IR-CUSM

# 2030 VISION

RI-MUHC

Centre universitaire de santé McGill
Institut de recherche

McGill University Health Centre
Research Institute

# MESSAGE FROM **OUR ED/CSO**

The development of our Strategic Plan — *RI-MUHC 2030 Vision* — has been a collaborative effort, marked by remarkable engagement from our researchers, staff, trainees, and external experts. I would like to take this opportunity to express my sincere gratitude to the thousands of stakeholders who have contributed to this process; to the tremendous support from Dr. Lucie Opatrny, President and Executive Director of the MUHC, and Dr. Sarah Prichard, Chair of the RI-MUHC Board, and the RI-MUHC Board members; Dr. Lesley Fellows, Dean of the Faculty of Medicine and Health Sciences at McGill University; the FRQS for your continued support; and to the MUHC, MGH, MCH, and Cedars Cancer Foundations for your generous support of our research activities. Your meaningful participation in consultations, surveys, committees, and numerous meetings has been instrumental in our strategic visioning. The valuable insights and perspectives you have shared are shaping the future of our organisation for years to come.

***More than two millennia ago, Hippocrates stated, "every human is distinct, and this affects both the disease prediction and the treatment." Consistently, our 2030 Vision is built upon our shared vision of advancing precision health, building toward a future where the Research Institute of the McGill University Health Centre (RI-MUHC) is globally recognised as a leader in transformative discoveries that advance human health throughout the life course.***

Our 2030 Vision outlines our strategic initiatives to realise Precision Health Research through **five Research Priorities**, which include cutting-edge methods and tools to help researchers develop scientific breakthroughs and improve patient care, and **four Enabling Priorities**, which are commitments to organisational excellence that support research success in an outstanding working environment.

As we move forward, I am confident that the RI-MUHC 2030 Vision will serve as a comprehensive roadmap, aligning our efforts and propelling us towards our shared goals. I am excited to collaborate with you as we embark on our journey towards a bright, bold, and visionary future.

**Rhian M. Touyz, MBBCh, M.Sc. (Med), PhD**
Executive Director and Chief Scientific Officer
Research Institute of the McGill University Health Centre (RI-MUHC)

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2030 **VISION**
RI-MUHC

# RI-MUHC PURPOSE

**CREATING CLINICAL IMPACT THROUGH INTERDISCIPLINARY SCIENCE**

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## VALUES

**Our values are shaped by the origin of the RI-MUHC, its history, its present, and its future**

### VARIED PERSPECTIVES

Diversity in viewpoints, experience, and what we study strengthens our science

### FREEDOM TO INNOVATE

Curiosity and broad exploration enables impactful discoveries

### COLLABORATION

Working together across disciplines, domains, and communities to cultivate innovation

### MENTORSHIP

Fostering learning and growth for everyone maximises our collective potential

### INTEGRITY

Honesty, transparency, trust, and ethical rigour keep us fair and accountable

## GUIDING PRINCIPLES

**These principles represent our collective commitments in pursuit of our purpose, shaping our scientific focus and operations**

### TRANSVERSAL COLLABORATIONS

**We prioritise the creation and strengthening of bridges across domains.** Collaboration between the professions, disciplines, programs, centres, locations, healthcare organisations, and our research environment is fundamental to unlocking novel and impactful discoveries.

### PATIENT-ORIENTED RESEARCH

We focus on research that informs prevention, care, and outcomes for patients, their families, and communities. Each activity, decision, process, and policy should enable research outcomes that support greater understanding of, and improvements to, patient and population well-being.

# OUR UNIQUE STRUCTURE

To foster collaborations and communication between our scientists, clinicians, trainees, and administrative staff, the **RI-MUHC is organised into eight thematic Research Programs across three Centres that span clinical, epidemiological, and fundamental research activities.**

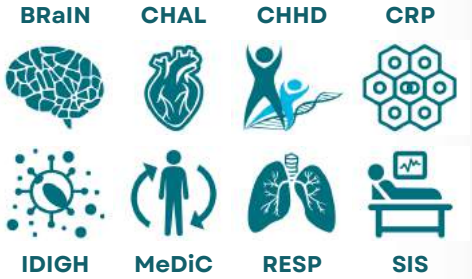
**These Programs are the:**

- Brain Repair and Integrative Neuroscience (BRaIN) Program
- Cancer Research Program (CRP)
- Cardiovascular Health Across the Lifespan (CHAL) Program
- Child Health and Human Development (CHHD) Program
- Infectious Diseases and Immunity in Global Health (IDIGH) Program
- Metabolic Disorders and Complications (MeDiC) Program
- Surgical and Interventional Sciences (SIS) Program
- Translational Research in Respiratory Diseases (RESP) Program

**Our Centres are the:**

- McConnell Centre for Innovative Medicine (CIM)
- Centre for Translational Biology (CTB)
- Centre for Outcomes Research and Evaluation (CORE)

**8**
**RESEARCH PROGRAMS**

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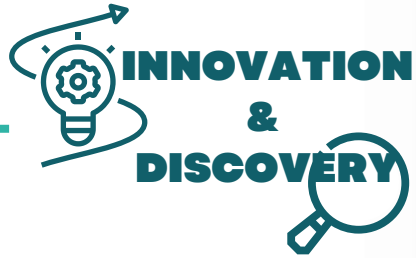
**RESEARCH CENTRES**




# THE RI-MUHC IS A HOSPITAL-BASED, STATE-OF-THE-ART RESEARCH FACILITY

The RI-MUHC is the research arm of McGill University's largest teaching hospital, the MUHC. Our researchers are located across the Montreal General Hospital (MGH); the Glen site, which includes the Montreal Children's Hospital (MCH), the Royal Victoria Hospital, and the Chest Institute; the Montreal Neurological Institute (MNI); and 5252 de Maisonneuve.

The integration of both pediatric and adult hospitals within the MUHC uniquely positions RI-MUHC researchers to study health and disease across the life course, from pre-conception to end of life.

In order: The Montreal General Hospital, The MUHC Glen Site, The Montreal Neurological Institute, and 5252 de Maisonneuve Boulevard W. Montreal, QC

# PATH TO DEVELOPING OUR SHARED PLAN

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ROADMAP 2022-2024

## PREPARATORY

CRAFT FIVE-YEAR STRATEGIC VISION

**Feb. 2022 – Feb. 2023**

- Initial visioning during RI-MUHC Retreat
- Creation of Internal and External Scientific Advisory Boards
- Collection of input and discussions with RI-MUHC members
- Establishment and sharing of preliminary vision and working documents

## PHASE I

SET STRATEGIC PRIORITIES

**Mar. 2023 – Oct. 2023**

- Creation of Strategic Vision Task Force
- Consultations and input from researchers and administrative leaders regarding RI-MUHC strategic priorities

## PHASE II

DEVELOP DETAILED STRATEGIC PLAN

**Nov. 2023 – May 2024**

- RI-MUHC-wide researcher survey on high-level directions
- Consolidation of information
- Development of detailed plans containing objectives, success metrics, and key results
- Resources allocated to support plans

## PHASE III

COMMUNICATE AND IMPLEMENT

**June 2024 & Onwards**

- Board approval of RI-MUHC 2030 Vision
- Communicate the strategic priorities across the RI-MUHC and to the broader community
- Initiate implementation
- Mobilise institute via strategic initiatives

# ENGAGEMENT PROCESS

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**43x**

**CONSULTATION SESSIONS ACROSS SITES AND PERSONNEL GROUPS**

**SITES**

- Virtual
- Glen
- MGH
- CORE
- Guy Street

**PERSONNEL GROUPS**

- Early-Career Researchers
- Mid-Career Researchers
- Senior-Career Researchers
- MGH Researchers
- CORE Researchers
- Administrative Leaders
- Administrative Staff
- Trainees

