



Scientific Domain	Competency	Enabling competencies
1: Scientific Concepts	a) Design and planning of research across pillars* science  *biomedical, clinical, health systems & services, population health	<b>Foundational</b> <ul style="list-style-type: none"> <li>Know how to design and plan for research within one's primary area of scientific expertise</li> <li>Understand the importance of pre-conception, peri-conception, pregnancy and post-partum periods, healthy public policy, and a life cycle approach to research for the optimal physical and mental health</li> <li>Ability to appropriately integrate sex and gender considerations into research proposals</li> <li>Ability to understand the role of knowledge translation (KT) and to develop an integrated KT plan for research proposals as appropriate to one's area of research</li> </ul>
	b) Analytic methods across pillars of science	<b>Foundational</b> <ul style="list-style-type: none"> <li>Know how to analyze data and use appropriate analytic techniques within one's primary area of expertise</li> <li>Understand study design and analytic challenges related to conducting research for both qualitative and quantitative data</li> </ul>
	c) Cross-disciplinary fluency	<b>Foundational</b> <ul style="list-style-type: none"> <li>Gain basic understanding of terminology, analytical techniques and broad conceptual bases of all pillars of science, outside of one's primary area of expertise</li> <li>Learn to identify and engage the appropriate collaborators to plan and execute a cross-disciplinary research project</li> </ul>
	d) Equity in health research	<b>Foundational</b> <ul style="list-style-type: none"> <li>Have the knowledge and skills to understand the implications of health inequalities research, recognize them, and how to address them in the design and conduct of research</li> <li>Ability to conduct Sex and Gender Based Analysis within the context of a diversity framework for formulation of research, policies and services, attending to determinants such as race, ethnicity, socioeconomic status, disability, sexual orientation, migration status, age and geography, and how they interact with sex and gender to contribute to exposures to various risk factors, disease course and outcomes</li> </ul>
2: Ethics, Quality and Risk Management	a) Ethics in research	<b>Foundational</b> <ul style="list-style-type: none"> <li>Understand the role of research ethics boards</li> <li>Know ethical issues related to engaging mothers, fathers, children, youth and families as research participants, including the role of assent</li> <li>Know the UN Convention of the Rights of the Child</li> <li>Know the ethical issues related to experimentation and drug trials</li> <li>Have the knowledge and ability to conduct research with integrity and transparency</li> </ul>
	b) Regulations and governance	<b>Foundational</b> <ul style="list-style-type: none"> <li>Acquire certification in regulations governing health research set out by governing bodies for research in Canada (including TCPS 2 CORE, Health Canada Division 5, GCP training)</li> </ul> <b>Advanced</b> <ul style="list-style-type: none"> <li>Know specific regulations concerning research involving fetal tissue, cord blood samples, embryos and stem cells collected in infancy</li> </ul>



<b>3: Priority and emerging research themes</b>		<ul style="list-style-type: none"> <li>Know regulations concerning research involving DNA banking, gene sequencing in embryos, fetuses, children, youth, return of results to participants, and incidental findings</li> </ul>
	c) Quality assurance and risk management	<b>Foundational</b> <ul style="list-style-type: none"> <li>Know and recognize risks for research participants and ensure safety of all participants</li> </ul>
	a) Indigenous Health	<b>Foundational</b> <ul style="list-style-type: none"> <li>Understand the key historical and political factors, including colonization and intergenerational trauma, that contribute to health disparities and recognize the factors that positively impact Indigenous health</li> <li>Describe the connection between historical trauma and current government practices to health outcomes among Indigenous people</li> <li>Understand how to establish respectful and equitable relationships between researcher and participants to conduct research with Indigenous communities and peoples</li> </ul> <b>Advanced</b> <ul style="list-style-type: none"> <li>Recognize and address one's own biases, stereotypes and their impact on Indigenous people's health/health research</li> <li>Develop strategies to assess, manage and reduce bias and its effects on Indigenous people</li> <li>Develop confidence and skills to challenge instances of institutional racism that are barriers to advancing health, education and career development for Indigenous peoples</li> <li>Develop strategies to work alongside Indigenous peoples to identify health issues, needs and co-develop solutions</li> <li>Understand cultural practices, legislation, policies concerning health and welfare in Indigenous (First Nations, Inuit, and Métis) communities</li> <li>Know the United Nations Declaration on the Rights of Indigenous Peoples, the Truth and Reconciliation Commission of Canada Calls to Action, and Jordan's Principle</li> </ul> <p>Understand and respect the First Nations Principles of OCAP (Ownership Access Control Possession) in research</p>
b) Health Equity, Social Determinants of Health, and Social Innovation	<b>Foundational</b> <ul style="list-style-type: none"> <li>Recognize biases in research that arise due to systemic inequities by participating in implicit bias training and assessment</li> </ul> <b>Advanced</b> <ul style="list-style-type: none"> <li>To build knowledge regarding social, historical, and political factors that contribute to health inequities in, including settler colonialism, racism, racialization, and gender</li> <li>To develop confidence and skills to challenge instances of institutional racism, discrimination, and sexism that are barriers to advancing health, education, and career development for racialized individuals, women, and other equity deserving groups through workshops to support inclusive and equitable practices</li> </ul> <p>Reflect on intersectional identities including racialization, gender, and sex that contribute to adverse health outcomes by reading and discussing the theory of intersectionality</p>	



