



We are the Department of Medicine.

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Wherever the art of
Medicine is loved,
there is also a love
of Humanity. *Hippocrates*



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If you want to go quickly,
go alone. If you want to
go far, go together.

African Proverb

Chair's Message



I write this in April 2020, in the midst of the global COVID-19 pandemic, the effects and consequences of which leave us grappling for comparisons. Even so, I see a very real sense of connectedness with the world through our international efforts to combat this contagion and on the front lines of care, where we are facing the same risks and worries but are committed to saving lives.

This coming together of people to think in innovative ways for solutions and to support and carry each other through the toughest of circumstances is not new to us in the Department of Medicine, although the scale and impacts of this catastrophe are unprecedented. As COVID-19 continues to surge, I see the collaborative efforts and accomplishments of last year as essential to our current and future medical leadership. .

The enormous effort and camaraderie, for example, that resulted in a successful University of Alberta Hospital campus Connect Care rollout in November 2019 is a strong predictor of a future successful provincial rollout. We have **Rob Hayward**, **Narmin Kassam** and **Stuart Rosser** among many, many others to thank for carving out a path that was both difficult and exhilarating. For now, further Connect Care development and roll-out is on hold: all attention and resources are needed for pandemic care. Ultimately, the lessons and experiences of practising pandemic medicine will only emphasize the necessity for rapidly accessible, integrated digital health information through Connect Care.

Our stellar efforts in achieving competency-based medical education milestones were most capably led by outstanding education innovators **Vijay Daniels**, **Anna Oswald** and **Steven Katz**. Currently, undergraduate medical education has moved entirely online, so residents and fellows work alongside faculty as always but within a new context of hypervigilance. This experience too, once the pandemic is contained, will enrich and shape all aspects of medical learning and standards.

We are witnessing research activity comparable only to wartime in the global effort to create Covid-19 treatments and, hopefully, an effective vaccine. Sharing knowledge across disciplines and distance is vital for such discoveries. But this holds true for all fields of medical research. For instance, when PhD- and clinician-scientists like **Gopi Sutendra** and **Ian Paterson** work together, we see knowledge emerging that reflects the necessary unity of basic and clinical medical research that, in their case, offers new ways to protect the hearts of cancer patients from the insults of life-saving chemotherapy.

Connectedness and interconnectivity are also the threads that run through the other stories in this report. **Gavin Oudit** and his work with patients, clinicians and industry will develop new ways to prevent heart failure. **Amanda Brisebois** shares her specialized palliative care expertise with colleagues and trainees so that priority in end-of-life care is given to patients' lives rather than only to their illnesses. **Giovanni Ferrara** is developing a training and research environment in the Pulmonary Division to ensure that the next generation of respirologists launch successful competitive careers. **Jacqueline Hebert's** lab draws talent from a dozen disciplines to create artificial limbs that will integrate seamlessly into the daily lives of patients, restoring ease of movement and quality of life. As part of an international network of physicians, **Maher Saqqur** cares for the victims of the Syrian civil war using commonly used technology to give real-time neurological care thousands of kilometres away. **Penny Smyth's** passion is developing medical professionalism not as a side note in our medical lives but as the foundation for how we teach, act, think and care for each other and our patients.

Connectedness has also been the theme of my decade-long tenure as Chair of the Department of Medicine. When asked recently what my biggest learning was when I went into the role, I replied that initially I did not relish the thought of conducting 200 in-person annual reports every year. Too much work, too much time, too much else to do, I thought then. How surprising then to discover that the annual report process was my favourite part of the job. I had the pleasure and the privilege to learn from and about each of you. The result is a viewpoint that may sound as if it is the advantage of the Chair but, through active connections with each other, could be universal: the ability to see the whole of our interconnected community in all its diversity, achievement and enormous potential.

I am delighted that Narmin Kassam will lead the Department into its bright future. Narmin's stellar leadership, keen vision, distinguished achievements and holistic understanding of the necessary directions for academic medicine will take us all to a higher level of success. Narmin's style, for those who have not yet had the pleasure of meeting her, is frank, open, down-to-earth and demanding, but most of all it is optimistic. I know that she makes the greatest demands on herself, but she will not be able to do this work without you. If you give to her the support and confidence you so freely shared with me over the last ten years, then for the DoM, the best is yet to come.