**REFINEMENT WORKSHOPS**
to review refine and perfect phase I outputs

**MULTIPLE SURVEYS**
distrubuted RI-MUHC wide

## GUIDED BY

**Multidisciplinary Strategic Vison Taskforce**

**Internal Scientific Advisory Board**

**External Scientific Advisory Board**

**RI-MUHC 2030 Vision Executives**

## OUR VISION

# ADVANCING PRECISION HEALTH THROUGHOUT THE LIFE COURSE

**By 2030, the RI-MUHC will be globally recognised as a leading research institute in transformative discoveries and innovations that advance precision health throughout the life course using a precision health strategy.**

# WHAT WILL OUR 2030 TRANSFORMATION LOOK LIKE?

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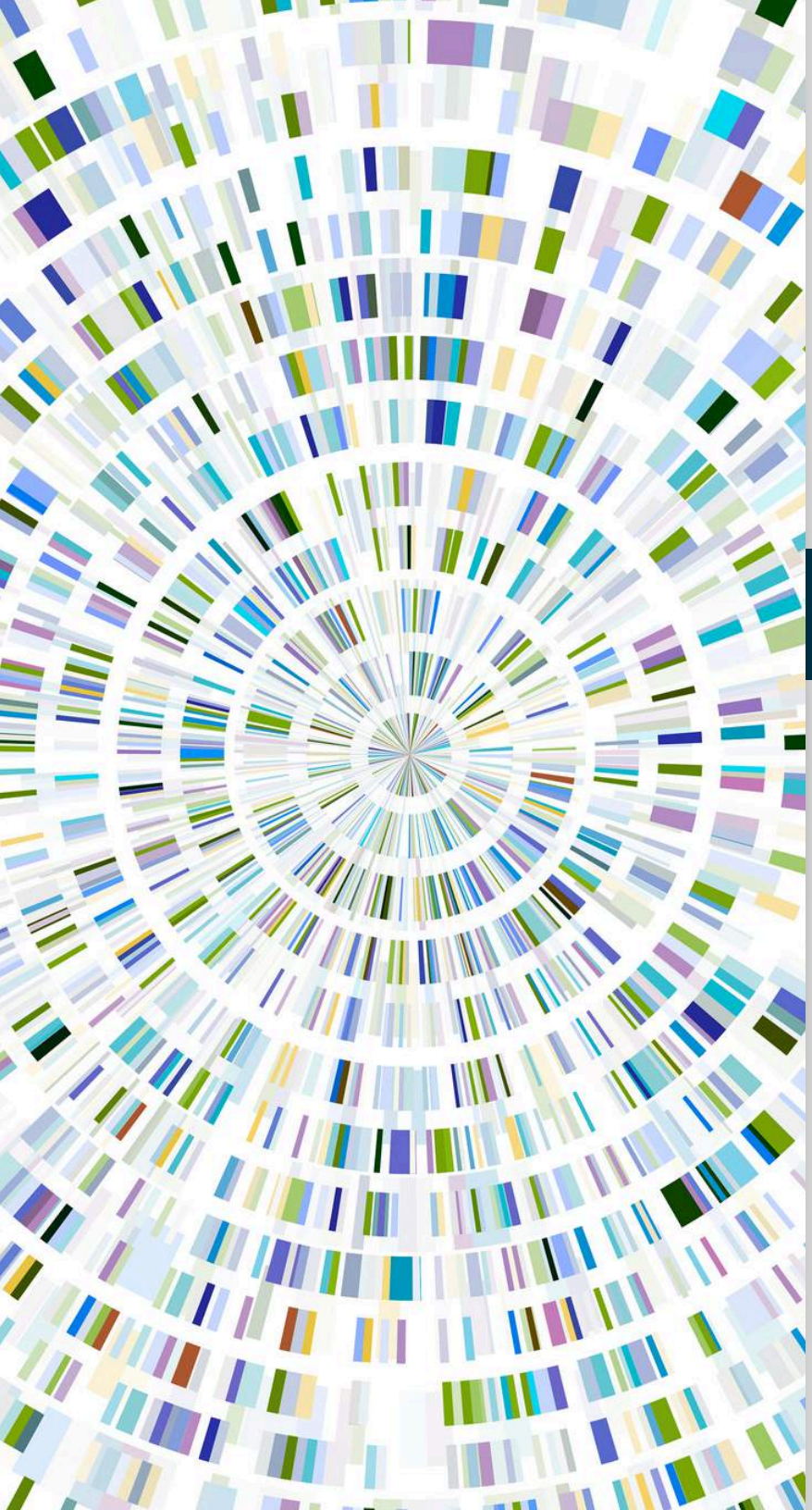
**Realisation of our 2030 vision will transform our disease-based and siloed research approach into one that is interdisciplinary and disease-agnostic, advancing our ability to address real world challenges.**

| | TODAY | 2030 |
|---|---|---|
| **Advancing Precision Health Throughout the Life Course** | • Research is based on individual diseases<br>• A "one-size-fits-all" approach is applied to preventive, diagnostic, and therapeutic strategies | • Discovery of new pathways guided by a precision health approach that defines disease throughout life<br>• New research themes based on RI-MUHC Networks and other initiatives<br>• New centres of excellence |
| **Our Research Programs** | Program direction dictated:<br>• By individual researchers<br>• In a disease-specific manner<br>• Through year-to-year funding opportunities<br>• In reaction to funding calls | • Programs transformed by priorities that are guided by new research themes (e.g., RI-MUHC Networks).<br>• New centres of excellence defined by strategic priorities<br>• Responsive long-term planning to support strategic priorities |



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# WHAT DOES IT MEAN TO **ADVANCE PRECISION HEALTH?**

**The ultimate goal of precision health is to ensure the best care for each individual by providing the right care to the right person at the right time.**

Precision health is a modern approach in medicine that tailors the way we prevent, diagnose, and treat diseases on the basis of an individual's unique characteristics. Gone are the days when a "one-size-fits-all" approach sufficed to inform effective disease management decisions. Advances in health-science research have proven that the interplay between genetic, molecular, environmental, behavioural, and sociodemographic factors differentially influences disease initiation, presentation, and progression. Collectively, these interdependent factors permit us to stratify a disease into novel "sub-diseases" and define specific phenotypes. With the emergence of innovative tools that enhance our ability to acquire more high-quality and enriched data — faster than ever before — we become more knowledgeable in disease stratification.

**Thus, data about each individual lies at the core of precision health**.

In much the same way that it is now common knowledge that cardiovascular disease is not one disease, but rather, a myriad of distinct conditions, we are working towards a *future* where we can more granularly stratify each of these into unique phenotypes according to the factors that define their presentation in each individual.

# OUR STRATEGIC PRIORITIES

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## RESEARCH PRIORITIES

1. Expand **mechanistic and multiomic** research to understand health and disease
2. Develop precise and effective **preventive, diagnostic, and therapeutic strategies**
3. Integrate **data science and digital technologies** across research
4. Advance **clinical trials** through novel methods to inform and improve patient care at all ages
5. Incorporate **determinants of health and disease** to reduce disparities


## ENABLING PRIORITIES

- **A** Provide an environment of **excellent service** to support world-class research
- **B** Strengthen our **research capabilities, tools, and platforms**
- **C** Develop our **talent** and reinforce **interdisciplinary research networks**
- **D** Intensify and enrich our **diverse partnerships**

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# EXPAND **MECHANISTIC AND MULTIOMIC RESEARCH** TO UNDERSTAND HEALTH AND DISEASE

## HOW WILL WE REALISE THIS PRIORITY?

- Increase researchers' abilities to functionally access and leverage **multiomic data** and analytical tools
- Develop **alternative preclinical models** of disease to drive discovery and test therapeutics
- Broaden research **collaborations and partnerships** for modelling human disease

## WHY THIS?

Pivotal to advancing precision health is our ability to unravel the **underlying mechanisms** that drive the development and progression of diseases throughout a person's life. These mechanisms are driven by complex interactions between elements such as an individual's suite of metabolites (metabol*omics*), genetic blueprint (*genomics*), the specific parts of that blueprint that are activated at any given time (*transcriptomics*), and those parts that are translated into proteins (prote*omics*) that can exert functions within and between cells. Collectively termed '***multiomics***', this emerging field enables researchers to unravel the mechanistic disease underpinnings that are personalised to each patient.

