tsoukas (McGill / MUHC)
- Dr. Peter Small (JGH);
Dr. Jessie Schwartz (as of January 2022)
- Dr. Jan Schulz (SMH)

Report

-  **4** CLINICIAN SCIENTISTS & INVESTIGATORS
-  **4** PHDS
-  **5** CLINICIAN TEACHERS & EDUCATORS

5 Notable 2021 Publications

(Division or DOM primary member's name in **bold** type)

Zhang Y, Li L, **Genest G**, Zhao W, Ke D, Bartolucci S, Pavey N, Al-Aubodah TA, Lejtenyi D, Torabi B, Ben-Shoshan M, Mazer B, **Piccirillo CA**. *Successful Milk Oral Immunotherapy Promotes Generation of Casein-Specific CD137⁺ FOXP3⁺ Regulatory T Cells Detectable in Peripheral Blood*. *Front Immunol*. 2021 Nov 23; 12:705615. doi: 10.3389/fimmu.2021.705615. PMID: 34887847; PMCID: PMC8650635.

Copaescu A, Choshi P, Pedretti S, Mouhtouris E, Peter J, Trubiano JA. (2021). *Dose Dependent Antimicrobial Cellular Cytotoxicity – Implications for ex vivo diagnostics*. *Frontiers in Pharmacology/Translational Pharmacology*. 12(640012):1-7.

W. Correa-Macedo, V.M. Fava, M. Orlova, P. Cassart, **R Olivenstein**, J. Sanz, A. Dumaine, R.H.M. Sindeaux, V. Yotova, A. Pacis, J. Girouard, B. Kalsdorf, C. Lange, **J.-P. Routy**, L.B. Barreiro, **E. Schurr**, *Epigenetic impairment and blunted transcriptional response to Mycobacterium tuberculosis of alveolar macrophages from persons living with HIV*, *J Clin Invest*, Sep 2:148013. doi: 10.1172/JCI148013, 2021.



Dr. Christos Tsoukas

Profile photo taken by Owen Egan

The Manual of Allergy and Clinical Immunology (1st ed.). CRC Press. Editors: Feteih, A., **Fein, M., & Tardio, N.** (2021). <https://doi.org/10.1201/9781003174202>. Contributors: DelCarpio J, **Fein M, Genest G**, Gold P, Alizadehfar R, **Tardio N, Genest G, Isabwe G, Tsoukas C.**

Exciting Research in the Pipeline

Dr. Erwin Schurr PI 2016-2022, \$ 11,000,000 CAD, NIH grant and a CIHR Foundation grant of \$ CAD 2,500,000

National Institutes of Health USA (NIAID-NIH) “Mechanisms of Immune Protection from TB among HIV-infected Individuals (R01-AI-14-072). (USD 1,750,000/year; site budget: USD ~390,000/year)

Emerging COVID-19 Research Gaps and Priorities Funding Opportunity (CIHR) - The role of anti-retroviral therapy in the increased rate of COVID-19 mortality of people living with HIV (\$500,000/year)

People living with HIV who are immune-reconstituted and virally-controlled are at increased risk of developing tuberculosis (TB) in endemic regions. In 2018, there were an estimated 1.4 million deaths caused by TB which included 210,000 HIV-positive people consistent with a two-fold higher mortality in HIV-positive people relative to HIV-negative persons. Alveolar macrophages are the first human innate immunity cells encountered by inhaled *Mycobacterium tuberculosis*. We have shown that anti-retroviral therapy induces an epigenetic reprogramming of alveolar macrophages that reduces the ability of these cells to respond to *M. tuberculosis*. The focus of the study

is to link classic genetic risk factors with epigenetic factors and changes in alveolar macrophage physiology.

Recent large cohort studies have identified HIV positivity as strong risk factor for severe COVID-19. Similar to TB, even HIV-positive people with low or undetectable HIV load and reconstituted CD4+ T-cell immunity still displayed two-fold increased COVID-19 mortality compared to HIV-free persons. It is our working hypothesis that the ART-induced epigenetic reprogramming of alveolar macrophages also underlies the increased COVID-19 susceptibility. These studies are expected to have major implications for the definition of innovative TB and COVID-19 prevention strategies in the HIV-infected population that will lead to reduced mortality of both TB in COVID-19 mortality in this highly vulnerable population.

Dr. Ciriaco Piccirillo: Co-investigator, together with multiple other McGill co-investigators. 2021/09-2023/09: Canadian Institutes of Health Research (CIHR); **Coronavirus Variants Rapid Response Network: CoVaRRNet** (Dr. Piccirillo \$200,000/year).

Team Grant Principal Applicant: Marc-Andre Langlois
Total Funding - 9,000,000 (Canadian dollar)

The Coronavirus Variants Rapid Response Network (CoVaRR-Net) is a network of interdisciplinary researchers from institutions across the country created to assist in the Government of Canada's overall strategy to address the potential threat of emerging SARS-CoV-2 variants. Our mandate is to coordinate, facilitate, support, and accelerate rapid response research throughout Canada.

The overall goal of CoVaRR-NET is to rapidly answer critical and immediate questions regarding variants, such as their increased transmissibility, likelihood to cause severe cases of COVID-19, and resistance to vaccines. The findings from the experts in our network and their teams will provide decision makers in Canada, but also abroad, with guidance regarding drug therapy, vaccine effectiveness, and other public health strategies.

Impactful Clinical Innovation

Dr. Ana Copaescu: Missed Opportunities for Severe Cutaneous Adverse Reaction (SCAR) Diagnostic at the McGill University Health Centre (MUHC).

Severe cutaneous adverse drug reactions (SCAR) are an overlooked group of disorders that are the result of inappropriate immune activation following drug exposure

and are associated with acute and chronic morbidity, mortality and excessive hospital costs. The utility of skin prick, intradermal patch testing and drug challenge tests, in this setting, are not well understood. Ex vivo assays such as the T cell enzyme-linked immunoSpot (ELISpot) to immunophenotype severe drug reactions have been established but their use as diagnostic assays in clinical practice and their reproducibility over time remains under investigation.

In a prospective multicenter IFN-g release ELISpot study of 81 patients with severe delayed hypersensitivity, Dr Copaescu demonstrated a sensitivity of 52% and specificity of 100%. She has recently initiated a multicenter project that aims to determine the combined utility of vivo and ex vivo assays in the diagnosis and management of SCAR. This project has strong potential to discover novel pathways to prevent, diagnose and assign drug causality in drug allergy.

The Immune Stress Test:

Aging and the use of targeted immunotherapies have created a pool of dysregulated immune phenotypes in those attending our clinics. We identified a need for a comprehensive assessment of immune function in a variety of patient groups having suspicion of compromised immunity.

The support activities of the research laboratory of the immune deficiency treatment center were expanded. An “immune stress test” was created to evaluate immune competence and potential risk for infection in individuals with documented or suspected inborn errors in immunity, as well as those with known secondary immune deficiency. This dynamic test evaluates the spectrum of events that are required for normal immune function. In addition to humoral responses, cellular immunity is evaluated extensively, with pathogen recognition, immune activation, proliferation and effector function, including intracellular cytokine production. Functional responses pre and post-vaccination to standard immunogens are used to assess immune fitness. We are piloting this test to determine safety in the continued use of immunosuppressive treatments, as well as, to measure cellular response to COVID-19 vaccines in those with primary and secondary humoral immune deficits.

Cardiology

Leadership

- Dr. Richard Haichin (MUHC Interim as of January 2021);
Dr. Atul Verma (as of April 2022)
- Dr. Lawrence Rudski (JGH)
- Dr. Mathieu Walker (SMH)

Report - JGH

-  **4** CLINICIAN SCIENTISTS & INVESTIGATORS
-  **1** PHD
-  **13** CLINICIAN TEACHERS & EDUCATORS

5 Notable 2021 Publications

(**Division** or DOM primary member's name in **bold** type)

Solomon J, Moss E, Morin JF, Langlois Y, Cecere R, de Varennes B, Lachapelle K, **Piazza N, Martucci G**, Bendayan M, Piankova P, Hayman V, Ouimet MC, **Rudski LG, Afilalo J**. *The Essential Frailty Toolset in Older Adults Undergoing Coronary Artery Bypass Surgery*. J Am Heart Assoc. 2021 Aug 3;10(15):e020219. doi: 10.1161/JAHA.120.020219. Epub 2021 Jul 28.

Langleben D, Berkson L, Chartrand S. *Selexipag Therapy for Raynaud Phenomenon-induced Severe Digital Ischemia in Intravenous Epoprostenol Responders With Connective Tissue Disease*. J Rheumatol. 2021 Apr;48(4):616-617. doi: 10.3899/jrheum.200716.

Windle SB, Sequeira C, **Filion KB**, Thombs BD, Reynier P, Grad R, **Els C, Eisenberg MJ**. *Impaired driving and legalization of recreational cannabis*. CMAJ. 2021 Apr 6;193(14):E481-E485. doi: 10.1503/cmaj.191032. PMID: 33824147

Semsar-Kazerooni K, Dima D, Valiquette J, Berube-Dufour J, **Goldfarb M**. *Early Mobilization in People With Acute Cardiovascular Disease*. Can J Cardiol. 2021 Feb;37(2):232-240. doi: 10.1016/j.cjca.2020.03.038. Epub 2020 Apr 2. PMID: 32739452

Vriz O, Veldman G, Gargani L, Ferrara F, Frumento P, D'Alto M, D'Andrea A, Radaan SA, Cocchia R, Marra AM, Ranieri B, Salzano A, Stanziola AA, Voilliot D, Agoston G, Cademartiri F, Cittadini A, Kasprzak JD, Grünig E, Bandera F, Guazzi M, **Rudski L**, Bossone E. *Age-changes in right ventricular function-pulmonary circulation coupling: from pediatric to adult stage in 1899 healthy subjects*. The RIGHT Heart International NETWORK (RIGHT-NET). Int J Cardiovasc Imaging. 2021 Dec;37(12):3399-3411. doi: 10.1007/s10554-021-02330-z. Epub 2021 Jul 5.

Exciting Research in the Pipeline

Project Title: **Impact of Frailty and sarcopenia in Post-Covid Recovery**

Canadian Institutes of Health Research - \$470,000 (Emerging COVID-19 Research Gaps & Priorities)

Project PI: **Afilalo, J**

Co-Investigators: Dr. **Cyrille Launay**; JGH and Dr. Olivier Beauchet; IUCPQ), Dr. Marc Afilalo; JGH and Dr. Debra Eagles; Ottawa, Dr. **Brent Richards**; JGH, Dr. Michael Chassé; CHUM, and Zara Vajih; JGH.

Leveraging the Biobanque du COVID-19 du Québec, this cross disciplinary team of geriatricians, emergentologists, internists, intensivists and data scientists are using multicentric health data and radiological images to evaluate frailty and sarcopenia, and accordingly predict the risk of adverse events in N=2,000 older adults post-COVID. One of the exciting applications is using clinical CT image to opportunistically derive measures of low skeletal muscle mass and quality indicative of sarcopenia. The overarching goal is to be able to identify vulnerable patients and proactively refer them to rehabilitation or other geriatric interventions that may mitigate their risks and improve their recovery and quality-of-life.

Project title: **FAME (Family Engagement in the ICU Setting)**

Principal Investigator: **Goldfarb, MJ**

Funding Source: Fonds de recherche du Québec – Santé

The FAME study is a prospective observational cohort with an embedded qualitative study of 198 family members in the ICUs of 4 Canadian hospitals. The objective of the study is to validate the FAMily Engagement (FAME) instrument in the ICU setting.

The FAME instrument was developed to quantify the degree and type of engagement behaviors and perspectives of family members of people in the ICU. The FAME study will explore the role of age, relationship, sex, gender, and race/ethnicity on family engagement, as well as evaluate the relationship between family engagement and family-centered outcomes. The results of this study will inform efforts to measure the impact of family-centered interventions on improving engagement in patient care.

Project title: **Aggressive Smoking Cessation Therapy Post-Acute Coronary Syndrome: The ASAP Trial**

Principal investigator: **Eisenberg, Mark J**

Co-investigator(s): Cox, Jafna L; Faris, Peter D; **Filion, Kristian B**; Gershon, Andrea S; Goodman, Shaun G; Lawler, Patrick R; Lonn, Eva; **Pilote, Louise**; Reid, Robert D; Strauss, Bradley H; Suskin, Neville G

Funding source: CIHR Project Grant, Circulatory and Respiratory Health

Funding amount: \$1,773,50

Study synopsis: The Aggressive Smoking Cessation Therapy Post-Acute Coronary Syndrome (ASAP) Trial is a 5-year, multi-centre, randomized controlled trial that will assess the efficacy, safety, and tolerability of aggressive smoking cessation therapy initiated in-hospital following ACS. It will recruit 798 adult patients smoking on average at least 10 conventional (tobacco) cigarettes per day who are motivated to quit smoking and have been diagnosed with ACS requiring hospitalization. Patients will be randomized (1:1) to one of two treatment arms: (1) combination therapy of varenicline and nicotine e-cigarettes plus counseling or (2) varenicline plus counseling for 12 weeks, with 52-week follow-up. Smoking cessation post-ACS is essential to reduce morbidity and mortality in this high-risk patient population. ASAP will provide regulators, health care professionals, and smokers with important information about the efficacy of combination varenicline and nicotine e-cigarettes for smoking cessation in patients with ACS.

Impactful Clinical Innovation

The JGH Division of Cardiology and the Azrieli Heart Center collaborated to develop a unique program of remote guidance for advanced structural interventions. As personnel were unable to travel or at times enter the healthcare facilities because of Covid, a solution was needed to provide remote support. Dr Lawrence Rudski, formed a partnership with an engineering company (Auger Group Conseil) and Medtronic Canada to combine a number of functionalities of the Microsoft HoloLens 2. This advanced technology coupled the hardware with software that permitted for real-time interaction with outside experts (Live Assist) as well as built-it step by step programming of procedures through an augmented reality program (MS Guides) that allowed for animations of steps to guide the user.

There were numerous technical challenges including transferring four simultaneous 4K digital feeds to the remote expert with a lag of only 200 msec, with built in systems redundancies.

Our TAVR (Transfemoral Aortic Valve Replacement) physician team of Drs Ali Abualsaud, Nathan Messas, Emmanuel Moss and Felix Ma partnered with a colleague in Toronto to perform the first-in-world live end-to-end HoloLens-guided valve implant using the HoloLens coupled with Live Assist + Guides. User experience was outstanding and the devices performed as desired. We have continued the development of this technology with Auger Group and Medtronic and are transferring this technology to other hospitals across Canada. This technology allows an expert to support less experienced users in rare and complex cases without having to be on-site and can also be used to help newer programs work through their learning curve in the “post-certification” but “not yet mature” phase of a program. Our team obtained a Medteq+ grant to support this development in TAVR and in other cardiovascular and vascular procedures with partners.