	c) Data Intensive Research	<p><b>Foundational</b></p> <ul style="list-style-type: none"> <li>Understand the role of big data approaches in application to GI and Liver research, for routinely collected data (RCD) and 'omics' approaches</li> <li>Gain a basic understanding of computer science analytic techniques such as artificial intelligence and machine learning, and how they can be applied to improve GI and liver health</li> </ul> <p><b>Advanced</b></p> <ul style="list-style-type: none"> <li>Demonstrate the ability to design and conduct research using RCD, including identification of bias, data validation, advanced epidemiology analytic techniques, and computer science analytic techniques such as artificial intelligence and machine learning</li> <li>Identify useful RCD sources in Canada available for health research</li> <li>Understand the specific risks of bias and benefits involving research using large sets of routinely collected health data (RCD)</li> <li>Be able to critically evaluate a manuscript of a research study conducted using RCD</li> </ul>
	d) Care innovation and clinical trials	<p><b>Advanced</b></p> <ul style="list-style-type: none"> <li>Develop skills to design multi-site trials, negotiate budgets, establish contracts, data sharing agreements, handle data, design trials for rare diseases</li> </ul> <p>Understand ethical considerations with research involving pregnant mothers, children and youth as participants, inclusion of marginalized populations, and relationships with industry</p>
	e) Translational medicine	<p><b>Advanced</b></p> <ul style="list-style-type: none"> <li>Know the ethical frameworks for experimentation in humans, government policy and regulations regarding pharmaceuticals and technology transfer, interactions with for profit sector, protection of intellectual property, commercialization, patents, and health services delivery</li> <li>Understand the value of patient partnership in translational research</li> </ul>
	f) Knowledge Translation, Implementation Science, Policy, and Patient Engagement	<p><b>Foundational</b></p> <ul style="list-style-type: none"> <li>Understand emerging concepts in knowledge translation and implementation science, theory, planning and evaluation</li> </ul> <p><b>Advanced</b></p> <ul style="list-style-type: none"> <li>Ability to review and understand methodological rigour of knowledge translation and implementation studies</li> <li>Ability to develop diverse partnerships (industry, health systems, policy makers)</li> <li>Understand the theoretical foundation of knowledge translation, patient engagement and implementation science</li> <li>Ability to develop an integrated KT plan</li> <li>Ability to produce an output aligned with identified KT goals and target audiences (e.g., policy brief, blog, public article, webinar, infographic)</li> </ul>



4: Research operations and management	a) Research conduct and delivery	<b>Foundational</b> <ul style="list-style-type: none"> <li>Demonstrate ability to successfully carry out a research protocol as designed and to mitigate challenges</li> </ul>
	b) Operations within the research environment	<b>Foundational</b> <ul style="list-style-type: none"> <li>Understand the various processes governing and guiding research within and between institutions</li> </ul>
	c) Resource management	<b>Foundational</b> <ul style="list-style-type: none"> <li>Ability to manage research staff, budgets, logistics, and grants reporting</li> </ul>
	d) Data management	<b>Foundational</b> <ul style="list-style-type: none"> <li>Understand and apply strategies to ensure highest quality of data collection, safety and adhere to obligations regarding secure storage of data, and preparation for analysis</li> </ul>
	e) Patient, family, and community engagement in the research process	<b>Foundational</b> <ul style="list-style-type: none"> <li>Describe the role of patient partners, and know how to integrate them into the research process</li> <li>Know how to meaningfully engage patients and families, including children and youth in governance, priority setting, research conduct, and knowledge translation</li> </ul>
5: Knowledge Exchange for engagement, and impact	a) Co-creation, communication & dissemination of results	<b>Foundational</b> <ul style="list-style-type: none"> <li>Ability to present research results suitable to all types of audiences - in person, written, graphic and video formats (e.g., oral presentations, poster presentations, abstracts and manuscripts, social media, visual abstracts, infographics)</li> </ul>
	b) Research to practice and policy	<b>Foundational</b> <ul style="list-style-type: none"> <li>Know the processes involved in mobilizing research to inform policy and practice</li> </ul> <b>Advanced</b> <ul style="list-style-type: none"> <li>Know how to work effectively with relevant policy partners in Canada, across sectors such as education, justice, health</li> <li>Demonstrate the ability to communicate effectively with policy and industry partners including the ability to write policy briefs based on research findings</li> </ul>
	c) Engaging stakeholders	<b>Foundational</b> <ul style="list-style-type: none"> <li>Know how to engage the right partners for the right research question, and negotiate partnerships</li> <li>Know how to create and implement and integrated KT plan with meaningful engagement</li> </ul>
6: Professional Development Domain	<b>Competency</b>	<b>Enabling Competencies</b>
A: Scientific writing	Communicate research plans and results effectively to scientific audiences and granting agencies	<b>Foundational</b> <ul style="list-style-type: none"> <li>Ability to write a grant that is competitive at the national level for funding and to prepare manuscripts for publication</li> <li>Ability to write for a general scientific audience</li> <li>Ability to communicate scientific results in writing to lay audiences</li> </ul>
B: Peer review	Engage in high quality peer review of scientific writing	<b>Foundational</b> <ul style="list-style-type: none"> <li>Ability to critically evaluate grants and manuscripts and provide constructive feedback</li> </ul> <b>Advanced</b> <ul style="list-style-type: none"> <li>Ability to participate in peer review panels</li> </ul>