Complementary to multiomics, **preclinical models of disease** are critical to both elucidate and validate these disease-promoting mechanisms. Novel genetic, environmental, and behavioural modeling systems — including humanised animal models, synthetic systems, multi-organ models, organoids, and bioengineered tissues — are essential tools for characterising the underlying mechanisms driving disease. This knowledge is critical for developing and testing emerging therapeutics.

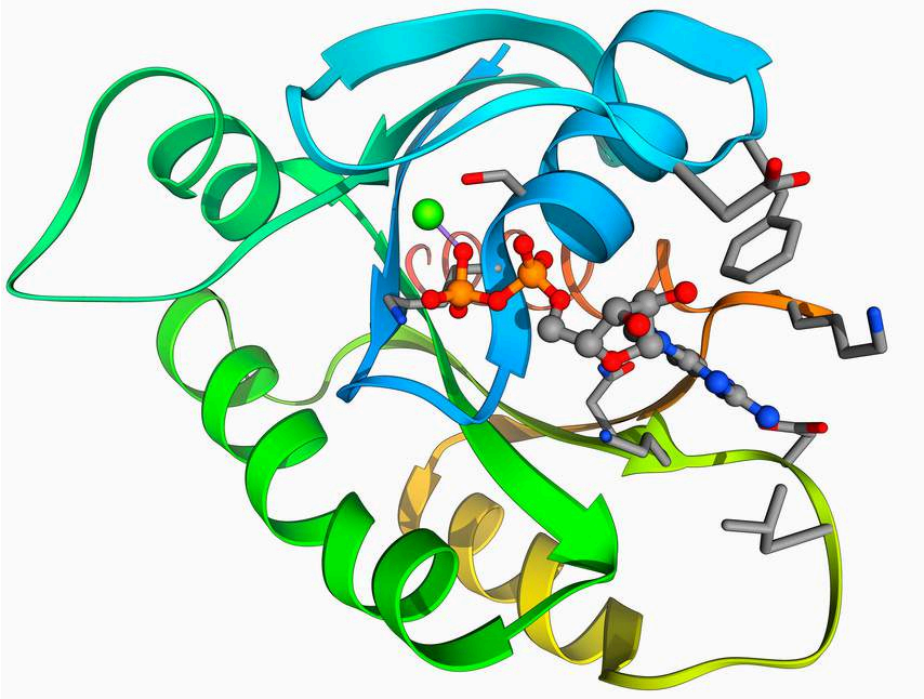
Strengthening and expanding our **research collaborations and industry partnerships** represent integral steps in promoting innovation across both multiomics-based approaches and preclinical models of disease, allowing our researchers to leverage existing expertise within our local health-science ecosystem. For example, enhancing our reciprocal collaborations with the *Early Drug Discovery Unit* at the Montreal Neurological Institute (MNI) represents an important opportunity to both expand our use of induced-pluripotent stem cells as a novel preclinical model to explore disease-promoting mechanisms, and to characterise the mechanisms unveiled by this model using multiomics-based approaches.

**Multiomics enables researchers to unravel the mechanistic disease underpinnings that are personalised to each patient, thereby driving precision health throughout the life course.**

## BUILDING UPON A FOUNDATION OF SUCCESS

To promote the use of multiomics-based approaches to facilitate our research questions, we will ensure that our researchers have timely access to state-of-the-art technologies, specialised bioinformatics expertise, and training resources through our Centre for Translational Biology (CTB). To this end, we plan to upgrade the ***RI-MUHC Proteomics and Molecular Analysis Platform***.

- **What:** We are working to replace our ageing Orbitrap Fusion mass spectrometer with the cutting-edge ASTRAL proteome analysis system to revolutionise our research capabilities in proteomics.
- **Why:** The older system can capture roughly 3,000 proteins per sample, but misses ~ 80% of the proteome that may contain a critical linchpin for treating a disease. In contrast, the revolutionary ASTRAL can characterise the *entire cellular proteome* (15,000 proteins) in that same time — at unprecedented resolution — providing details of each protein's variations and modifications.
- **How:** ASTRAL's 10X higher sensitivity levels and 20X faster processing speed, at a fraction of the cost per sample, represents an important step towards enhancing the capabilities of our researchers to perform transformative multiomics research.



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# DEVELOP PRECISE AND EFFECTIVE **PREVENTIVE, DIAGNOSTIC, AND THERAPEUTIC STRATEGIES**

## HOW WILL WE REALISE THIS PRIORITY?

- Develop and apply advanced **biomarker approaches** to predict disease progression and validate therapeutic efficacy
- Enhance capabilities in **cell, RNA, and regenerative therapy**
- Increase the use of, and pioneer new, **biomedical technologies**

## WHY THIS?

The transformative potential of **biomarkers** lies in their inherent simplicity: biomarkers represent any *measurable characteristic* that indicates a certain phenomenon. This means that — on the basis of each patient's unique characteristics — the right biomarker has the ability to predict an individual's likelihood of *developing* a disease, the probable course of disease *progression*, and which *therapies* have the best chance of success. We are no longer forced to rely solely on biomarkers derived from invasive surgical biopsies taken *after a disease has initiated*: advanced biomarker approaches — such as non-invasive liquid biopsies — have the potential to transform the way we realise precision health and manage disease.

Another way to advance how we manage disease is by enhancing our capabilities in **cell, RNA, and regenerative therapies** to drive innovation in novel therapeutic delivery systems. For example, chimeric antigen receptor (CAR)-T cell therapies — a type of cellular therapy whereby specific immune cells are collected from patients, genetically altered in the laboratory to express a target receptor of choice, and then infused back into the patient — are at the frontier of novel therapeutics. These therapies have the ability to address a breadth of unmet medical needs in regenerative medicine, infectious diseases, autoimmune disorders, and cancers.

Complementary to both the application of advanced biomarker approaches and enhanced capabilities in cell, RNA, and regenerative therapies, is increasing the use of, and pioneering new, **biomedical technologies**. While innovations in digital imaging, for example, provide a foundation upon which to identify novel radiologic biomarkers capable of diagnosing diseases earlier — when treatments have the highest curative potential— advances in surgical robotics are transforming our ability to eliminate diseases at their source.

**We are no longer forced to rely solely on biomarkers derived from invasive surgical biopsies taken *after* a disease has initiated: advanced biomarker approaches are transforming the way we realise precision health and manage disease throughout the life course.**

## BUILDING UPON A FOUNDATION OF SUCCESS

As an initial step towards advancing our ability to develop and apply advanced biomarker approaches in our research, we have established the ***Liquid Biopsy Core*** and the ***Centre for Applied Nanomedicine (CAN)*** at the RI-MUHC. The Liquid Biopsy Core was born from a $6M research grant and generous support from the Montreal Children's Hospital (MCH) Foundation to develop non-invasive blood or urine tests that replace risky surgical biopsies to determine whether a suspicious lump is cancerous. Leveraging this expertise in liquid biopsy-derived biomarker research, an additional $3.4M was secured from the Canada Foundation for Innovation to establish the CAN: this platform provides critical equipment, expertise, and collaborative research opportunities that will enable our researchers to decipher information about cancer, infectious disease, and immunity from exosomes in the bloodstream.