Our HoloLens program has extended throughout the CIUSSS to include use cases in a number of facilities to support and amplify staffing related to Covid and has permitted to extend precious resources such as would care specialists and training of virtual care nurses in support of our cardiovascular missions. There are numerous possibilities to apply this technology across the healthcare sector to bring previously unavailable care and expertise to many other settings, addressing financial challenges and inequities in accessing specialized care.

Report - MUHC

	8	CLINICIAN SCIENTISTS & INVESTIGATORS
	4	PHDS
	22	CLINICIAN TEACHERS & EDUCATORS

5 Notable 2021 Publications

(**Division** or DOM primary member's name in **bold** type)

Diller GP, Arvanitaki A, Opatowsky AR, Jenkins K, Moons P, Kempny A, Tandon A, Redington A, Khairy P, Mital S, Gatzoulis MA, Li Y, **Marelli A**. *Lifespan Perspective on Congenital Heart Disease Research: JACC State-of-the-Art Review*. J Am Coll Cardiol. 2021 May 4;77(17):2219-2235.

Ochs MM, Kajzar I, Salatzki J, Ochs AT, Riffel J, Osman N, Katus HA, **Friedrich MG**. *Hyperventilation/Breath-Hold Maneuver to Detect Myocardial Ischemia by Strain-Encoded CMR: Diagnostic Accuracy of a Needle-Free Stress Protocol*. JACC Cardiovasc Imaging. 2021 Oct;14(10):1932-1944.

Sharma A, Ofstad AP, Ahmad T, Zinman B, Zwiener I, Fitchett D, Wanner C, George JT, Hantel S, Desai N, Mentz RJ. *Patient Phenotypes and SGLT-2 Inhibition in Type 2 Diabetes: Insights from the EMPA-REG OUTCOME Trial*. JACC Heart Fail. 2021 Aug;9(8):568-577.

Pearson GJ, **Thanassoulis G**, Anderson TJ, Barry AR, Couture P, **Dayan N**, Francis GA, **Genest J**, Grégoire J, **Grover SA**, Gupta M, Hegele RA, Lau D, Leiter LA, Leung AA, Lonn E, Mancini GBJ, Manjoo P, McPherson R, Ngui D, Piché ME, Poirier P, Sievenpiper J, Stone J, Ward R, Wray W. 2021 *Canadian Cardiovascular Society Guidelines for the Management of Dyslipidemia for the Prevention of Cardiovascular Disease in Adults*. Can J Cardiol. 2021 Aug;37(8):1129-1150.

Nair GM, Birnie DH, Sumner GL, Krahn AD, Healey JS, Nery PB, Kalfon E, **Verma A**, Ayala- Paredes F, Coutu B, Becker G, Philippon F, Eikelboom J, Sandhu RK, Sapp J, Leather R, Yung D, Thibault B, Simpson CS, Ahmad K, Sturmer M, Kavanagh K, Crystal E, Wells GA, **Essebag V**;

BRUISE CONTROL Investigators. *Post-operative pain following cardiac implant able electronic device implantation: insights from the BRUISE CONTROL trials*. Europace. 2021 May 21;23(5):748-756.

Exciting Research in the Pipeline

Investigator: **Dr. Jacqueline Joza**

Project Title: **LEFT Bundle Pacing vs Standard RV Pacing for Heart Failure**

Agency: Heart & Stroke Foundation of Canada

Date: 2021-Jul-01 to 2024-Jun-30

Amount: \$288,185

Investigator: **Dr. Ariane Marelli**

Project Title : **Heart Failure Trajectory along the Care Continuum for Congenital Heart Disease Patients across the Lifespan**

Agency: Heart & Stroke Foundation of Canada

Date: 2021-Jul-01 to 2024-Jun-30

Amount: \$197,103

*Ariane Marelli, 2021 recipient for the John J. Day Award of Excellence for above research by Heart and Stroke Foundation.

Investigator: **Dr. Abhinav Sharma**

Project Title : **Identification and Prediction of Sex-Specific Cardiovascular Causes of Death and Outcomes in People with Diabetes Mellitus Post Myocardial Infarction**

Agency: Canadian Institute of Health Research

Date: 2021-Apr-01 to 2024-Mar-31

Amount: \$149,176

Impactful Clinical Innovation

With a team of medical and computer science students, we have developed a smartphone application to improve patient care for acute myocardial infarction.

“Stem” is a targeted and fully integrated platform for mission critical care coordination, communication, and data analytics.

Mission critical care coordination

With critical alert push notifications, live call routing, and mobile incident management, Stem enables real-time operational accountability.

Platform for every environment

From hub and spoke emergency rooms, to cardiac catheterization laboratories and coronary care units, Stem offers a complete stack for all care coordination.

Intuitive data processing

We've intuitively built data collection into the care coordination process, such that it seamlessly integrates with the care continuum, and accurately and intelligently collects meaningful event-driven data for real-time data visualization, quality improvement, and compliance.

Security and privacy

All data is encrypted at-rest and in-transit. Our cloud-based infrastructure for processing and storing your data is silos between hospitals, from end-to-end.

We teamed up with leaders in every field to build a solid foundation for the app. For example, our legal team at Fasken have allowed us to build a robust legal framework to ensure that hospitals can adopt this technology with confidence. In addition, our technology is built on the AWS cloud, which reliably guarantees Stem to have over 99.5% uptime.

Stem is currently in use in 2 centers in the Montreal area, with more centers joining in the Quebec City region, Chicoutimi, and other centers. Over the course of the next year, we aim for the app to be used in all 15 centers where primary PCI is performed in the province, and to expand to other provinces and to the United States. Internally, we are building our Emergency Medical Services (EMS) module, so that patients can be identified upon First Medical Contact (FMC). This will allow us to maximize benefits conferred by early detection and activation.



Leadership

- Dr. Robyn Tamblyn (MUHC)
- Dr. Samy Suissa (JGH)

Report - MUHC



5 Notable 2021 Publications

(**Division** or DOM primary member's name in **bold** type)

Douros A, Santella C, Dell'Aniello S, Azoulay L, Renoux C, **Suissa S**, **Brassard P**. *Infectious Disease Burden and the Risk of Alzheimer's disease: A Population-Based Study*. J Alzheimers Dis. 2021;81(1):329-338. doi: 10.3233/JAD-201534.

Bérard A, Sheehy O, Zhao JP, **Vinet E**, Quach C, Kassai B, **Bernatsky S**. *Available medications used as potential therapeutics for COVID-19: What are the known safety profiles in pregnancy*. PLoS One. 2021 May 19; 16(5):e0251746. doi: 10.1371/journal.pone.0251746. eCollection 2021. PMID: 34010282

Lee TC, Goodwin Wilson M, Lawandi A, **McDonald EG**. *Proton Pump Inhibitors Versus Histamine-2 Receptor Antagonists Likely Increase Mortality in Critical Care: An Updated Meta-Analysis*. Am J Med. 2021 Mar; 134(3): e184-e188. doi: 10.1016/j.amjmed.2020.08.004. Epub 2020 Sep 12. PubMed PMID: 32931766.

McDonald EG, Wu PE, Rashidi B, Wilson MG, Bortolussi-Courval É, Atique A, Battu K, Bonnici A, Elsayed S, Wilson AG, Papillon-Ferland L, **Pilote L**, Porter S, Murphy J, Ross SB, Shiu J, **Tamblyn R**, Whitty R, Xu J, Fabreau G, Haddad T, Palepu A, Khan N, McAlister FA, Downar J, Huang AR, MacMillan TE, Cavalcanti RB, **Lee TC**. *The MedSafer Study-Electronic Decision Support for Deprescribing in Hospitalized Older Adults: A Cluster Randomized Clinical Trial*. JAMA Intern Med. 2022 Mar 1; 182(3):265-273. doi: 10.1001/jamainternmed.2021.7429. PMID: 35040926

2021 Feb 16;143(7):764-766. doi: 10.1161/CIRCULATIONAHA.120.052520. Epub 2021 Feb 15. Elharram M, Hillier E, Hawkins S, Mikami Y, Heydari B, Merchant N, White JA, Anderson T, **Friedrich MG**, **Pilote L**. *Regional Heterogeneity in the Coronary Vascular Response in Women With Chest Pain and Nonobstructive Coronary Artery Disease*. Circulation. PMID: 33587662

Exciting Research in the Pipeline

Term: 2022-2028

Source: Canadian Institutes of Health Research

Title: Principal investigator. **Dr Robyn Tamblyn**

Amount: \$965,000

Over 3 million hospitalizations and 17 million emergency department (ED) visits occur in Canada annually, a substantial proportion of which are medication-related and preventable. Moreover, over 50% of patients discharged from hospital are readmitted or return to the ED within 90 days. Medication non-adherence and the use of potentially inappropriate medications (PIMs) both contribute to the risk of adverse events following hospital discharge. While hospital-based medication review and post-discharge follow-up programs have achieved modest success in reducing PIMs and non-adherence, their impact on adverse events is uncertain. This may be because interventions do not address root causes. Two-thirds of PIMS are prescribed by community physicians, and over 40% of changes to medications during hospitalization are not adhered to by patients. The lack of success of previously evaluated adherence interventions may be because they target a limited number of adherence-challenges, despite research that suggests that multi-component interventions are most effective. They also typically focus on single medications, do not address high rates of non-adherence to medication changes made during hospital stay, and fail to empower patients and caregivers to manage complex medication regimens. This RCT will evaluate the effectiveness of a patient-centered medication management application in reducing non-adherence to medication changes made during hospitalization, reducing adverse events, and enhancing patient empowerment and quality of life. This intervention has the potential to improve medication adherence following hospital discharge, reduce the risk of subsequent adverse events and associated healthcare costs, and empower patients and caregivers to better manage complex medication regimens.



Impactful Clinical Innovation

Dr Nikki Pai

In low- and middle-income countries, adolescents and young women face socio-economic, systemic barriers, impeding access to basic sexual and reproductive health services. Suboptimal healthcare can lead to poor management of menstrual irregularities, precipitating Anemia. Besides, Unplanned pregnancies and untreated Sexually transmitted infections, can have serious reproductive sequelae. Mental illnesses have skyrocketed during the pandemic. Quality primary health interventions are non-existent; therefore, a personalized, accessible, data-driven strategy for period health, reproductive health and mental wellness with timely clinical care is urgently needed.

AnkaSmart! is a novel IoT (Internet of Things) solution for young women and gender diverse populations globally. It democratizes access to personalized physical, mental, and reproductive care and linked clinical services, while providing evidence-based information on taboo sexual, reproductive, and menstrual health (SRHR MH) topics. With a cloud connected wearable device, it collects data on necessary vitals to customize care. Finally, it aims to empower young people to make smart and timely decisions and become advocates for their health and wellness.

Report – JGH



5 Notable 2021 Publications

(**Division** or DOM primary member's name in **bold** type)

Douros A, Santella C, Dell'Aniello S, Azoulay L, Renoux C, **Suissa S**, Brassard P. *Infectious Disease Burden and the Risk of Alzheimer's Disease: A Population-Based Study*. *J Alzheimers Dis*. 2021;81(1):329-338.

Moriello C, Paterson JM, Reynier P, Dahl M, Aibibula W, Fisher A, Gamble JM, Kuo IF, Ronksley PE, Winquist B, **Fillion KB**, for the Canadian Network for Observational Drug Effect Studies (CNODES) Investigators. *Off-label postpartum use of domperidone in Canada: a multi-database cohort study*. *CMAJ Open*. 2021 May 14;9(2):E500-E509.

Renoux C, Azoulay L, **Suissa S**. *Biases in Evaluating the Safety and Effectiveness of Drugs for the Treatment of COVID-19: Designing Real-World Evidence Studies*. *Am J Epidemiol*. 2021 Aug 1;190(8):1452-1456.

Suissa S. *Single-arm trials with historical controls: Study designs to avoid time-related biases*. *Epidemiology*. 2021 Jan;32(1):94-100.

Exciting Research in the Pipeline

Samy Suissa (PI), Canadian Institutes of Health Research, **Canadian Network for Observational Drug Effect Studies (CNODES)** 2016-2022 (\$17,500,000)

The Canadian Network for Observational Drug Effects Studies (CNODES) is a network of over 120 Canadian researchers, analysts and trainees, funded by CIHR and DSEN, headquartered at the JGH-LDI Division of Clinical Epidemiology and headed by Dr Suissa. At the Provincial level, CNODES has established close collaborations with INESSS, with whom they are currently working for example on a series of multi-database pharmacoepidemiology studies on the safety and effectiveness of the newer anti-diabetic drugs.

At the Canadian level, CNODES collaborates directly with Health Canada on studies of drug safety (cardiovascular, pregnancy, diabetes, infections, etc...) and with CADTH on studies of drug safety and effectiveness in the real-world setting. Two yearly CNODES meetings conducted in Canada bring together over 100 participants to share and learn about new methodologies to study drug safety. CNODES has also conducted studies within a collaboration between Health Canada and the European Medicines Agency on the safety of the newer oral anticoagulants, and is now establishing links to collaborate with the FDA's Sentinel Initiative. At the wider international level, collaborations have been established with researchers and database holders from France, Italy, Taiwan and Israel to conduct joint international studies on drug safety for infrequently used drugs. These initiatives have been the object of workshops on worldwide collaborations organized by CNODES members in several international conferences and have attracted a large number of trainees and post-docs to the LDI.

Antonios Douros (PI), Canada – Germany collaborative industrial R&D program (National Research Council of Canada & German Federal Ministry for Economic Affairs and Energy) - R&D Project. **AIR_PTE - AI based risk prediction and treatment effect estimation based on health claims data** 2020-22 (\$1,351,200)

AIR_PTE aims to develop artificial intelligence (AI) based methods to improve and automate treatment effect estimation, ultimately supporting multiple evaluations and therapy decisions at the clinical point of care. The methods will be developed and compared within the context of treatment of venous thromboembolism using administrative healthcare data from Quebec and Germany, and then generalized in further settings. This 2-year project is funded with €1,000,000 by the Canada – Germany collaborative industrial R&D program (National Research Council of Canada and German Federal Ministry for Economic Affairs and Energy). The McGill Department of Medicine (with Dr. Antonios Douros as representative) participates as an associated non-funded partner.

Kristian Filion (PI), Canadian Institutes of Health Research-Project Grant. **Comparative effectiveness and safety of long-acting insulins and neutral protamine Hagedorn (NPH) insulin among patients with type 2 diabetes**. 2021-2023 (\$137,700)

As with much of the developed world, Canada is facing a diabetes epidemic. Both long-acting insulins and Neutral Protamine Hagedorn (NPH) insulin are effective at decreasing HbA1c levels and thus recommended for treatment in patients with type 2 diabetes to attain glycemic control. However, while their glucose-lowering effects have been studied extensively in clinical trials, little high-quality evidence is available regarding their comparative effectiveness and safety in a real-world setting. This CIHR-funded study will compare the rates of major adverse cardiovascular events and of hypoglycemia with long-acting insulins versus NPH insulin among patients with type 2 diabetes, generating the real-world evidence needed to address this knowledge gap. This study will provide regulatory agencies, guideline writing committees, drug plan managers, clinicians, and patients with the information needed to make more informed decisions on the use of different insulins for the treatment of type 2 diabetes. In doing so, it will improve the health of patients with type 2 diabetes in Canada and internationally.