Barbara J. Ballermann, MD

*Professor and Chair, Department of Medicine, University of Alberta
Head, Clinical Department of Medicine, AHS Edmonton Zone*

DEPARTMENT OF MEDICINE

2019/20
STEERING COMMITTEE**BACK ROW – LEFT TO RIGHT**

Dr. Wayne Tymchak, Director, Division of Cardiology
 Dr. Douglas Zochodne, Director, Division of Neurology
 Dr. Daniel C. Baumgart, Director, Division of Gastroenterology
 Dr. Adrian Wagg, Deputy Chair, Associate Chair, Finance and Director, Division of Geriatric Medicine
 Mr. Francois Bouman, Assistant Chair, Administration
 Dr. Robert Gniadecki, Director, Division of Dermatology

MIDDLE ROW – LEFT TO RIGHT

Dr. Sebastian Straube, Director, Division of Preventive Medicine
 Dr. Branko Braam, Director, Division of Nephrology
 Dr. Joanne Homik, Ambulatory Clinics Lead
 Dr. Karen Doucette, Director, Division of Infectious Diseases
 Dr. William Dafeo, Associate Chair, Faculty Development
 Dr. Peter Senior, Director, Division of Endocrinology & Metabolism
 Dr. Ron Damant, Interim Director, Division of Pulmonary Medicine until January 31, 2019. Missing: Dr. Giovanni Ferrara, Director, Division of Pulmonary Medicine as of February 1, 2019

FRONT ROW – LEFT TO RIGHT

Dr. John Bradley, Associate Chair, Clinical Faculty
 Dr. Evangelos Michelakis, Associate Chair, Research
 Dr. Steven Katz, Associate Chair, PGME
 Dr. Barbara Ballermann, Chair, Department of Medicine and Clinical Department Head
 Dr. Gopinath Sutendra, Associate Chair, Graduate Studies
 Dr. Joseph Brandwein, Director, Division of Hematology
 Dr. Narmin Kassam, Associate Chair, Clinical Affairs and Director, Division of General Internal Medicine until February 13, 2019. Missing: Dr. Peter Hamilton, Director, Division of General Internal Medicine as of February 14, 2019.

SPOTLIGHT

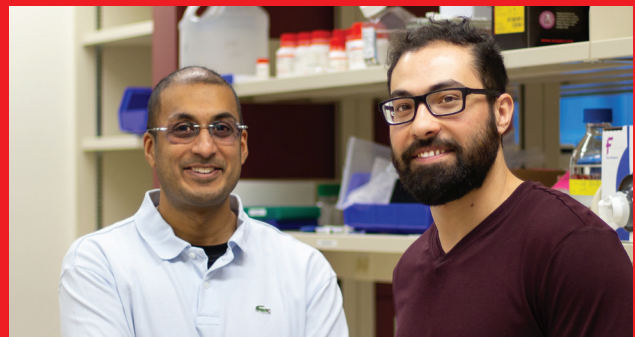
Spotlight on Department of Medicine Award Winners

The Science Behind the Medicine



GOPINATH SUTENDRA & BRUNO SALEMÉ

MD/PhD candidate **Bruno Salemé** and his supervisor **Gopinath Sutendra** won the Department of Medicine's Translational Research Fellowship Award and Basic Science Publication Award respectively for their paper "Tissue-Specific Regulation of p53 by PKM2 is Redox Dependent and Provides a Therapeutic Target for Anthracycline-Induced Cardiotoxicity," which was the cover story of *Science Translational Medicine*. Mr. Salemé won an Alberta Innovates Graduate Scholarship, along with the MedStar publication award (from FoMD) for this work.



Dr. Sutendra's and Mr. Salemé's landmark publication in 2019 details a molecular mechanism that can protect heart tissue from toxicity caused by certain cancer therapies. Heart cells, unlike many other cells in the body, grow so slowly that their numbers are considered finite, which is why damage from chemotherapy can lead to heart disease in some people. Prior to this research, there was scant understanding of how to protect heart cells during chemotherapy partly due to limited research in the emerging cardio-oncology field. The authors used oxygen as the basis of selective protection of the heart as the heart is an oxygen-rich environment whereas tumours are generally oxygen-poor. When the authors stabilized oxygen-sensitive PKM2 protein in the heart, they showed that it not only protects the heart from chemotherapy, it enhances the chemotherapy's effectiveness on the tumour.