To enhance our capabilities in cell therapies, we have partnered with the MUHC Foundation to expand the RI-MUHC ***Cellular Therapy Laboratory (CTL)***. This expansion project will enable the CTL to support the industry-sponsored clinical trials and discovery-driven research necessary to adapt CAR-T therapies to benefit the countless patients across diverse disease states who do not fit the current, strict clinical indications for treatment. Generous support from the MUHC Foundation has made it possible to establish our CTL, which has both clinical and research applications. In 2023, the MUHC Foundation provided funding to support Phase 1 of the CTL expansion proposal, which provided critical infrastructure upgrades within the research arm of the CTL that enable our researchers to participate in industry-sponsored clinical trials. Our Phase 2 plan for the CTL is to establish an interim biomanufacturing platform, which would permit the on-site production of custom engineered cellular therapies. Successful completion of Phase 2 would enable the MUHC CTL to both lead, and participate in, non-commercial engineered cell therapy trials. This would position our CTL as the first research institution in Quebec to partake in these innovative cell therapy trials.

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# INTEGRATE **DATA SCIENCE AND DIGITAL TECHNOLOGIES** ACROSS RESEARCH

## HOW WILL WE REALISE THIS PRIORITY?

- Harness **artificial intelligence (AI) and data science** tools and techniques for research and discovery
- Apply **digital tools and therapies** to enhance patient health and wellness
- Advance **centres of excellence in digital health** research

## WHY THIS?

The essence of precision health is to tailor disease management strategies to each individual — this requires understanding the interplay between the unique characteristics of each patient. In the same way that we would not remove a single piece of a 100-piece jigsaw puzzle and assume to fully understand the complete picture, we cannot appreciably advance precision health if we continue to conduct our research on the basis of isolated components of a patient's condition. *The emergence of **AI and data science-based tools and techniques** now permits researchers to meaningfully advance precision health across the life course by visualising the patient 'puzzle' in its entirety.* These tools enable the acquisition of insights about the complex interactions that define unique disease phenotypes. Just as we now understand that there exist differentially aggressive breast cancer subtypes that require different therapeutic strategies, our ability to identify novel phenotypes across any disease using these tools has the potential to revolutionise clinical decision making.

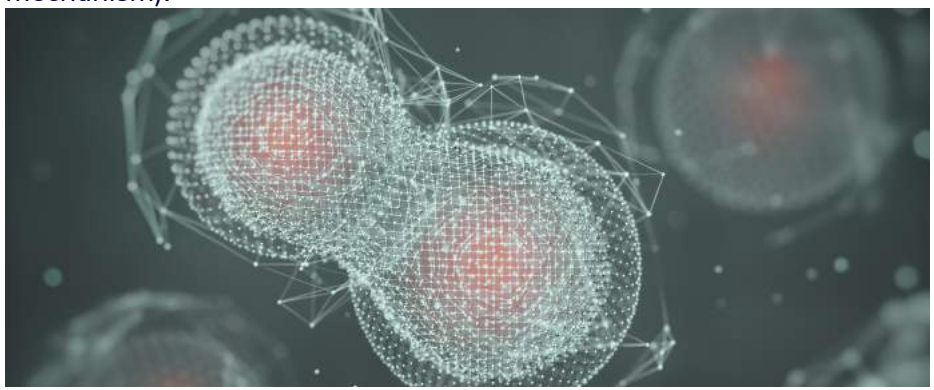
Underpinning the research utility of AI and data science-driven tools is the need to acquire *large quantities of data* — both within and among patients. **Digital tools**, such as health-monitoring wearables, represent one way to continuously and remotely collect staggering quantities of data, which can later be interrogated by AI and data science-driven tools to facilitate discovery. Moreover, these digital tools also provide physiological insights about a patient's health over time, which can dually inform clinical disease management decisions and empower patients with the ability to take control of their health. Collectively, integrating data science and digital technologies throughout our research programs will enable us to acquire the *knowledge* needed to comprehend the complete patient 'puzzle' and advance precision health throughout the life course.

**The emergence of AI and data science-based tools now permits researchers to meaningfully advance precision health across the life course by visualising the patient 'puzzle' in its entirety.**

## BUILDING UPON A FOUNDATION OF SUCCESS

Centres of excellence represent an important way to centralise expertise, equipment, infrastructure, and research interests, thereby enhancing access to, and uptake by, our researchers across the institution. Generous support from the FRQS, MEIE, and the Terry Fox Foundation — equating to nearly $2.5M — led to the formal establishment of the ***RI-MUHC Digital Health Research Hub*** in April 2024. The mandate of this Hub is to provide networking opportunities that facilitate research on the development and evaluation of digital interventions and health data science; enhance access to digital health data and infrastructure; and offer specialised training support to our research community. Notably, this Hub has taken early steps in advancing several important initiatives to benefit our researchers, such as developing the ***MUHC Data Lake***, which will augment the Data Warehouse to improve access to clinical data from the MUHC; and launching the ***Secure Data for Health (SD4H)*** initiative in collaboration with McGill to develop a data governance framework and configure a high-performance computing environment within Calcul Quebec.

We have also initiated the development of the ***RI-MUHC Centre for Digital Brain Therapies***. This Centre was born from the lack of effective and non-invasive therapies for patients suffering from brain disorders, and to alleviate the burden of these conditions on health care systems, caregivers, and society. Leveraging the world-leading expertise of many of the Montreal General Hospital (MGH)-based researchers in digital therapies and neurocognitive diseases, this Centre provides a foundation upon which to address these needs in the context of brain disorders for which limited effective treatments or cures currently exist, such as traumatic brain injury, stroke, neurodevelopmental disorders, and neurodegenerative diseases. Space for our new Centre and plans for its renovation and reconfiguration have been approved, with support from the MGH Foundation, RI-MUHC, and the Province of Québec (PSOv4 mechanism).



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# ADVANCE **CLINICAL TRIALS** THROUGH NOVEL METHODS TO INFORM AND IMPROVE PATIENT CARE AT ALL AGES

## HOW WILL WE REALISE THIS PRIORITY?

- Increase the number of RI-MUHC **investigator-led and Phase I** clinical trials
- Broaden awareness of, and access to, the **Centre for Innovative Medicine (CIM)**
- Facilitate innovation in **trial design methodologies**

## WHY THIS?

Advancing our capacity to lead and participate in innovative clinical trials is crucial to translate precision health discoveries from bench-to-bedside, throughout the life course, in a true patient-centric manner. Currently, the majority of clinical trials run through our CIM are industry-sponsored, Phase II and III trials. Consequently, increasing the number of **early Phase I trials and trials led by our investigators** is of paramount importance to the RI-MUHC 2030 Vision. As Phase I trials represent the first patient-facing opportunity to define the safety and dosage of novel therapeutic interventions, it is here, where the true bench-to-bedside translation takes place. By leveraging the complementary mechanistic and interventional expertise of our researchers, we are uniquely positioned to initiate Phase I trials on the basis of strong fundamental and clinical collaborations. Increasing our capacity to lead clinical trials will be realised in several ways.

First, by streamlining administrative and legal processes that underpin clinical trial conduct — such as facilitating the establishment of a universal consent or streamlining research ethic board approvals for multi-site trials — we will facilitate efficient and timely trial initiation.

Next, by **broadening awareness of, and access to, the clinical trial services available through the CIM** — our state-of-the-art and self-contained clinical research facility located directly within the MUHC hospital complex — our clinical researchers' will have enhanced opportunities to leverage these resources and infrastructure to support the design, initiation, conduct, and reporting of their interdisciplinary clinical trials.