Impactful Clinical Innovation

Sodium-glucose cotransporter-2 (SGLT2) inhibitors are a newer class of anti-diabetic drugs that have shown favorable effects in cardiovascular outcome trials and are currently recommended as second- to third-line treatments in the management of type 2 diabetes. In 2018, the Canadian Network for Observational Drug Effect Studies (CNODES), led by the Division, initiated a large multicenter project to assess the effectiveness, and safety of SGLT2 inhibitors among patients with type 2 diabetes in real-world clinical practice. The main data sources were electronic healthcare databases from 7 Canadian provinces and one from the UK. An additional study on SGLT2 inhibitors was based on healthcare data from Germany. Studies were also conducted on the safety of sulfonylureas. This wide project involved several members of the Division who each led parts of this large undertaking.

Specifically, we assessed the risk of major adverse events with SGLT2 inhibitors in the real-world context of clinical practice, including cardiovascular events, death, below-knee amputation, urosepsis, fractures, venous thromboembolism, and diabetic ketoacidosis. The safety of sulfonylureas revolved around cardiovascular events and hypoglycemia and the role of obesity as effect modifier. Members of the Division led these efforts with the results published in major journals: *British Medical Journal* (2), *Annals of Internal Medicine*, *Diabetes Care* (4), *Diabetes Obesity and Metabolism* (3), and the *American Journal of Medicine* (2). These studies will provide useful insight regarding the use and effects of SGLT2 inhibitors and sulfonylureas in real-world clinical practice. They will help inform patients and regulators, as well as aid clinical decision making in balancing risks and benefits when prescribing pharmacotherapy for type 2 diabetes.


Dermatology

Leadership

- Dr. Linda Moreau (MUHC)
- Dr. Robin Billick (JGH)

Report

 **5** CLINICIAN SCIENTISTS & INVESTIGATORS

 **6** CLINICIAN TEACHERS & EDUCATORS

JGH Report

5 Notable 2021 Publications

(**Division** or DOM primary member's name in **bold** type)

Litvinov IV, Xie P, Gunn S, **Sasseville D**, **Lefrançois P**.

The transcriptional landscape analysis of basal cell carcinomas reveals novel signalling pathways and actionable targets. Life Sci Alliance. 2021;4(7):e202000651. Published 2021 May 10. doi:10.26508/lsa.202000651

Esfahani K, Henderson Berg MH, Zargham H, **Billick R**, **Pehr K**, Redpath M, **Roshdy O**, Miller WH. *Narrowband ultraviolet B therapy for refractory immune-related lichenoid dermatitis on 'PD-1 therapy: a case report.* J Immunother Cancer. 2021;9(3):e001831. doi:10.1136/jitc-2020-001831

Bendayan S, Mititelu R, Redpath M, **Billick R**. *Thymoma-associated multiorgan autoimmunity with cutaneous only presentation: A case report.* SAGE Open Med Case Rep. 2021;9:2050313X211055928. Published 2021 Oct 28. doi:10.1177/2050313X211055928

Lubov J, Labbe M, Sioufi K, Morand GB, Hier MP, **Khanna M**, Sultanem K, Mlynarek AM. *Prognostic factors of head and neck cutaneous squamous cell carcinoma: a systematic review.* J Otolaryngo/ Head Neck Surg. 2021;50(1):54. Published 2021 Sep 7. doi:10.1186/s40463-021-00529-7

Chan J, **Pehr K**. *Electrodessication Matricectomy With Modified Hyfrecator Tip: Case Series and Literature Review.* Cutan Med Surg. 2021;25(4):418-423. doi:10.1177/12034754211024124

Exciting Research in the Pipeline

We have recruited our first Clinician-Scientist, Dr. Philippe Lefrançois, to set up a translational skin cancer lab at the JGH and LDI. His most recent work involved the characterization of Basal Cell Carcinoma, the most common cancer in humans, using patient-derived tumors, genomics, and computational biology. He has received the Inaugural Carole & Myer Bick Clinician Scientist Catalyst Award from the JGH Foundation. His most recent publication was in Life Science Alliance, a basic science biomedical journal.

Impactful Clinical Innovation

Our multidisciplinary skin cancer clinics (Melanoma, Non-Melanoma Skin Cancer (NMSC), Cutaneous Lymphoma (CTCL)) have resumed in Sprint 2021, and have served hundreds of patients without major issues despite COVID-19. These clinics have sped up prompt management of complex and advanced cancer patients.

NMSC 291 patients

Melanoma 247 patients

CTCL 128 patients

MUHC Report

5 Notable 2021 Publications

(**Division** or DOM primary member's name in **bold** type)

Litvinov IV, Xie P, Gunn S, **Sasseville D**, **Lefrançois P**.

The transcriptional landscape analysis of basal cell carcinomas reveals novel signalling pathways and actionable targets. Life Sci Alliance. 2021 May 10;4(7):e202000651. doi: 10.26508/lsa.202000651. Print 2021 Jul. PMID: 33972406

Maintz L, Bieber T, Bissonnette R, **Jack C**. *Measuring Atopic Dermatitis Disease Severity: The Potential for Electronic Tools to Benefit Clinical Care.* J Allergy Clin Immunol Pract. 2021 Apr;9(4):1473-1486.e2. doi: 10.1016/j.jaip.2021.02.027. PMID: 33838840

Jfri A, **Litvinov IV**, **Netchiporouk E**, **O'Brien E**. *Clinical and psychosocial factors affecting work productivity among patients with hidradenitis suppurativa: A cluster analytical investigation.* J Am Acad Dermatol. 2022 Mar;86(3):675-677. doi: 10.1016/j.jaad.2021.02.066. Epub 2021 Mar 1. PMID: 33662462

Chirico A, Henderson Berg MH, Roberge D, **Pehr K**. *Intralesional rituximab in the treatment of indolent primary cutaneous B-cell lymphoma.* Br J Dermatol. 2021 Feb;184(2):354-356. doi: 10.1111/bjd.19490. Epub 2020 Sep 24. PMID: 32798319

Muntyanu A, Ouchene L, Zhou S, **Hudson M**, Rezaeian M, LaChance A, **Litvinov IV**, **Baron M**, **Netchiporouk E**. *Geographical distribution of systemic sclerosis in Canada: An ecologic study based on the Canadian Scleroderma Research Group.* J Am Acad Dermatol. 2022 Jan 11:S0190-9622(22)00031-7. doi: 10.1016/j.jaad.2021.12.055.

Exciting Research in the Pipeline

Canadian Cancer Society/CIHR Action Grant: \$195,315
Nominated Principal Investigator: Dr. **Ivan Litvinov**
The Research Institute of the McGill University Health Centre (RI MUHC)

SunFit Project: skin cancer prevention through behavioral risk factor modification targeting sun and ultraviolet exposure practices using sex/gender and community specific approaches

cancer.ca/en/research/for-researchers/funding-results/results-sept-2021-action-grants-competition

Canadian Dermatology Foundation Grant : 50,000\$
Nominated Principal Investigator: Dr. **Elena Netchiporouk**
Investigating the impact of the environment on Systemic Sclerosis in Quebec.



Endocrinology & Metabolism

Leadership

- Dr. George Fantus (McGill / MUHC)
- Dr. Mark Trifiro (JGH)
- Dr. Les Meissner (SMH)

Report

	10	CLINICIAN SCIENTISTS & INVESTIGATORS
	12	PHDS
	25	CLINICIAN TEACHERS & EDUCATORS

5 Notable 2021 Publications

(**Division** or DOM primary member's name in **bold** type)

Zhou S, Butler-Laporte G, Nakanishi T, Morrison DR, **Afilalo J**, Afilalo M, Laurent L, Pietzner M, Kerrison N, Zhao K, Brunet-Ratnasingham E, Henry D, Kimchi N, Afrasiabi Z, Rezk N, Bouab M, Petitjean L, Guzman C, Xue X, Tselios C, Vulesevic B, Adeleye O, Abdullah T, Almamlouk N, Chen Y, Chasse M, Dur M, Paterson C, Normark J, Frithiof R, Lipcsey M, Hultstrom M, Greenwood CMT, Zeberg H, Langenberg C, Thysell E, Pollak M, Mooser V, Forgetta V, Kaufmann DE, **Richards JB**. (2021) *A Neanderthal OAS1 Isoform Protects European Ancestry Individuals Against COVID-19 Susceptibility and Severity*. Nature Medicine [IF: 36.13]. doi: 10.1038/s41591-021-01281-1.

Butiaeva LI, Slutzki T, Swick HE, Bourguignon C, Robins SC, Liu X, Storch KF, **Kokoeva MV**. *Leptin receptor expressing pericytes mediate access of hypothalamic feeding centers to circulating leptin*. Cell Metab, 33(7):1433-1448 (2021)

Skrivankova VW, Richmond RC, Woolf BAR, Yarmolinsky J, Davies NM, Swanson SA, VanderWeele TJ, Higgins JPT, Timpson NJ, Dimou N, Langenberg C, Golub RM, Loder EW, Gallo V, Tybjaerg-Hansen A, Davey Smith G, Egger M, **Richards JB**. (2021) *Strengthening the Reporting of Observational Studies in Epidemiology Using Mendelian Randomization: The STROBE-MR Statement*. JAMA [IF: 56.27]. 2021 Oct 26;326(16):1614-1621. doi: 10.1001/jama.2021.18236.



Dr. George Fantus

Profile photo taken by Owen Egan

Doyle JJ, Maios C, Vrancx C, Duhaime S, Chitramuthu B, **Bennett HPJ**, **Bateman A**, Parker JA. *Chemical and genetic rescue of in vivo progranulin-deficient lysosomal and autophagic defects*. Proc Natl Acad Sci U S A. 2021 Jun 22;118(25):e2022115118.

Tsoukas MA, Majdpour D, **Yale JF**, Fathi AE, **Garfield N**, Rutkowski J, Rene J, Legault L, Haidar A. *A fully artificial pancreas versus a hybrid artificial pancreas for type 1 diabetes: a single-centre, open-label, randomised controlled, crossover, non-inferiority trial*. Lancet Digit Health 2021 Sep 24:S2589-7500 (21) 00139-4.

Exciting Research in the Pipeline

Canadian Institute of Health Research (CIHR) / Medical Research Council of the UK: **Canada-UK Artificial Intelligence (AI) Initiative**. Artificial intelligence to create equitable multi-ethnic polygenic risk scores that improve clinical care.

Co-PIs: **Brent Richards** and Michael Inouye (University of Cambridge).

Collaborators M Schaar, H Martin, R Clarke, A Durant, C Greenwood. £500,000. \$881,339 CAD. Funds for Dr. Richards \$538,078. 2020-2023

04/2021 to 03/2026 CIHR Project grant, \$711,450
Title: **Matricellular protein CCN5/WISP2 mediates a synergistic stimulation of pancreatic β -cell expansion by IGF-I and Wnt signaling** (PI: **JL Liu**) PJT-175208



Maia Kokoeva (PI) 2 grants funded!

- Canadian Institute of Health Research.
Title: **Could mitotic senescence in NG2-glia explain the remyelination deficit in multiple sclerosis?**
Amount awarded \$837,675
Term of Approved Project: 2021-2026
- Canadian Institute of Health Research
Title: **The leptin receptor expressing pericyte links obesity to neuroinflammation.**
Amount awarded: \$814,725
Term of Approved Project: 2021-2026

Impactful Clinical Innovation

Based on Quality Improvement and M&M Rounds a new policy on prescribing of SGLT2 inhibitors for in hospital patients with diabetes was developed with Cardiology and Pharmacy and Therapeutics Committee. The risk of euglycemic ketoacidosis was increasingly recognized and these policies should mitigate this risk. We are doing a follow-up to confirm effectiveness of policy change.

Briefly, all SGLT2i drugs will not be given to acutely ill admitted patients and prescriptions limited to Endocrinology and Cardiology.




Leading for the Endocrinology Division was **Wen Hu**.

Gastroenterology & Hepatology

Leadership

- Dr. Alain Bitton (McGill / MUHC)
- Dr. Albert Cohen (JGH)
- Dr. Gaetano Morelli (SMH)

Report

-  **7** CLINICIAN SCIENTISTS & INVESTIGATORS
-  **1** PHDS
-  **23** CLINICIAN TEACHERS & EDUCATORS

5 Notable 2021 Publications

(**Division** or DOM primary member's name in **bold** type)

Vermeire S, **Lakatos PL**, Ritter T, Hanauer S, Bressler B, Khanna R, Isaacs K, Shah S, Kadva A, Tyrrell H, Oh YS, Tole S, Chai A, Pulley J, Eden C, Zhang Z, Feagan BG on behalf of the LAUREL Study Group *Etolizumab for maintenance therapy in patients with moderately to severely active ulcerative colitis (LAUREL): a randomised, placebo-controlled, double-blind, phase 3 study* Lancet Gastroenterology and Hepatology. Published online ahead of print: November 16, 2021 DOI: [https://doi.org/10.1016/S2468-1253\(21\)00295-8](https://doi.org/10.1016/S2468-1253(21)00295-8)

Mendoza YP, Shengir M, Bosch J, **Sebastiani G**, Berzigotti A. *FIB-4 improves LSM-based prediction of clinical decompensation in overweight or obese patients with compensated advanced chronic liver disease.* Clinical Gastroenterology Hepatology 2021 March 11: S1542-3565(21)00271.

Barkun AN, Alali A. *The Role of Hemostatic Powder in Endoscopic Hemostasis of Nonvariceal Upper Gastrointestinal Bleeding.* Ann Intern Med. 2021 Dec 7. doi: 10.7326/M21-4267. Online ahead of print. PMID: 34871058.



Dr. Alain Bitton

Profile photo taken by Owen Egan

Marino Amanda, Bessissow Ali, **Miller Corey S**, Valenti David, Boucher Louis M, Chaudhury Prosanto, Barkun Jeffrey, Forbes Nauzer, Khashab Mouen A, **Parent Josee, Waschke Kevin**, Martel Myriam, **Chen Yen-I**. (2021). *Modified EUS-guided double-balloon-occluded gastroenterostomy bypass (M-EPASS): a pilot study.* Endoscopy, ahead of print, doi:10.1055/a-1392-4546

Benmassaoud A, Bessissow T, Wong P, Fallone CA, Barkun A, Afif W, Forbes N, Martel M, Geraci O, **Chen YI**. *Novel Negative Pressure Protective Box in Upper Digestive Endoscopy: A Prospective Case Series.* Am J Gastroenterol. 2021 Jun 1;116(6):1339-1341.