<b>C: Communication</b>	Listen and understand others' perspectives Speak clearly and effectively to diverse audiences	<b>Foundational</b> <ul style="list-style-type: none"> <li>Ability to contribute to general public and national discourse on science</li> </ul> <b>Advanced</b> <ul style="list-style-type: none"> <li>Be a credible expert in science and policy related to GI and liver health in Canada</li> </ul>
<b>D: Media fluency</b>	Fluency in use of multiple media platforms to disseminate research results and participate in discussions with both scientific and lay public	<b>Foundational</b> <ul style="list-style-type: none"> <li>Know and understand how to use traditional and emerging media platforms to nuances of communicate with a variety of audiences</li> </ul> <b>Advanced</b> <ul style="list-style-type: none"> <li>Master both written and oral communications over various media platforms</li> </ul>
<b>E: Mentorship</b>	Learn best practices in providing and receiving mentorship in a research setting	<b>Foundational</b> <ul style="list-style-type: none"> <li>Understand the importance of creating safe and inclusive spaces for teaching and learning</li> </ul> Recognize harmful practices related to sexism, racism, ageism, microaggressions in mentorship
<b>F: Leadership</b>	Demonstrate emerging leadership ability	<b>Foundational</b> <ul style="list-style-type: none"> <li>Ability to serve as a leader in diverse roles as appropriate to career stage over career progression</li> <li>Ability to resolve conflicts</li> </ul> Ability to create healthy team dynamics Demonstrate good mentoring skills to junior trainees
<b>G: Teamwork</b>	Optimize efficiency and effectiveness of teams	<b>Foundational</b> Ability to lead teams with efficiency and effectiveness mastering the art of communication, delegation and team building
<b>H: Research professional identity formation</b>	Integrative developmental process of one's self-concept as a researcher	<b>Foundational</b> <ul style="list-style-type: none"> <li>Learn to identify personal and professional goals</li> <li>Create mission and vision statements for one's self</li> <li>Establish a personal and professional identity</li> </ul> Identify a professional community and other sources of support
<b>I: Personal wellness</b>	Learn the importance of self-care to increase resilience and career sustainability	<b>Foundational</b> <ul style="list-style-type: none"> <li>Develop and use strategies for psychological resilience</li> <li>Recognize signs and symptoms of burnout</li> <li>Learn to ask for help</li> </ul> Ability to prioritize family, parenting, relationships and friendships, and attend to personal wellness
<b>J: Personal effectiveness</b>	Develop personal qualities and approach to be an effective researcher	<b>Foundational</b> <ul style="list-style-type: none"> <li>Develop time management skills</li> <li>Develop skills to protect time to read and write scientific literature</li> </ul> Learning to say no to prevent overwork
<b>K: Business and entrepreneurship</b>	Commercialization of research results	<b>Advanced</b> <ul style="list-style-type: none"> <li>Be aware of the process of commercialization, technology transfer, and business practices in the for-profit sector</li> <li>Understand regulations surrounding intellectual property and relationships with universities and institutional differences</li> </ul>
<b>L: Indigenous cultural safety</b>	Cultural humility and safety practices in acknowledging First Nations, Inuit and	<b>Foundational</b> <ul style="list-style-type: none"> <li>Understand the historic and cultural importance of Indigenous communities in Canada (First Nations, Inuit, and Métis)</li> </ul>



training a new generation of researchers  
in gastroenterology and liver

former une nouvelle génération de  
chercheurs en gastro-entérologie et foie



	<p>Métis communities of Canada</p>	<ul style="list-style-type: none"> <li>• Be aware of Calls to Action in the Truth and Reconciliation Commission Report, specifically #18 and 19</li> <li>• Develop and engage in reconciliation practices routinely within research environments</li> </ul>
<p><b>M: Equity, diversity and inclusion. Sex and gender-based analysis.</b></p>	<p>Creating equitable, diverse and inclusive research teams and environments</p>	<p><b>Foundational</b></p> <ul style="list-style-type: none"> <li>• Develop skills to challenge instances of institutional racism, discrimination, and sexism that are barriers to advancing health, education, and career development for racialized individuals, women, and other equity deserving and historically marginalized groups</li> </ul> <p><b>Advanced</b></p> <ul style="list-style-type: none"> <li>• Know concrete practices that promote equity, diversity and inclusion in the research environment</li> <li>• Know and apply Sex and Gender-Based Analysis Plus (SGBA+) to research, policies and programs, including exploration of biological (sex-based) and socio, cultural (gender-based) similarities and differences between women, and men, boys and girls</li> </ul>