Finally, expanding our administrative research services to include a dedicated methodologist with specialised expertise to support our trialists in the effective design of complex trials, will dually serve to increase our researchers' abilities to lead clinical trials, and to develop and implement **novel trial design methodologies.**

**Advancing our capacity to lead and participate in innovative clinical trials is crucial to translate precision health discoveries from bench-to-bedside, throughout the life course, in a true patient-centric manner.**

## BUILDING UPON A FOUNDATION OF SUCCESS

To advance our quantity, rigour, and capacity to conduct in-house clinical trials at the RI-MUHC, we have embarked on early advances towards realising this precision health research priority. We have expanded our administrative research services team to include a new ***Research Facilitator***, whose role is to support researchers in navigating the complex processes associated with launching new clinical research studies. Specifically, this support is provided in the forms of educational materials to address community-identified knowledge gaps, direct consultations with researchers, and contributions to process improvement initiatives to enhance efficiency within our clinical research ecosystem; these latter initiatives include ethics and feasibility review processes, data access regulations, and regulatory affairs requirements.

Building upon the need to support our researchers with regulatory documentation, we have allocated resources to on-board a ***regulatory affairs specialist*** to guide our researchers in the submission of Health Canada applications. This specialist has been made available to our researchers, free-of-charge, through generous support from the *RI-MUHC Accelerating Clinical Trials- Clinical Trials Unit (ACT-CTU)*. The RI-MUHC ACT-CTU is a part of the larger pan-Canadian consortium to boost the impact and speed of Canadian-led clinical trials.

Recently, we have made important strides towards transforming the clinical research environment at the RI-MUHC by bolstering growth in the number of our oncology trials.

Our researchers have also had recent success in the ***2023 CIHR Operating Grant: Clinical Trials Project competition*** as part of the *Clinical Trials Fund*, where 100% (4/4) of RI-MUHC-led clinical trial applications were successful.

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# INCORPORATE **DETERMINANTS OF HEALTH AND DISEASE** TO REDUCE DISPARITIES

## HOW WILL WE REALISE THIS PRIORITY?

- Increase **diversity** in research participants by broadening **stakeholder engagement** and **knowledge mobilisation**
- Build research relationships with **Indigenous communities**
- Create a **Health Equity Research Hub** representative of Canadian communities
- Implement institution-wide **education and support** related to inclusive health research

## WHY THIS?

**Intersectional variables** are those that encompass multiple dimensions of identity and social systems. While 'sex' as a biological factor and 'gender' as a sociocultural construct are the traditional intersectional variables that come to mind in the context of reducing healthcare disparities, the systematic evaluation of biological and social determinants of health is much broader. These encompass diverse characteristics such as age, ethnicity, language, socioeconomic status, and religious beliefs. The unique combination of these variables will differentially influence patients' perceptions, understanding of, and access to, healthcare services; and even their willingness to undergo certain medical treatments. Therefore, recognising and incorporating these diverse determinants of health into our research designs, methods, analyses, and interpretation and dissemination of results is critical to advancing precision health across the life course. Ultimately, these variables — akin to drug dosage or frequency — impact the efficacy of interventions; thus, they directly inform personalised disease management strategies.

One important way to understand *which* intersectional variables are of particular relevance to a given disease is to integrate and **engage diverse stakeholders** within research teams. These include **persons with lived or living experiences** to inform the relevance of proposed research outcomes in addressing unmet patient needs; **policy makers** to promote guideline changes; and members of **Indigenous communities** to ensure the inclusion of practices that value Indigenous ways-of-knowing, while supporting and complementing their health priorities. To facilitate this engagement and enhance our understanding of diverse patient needs, the RI-MUHC is committed to launching a hub to identify and target sources of health disparities across the populations that we serve in Montreal, Quebec, and Canada. This engagement is most effective when incorporated throughout the research continuum, ensuring that the research outputs generated are mobilised across all relevant stakeholder groups through targeted and accessible mechanisms that maximise their outreach and potential clinical impact.

**Intersectional variables – akin to drug dosage or frequency – impact the effectiveness of interventions; their inclusion within research is paramount to advance precision health throughout the life course.**

## BUILDING UPON A FOUNDATION OF SUCCESS

The RI-MUHC is committed to the integration of equity, diversity, and inclusion (EDI) principles and practices to foster an inclusive, accessible, safe, and supportive environment for the research and professional development of our staff, trainees, and researchers. In 2021, the RI-MUHC initiated a participatory consultation on the barriers that equity-seeking groups face to conduct research and work in a research environment, culminating in the creation of an **institutional EDI Policy** in May 2021; an EDI and Human Resources Committee was created at the Board level to ensure its implementation. Drawing on these initiatives, the RI-MUHC submitted its **institutional EDI Action Plan** to the Fonds de recherche du Québec-Santé (FRQS) in October 2022. This plan aims to ensure that each member of the RI-MUHC community feels valued, respected, and supported in the development of their full potential, and to make the RI-MUHC a space free from discrimination and harassment. This EDI Action Plan was approved in March 2023 by the FRQS. The RI-MUHC currently implements this Action Plan under the leadership of our new ***EDI Specialist*** with the support and monitoring of a 15-member **EDI Advisory Committee**.

One of the four specific objectives of this Action Plan is to *Strengthen the EDI skills of RI-MUHC* community members through basic and advanced training, pedagogic tools, technical support to administrative and research staff, and mentoring programs. To this end, a new **inclusive writing guide** in French and English has been developed and shared with the RI-MUHC community, and a secondary guideline about the integration of people *living with disabilities* is under development. Additionally, we just launched our new professional development certification-course, ***Let's be allies: Foundations in EDI***, representing the first of many formal research trainings that are actively being developed by our EDI Specialist, about inclusivity in health research. These trainings seek to empower our researchers to integrate EDI considerations and ensure the incorporation of determinants of health and disease throughout the research continuum.

United diversity. Photo by Getty Images


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# PROVIDE AN ENVIRONMENT OF **EXCELLENT SERVICE TO SUPPORT WORLD-CLASS RESEARCH**

## HOW WILL WE REALISE THIS PRIORITY?

- Ensure accessible, clear, and continuous communication
- Establish a comprehensive onboarding process for new researchers and staff
- Implement robust administrative, infrastructure, and IT support
- Establish an eco-friendly environment that supports sustainability

## BUILDING UPON A FOUNDATION OF SUCCESS

Our comprehensive ***Onboarding Initiative*** took its first steps towards initiation in Spring 2024. It is currently undergoing a needs assessment to evaluate community-identified knowledge gaps pertaining to accessibility and navigability of research policies, administrative processes, and the division of responsibilities between McGill and the RI-MUHC. Launched in response to community feedback citing ongoing uncertainties with regards to the RI-MUHC's complex research landscape and administrative processes — lasting well beyond the initial "new hire" period — this initiative seeks to replace departmental orientation processes with a holistic and standardised onboarding program. Our onboarding program will be implemented in a phased approach: the first phase will target new researchers and trainees, and the second phase, administrative employees.

The ***RI-MUHC Application Modernisation Program (AMP)*** was recently launched. The AMP seeks to streamline and integrate administrative processes across the institution to improve operational efficiency, enhance security and compliance, and provide our researchers with a better user experience. The AMP spans IT, finance, human resources (HR), research services, and the CIM. Currently, distinct yet complementary Ministère de la Santé et des Services Sociaux (MSSS)-compliant, vendor-based solutions are under evaluation for Accounts Payable, Enterprise Resource Planning (Finance, HR, and Research Services), and a Clinical Trials Management System (CTMS) to support the CIM.