Exciting Research in the Pipeline

2021 - 2023 **CIHR: "Digestive endoscopy in the era of COVID-19: an opportunity for optimizing care during the pandemic and beyond"**
Amount \$748,125

Dr. Alan Barkun (PI)

This grant will allow us to address in a more efficient and evidence-based approach the huge backlog of endoscopic procedures that has resulted from the COVID-19 pandemic

2021-2025 CIHR Canadian HIV Trials Network. Project: CTN 326: **The LIVEr disease in HIV Cohort Plus (LIVEHIV)**
Total: \$113,425

Dr. Giada Sebastiani (PI)

This award will help understand the role of fatty liver in the development of chronic liver disease in individuals living with HIV. The CIHR LIVE HIV cohort will involve more than 20 investigators in Canada and worldwide.

TransMedTech/MEDTEQ/Mitacs/Medical Starpax Inc/JGH Foundation; \$6.2M

A Phase I / II Study to Evaluate the Safety, Tolerability and Efficacy of Escalating and Multiple Dose Administration of Bn1-STM Bacteria Conjugated with Liposomal SN-38 with Tumor Targeting via the Starpax Magnetotaxi M1000TM

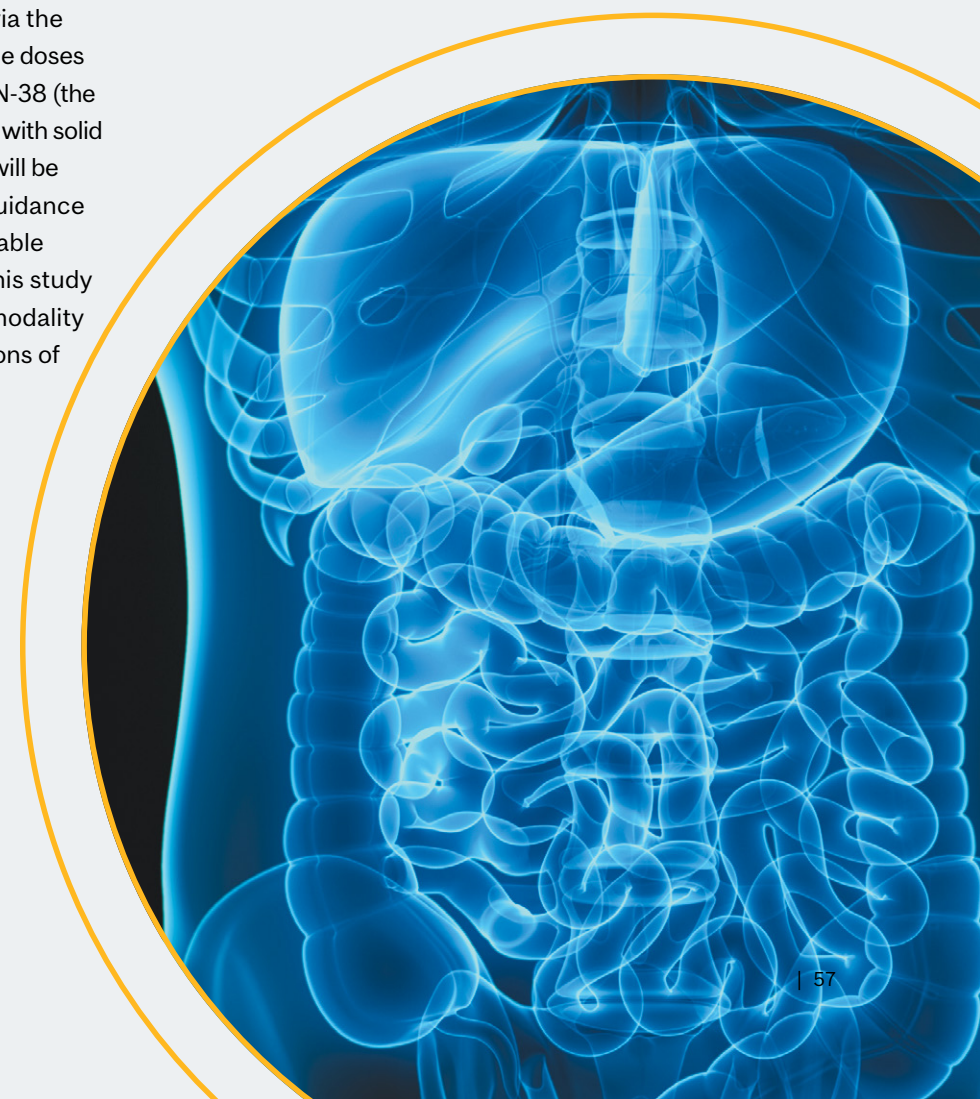
Dr. Corey Miller: Co-PI and lead for pancreas axis of clinical study

The goal of this project is to validate a novel, targeted, non-systemic delivery system for anti-cancer drugs in solid tumors. This combined phase I/II study will investigate the safety, tolerability and efficacy of administration and intra-tumoural targeting via the Magnetotaxi M1000™ of escalating and multiple doses of Bn1-STM bacteria conjugated with liposomal SN-38 (the active metabolite of irinotecan) in adult patients with solid tumours. For the pancreas axis, the treatment will be administered under endoscopic ultrasound guidance in patients with locally advanced or unresectable pancreatic adenocarcinoma. The results of this study and the development of this new treatment modality have the potential to significantly impact millions of patients with cancer.

Impactful Clinical Innovation

MUHC Portal Hypertension Group

To improve the care of patients with portal hypertension, we have created a unique multidisciplinary group bringing together hepatologists, therapeutic endoscopists, and interventional radiologists in a close collaborative effort to review and to advise on the management of patients with complications related to portal hypertension. We combine personalized evidence-based management strategies with cutting-edge interventions to guide the care of complex cases including bleeding from gastric, duodenal, cecal, and rectal varices. We are also working on improving the access to non-invasive physical diagnostic tools for portal hypertension. By raising awareness at the level of the MUHC and the MUHC Foundation, we are preparing the addition of innovative elastography techniques. Through our efforts, we hope to position the MUHC as a national and international leader in the field of portal hypertension.



General Internal Medicine

Leadership

- Dr. Vicky Tagalakis (McGill)
- Dr. Suzanne Morin (MUHC)
- Dr. Rubin Becker (JGH)
- Dr. Gail Goldman (SMH)

Report



12

CLINICIAN SCIENTISTS
& INVESTIGATORS



50

CLINICIAN TEACHERS
& EDUCATORS

5 Notable 2021 Publications

(**Division** or DOM primary member's name in **bold** type)

Berillo O, Ouerd S, Idris-Khodja N, Rehman A, Richer C, Sinnett D, Kwitek AE, Paradis P, **Schiffrin EL**. *Chromosome 2 fragment substitutions in Dahl salt-sensitive rats and RNA sequencing identified Enpep and Hs2st1 as vascular inflammatory modulators*. Hypertension. 2021;77:178-189. DOI: 10.1161/HYPERTENSIONAHA.120.15690.

ATTACC Investigators; ACTIV-4a Investigators; REMAP-CAP Investigators, Lawler PR, Goligher EC, Berger JS, Neal MD, McVerry BJ, Nicolau JC, Gong MN, Carrier M, Rosenson RS, Reynolds HR, Turgeon AF, Escobedo J, Huang DT, Bradbury CA, Houston BL, Kornblith LZ, Kumar A, **Kahn SR**, Cushman M, McQuilten Z, Slutsky AS, Kim KS, Gordon AC, Kirwan BA, Brooks MM, Higgins AM, Lewis RJ, Lorenzi E, Berry SM, Berry LR, Aday AW, Al-Beidh F, Annane D, Arabi YM, Aryal D, Baumann Kreuziger L, Beane A, Bhimani Z, Bihari S, Billett HH, Bond L, Bonten M, Brunkhorst F, Buxton M, Buzgau A, Castellucci LA, Chekuri S, Chen JT, Cheng AC, Chkhikvadze T, Coiffard B, Costantini TW, de Brouwer S, Derde LPG, Detry MA, Duggal A, Džavík V, Effron MB, Estcourt LJ, Everett BM, Fergusson DA, Fitzgerald M, Fowler RA, Galanaud JP, Galen BT, Gandotra S, García-Madróna S, Girard TD, Godoy LC, Goodman AL, Goossens H, Green C, Greenstein YY, Gross PL, Hamburg NM, Haniffa R, Hanna G, Hanna N, Hegde SM, Hendrickson CM, Hite RD, Hindenburg AA, Hope AA, Horowitz JM, Horvat CM, Hudock K, Hunt BJ, Husain M, Hyzy RC, Iyer VN, Jacobson JR, Jayakumar D, Keller NM, Khan A, Kim Y, Kindzelski AL,



Dr. Vicky Tagalakis

Profile photo taken by Felipe Argaez

King AJ, Knudson MM, Kornblith AE, Krishnan V, Kutcher ME, Laffan MA, Lamontagne F, Le Gal G, Leeper CM, Leifer ES, Lim G, Lima FG, Linstrum K, Litton E, Lopez-Sendon J, Lopez-Sendon Moreno JL, Lothar SA, Malhotra S, Marcos M, Saud Marinez A, Marshall JC, Marten N, Matthay MA, McAuley DF, **McDonald EG**, McGlothlin A, McGuinness SP, Middeldorp S, Montgomery SK, Moore SC, Morillo Guerrero R, Mouncey PR, Murthy S, Nair GB, Nair R, Nichol AD, Nunez-Garcia B, Pandey A, Park PK, Parke RL, Parker JC, Parnia S, Paul JD, Pérez González YS, Pompilio M, Prekker ME, Quigley JG, Rost NS, Rowan K, Santos FO, Santos M, Olombrada Santos M, Satterwhite L, Saunders CT, Schutgens REG, Seymour CW, Siegal DM, Silva DG Jr, Shankar-Hari M, Sheehan JP, Singhal AB, Solvason D, Stanworth SJ, Tritschler T, Turner AM, van Bentum-Puijk W, van de Veerdonk FL, van Diepen S, Vazquez-Grande G, Wahid L, Wareham V, Wells BJ, Widmer RJ, Wilson JG, Yuriditsky E, Zampieri FG, Angus DC, McArthur CJ, Webb SA, Farkouh ME, Hochman JS, Zarychanski R. *Therapeutic Anticoagulation with Heparin in Noncritically Ill Patients with Covid-19*. NEJM 2021 Aug 26;385(9):790-802.

Morin SN, Yan L, Lix LM, Leslie WD. *Long-term risk of subsequent major osteoporosis fracture and hip fracture in men and women: a population-based observational study with a 25-year follow-up*. Osteoporosis International 2021, June 24; PMID: 34165587

Ezer N, Belga S, Daneman N, Chan A, **Smith BM**, Daniels SA, Moran K, Besson C, Smyth LY, **Bartlett SJ**, **Benedetti A**, **Martin JG**, **Lee TC**, **McDonald EG**. *Inhaled and intranasal*

ciclesonide for the treatment of covid-19 in adult outpatients: CONTAIN phase II randomised controlled trial. BMJ 2021; 375:e068060 doi:10.1136/bmj-2021-068060.

Malhamé I, Danilack V., Raker C. A., Hardy E. J., Vrees R., Hurlburt H., Spalding H., Bouvier B. A., Savitz D. A., Mehta N. *Cardiovascular severe maternal morbidity in pregnant and postpartum women: development and internal validation of risk prediction models*. BJOG 2021 Apr;128(5):922-932 doi: 10.1111/1471-0528.16512. Epub 2020 Nov 4. PMID: 32946639.

Exciting Research in the Pipeline

2021-2024 CIHR - Institute of Human Development, Child and Youth Health

Project Grant **Atrial FIBrillation in Pregnancy: assessing severe maternal morbidity and anticoagulation strategies** (AFIB-PREG) Study.”

Nominated PI **Isabelle Malhamé**, co-PIs Dr. Anick Bérard, **Louise Pilote, Sasha Bernatsky** (\$275,400)

2021-2025 CIHR

Project Grant **Multifaceted Intervention using Telehealth to Reduce the risk of Falls and Fractures in Older Men** (MisterFit study): a Pilot study.”

PI **Suzanne Morin** (\$459,765)

2020-2025 UK Medical Research Council and Canadian Institutes of Health Research (CIHR)

UK Canada Diabetes Research Team grants 2019 celebrating 100th anniversary of insulin Remission of diabetes and improved diastolic function by combining structured exercise with meal replacement and food reintroduction.

Canadian Nominated PI **Kaberi Dasgupta**; UK Nominated PI: T Yates (\$950,000).

Impactful Clinical Innovation

Critical Illness Recovery Centre, MUHC Director, David Hornstein

The Critical Illness Recovery Centre was first conceived of in 2016, and opened in September 2018. The goal of the centre is to support patients post discharge from an ICU stay. Post Intensive Care Syndrome (PICS) comprises a set of physical cognitive, executive and emotional

challenges. Data shows that the Post Intensive Care Syndrome (PICS) affects 25 to 80 percent of patients discharged from the ICU.

As the MUHC is a tertiary and quaternary care centre, with a large number of ICU patients, this recovery centre is particularly important for the MUHC. The CIRC program involves individual visits with members of the multidisciplinary team as well as peer support group sessions with all the patients and family members together. The patient cohort attends the program for a four-week period in which they see all the professionals and attend four peer support sessions. Some patients from previous cohorts continue to participate in the weekly peer support sessions. Journaling is another important tool used to help patients recover.

This Centre responds to the care gap that most survivors of critical illness experience – their follow up needs are complex and oft times they do not receive appropriate attention to these needs, especially when the needs are not clearly physical. The Centre also provides a bridge to the patient's primary physician so that these can understand the depth of what the patient has been through, and can continue to support the patient.

Since the beginning of the Centre about 100 patients (and their family members) are being followed. Dr. Hornstein has raised his own funds for the clinical coordinator position via the Lauren Alexander support for the families' fund of the MGH Foundation. He continues to advocate for adequate resources for it, preparing a “fiche des projets” to have an MUHC approved/supported position. He has worked with trainees (both students and residents) to support and evaluate the program.

The impact of this program on individuals has been quite remarkable. “Life changing” comes up in several patient descriptions. Soon, the CHUM and Sacré Coeur will be setting up similar programs for their critically ill recovered patients.

Geriatric Medicine

Leadership

- Dr. José Morais (McGill / MUHC)
- Dr. Ruby Friedman (JGH)
- Dr. Shek Hong Fung (SMH)

Report

-  **3** CLINICIAN SCIENTISTS & INVESTIGATORS
-  **1** PHDS
-  **15** CLINICIAN TEACHERS & EDUCATORS



Dr. José Morais

Profile photo taken by Owen Egan

5 Notable 2021 Publications

(**Division** or DOM primary member's name in **bold** type)

Claire Godard-Sebillotte, Erin Strumpf, Nadia Sourial, Louis Rochette, Eric Pelletier, Isabelle Vedel. *Primary care continuity and avoidable hospitalization in persons with dementia*. J Am Geriatr Soc. 2021 May;69(5):1208-1220. doi: 10.1111/jgs.17049. Epub 2021 Feb 26. PMID: 33635538.