# Operational excellence drives research excellence.

The **RI-MUHC Division of Research Services** facilitates research excellence across the entire lifespan of a grant – from conception to completion. This Division consists of four offices: Pre-Awards, Research Agreements, Research Grants, and Institutional Performance. In the past year, we have expanded our **Pre-Awards Office** to bolster the grant development support and resources available to our researchers.

In our commitment to improve sustainability at the RI-MUHC, our Technical Services division spearheaded the recently expanded **Sustainability Team**, whose role is to drive initiatives that reduce our environmental research footprint. This team leads recycling programs for equipment, plastics, nitrile gloves, and glass. In 2023, the RI-MUHC launched its first annual large equipment recycling effort across the Glen and MGH, redirecting a total of 5,109 kilograms of diverse waste out of landfills and into recycling streams. These initiatives represent our first steps towards reducing waste sent to landfills, disposing unwanted materials responsibly, and improving energy efficiency within our research environment. Our goal is to double these efforts over the next few years.


B

# STRENGTHEN OUR **RESEARCH CAPABILITIES, TOOLS, AND PLATFORMS**

## HOW WILL WE REALISE THIS PRIORITY?

- Improve access to, and usability of, MUHC data to support research
- Advance the capabilities and accessibility of our research support and technology platforms
- Conduct a researcher-guided evaluation of needs and use cases to inform additional investments

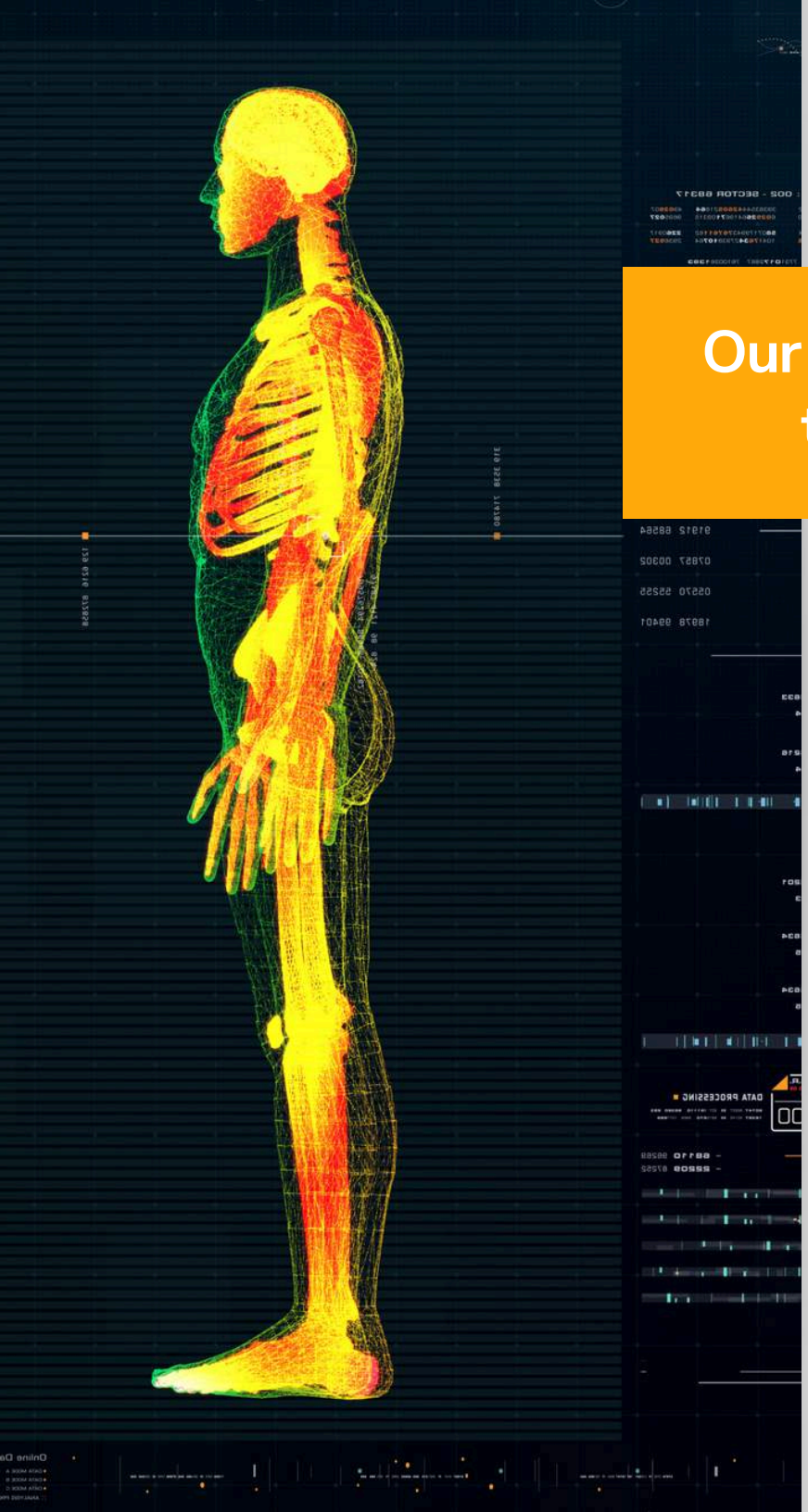
## BUILDING UPON A FOUNDATION OF SUCCESS

Big data and digitisation are the cornerstones of precision health. The RI-MUHC and MUHC are data-rich institutions that have already accumulated large-scale molecular and clinical data. As we advance our 2030 Vision, we need to link diverse datasets to uncover new causal pathways and correlations. This involves high-throughput, high-resolution, data-generating technologies; seamless data access; and state-of-the-art methodologies.

Our **Bioinformatics Platform** is already processing multiomics data, and our new **Digital Health Research Hub** is developing a data governance framework that will support easy access to MUHC clinical data. Consistently, the ***MDClone initiative***, led by the MUHC, has recently been launched to improve MUHC data usability for research purposes. MDClone represents an established self-service platform that we will employ to generate computationally derived ("synthetic") data from the MUHC's data core.

Since these synthetic data do not contain protected health information, their use is not deemed human subject research, thereby improving our researchers' ability to access this data for research purposes.

Our eight **technology CTB Platforms** — led by scientific and technical experts — help our researchers advance the frontiers of biomedical research. Innovations in techniques and technologies facilitate new approaches to tackle challenging scientific questions and to undertake experiments that, in the past, were not possible. We are modernising our technologies and investing in improved efficiencies. Experiments that took weeks or months can now be accomplished in hours or days. We are committed to advancing our proteomics and molecular analytics, supporting light sheet microscopy and cutting-edge imaging systems, harmonising biobank systems, and expanding research capacity of our updated **Containment Level 3 Platform**. We are also growing our bioengineering capacity.



IR-CUSM
2030 VISION
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# Our research outputs are only as strong as the tools we use to generate them.

In addition to enhancing capabilities within the existing disease-agnostic CTB Platforms, we are equally committed to driving innovation through the establishment of novel disease-targeting platforms. Notably, the **Courtois Cardiovascular Signature Program** established an MRI-based platform for 'personalised cardiovascular disease signatures' on the basis of each person's unique combination of genetic, microbiotic, and environmental signatures. This platform collectively addresses three of our research priorities as a means to personalise cardiovascular disease management: driving innovation in multiomics-based research (Priority 1), applying digital tools and technologies (Priority 3), and incorporating determinants of health (Priority 5).