Jacob KJ, Sonjak V, Spendiff S, Hepple RT, Chevalier S, Perez A, **Morais JA**. *Mitochondrial Content, but Not Function, Is Altered With a Multimodal Resistance Training Protocol and Adequate Protein Intake in Leucine-Supplemented Pre/Frail Women*. Front Nutr. **2021** Jan 22;7:619216. doi: 10.3389/fnut.2020.619216

Launay CP, Lubov J, Galery K, Vilcoq C, Maubert É, Afilalo M, Beauchet O. *Prognosis tools for short-term adverse events in older emergency department users: result of a Québec observational prospective cohort*. BMC Geriatr. 2021 Jan 22;21(1):73. doi: 10.1186/s12877-020-01999-6.

Silverstone-Simard I, Wu J, Nassim M, Friedman R, Segal M, **Monette J**, Rej S. *Management of Agitation in Dementia and Effects on Inpatient Length of Stay*. Can Geriatr J. 2021 Jun 1;24(2):111-117. doi: 10.5770/cgj.24.483. eCollection 2021 Jun.

Zhao J, Rozenberg D, Nourouzpour S, Orchanian-Cheff A, Flannery J, Kaul R, Agbeyaka S, Barber M, dePeiza P, Doumouras AM, Draper H, Gebara N, Lau J, **Liberman D**, Luther RA, Sanh M, Furlan AD. *Positive impact of a telemedicine education program on practicing health care workers during the COVID-19 pandemic in Ontario, Canada: A mixed methods study of an Extension for Community Healthcare Outcomes (ECHO) program*. Journal of Telemedicine and Telecare. December 2021. doi:10.1177/1357633X211059688.

Exciting Research in the Pipeline

CIHR - Project Grant - Ketone bodies as therapeutic agents to reduce the harmful effects of bed rest on muscle mass and metabolic health in older adults.

2020/05 - 2023/04 - \$420,751

PI: Churchward-Venne T. **Co-Applicants:** Chevalier S, Gouspillou G, **Morais JA**

Canadian Space Agency - Microgravity Research Activity: Understanding the health impact of inactivity for the benefit of older adults and astronauts Initiative.

07/2020 - 04/2022 \$1,785,000

PI: Morais, JA

Rosy Cancer Network (RCN), Cancer Quality & Innovation Program (CQI) - Personalized Prehabilitation for Older Patients with Colorectal Cancer Surgery and Low Physical Performance: Understanding Which Factors Influence Functional Capacity.

06/2020 - 05/2021 \$91,847

PI: Morais JA and Carli F. Co-Applicants: S Liberman, Boutros M, **Levinoff E**.

Impactful Clinical Innovation

Medical coordination of the medical response in private residences of the CIUSSS ODIM territory during the 2nd wave of COVID with creation of Mobile Rapid Intervention Teams under the leadership of Dr. Julia Chabot, from St-Mary's Hospital.



Hematology

Leadership

- Dr. Hans Knecht (McGill / JGH)
- Dr. Molly Warner (MUHC);
Dr. Chantal Séguin (as of February 2022)
- Dr. Adrian Lenglé (SMH)

Report

	8	CLINICIAN SCIENTISTS & INVESTIGATORS
	3	PHDS
	21	CLINICIAN TEACHERS & EDUCATORS

5 Notable 2021 Publications

(**Division** or DOM primary member's name in **bold** type)

Isnard S, Lin J, Bu S, Fombuena B, Royston L, **Routy JP**. *Gut Leakage of Fungal-Related Products: Turning Up the Heat for HIV Infection*. Front Immunol. 2021 Apr 12;12:656414. doi: 10.3389/fimmu.2021.656414. PMID: 33912183; PMCID: PMC8071945.

Rys RN, Wever CM, Geoffrion D, Goncalves C, Ghassemian A, Brailovski E, Ryan J, Stoica L, Hébert J, Petrogiannis-Haliotis T, Dmitrienko S, Frenkiel S, Staiger A, Ott G, Steidl C, Scott DW, Sesques P, Del Rincon S, Mann KK, Letai A, **Johnson NA**. *Apoptotic Blocks in Primary Non-Hodgkin B Cell Lymphomas Identified by BH3 Profiling*. Cancers (Basel). 2021 Feb 28;13(5):1002. doi: 10.3390/cancers13051002. PMID: 33670870; PMCID: PMC7957722.

Morin RD, Arthur SE, **Assouline S**. *Treating lymphoma is now a bit EZ-er*. Blood Adv. 2021 Apr 27;5(8):2256-2263. doi: 10.1182/bloodadvances.2020002773. PMID: 33904892; PMCID: PMC8095133.

Royston L, Isnard S, Lin J, **Routy JP**. *Cytomegalovirus as an Uninvited Guest in the Response to Vaccines in People Living with HIV*. Viruses. 2021 Jun 29;13(7):1266. doi: 10.3390/v13071266. PMID: 34209711; PMCID: PMC8309982.



Dr. Hans Knecht

Profile photo taken by Felipe Argaez

Bazinet A, Heath J, Chong AS, Simo-Cheyrou ER, Worme S, Rivera Polo B, **Foulkes WD, Caplan S, Johnson NA, Orthwein A, Mercier FE**. *Common clonal origin of chronic myelomonocytic leukemia and B-cell acute lymphoblastic leukemia in a patient with a germline CHEK2 variant*. Cold Spring Harb Mol Case Stud. 2021 Jun 11;7(3):a006090. doi: 10.1101/mcs.a006090. PMID: 33986034; PMCID: PMC8208041.

Exciting Research in the Pipeline

Novartis Canada Ltd. Investigator sponsored study. (2021-2025) \$ 1,700 000

Québec treatment free remission attempt in imatinib-treated CP-CML patients - the role of ABL001/asciminib (QC-TFR1-ABL001)

PI: Dr. Sarit Assouline

Treatment-free remission (TFR) is an important breakthrough for patients with chronic myelogenous leukemia (CML). Approximately 50% of patients on first line imatinib in sustained deep molecular response (DMR) can achieve a first TFR. Second generation TKIs may bring more patients to meet criteria for a TFR attempt but are not associated with a greater chance of achieving a longer TFR. Thus new therapeutic approaches with the potential to increase TFR success rate in patients discontinuing imatinib are needed. Asciminib is a first-in-class STAMP (Specifically Targeting the ABL Myristoyl Pocket) inhibitor that binds to the myristoyl pocket of ABL1 and induces

the formation of an inactive kinase conformation. The demonstrated synergy between imatinib and the BCR-ABL allosteric inhibitor asciminib provides an attractive option to improve TFR that has yet to be investigated. The aim of this study is to establish if consolidation of imatinib-treated patients in first and stable DMR, through the addition of asciminib, can lead to superior rates of TFR1, compared to imatinib alone.

Dr. Sarit Assouline, with the collaboration and support of the GQR-LMC/NMP (Groupe Québécois de recherche en leucémie myéloïde chronique et néoplasie myéloproliférative), is leading an investigator-sponsored, phase III randomized, open-label, superiority trial of asciminib + imatinib vs. imatinib administered over 1 year followed by TKI cessation and follow up for rate of TFR. This study aims to recruit eligible CML-CP patients from across Quebec, who have been taking imatinib as a first-line treatment for at least 4 years and have achieved DMR for at least one year. Subjects will be recruited and followed in an outpatient setting. This study will also examine the value of early molecular response, presence or absence of CHIP (Clonal Hematopoiesis of Indeterminate Potential) and the microbiome on TFR success. Overall, for the patients this is new hope towards achievement of a longstanding, successful treatment discontinuation.

Foundation: Doggone Foundation, Elspeth McConnell. (2021-2023) \$1,000 000.-

Rare Congenital Blood Disorders, kids to adults
(Program name)

PI: Dr. Margaret Warner

This grant offers support for an exciting rapidly evolving field of rare congenital blood disorders, spanning the lifetime of a patient, from birth, through transition to adulthood, to mature years. They include bleeding disorders, hemoglobinopathies, red cell membrano- and enzymopathies, thrombotic conditions and marrow failure syndromes. For the first time, many exciting novel treatments, sometimes curative, are becoming available for these patients, who previously had few alternatives. With this generous grant, we have built a team with both clinical and research endpoints, with a strong focus on transition. Dr Margaret Warner (adult hematology) and Dr Catherine Vézina (paediatric hematology) will be co-directors for the project at the outset.

Several novel and exciting research projects have been started including gene therapy for hemophilia B and disease modifying agents such as P-selectin inhibitors for sickle cell anemia. Further projects for congenital thrombotic conditions (working with the International Society of Thrombosis and Haemostasis, ISTH) are under way. Most recently, building on its gene therapy experience, the team has been approached to consider Crisper therapies for hemophilia B patients in the future. The MUHC and its paediatric and adult teams on one site for the first time, represent an opportunity for these goals to be addressed and met.

Canadian Myeloma Research Group - Research to Remission Grant. (2021-2022) \$150,000

Impact of maintenance therapy after salvage autologous stem cell transplantation in relapsed multiple myeloma

PI: Dr Rayan Kaedbey

Dr. Rayan Kaedbey, director of the autologous stem cell transplant program and apheresis center at JGH, successfully integrated the myeloma program into the Canadian Myeloma Research Group (CMRG), where he acts as a member of the database steering committee. He specialized in plasma cell dyscrasias with a focus on multiple myeloma.

The aim of the current grant is to evaluate the impact of salvage transplants at the time of relapse in patients with multiple myeloma in the era of more relevant clinical practice. These transplants have been studied and performed prior to the routine use of maintenance therapy and prior to the introduction of more novel agents, including anti-CD38 monoclonal antibodies. The improved outcomes for patients with relapsed myeloma with these new regimens has put into question whether a second transplant is in fact needed. With this in depth analysis, the goal is to be able to understand and perhaps better select a subgroup of patients for whom a salvage transplant is beneficial versus those that can be treated more conservatively with the newer therapies. The results of this study will be meaningful for optimal management of a group of elderly, often frail patients.

Impactful Clinical Innovation

Chimeric Antigen Receptor (CAR)-T Cell Therapy

Chimeric antigen receptor (CAR)-T cell therapy is an innovative new cornerstone in cancer treatment. In hematologic malignancies, in particular in B-Acute Lymphoblastic Leukemia (B-ALL) and Diffuse Large B Cell Lymphoma (DLBCL), CAR-T cell therapy is remarkably effective.

In 2021, Dr. Michael Sebag has successfully implemented the CAR-T Program at the MUHC. This represents a major success in cutting-edge, tailored leukemia and lymphoma treatment. The MUHC Immune Effector Cell program has officially been designated by the MSSS as an accredited site for delivery of chimeric antigen receptor T cell (Car-T) cell products. CAR-T cells are cellular therapies that derive from patient autologous lymphocytes that are engineered to target cancer and then are re-infused into patients. Following FACT (Foundation for the Accreditation of Cellular Therapies) accreditation, the MUHC cell therapy program has grown to accommodate this exciting form of cancer therapy. Cooperation and coordination with other medical services (ICU, neurology, ER) is mandatory for the care of these patients and was crucial for a successful start.

The current Health Canada indications for CAR-T cells are for ALL in young adults, DLBCL after two previous lines of therapy, Mantle Cell Lymphoma (MCL) after two lines of previous therapy and Multiple Myeloma (MM) after three lines of previous therapy. For the moment, only the first two indications are on the MSSS formulary and we collaborate with two pharmaceutical partners to manufacture CAR-T products (Novartis and Gilead/Kite). However, the indications are rapidly expanding as this treatment proves itself effective in other diseases and settings. Our current projected volumes are approximately 25 cases per year, but these could easily double in the near future.

High Performance Teaching and Research Microscopes

Blood and bone marrow cytology teaching at the microscope represents a cornerstone in the Hematology Fellow formation. The JGH Division of Hematology and the JGH Foundation are proud that October 18, 2021, two top performance ZEISS AxioScope.5 Co-Observation systems (4 heads & 2 heads) were installed on new special tables in the D-136 morphology room. These instruments are owned by the JGH Hematology Division and are designated for teaching and research only. McGill Fellows, Residents and Staffers are fascinated by the quality of the optical systems and the corresponding precision of the high-resolution screens. Scientific work with Fellows is already under way.

Infectious Diseases

Leadership

- Dr. Marcel Behr (McGill / MUHC)
- Dr. Karl Weiss (JGH)
- Dr. Joe Dylewski (SMH)

Report

	10	CLINICIAN SCIENTISTS & INVESTIGATORS
	8	PHDS
	20	CLINICIAN TEACHERS & EDUCATORS

5 Notable 2021 Publications

(**Division** or DOM primary member's name in **bold type**)

Cheng MP, Lawandi A, Butler-Laporte G, De l'Étoile-Morel S, Paquette K, **Lee TC**. *Adjunctive Daptomycin in the Treatment of Methicillin-susceptible Staphylococcus aureus Bacteremia: A Randomized, Controlled Trial*. Clin Infect Dis. 2021 May 4;72(9):e196-e203. doi: 10.1093/cid/ciaa1000. PMID: 32667982

Ward BJ, Gobeil P, Séguin A, Atkins J, Boulay I, Charbonneau PY, Couture M, D'Aoust MA, Dhaliwall J, Finkle C, Hager K, Mahmood A, Makarkov A, **Cheng M**, Pillet S, Schimke P, St-Martin S, Trépanier S, Landry N. *Phase 1 trial of a Candidate Recombinant Virus-Like Particle Vaccine Produced in Plants for Covid-19 Disease*. Nature Medicine 2021 May 18. doi: 10.1038/s41591-021-01370-1.

Behr MA, Kaufmann E, Duffin J, Edelstein PH, Ramakrishnan L. *Latent Tuberculosis: Two Centuries of Confusion*. Am J Respir Crit Care Med. 2021 Jul 15;204(2):142-148

Yansouni CP, Papenburg J, **Cheng MP**, Corsini R, Caya C, Vasquez Camargo F, Harrison LB, **Zaharatos G**, Büscher P, Faye B, Ndiaye M, Matlashewski G, **Ndao M**. *Specificity of SARS-CoV-2 Antibody Detection Assays against S and N Proteins among Pre-COVID-19 Sera from Patients with Protozoan and Helminth Parasitic Infections*. J Clin Microbiol. 2022 Jan 19;60(1):e0171721. doi: 10.1128/JCM.01717-21. Epub 2021 Oct 20. PMID: 34669455



Dr. Marcel Behr

Profile photo taken by Owen Egan

Goguen RP, Del Corpo O, Malard CMG, Daher A, Alpuche-Lazcano SP, Chen MJ, Scarborough RJ, **Gatignol A**. *Efficacy, accumulation and transcriptional profile of anti-HIV shRNAs expressed from human U6, 7SK and H1 promoters*. Mol. Ther. Nucleic Acids. 2021. 23 :1020-1034.

Exciting Research in the Pipeline

Michael Libman: GeoSentinel award

Awarded in Sept 2021 in the amount of USD\$7.5 million over 5 years, this award aims to shift GeoSentinel from being a surveillance network to a network doing research on the movement of infectious diseases across international borders via travel and migration. The funding is for the Network, but several specific research projects are embedded.

Impactful Clinical Innovation

Don Vinh: Based on the detection of auto-antibodies to interferon in COVID-19, Dr. Vinh is developing a platform for auto-antibodies to other immune targets (cytokine, receptor, etc), in order to be able to test whether these underlie some (many?) of the infections we see.

Medical Biochemistry

Leadership

- Dr. David Blank (McGill / MUHC)
- Dr. Elizabeth MacNamara (JGH)

Report

-  **1** CLINICIAN SCIENTISTS & INVESTIGATORS
-  **2** PHDS
-  **8** CLINICIAN TEACHERS & EDUCATORS

5 Notable 2021 Publications

(**Division** or DOM primary member's name in **bold** type)

Paquette M, Fantino M., Bernard, S., **Baass A.** *Paternal inheritance predicts earlier cardiovascular event onset in patients with familial hypercholesterolemia.* Atherosclerosis. 2021 Jul;329:9-13. doi: 10.1016/j.atherosclerosis.2021.06.006. Epub 2021 Jun 11.

Paquette M, Bernard, S., Cariou B., Hegele R. A., **Genest J.**, Trinder M., Brunham L. R., Béliard S., **Baass A.** *Familial Hypercholesterolemia-Risk-Score: A New Score Predicting Cardiovascular Events and Cardiovascular Mortality in Familial Hypercholesterolemia.* Arterioscler Thromb Vasc Biol. 2021 Oct;41(10):2632-2640. doi: 10.1161/ATVBAHA.121.316106. Epub 2021 Aug 26.

Sorin M., Walkins D., **Gilfix B.M, Rosenblatt D.S.** *Methionine Dependence in Tumor Cells: The potential role of Cobalamin and MMACHC.* Molecular Genetics and Metabolism 2021 Mar; 132:1510161. Doi: 10.1016/j.ymgme.2021.01.006. Epub 2021 Jan 13. PMID 33487542

Lepage, M. A., Rozza, N., **Kremer, R., Grunbaum, A.** *Safety and effectiveness concerns of lopinavir/ritonavir in COVID-19 affected patients: a retrospective series.* Clinical toxicology (Philadelphia, Pa.) 2021, 59(7), 644–647. <https://doi.org/10.1080/15563650.2020.1842882>

Beltran-Bless A., **Murshed M.**, Zakikhani M., Kuchuk I., Bouganim N., Robertson S., Kekre N., Vandermeer L., Li J., Addison C.L., Rauch F., Clemons M., **Kremer R.** *Histomorphometric and microarchitectural analysis of bone in metastatic breast cancer patients.* Bone Reports 2021 Oct 22;15:101145. doi: 10.1016/j.bonr.2021.101145. PMID: 34841014; PMCID: PMC8605385.

Exciting Research in the Pipeline

Effect of 1,25-dihydroxyvitamin D3 on control of cell growth and differentiation

PI: **Richard Kremer**

Funded by: Canadian Institutes of Health Research (CIHR): 04/2019 - 03/24. Amount: \$914,175.

A lack of vitamin D has been linked to the development and progression of several types of cancer including breast cancer. Most breast cancer patients who have a recurrence will develop cancer spread to the skeleton, which causes considerable suffering and morbidity including pain and fractures. Bone metastases are currently treated with anti-resorptive agents such as the potent bisphosphonate zoledronate (zometa) or Denosumab (Xgeva) that help reduce bone destruction by cancer cells. Unfortunately, these agents are not a cure and the number of patients experiencing skeletal complications is reduced by only 40%. Furthermore, these agents do not show any benefit on survival which exemplifies the need for novel therapies and/or agents that will improve the efficacy of current therapies.

In this proposal we will build on our recent finding that vitamin D deficiency activates the bone marrow environment and help cancer cells seed and grow in this favorable “soil”. We aim to develop improved vitamin D therapies with minimal side effects by enhancing the local activity of vitamin D in the bone microenvironment. For this purpose, we have developed unique pre-clinical models to test this hypothesis.

This innovative therapeutic approach when combined with approved anti-resorptive therapies such as bisphosphonates and Denosumab aims to significantly improve the devastating skeletal complications seen in the great majority of patients with advanced breast cancer.

Impactful Clinical Innovation

Pre-eclampsia Screening Test

Drs. Ami Grunbaum and Isabelle Malhamé (Internal Medicine) working with Dr. Richard Brown (Obstetrics and Gynecology) are in the process of introducing The sFit/PIGF ratio at the MUHC.

Pre-eclampsia (PET) is a multisystem disorder that carries a significant risk of maternal and/or fetal morbidity and mortality. It is thought to be related to problems with placental development and is characterized by hypertension and proteinuria. Other symptoms include headache, visual disturbances, epigastric pain, edema and oliguria. If not diagnosed and closely monitored, it can lead to potentially life-threatening complications (e.g. HELLP syndrome, DIC, stroke, or organ dysfunction). The fetus may also be affected (e.g. intrauterine growth restriction, prematurity, death). Current management of suspected PET involves admission to hospital for treatment and monitoring. However, the manifestation and development of PET is varied, making it difficult to identify which women are the most at risk of developing complications.

The McGill University Health Centre (MUHC) includes 5 maternity wards, including 2 high risk maternity wards. Over 16000 deliveries are performed annually, including 1000 high-risk deliveries. For the year 2019, 400 deliveries at the Glen site were complicated by preeclampsia. The MUHC has national and international recognition for its fetomaternal program.

A blood test can be used to identify those women at very low or very high risk of imminently developing PET. The sFit/PIGF ratio measures the ratio of two biomarkers, soluble fms-like tyrosine kinase 1 (sFit) and placental growth factor (PIGF). This is raised in women with PET, as well as those who are developing PET. This test can be used to assess the risk of developing PET, enabling appropriate admission or follow-up plans to be made.

Based on published data and internal estimates of hospitalization costs for the MUHC and the province of Quebec while accounting for the expected costs of preeclampsia marker tests, we estimate a potential net savings of \$405 to \$870 per patient tested.

The introduction of these tests into the Quebec repertoire has the potential to dramatically decrease both laboratory and hospital costs and use of resources as well as improve the quality of life and care of the affected patients. These tests will be used in conjunction with clinical findings to rule in or rule out progression of preeclampsia. Patients with reassuring tests results will be able to avoid unnecessary hospitalization, investigations and treatments along with potential nosocomial morbidities associated with unnecessary pre-natal hospitalizations.



Medical Oncology



Roughly 50% of the medical oncologists at McGill hold their primary faculty (academic) appointment in the McGill Department of Medicine, and the other half are primary in the McGill Department of Oncology.

The DOM Annual Reports of 2019 and 2020 did not include information related to the DOM-affiliated medical oncologists. As of this year, we will report on the activities of this part of the DOM family.

Leadership

- Dr. Thierry Alcindor (MUHC)

Report

	2	CLINICIAN SCIENTISTS & INVESTIGATORS
	3	CLINICIAN TEACHERS & EDUCATORS

5 Notable 2021 Publications

(**Division** or DOM primary member's name in **bold** type)

Alcindor T. *Cancer and Neurofibromatosis Type 1: confirming what we knew and learning something new.* JAMA Network Open. 2021 Mar 1;4(3):e211061. doi: 10.1001/jamanetworkopen.2021.1061.

Alcindor T, Dumitra S, Albritton K, Thomas DM. *Disparities in sarcoma care: the example of sarcoma-In search of solutions for a global issue.* ASCO Educational Book 2021 Mar;41:1-7. doi: 10.1200/EDBK_320463

van de Sande MAJ, Tap WD, Gelhorn HL, Yen X, Speck RM, Palmerini E, Stacchiotti S, Desai J, Wagner AJ, **Alcindor T,** Ganjoo K, Martín-Broto J, Qiang Wang Q, Shuster D, Gelderblom H, Healey J. *Pexidartinib Improves Physical Functioning and Stiffness in Patients with Tenosynovial Giant Cell Tumor: Results from the ENLIVEN Randomized Clinical Trial.* Acta Orthopaedica. 2021 May 12:1-7. doi: 10.1080/17453674.2021.1922161. Online ahead of print

Patricia A Ganz, Reena S Cecchini, Louis Fehrenbacher, Charles E Geyer Jr, Priya Rastogi, John P Crown, **Michael P Thirlwell** et al. *NRG Oncology/NSABP B-47*

menstrual history study: impact of adjuvant chemotherapy with and without trastuzumab. NPJ Breast Cancer. 2021 May 20;7(1):55.

Andrews MC, Duong CPM, Gopalakrishnan V, Iebba V, Chen WS, Derosa L, Khan MAW, Cogdill AP, White MG, Wong MC, Ferrere G, Fluckiger A, Roberti MP, Opolon P, Alou MT, Yonekura S, Roh W, Spencer CN, Curbelo IF, Vence L, Reuben A, Johnson S, Arora R, Morad G, Lastrapes M, Baruch EN, Little L, Gumbs C, Cooper ZA, Prieto PA, Wani K, Lazar AJ, Tetzlaff MT, Hudgens CW, Callahan MK, Adamow M, Postow MA, Ariyan CE, Gaudreau PO, Nezi L, Raoult D, **Mihalcioiu C,** Elkrief A, Pezo RC, Haydu LE, Simon JM, Tawbi HA, McQuade J, Hwu P, Hwu WJ, Amaria RN, Burton EM, Woodman SE, Watowich S, Diab A, Patel SP, Glitza IC, Wong MK, Zhao L, Zhang J, Ajami NJ, Petrosino J, Jenq RR, Davies MA, Gershenwald JE, Futreal PA, Sharma P, Allison JP, Routy B, Zitvogel L, Wargo JA. Andrews MC, et al. *Gut microbiota signatures are associated with toxicity to combined CTLA-4 and PD-1 blockade.* Nat Med. 2021 Aug;27(8):1432-1441

Exciting Research in the Pipeline

Dr. Alcindor is co-investigator on a Canadian Institutes of Health Research (CIHR) grant for a Canadian Cancer Trials Group (CCTG)-endorsed trial that examines the impact of circulating tumor DNA (ctDNA) on decisions about adjuvant chemotherapy for colorectal cancer.

After being co-investigator on a Terry Fox Research Institute grant for research on melanoma, Dr. Mihalcioiu has obtained more funding through philanthropic donations to develop liquid biopsies as a research tool at the MUHC.

Dr. Thirlwell played an instrumental role in the development of neratinib, a novel oral anti-HER2 agent, considered as promising in the treatment of breast cancer.

Impactful Clinical Innovation

With the help of Nursing and Oncology Pharmacy, Dr. Christine Legler and Dr. Alcindor have spearheaded a project where patients on clinical trial now receive their treatment at the Center for Innovative Medicine (CIM) under safety conditions similar to those of the Oncology Day Center at the Cedars Cancer Center. This results, in turn, in easier access to timely chemotherapy appointments for patients receiving standard-of-care treatments off trials.

Nephrology

Leadership

- Dr. Rita Suri (McGill / MUHC)
- Dr. Mark Lipman (JGH)
- Dr. Johana Eid (SMH)

Report

	5	CLINICIAN SCIENTISTS & INVESTIGATORS
	1	PHD
	21	CLINICIAN TEACHERS & EDUCATORS

5 Notable 2021 Publications

(**Division** or DOM primary member's name in **bold** type)

Matsuda J, Asano-Matsuda K, Kitzler TM, **Takano T.** *Rho GTPase regulatory proteins in podocytes.* Kidney Int. 2021 Feb;99(2):336-345.

Goupil R, Benlarbi M, Beaubien-Souligny W, Nadeau-Fredette AC, Chatterjee D, Goyette G, Gunaratnam L, Lamarche C, Tom A, Finzi A, **Suri RS;** for the Réseau Rénal Québécois (Quebec Renal Network) COVID-19 Study Investigators. *Short-term antibody response after 1 dose of BNT162b2 vaccine in patients receiving hemodialysis.* CMAJ. 2021 May;193(22):E793-E800.

Mavrakanas TA, Kamal O, Charytan DM. *Prasugrel and Ticagrelor in Patients with Drug-Eluting Stents and Kidney Failure.* Clin J Am Soc Nephrol. 2021 May;16(5):757-764.

Torban E, Sokol SY. *Planar cell polarity pathway in kidney development, function and disease.* Nat Rev Nephrol. 2021 Jun;17(6):369-385.

Sandal S, Ahn JB, Segev DL, **Cantarovich M,** McAdams-DeMarco MA. *Comparing outcomes of third and fourth kidney transplantation in older and younger patients.* Am J Transplant. 2021 Dec;21(12):4023-4031.



Dr. Rita Suri

Profile photo taken by Christinne Muschi

Exciting Research in the Pipeline

Project Title: **Actin regulation of ciliogenesis: unraveling novel mechanisms of human ciliopathies caused by mutations in the PCP effector genes.**

Nominated PI: **Elena Torban**

Source: Canadian Institutes of Health Research
Dates: 2021-2025

Funding: **\$776,475**

Description: Some very severe human developmental disorders are caused by dysfunction of the microscopic hair-like structure (primary cilium). Primary cilium projects from most cells in the human body and acts like a "GPS-antenna" to survey the environment outside cells and transduce this information into inside the cell so that the cells can adjust their shape, movement and proliferation and other functions during organ development. It is therefore not surprising that defects in primary cilia lead to a wide-range of congenital abnormalities affecting brain, heart, skeleton, and kidneys. Ciliopathies are incurable and may cause fetal death, considerable morbidity after birth or reduced longevity. Investigation of the functions of the genes mutated in humans is crucial if we want to find a cure for ciliopathies. We focus on a specific group of genes (Fuzzy, Inturned and Wdpcp), termed PCP effectors. Mutations in these 3 genes are associated with various human ciliopathies which feature facial and rib defects, neural tube defects, and cystic kidneys. Mouse

mutants for these genes have severe malformations, which resemble features of humans with PCP effector gene mutations. Using cells and mice bearing mutations of the Fuzzy as our main experimental model, we will try to identify and explain the mechanisms through which loss of Fuzzy (and its molecular partners, Inturned and Wdpcp) disturbs generation of cilia and distorts the ciliary signals that are so crucial for normal development. Based on our studies, we hope to offer novel therapeutic strategy for the severe human developmental defects caused by the mutation in the PCP effector genes and, likely, other ciliopathies.