C

# DEVELOP OUR **TALENT** AND REINFORCE **INTERDISCIPLINARY RESEARCH NETWORKS**

## HOW WILL WE REALISE THIS PRIORITY?

- Strengthen our team science support and interdisciplinary research Networks
- Recruit researchers and highly qualified personnel strategically
- Enhance training opportunities across targeted skillsets
- Implement high-quality mentorship programs for all personnel

## BUILDING UPON A FOUNDATION OF SUCCESS

To enhance our researchers' contribution to, and initiation of, team science-driven initiatives, we expanded our administrative research services team in May 2023 to include a new ***Strategic Initiatives Advisor*** within the Pre-Awards Office, whose role is to support the management and development of funding applications for large-scale, multi-partner funding opportunities. This support is offered in the form of project management workflows, tailored templates of application components to guide content population, strategic reviews of applications to ensure alignment with call-specific evaluation criteria, partnership initiation to fill identified resource gaps, and in-depth medical editing services. Further bolstering team science within our institution, the first ***RI-MUHC Inaugural Networks Competition*** was launched in Fall 2023. The goal of this internal initiative is to bring together researchers across different RI-MUHC Research Programs and disciplines to carry out novel research that advances precision health throughout the life course.

Phase 1 of this competition will award up to $10K to six Networks to support the development of their Phase 2 applications; Phase 2 will provide three Networks with up to $100k/yr of seed funding for two years to generate preliminary results that will increase their chances of successfully procuring future external funding. We have had incredible engagement from our research community in this inaugural competition, receiving 23 complete Phase 1 applications that are currently undergoing review.

**To be excellent, we must establish ourselves as a preferred workplace for skillful training and visionary research.**



**We have recently launched three notable institutional training initiatives:**

1. Professional medical writers on our administrative research services team now offer **grant writing sessions** to help researchers craft clear, concise, and compelling grant applications. These sessions, which focus on writing scientific summaries, plain-language summaries, and scientific research proposals, have been attended by more than 160 RI-MUHC and McGill researchers since their launch one year ago.
2. Established in 2023, **CANTRAIN** is a clinical trial training platform funded by CIHR ($11.3 million over 3 years). It provides specialised training to individuals across Canada to develop essential skills for clinical trial roles. CANTRAIN aims to enhance Canada's research landscape by advancing clinical trial expertise among diverse groups, including graduate health research trainees, clinical research professionals, experienced medical professionals, and patient and community partners.
3. In Spring 2024, the RI-MUHC launched its **Distinguished Professor Lecture Series**. This initiative connects our researchers with global leaders in various health-science fields, offering on-site presentations and networking opportunities.

The **Desjardins Centre for Advanced Training (DCAT)** supports the career and professional development of health-science trainees at the RI-MUHC. To enhance training opportunities across our institution, we will continue to invest in DCAT to facilitate the expansion of these important career development initiatives.

As an initial step towards developing mentorship programs for all RI-MUHC personnel, we have been building the ***EArly and mid-CAreer REsearchers network (EACARE)*** since July 2022. EACARE aims to advance the professional development of our postdoctoral fellows, research associates, and research assistants. It provides early and mid-career scientists with mentorship, networking opportunities, and skill development in career advancement, scientific independence, communication, grant writing, research integrity, and time management.


D

# INTENSIFY AND ENRICH OUR **DIVERSE PARTNERSHIPS**

## HOW WILL WE REALISE THIS PRIORITY?

- Engage patient and community advisory groups from the diverse locales served by the RI-MUHC and MUHC
- Enhance collaborative opportunities across the Montreal and Quebec health-science and research ecosystems
- Strive to integrate national and international collaborators in large-scale, multi-site research initiatives

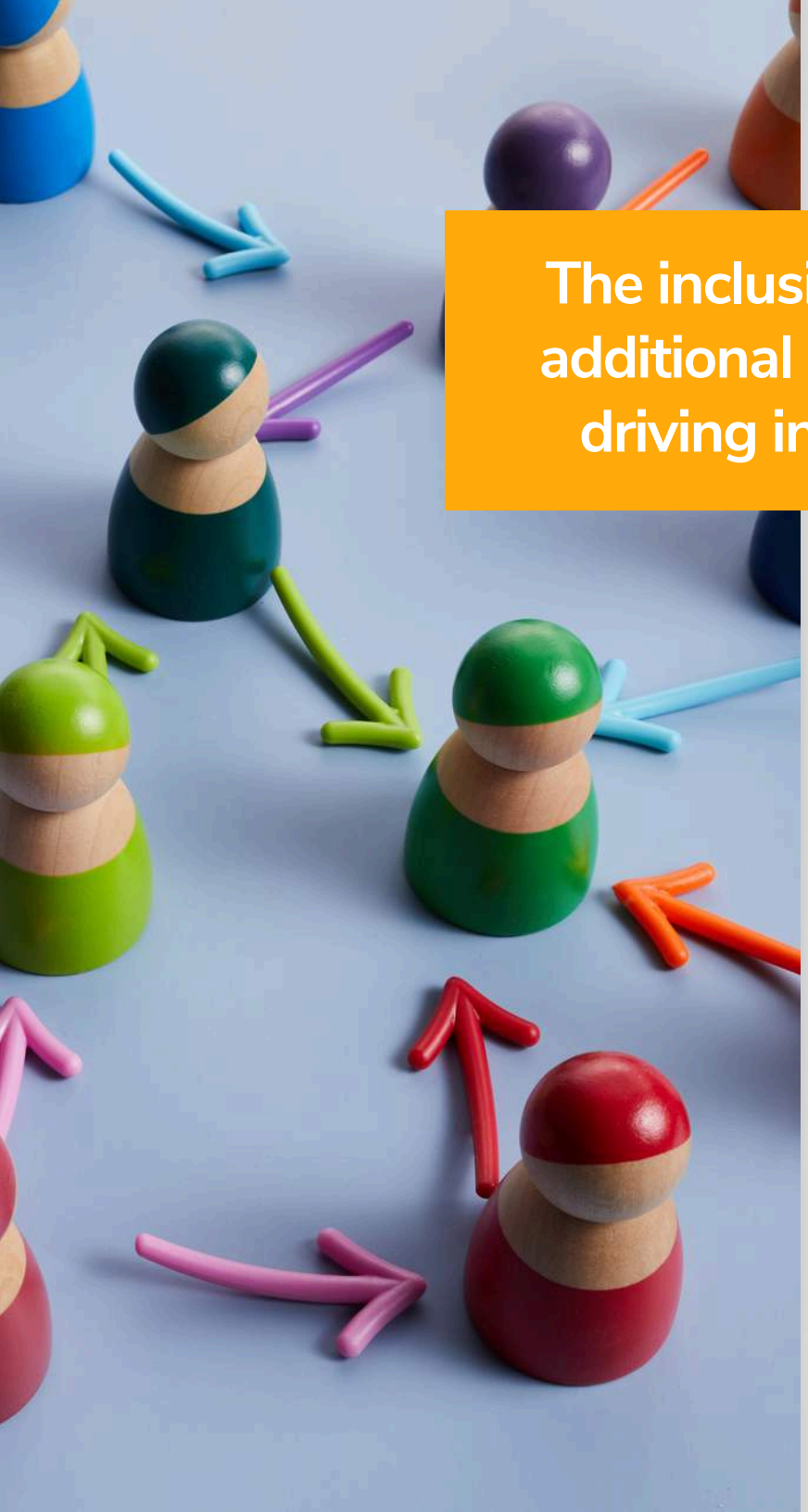
## BUILDING UPON A FOUNDATION OF SUCCESS

Integrating patient perspectives throughout the research continuum is critical to ensuring that our research questions address the unmet needs of those directly living with the conditions we study. Recently, we began collaborating with the ***MUHC Patient Engagement Office (PEO)*** to create a framework for increasing patient representation within our research teams. This framework enables RI-MUHC researchers to be paired with a patient or caregiver whose experiences align with their research initiatives, facilitated by the PEO.

The ***RI-MUHC Clinical Innovation Platform (CLIP)*** is a state-of-the-art facility within the Montreal General Hospital (MGH), which receives generous support from the MGH Foundation. It is designed to accelerate the adoption of innovative health technologies into the market by providing an environment for HealthTech companies to meaningfully connect with key players in the field. As such, CLIP represents an important initiative to enhance our industry-partnered research.