Project Title: **Adverse Effects of SARS-CoV-2 Vaccines in Kidney Transplant Recipients**

Co-PIs: **Ruth Sapir-Pichhadze, Ioannis Ragoussis**

Sources: Canadian Institutes of Health Research, Emerging COVID-19 Research Gaps & Priorities

Dates: 2021/09 – 2022/09

Funding: **\$499,844 (CAD)**

Description: The COVID-19 pandemic has presented an unprecedented challenge to Canada. To date, >1.5 million Canadians have been infected with the SARS-CoV-2 virus, and >27,000 individuals have died. The impact is even greater in kidney transplant recipients (KTR), often including members of ethnocultural, Indigenous, marginalized communities, with incidence exceeding that of the general population by 15-fold, and risk of death also higher. Differences between KTR and the general population have been attributed to immunosuppression geared towards attenuating the immune response and thus prevent rejection. The immunosuppressed state contributes to markedly lower neutralizing antibody responses to SARS-CoV-2 vaccines in KTR, which may still be offering protection; however, vaccine-induced anti-HLA antibody development, may increase risk of graft rejection and loss. Immune response to vaccines, viruses, and donor specific proteins (HLA) by KTRs' sex and age, with young females generating greater innate and adaptive immune responses than males. Our study will utilize longitudinally collected biospecimens from the MUHC Kidney Disease Biorepository. We will ascertain donor and recipient HLA genotypes by next generation sequencing, and anti-HLA antibodies - by solid phase assays. Using high-resolution genomic technologies, we will study the molecular makeup of blood immune cells

and their activity. Simultaneous profiling of variation in genomic sequence of receptors on immune cells will allow us to identify expansion of antibody forming cells and their relative distribution before and after vaccination. We will evaluate desirable as well as undesirable antibody responses to mRNA SARS-CoV-2 vaccines and how they are modified by timing, dose, and vaccine product, as well as KTRs' age and sex. This work will offer solutions towards the prevention of SARS-CoV-2 infection and decrease risk of graft rejection through personalized management of vulnerable KTR.

Project Title: **Health system barriers and facilitators to living donor kidney transplantation**

Nominated PI: **Shaifali Sandal**

Source: Kidney Foundation of Canada

Dates: 2021/07-2023/06

Funding: **\$100,000 (CAD)**

Description: Living donor kidney transplantation (LDKT) is the best treatment option for patients with kidney failure. However, LDKT rates have stagnated in Canada and vary widely across provinces. The reasons for this are poorly understood. Current efforts to increase LDKT focus on individual levels of a health system in silos; however, a health system is a multi-level and interconnected network that is comprised of patients, care teams, organizations and environments. In this study, we aim to identify barriers and facilitators to LDKT at the level of health systems. We will conduct a comparative case study, which entails analyzing similarities, differences, and patterns across multiple cases. We will first conduct independent case studies of three health systems with high (BC), moderate (ON), and low (QC) rates of LDKT. Data collection methods include document review, interviews, and field visits. Individual cases will be analysed thematically. We will then conduct a comparative case analysis, an analytical method that provides a structured approach to studying complex causal relationships through the in-depth and comparative study of individual cases. During this stage, we will also conduct focus groups with key national stakeholders, to better contextualise our analysis. Final themes regarding health system barriers and facilitators to LDKT will be grounded in thorough in-case and between-case analyses. We will identify health system facilitators and barriers to LDKT by learning from three existing health systems with variable LDKT

performance, in order to inform policy and promote the development of pan-Canadian approach to optimize LDKT in all provinces.

Impactful Clinical Innovation

Improving the Quality, Safety, and Costs of Dialysis Care at the MUHC

MUHC dialysis leadership team – Drs. Suri, Trinh, Vasilevsky, Podymow, Weber, Takano; Ms. Nancy Filteau, Mr. Harold Villaruel, Ms. Jerrica McKinnon; and Mr. Alexander Tom.

Currently, 27,000 Canadian patients with end-stage kidney disease are being treated with chronic dialysis at a cost of \$2.2 billion dollars annually. Dialysis is an intensive prolonged therapy that requires assessment and management of multiple physiological parameters on a daily basis, including hemodynamics, fluid balance, body temperature, laboratory variables, and patient symptoms. While technologies for *dialysis delivery* have improved substantially over the last several decades, in Canada the management and prescription of patients' dialysis treatments remains generally inefficient, non-standardized, and laborious with little automation of quality monitoring. This is partially the result of inertia and costs associated with instituting automation and standards.

In collaboration with our information technology specialist, Mr. Alex Tom, our team of dialysis physicians have been working to improve the functionality of our dialysis electronic medical record (EMR) and develop

algorithms, in order to optimize the care of dialysis and pre-dialysis patients at the MUHC. These algorithms are being used to provide clinical care, monitor quality of care, and determine eligibility for clinical trial enrolment so that the appropriate trials are offered to the maximum number of patients. Some examples of projects that have been completed and are ongoing are:

- identifying patients who require reduction in immunosuppression after failed kidney transplant;
- ensuring all patients are on the most appropriate treatment for anemia and iron deficiency and
- meeting evidence-based targets;
- monitoring access problems and reduce excessive use of thrombolytics;
- eliminating use of dialysate additives and unnecessary medications;
- identifying those who have not yet had level of intervention discussed and formally documented;
- systematically following vaccination status and vaccinating those who require it;
- identifying pre-dialysis patients who would be suitable candidates for home dialysis and transplantation;
- estimating the number of patients who will need dialysis at the MUHC over the next 5 years in order to plan personnel and resource needs;
- identifying patients meeting eligibility criteria for randomized trials to increase enrolment.

Physiatry / Rehab Service

Leadership

- Dr. Mohan Radhakrishna (McGill / MUHC)

Report

-  **1** CLINICIAN SCIENTISTS & INVESTIGATORS
-  **4** CLINICIAN TEACHERS & EDUCATORS



Dr. Mohan Radhakrishna

Profile photo taken by Owen Egan

5 Notable 2021 Publications

(**Division** or DOM primary member's name in **bold** type)

Zhao X, **Gao C**, Dai F, Treggiari MM, Deshpande R, Meng LZ. *Apixaban associated with lower mortality in critically ill COVID-19 patients during the first pandemic wave: cohort study across a health care system.* Under review - Anesthesiology

Song A, Kim P, Ayers GD, **Gao C**, Giri A, Jain NB. *Risk factors for degenerative, symptomatic rotator cuff tears: a case-control study.* Under review - Journal of Bone and Joint Surgery

Khadadah S, **Kimoff RJ**, Duquette P, Jobin V, Lapierre Y, **Benedetti A**, Johara FT, Robinson A, Roger E, Bar-Or A, Leonard G, **Kaminska M**, Trojan DA. *Effect of continuous positive airway pressure treatment of obstructive sleep apnea-hypopnea in multiple sclerosis: A randomized, double blind, placebo-controlled trial (SAMS-PAP study).* Multiple Sclerosis Journal 2022;28(1):82-92.

Exciting Research in the Pipeline

04/2012-03/2021 ***Trojan DA**, ***Kimoff J**, Bar-Or A, Kaminska M, Lapierre Y, Duquette P, Jobin V, **Benedetti A**. Operating Grant (renewal), Multiple Sclerosis Society of Canada, for "**A randomized, controlled, clinical trial of continuous positive airway treatment of obstructive sleep apnea-hypopnea in multiple sclerosis,**" \$95,000 per year for three years. The study has been extended for an additional six years (no cost extension). All the investigators are at McGill except for Drs. Duquette and Jobin (CHUM).

Fatigue is the most common and typically most disabling symptom for multiple sclerosis (MS) patients. Sleep disorders are common in MS and are related to fatigue. In a previous study, we found that obstructive sleep apnea-hypopnea (OSAH) is most common sleep disorder in MS, occurring in 58% of 62 MS patients, and is strongly related to fatigue. In a non-randomized, controlled trial, we reported that treatment of OSAH can improved fatigue in MS. Continuous positive airway pressure (CPAP) is the best treatment for OSAH in the general population. The aim of this study is to complete the first randomized, controlled clinical trial to evaluate the clinical effectiveness of a six month course of CPAP treatment on fatigue and other clinical outcomes in MS patients with OSAH. This study may lead to a treatment for fatigue for MS patients.

Dr. Gao is an early career researcher and has a research lab at the Montreal General Hospital (MGH). He is currently operating on his start-up grant. The RSBO (30K) and AO North America (20K) grants provide both short-term operating support and sufficient pilot to apply for bigger long-term grants. The immediate goal will be to use results to attract larger, long-term funding, while the ultimate long-term goal is clinical translation of this innovative approach. The anticipated grant opportunities to be pursued are CIHR Project grants (Fall 2022 and Spring 2023) and United States Department of Defense (DoD) grants (Sep 2022). The protocols developed during the execution of the project sponsored by the 2 funding agencies will also be applied to other collaborative projects and help advance the field of cartilage and bone biology and help amalgamate these projects.

Impactful Clinical Innovation

Mild traumatic brain injury can lead to prolonged disability. In concert with members of the Division of Neurosurgery some physiatrists are involved in early assessment of mild traumatic brain injury. In this novel program, there is both physician and psychologist input early after the injury. This is unique with the goal to see whether this reduces the symptoms and long- term disability often associated with mild traumatic brain injury.






Respiratory Medicine

Leadership

- Dr. Kevin Schwartzman (McGill / MUHC)
- Dr. Andrew Hirsch (JGH)
- Dr. Harold Zackon (SMH)

Report

	15	CLINICIAN SCIENTISTS & INVESTIGATORS
	9	PHDS
	33	CLINICIAN TEACHERS & EDUCATORS

5 Notable 2021 Publications

(Division or DOM primary member's name in bold type)

Vameghestahbanati M, Kirby M, Tanabe N, Vasilescu DM, Janssens W, Everaerts S, Vanaudenaerde BM, **Benedetti A**, Hogg JC, **Smith BM**. *Central Airway Tree Dysanapsis Extends to the Peripheral Airways*. Am J Respir Crit Care Med 2021 203(3):378-381.

Kaminska M, Rimmer KP, Nonoyama M, Giannouli E, Morrison DL, O'Connell C, **Petrof BJ**, McKim DA, Maltais F. *Long-term Non-Invasive Ventilation in Patients with Chronic Obstructive Pulmonary Disease (COPD): 2021 Canadian Thoracic Society Clinical Practice Guideline Update*. Can. J. Respir. Crit. Care Sleep Med, 5:3, 160-183, doi: 10.1080/24745332.2021.1911218

Ezer N, Belga S, Daneman N, Chan A, **Smith BM**, Daniels SA, Moran K, Besson C, Smyth LY, **Bartlett SJ**, **Benedetti A**, **Martin JG**, **Lee TC**, **McDonald EG**. *Inhaled and intranasal ciclesonide for the treatment of covid-19 in adult outpatients: CONTAIN phase II randomised controlled trial*. BMJ. 2021 Nov 2;375:e068060. doi: 10.1136/bmj-2021-068060. PMID: 34728476

Uppal A, Rahman S, Campbell JR, Oxlade O, **Menzies D**. *Economic and modeling evidence for tuberculosis preventive therapy among people living with HIV: A systematic review and meta-analysis*. PLoS Med. 2021 Sep 14;18(9):e1003712. doi: 10.1371/journal.pmed.1003712. PMID: 34520463; PMCID: PMC8439468.



Dr. Kevin Schwartzman

Profile photo taken by Owen Egan

Kwong K, **Benedetti A**, Yau Y, Waters V, **Nguyen D**. *Failed eradication therapy of new onset Pseudomonas aeruginosa infections in cystic fibrosis children is associated with bacterial resistance to neutrophil functions*. J Infect Dis. 2021 Feb 19. Epub ahead of print. PMID: 33606875. <https://doi.org/10.1093/infdis/jiab102>

Exciting Research in the Pipeline

Chest Radiography and TB Elimination in Nunavik: novel solutions to fill gaps and strengthen regional capacity

Nominated PI Faiz Ahmad Khan; co PIs Frantz Jean-Louis, **Kevin Schwartzman**

CIHR, \$393,374, 2022-2025

In 2021, the World Health Organization (WHO) approved computer-aided detection (CAD)-artificial intelligence-based radiology analysis-to detect tuberculosis (TB) on chest X-ray (CXR), as an alternative to human readers. CAD provides an immediate CXR reading at the point of care. This project will evaluate CAD in Nunavik, Quebec, where TB occurs at a rate much higher than the provincial average and where the time needed to obtain radiologists' reports can limit the use of CXRs for real-time decision-making. This study uses existing CXR and clinical data from Nunavik, to estimate the accuracy of CAD, and the economic implications for the healthcare system if CAD is used instead of the status quo.

Air pollution, climate and COPD: acute and long-term impacts in Canadian populations

Nominated PI: Jean Bourbeau. Co-PIs: Jeffrey Brook, **Benjamin Smith**.

CIHR, \$1,086,300, 2021-2025

While tobacco smoke is recognized as the single most important risk factor for the development and progression of COPD, 25% to 45% of individuals with COPD have never smoked. To decrease the burden of disease, we must therefore better understand the contribution of environmental factors beyond cigarette smoking to COPD development and exacerbation. Climate projections show that Canadian cities can expect an increase in abnormal weather events such as heat waves and extreme cold events, more wildfires leading to poor air quality episodes, and overall higher levels of air pollution over the next decades. This project will make use of data collected by three large pan-Canadian studies linked to short and long-term air pollution and climate data as well as administrative health information on COPD hospital admissions and medication use to explore how environmental factors stemming from climate change will impact the burden of COPD in Canada.

Harnessing predictive analytics for personalized high-value health: nesting clinical decision support for cardiovascular disease and chronic obstructive pulmonary disease in a provincial lung cancer screening program

Nominated PI: Nicole Ezer; **co-PI Emily McDonald**.

CIHR, \$466,650, 2021-2024.

The three main causes of death in persons screened for lung cancer are cardiovascular disease (25%), lung cancer (24%), and chronic obstructive pulmonary disease (COPD, 10%). These individuals have high rates of untreated cardiovascular disease, identified on imaging of the heart on low dose CT of the chest, and untreated COPD, identified on imaging and history documented by lung cancer screening navigators. This project involves a randomized clinical trial of comprehensive personalized health intervention provided to physicians and patients. Exploiting data already extracted by nurse navigators for lung cancer screening, and data from imaging by low dose CT as part of clinical care, the team will implement a clinical decision support for primary care providers, and educational resources for patients. This will empower patients and their providers to engage with proven effective treatments for cardiovascular disease and COPD.

A novel mechanism of antibiotic tolerance in Pseudomonas aeruginosa

PI: Dao Nguyen

CIHR, \$822,376, 2021-2026

Pseudomonas aeruginosa is a key bacterial pathogen, infecting the lungs of persons with cystic fibrosis, COPD and other chronic lung diseases. The bacteria can become tolerant to antibiotics, such that the antibiotics are no longer effective in killing these bacteria. The goal of the project is to understand the mechanism of tolerance and to advance the discovery of new antibacterial therapies effective against tolerant bacteria in order to treat chronic infections.