Enhancing research collaborations and partnered activities across the **Montreal and Quebec health-science and research ecosystem** (e.g., McGill University, the MUHC, Mila Quebec Artificial Intelligence Institute, the Institut de recherches cliniques de Montréal, Ste Justine, and the Université de Montréal) is an important way to leverage a wealth of local expertise.

Indeed, we have established strong partnerships with **McGill University and its research institutes** (e.g., the Lady Davis Institute and the Douglas Research Centre), with active collaborations across numerous McGill-affiliated centres including the Goodman Cancer Institute and the Institute of Genomic Medicine. Similarly, we are proud to work closely with, and receive tremendous support from, the four **McGill-affiliated Foundations: MUHC, MGH, MCH, and Cedars Cancer Foundation**.



**The inclusion of diverse perspectives introduces additional knowledge that strengthens our own, driving innovation in health-science research.**

Moreover, three RI-MUHC-led research teams were awarded funding in the ***FRQS Thematic Network Competition (2024-2032)*** to formally establish interdisciplinary Quebec-based Networks that leverage and harmonise province-wide expertise and resources. Specifically, these are the Network for Rare Diseases, the Digital Health Network, and the Network to Transform Autism Care.

Pivotal to advancing effective **team science initiatives** at the RI-MUHC are strong national and international collaborations. Over the past year, we have actively allocated extensive Pre-Awards and Research Program-specific application development support to our researchers applying to pan-Canadian funding competitions; these include the *Team Grant: Lung Health* competition sponsored by CIHR (results not yet publicly available); the *Pan-Canadian Network for HIV/AIDS and STBBI Clinical Trials Research- Phase 1* competition sponsored by CIHR (anticipated notice of decision: June 2024); and the *Research Networks of Excellence in Women's Heart and/or Brain Health* competition jointly sponsored by the Heart and Stroke Foundation of Canada and CIHR (anticipated notice of decision: August 2024).

# RESEARCH PRIORITIES

## WHAT WILL OUR 2030 TRANSFORMATION LOOK LIKE?

IR-CUSM 2030 VISION RI-MUHC

| | TODAY | | 2030 |
|---|---|---|---|
| **Mechanistic and Multiomic Research** | Defined on the basis of disease presence or absence | > | Defined on the basis of unique individual characteristics |
| **Preventative, Diagnostic, and Therapeutic Strategies** | Limited capacity to conduct biomarker, cell, and gene therapy research | > | Validation of biomarkers for diagnostics and expansion of Cellular Therapy Laboratory to include a biomanufacturing platform |
| **Data Sciences and Digital Technologies** | Compartmentalised use of these tools among select researchers | > | Widespread use of these tools facilitated through centres of excellence |
| **Clinical Trials** | Predominately industry-led, Phase II and III trials | > | Increased quantity of in-house, Phase I trials led by RI-MUHC investigators |
| **Determinants of Health and Disease** | Largely homogenous research teams that comprise scientists and clinicians | > | Heterogeneous research teams of diverse stakeholders to ensure the evaluation of meaningful intersectional variables |

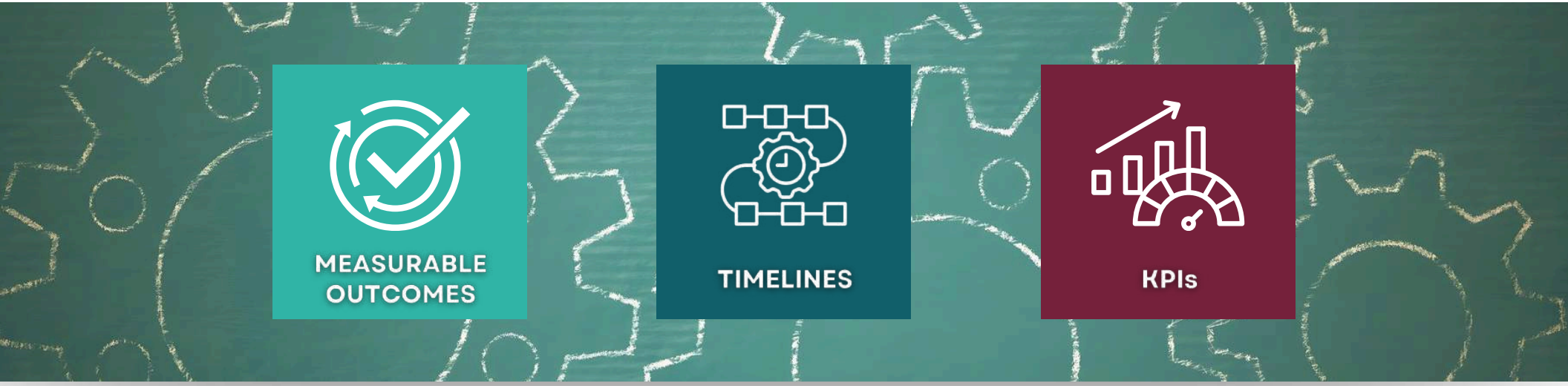
# ENABLING PRIORITIES

## WHAT WILL OUR 2030 TRANSFORMATION LOOK LIKE?

IR-CUSM 2030 VISION RI-MUHC

| | TODAY | | 2030 |
|---|---|---|---|
| **Excellent Service** | Ongoing challenges navigating our complex research landscape and administrative processes | > | Streamlined navigation through a comprehensive onboarding and application modernisation program |
| **Tools and Platforms** | Ageing platform equipment that requires upgrading | > | Renewed, upgraded, and expanded platform equipment |
| **Talent and Interdisciplinary Research Networks** | Research largely siloed on the basis of eight disease-areas | > | Interdisciplinary and team-science research initiatives |
| **Diverse Partnerships** | Ad-hoc partnerships established as a product of opportunistic research initiatives | > | Partnership initiation strategically aligned with McGill-affiliated Foundations and McGill University |

# OUR **NEXT STEPS**




After the presentation of the *RI-MUHC 2030 Vision* to, and approval by, the RI-MUHC Board of Directors, we will focus on delivering the corresponding implementation plan to make our ambitious vision a reality. This implementation plan will outline the **measurable outcomes, timelines, and key performance indicators (KPIs)** to monitor progress of our five precision health research priorities and four enabling priorities.

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- Rhian Touyz, (Chair), MBBCh, MSc (Med), PhD

## 2030 VISION EXECUTIVE TEAM

- Julia V Burnier, PhD
- Indra Gupta, MD
- Nada Jabado, MD, PhD
- Irah King, PhD
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- Benjamin Smith, MD, MSc, FRCPC
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- Gilbert Tordjman, CPA
- Rhian Touyz, MBBCh, MSc (Med), PhD

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- Liane Feldman, MD
- Alan John Forster, MD, MSc
- Beth Foster, MD, MSCE
- Lucie Opatrny MDCM, MSc
- Marc Rodger, MD, MSc

## COMMUNICATIONS

- Christina Farant (graphic design for 2030 Vision)
- Catriona McDonald, MBA

## STRATEGIC TASK FORCE

- Marcel A. Behr, MD, MSc, FRCPC
- Bertrand Jean-Claude, MSc, PhD
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- Calum MacRae, MD, PhD (Harvard Stem Cell Institute)
- Lillian L Siu, MD, FRCPC (Princess Margaret Cancer Centre)

## 2030 VISION DEVELOPMENT TEAM

- Sabine Dhir, PhD
- Necola Guerrina, PhD, MWC
- Susan James, MBA
- Jared Lee, MBA, MSc
- Rhian Touyz, MBBCh, M.Sc. (Med), PhD

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