Impactful Clinical Innovation:

At the Jewish General Hospital, the Departments of medicine and emergency medicine, supported by the hospital administration, established a hospital at home program to provide care at home for eligible people who would otherwise be hospitalized. This program was first established for persons with Covid-19 and has been expanded to treat patients with various medical problems including those with acute exacerbations of COPD and those with pneumonia. **Dr. Nathalie Saad and Dr. Mark Palayew** have provided key leadership in this regard. Care of the patient including supplemental oxygen therapy allows patients who meet eligibility and safety criteria to be treated in their home environment while being closely monitored by a team that includes a nurse, respiratory therapist and a physician. There has been a high level of satisfaction from patients and an exceedingly low need for transfer to traditional inpatient care. This program decreases costs of hospitalization and liberates hospital beds for more severely ill people.

Rheumatology

Leadership

- Dr. Christian Pineau (McGill / MUHC)
- Dr. Laeora Berkson (JGH Interim as of January 2021)
- Dr. Jan Schulz (SMH)

Report

-  **8** CLINICIAN SCIENTISTS & INVESTIGATORS
-  **2** PHDS
-  **10** CLINICIAN TEACHERS & EDUCATORS



Dr. Christian Pineau

Profile photo taken by Owen Egan

5 Notable 2021 Publications

(**Division** or DOM primary member's name in **bold** type)

Mendel A, Ennis D, Lake S, Carette S, Pagnoux C. *An initiative to improve timely glucocorticoid tapering in vasculitis*. J Clin Rheumatol. 2021 Dec 1;27(8): e612-e615. doi: 10.1097/RHU.0000000000001744. PMID: 33938498

Zhao N, Al-Aly Z, **Zheng B**, van Donkelaar A, Martin RV, **Pineau CA**, **Bernatsky S**. *Fine particles matter components and interstitial lung disease in rheumatoid arthritis*. Eur Respir J. 2021 Dec 23;2102149. doi: 10.1183/13993003.02149-2021. Online ahead of print. PMID: 34949700

Colmegna I, Valerio V, Gosselin-Boucher V, Lacoste G, Labbe S, Lavoie KL, **Hazel E**, Ward B, **Hudson M**, Peláez S. *Barriers and facilitators to influenza and pneumococcal vaccine hesitancy in rheumatoid arthritis: a qualitative study*. Rheumatology (Oxford). 2021 Nov 3;60(11):5257-5270.

Lambert-Fliszar F, **Bernatsky S**, **Kalache F**, **Grenier LP**, **Pineau C**, **Vinet É**. *Personalized therapy during pre-conception and gestation in SLE: Usefulness of 6-mercaptopurine metabolite levels with azathioprine*. Lupus Science & Medicine 2021 Aug;8(1):e000519. doi: 10.1136/lupus-2021-000519. PMID 34413183.

Hoa **S**, **Bernatsky S**, **Baron M**, Proudman S, Stevens W, Sahhar J, Wang M, Steele RJ; Canadian Scleroderma Research Group (CSRG); Australian Scleroderma Interest Group (ASIG), Nikpour M, **Hudson M**. *Association Between Immunosuppressive Therapy and Incident Risk of Interstitial Lung Disease in Systemic Sclerosis*. Chest. 2021 Dec;160(6):2158-2162. doi: 10.1016/j.chest.2021.06.014. Epub 2021 Jun 18. PMID: 34153341

Exciting Research in the Pipeline

PI: **Dr. Sasha Bernatsky**

Co-PI: **Dr Ines Colmegna**

Title: **Safety immUnogenicity of Covid-19 vaCcines in systEmic immunE mediated inflammatory Diseases**.

Funding source: Public Health Agency of Canada/COVID Immunity Task Force

Total funding: \$ 3,131,216

Funding period: 2021-2023

PIs: **M. Hudson, S. Bernatsky, I. Colmegna**

Title: **Stand Up to Rheumatoid Arthritis (SUPRA) - feasibility study of adaptive trial of to personalize choices of biologics for rheumatoid arthritis**

Funding sources: McGill Interdisciplinary Initiative in Infection and Immunity (MI4)

Total funding: \$950,000

Funding period: 2021-2026

CO-PI: **Evelyne Vinet**

Title: **At the heart of the matter - Speckle tracking echocardiography in lupus mothers and their offspring**.

Funding sources: McGill Interdisciplinary Initiative in Infection and Immunity (MI4)

Total Funding: \$150,000

Funding period: 2021-2022

PI: **Ines Colmegna**

Title: **COVID-19 Vaccine in Immunosuppressed Adults with Autoimmune Diseases (COVIAAD)**

Funding sources : Government of Quebec - Mandate

Total Funding: \$800,000

Funding period: 2021- 2022

Impactful Clinical Innovation

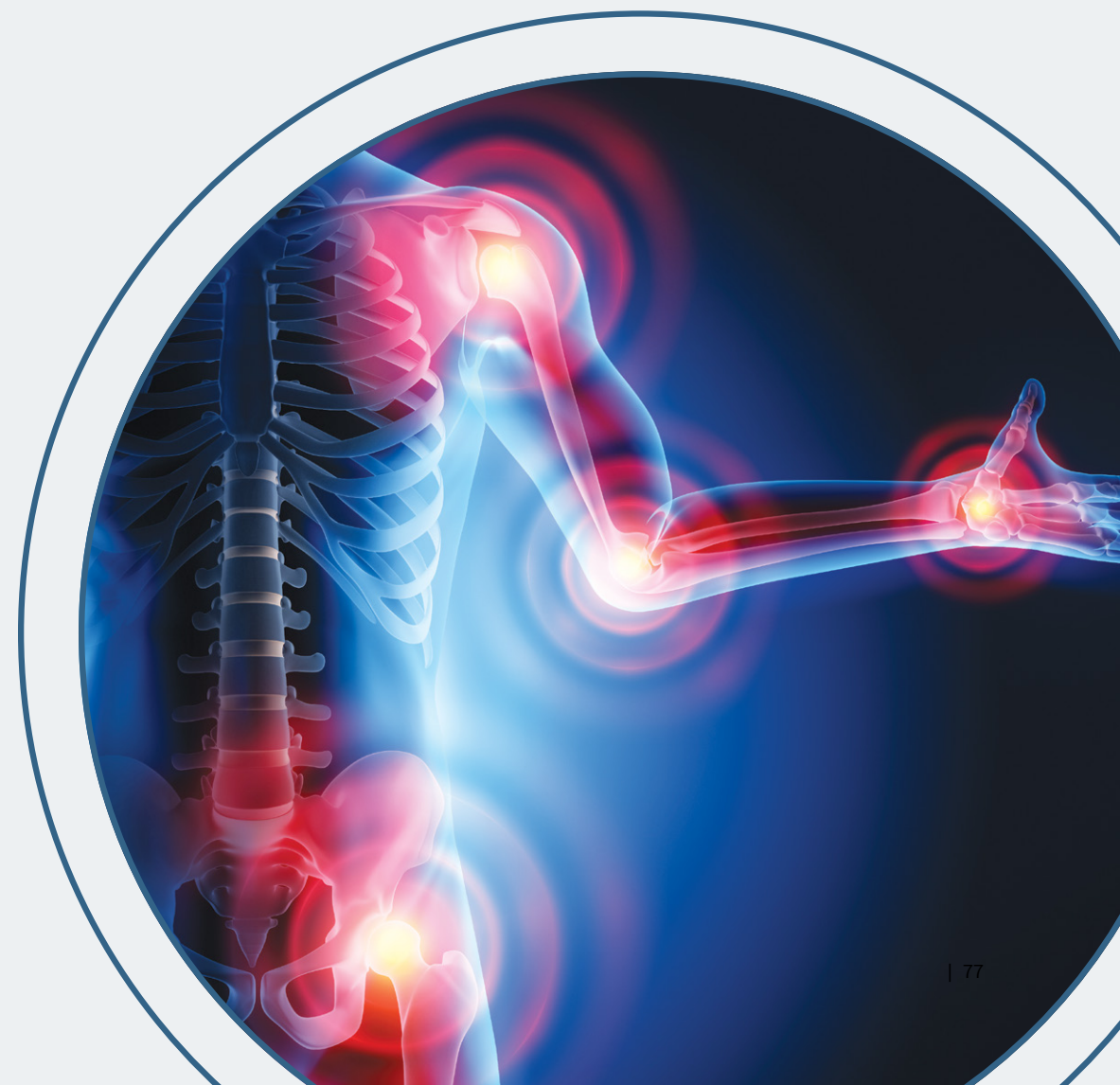
Rheumatology-oncology clinic for immune-related adverse events from cancer immunotherapies

Held at the Jewish General Hospital

Half a day a week clinic

Led by Dr. Hudson with participation of trainees at all stages of training

Participation at weekly Multi-disciplinary Immuno-oncology tumor board to discuss difficult cases



Division of Experimental Medicine

Leadership

- Dr. Anne-Marie Lauzon, Graduate Program Director
- Dr. Elizabeth Fixman, Associate Program Director

Major objectives of the Division of Experimental Medicine (ExMed):

The Division of Experimental Medicine is the graduate program of the Department of Medicine of McGill University. Two hundred and seventy eight professors (clinical and basic science researchers) located in the Research Institutes of the McGill teaching hospitals (and Institut de recherche clinique de Montréal, IRCM) supervise graduate students (~350, see details for 2021 below) through their membership in the Division. The Division offers 45 courses ranging from the Biology of Cancer to Quantitative Research Methods, etc.

Programs:

The Division offers 6 thesis-based degree programs, in addition to the diploma and certificate programs:

- MSc in Experimental Medicine
- MSc in Experimental Medicine, Options in Bioethics, Environment, or Digital Health Innovation
- PhD in Experimental Medicine
- PhD in Experimental Medicine, Option in Environment
- Graduate Diploma in Clinical Research
- Graduate Certificate in Regenerative Medicine

Program Updates from 2021

- The MSc Option in Digital Health Innovation (DHI) launched in Fall 2021, welcoming three new students into the Division. The focus of the DHI program is on the basics of clinical epidemiology, medical artificial intelligence, clinical innovation, and applied data science, including the use and generation of digitized health and social data using specialized software.



Dr. Anne-Marie Lauzon

Profile photo taken by Owen Egan

- Three new courses developed for the DHI program were first offered in the 2021-2022 academic year:
 - EXMD 600, Principles of Clinical Research (27 students)
 - EXMD 601, Real World Applications of Data Science and Informatics (7 students)
 - EXMD 630, Developing Digital Health Innovations for Health Impact (16 students)
- The Graduate Certificate in Regenerative Medicine is currently being extended into an MSc Thesis Program. The launching of this new MSc program is expected to for Fall 2023.
- Changes to the oral comprehensive exam (OCE) in ExMed were finalized in 2021. In the revised OCE, students critically evaluate a research article in their field in addition to presenting their research project. Writing and presentation skills are evaluated, including the ability of students to answer questions both directly and indirectly related to their research project. Passing the OCE is also required for MSc students wishing to fast-track to PhD. Changes will go into effect for students admitted in the Fall of 2022.

New Student Stipend Policy

The Faculty of Medicine and Health Sciences developed a harmonized stipend (HS) policy to ensure that all graduate students in the Faculty receive an adequate stipend, consisting of a base living allowance plus tuition and student fees. In November 2021, the ExMed Division held a meeting with supervisors at which Dr. Aimee Ryan, Associate Dean of GPS, presented the new HS policy, and supervisors had the opportunity to ask questions and discuss their concerns. The new stipend policy will be implemented in September 2022. The ExMed Division did a careful budgetary analysis in order to provide financial support to cover the higher rates of tuition and fees paid by out-of-province and international students. This analysis was based on the new budget awarded by the Office of Graduate Studies (Graduate Excellence Award [GEF]).

Student Funding

In 2021, ExMed students successfully received funding from external and internal sources. Fifty-eight students received external studentships and awards totaling \$1,210,700. Of special mention, two PhD students from the Division were awarded Vanier scholarships in 2021! An additional 40 students received internal awards and studentships totaling \$440,125. In addition, the Division of Experimental Medicine disbursed \$690,000 of its GEF to its MSc and PhD students as recruitment awards and international student tuition supplements, and \$18,300 in GREAT Travel awards for both remote and in-person conferences.

Statistics on Students applications

The ExMed admissions committee reviews all complete applications submitted to the Division and criteria of admission are based on applicants meeting minimum cGPA requirements, letters of recommendation, CVs, English language proficiency and personal statements. For the 2021-2022 year, 43% of applicants were from Quebec, 32% were international, and 25% were non-Quebec Canadians. Despite the challenges of Covid-19, the overall student numbers in ExMed increased in 2021 (356 students in Fall 2021 vs. 305 students in Fall 2020). In addition, the Division welcomed 29 students in Winter 2021 and 91 new students in Fall 2021.



Student Numbers (Winter 2021, Fall 2021, Winter 2022)

Term	Diploma	MSc	PhD	Not registered in Minerva, (Leave of Absence (LOA), Time Limitation(TL) Did not register (DNR))	TOTAL
2021/01	12	151	147	5 (LOA), 4 (TL), 4(DNR)	323
2021/09	8	185	150	3 (LOA), 1 (TL), 9 (DNR)	356
2022/01	11	168	148	4 (LOA), 3 (TL), 4 (DNR)	338

Graduation Statistics (Years to Complete)

For the calendar year 2021 (February, May and October 2021 grads), the average time to complete programs was: MSc: 2.23 years, n=26; PhD: 5.88 years, n=17; Diploma: 1.21 years, n=7. As the quality of our students is rising (based on higher admission standards), it is expected that these times will further decrease.

Governance

ExMed is led by a Graduate Program Director and an Associate Graduate Program Director. An Executive Committee is in charge of curriculum review and is comprised of members from each Research Institute, both PhDs and MDs, and meets every nine months. An admissions committee comprised of 5 members evaluates applications on a rolling basis.

Student Orientation

The ExMed Graduate Students' Society (EMGSS), in collaboration with the ExMed Division, hosts a new student orientation in September and January, where students are provided an overview of the programs, program expectations, funding information, and university services available to them. In 2021, the orientation was held via Zoom, but following orientation, the EMGSS organized an in-person, outdoor welcome gathering for all students in the Division, following University COVID-19 guidelines.

Student Wellness

EMGSS organizes activities to foster inclusiveness and to support graduate students in varied ways. Activities range from the Buddy Program, stress management workshops to social activities, discussions and peer guidance for thesis writing, and career development. In 2021, they hosted a professional LinkedIn profile photo shoot for ExMed students. In 2021, these activities were held both virtually and in-person, as permitted by public health and university guidelines. Two student affairs coordinators and one student affairs officer also provide support to ExMed students.

Special events

- The 2021 Annual McGill Biomedical Graduate Conference (AMBGC) was held remotely on May 11, 2021, and was attended by 317 students and faculty members. The AMBCG included poster sessions, oral presentations, and a keynote presentation by Dr. Robert Weinberg of the Whitehead Institute, M.I.T.
- The Division participated in a Graduate Student Recruitment event organized by the Faculty of Medicine, held virtually on October 14, 2021.

“What a treat it is to work every day with world-class scientists, teachers, providers, leaders, advocates and just plain world-class people.”

CHAIR, DR. MARC ALAN RODGER