SPOT LIGHT

AISHWARYA IYER

Post-doctoral Fellow **Aishwarya Iyer** (supervisor **Robert Gniadecki**) won the Department of Medicine's Paul Man Award for her Research Day abstract "Cutaneous T-Cell Lymphoma is Genetically and Clonotypically Heterogenous."



Dr. Iyer's abstract presents an alternate theory of how cutaneous T-cell lymphoma develops. This malignancy was thought to result from "skin resident mature monoclonal T-cells." Clinical observations, multifocal development and recurrent relapse of the disease pose some challenges to this theory of development. Dr. Gniadecki's research group, of which Dr. Iyer is

a member, used the technique of whole exome sequencing to identify multiple malignant T-cell clonotypes, thus proving that the disease does not develop from mature monoclonal T-cells. Their theory is that the disease likely develops from immature T-cells that manifest on the skin in the form of tumour lesions.



MARYAM EBADI

Post-doctoral Fellow **Maryam Ebadi** (supervisor **Aldo Montano-Loza**) won the Department of Medicine's Translational Research Fellowship Award for her paper "Performance of Psoas Muscle Index for Identification of Patients with Higher Waitlist Mortality Risk in Cirrhosis," published in the *Journal of Cachexia, Sarcopenia and Muscle*.



Sarcopenia, characterized by low muscle mass, is independently associated with elevated mortality in cirrhosis but is not included in the current liver transplant allocation system. In the past decade, new research on sarcopenia in cirrhosis has emerged. This information has advanced our knowledge; however, the field is currently hampered by differing definitions

and measurements. Sensitive and reproducible measures of muscle mass are required to assess the evolution of muscle loss and to follow outcomes of therapeutic interventions. Skeletal muscle index (SMI) in a single computed tomography image at the level of the third lumbar vertebra is a valid representative of whole body muscle mass. Low psoas muscle index identifies an incomplete subset of patients at increased risk of mortality indicated by low SMI. Given the poor performance of psoas muscle index, SMI should not be substituted by psoas muscle index.

SPOTLIGHT

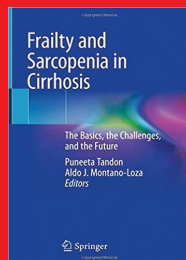
ALDO J. MONTANO-LOZA

Aldo J. Montano-Loza received the Department of Medicine's Clinical Investigation Publication Award for his paper "Factors Associated with Recurrence of Primary Biliary Cholangitis after Liver Transplantation and effects on Graft and Patient Survival," published in *Gastroenterology*.



Primary biliary cholangitis (PBC) is a chronic liver disease resulting from the immune system's attack on biliary cells causing slow, progressive damage to the bile ducts. A significant number of patients end up needing liver transplantation, and recurrent PBC (rPBC) is frequent after transplantation. The author evaluated risk factors associated

with rPBC and its impact on patient and graft survival in a multicentre, international cohort that included data from 13 centres. Of a total of 785 patients, rPBC was diagnosed in 240 patients (30%). The findings indicated that a younger age at the time of diagnosis and liver transplantation, the use of the immunosuppressant tacrolimus and biochemical decrease in bile flow (cholestasis) after transplantation are associated with rPBC. Because graft and patient survival are compromised by rPBC, therapeutic interventions to prevent or reduce the impact of rPBC are encouraged.



RICHARD LONG



Richard Long won the Department of Medicine's Paul W. Armstrong Excellence in Research Award for his lifetime body of work. His *opus* is exemplified in his recent paper, co-authored with Courtney Heffernan, "Two Row Wampum, Human Rights, and the Elimination of Tuberculosis from High-Incidence Indigenous Communities," published in the *Health and Human Rights Journal*.

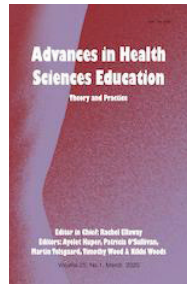


This paper describes a recent project designed to change the delivery of public health, specifically tuberculosis (TB) programming, in high-incidence First Nations and Metis communities on the Canadian prairies. Strategically, the project has forged a new relationship (or revisits the concept of the Two Row Wampum relationship) between government stakeholders and

communities. This relationship establishes communities as equal partners in decision-making to dismantle figuratively the colonially rooted jurisdictional boundaries that separate communities and, up till now, have confounded TB control. By unanimous decision, all stakeholders agreed to respect the rights of Indigenous Peoples and to use those rights to hold their deliberations and actions to account.

SPOT LIGHT

SHANNON FONG & ANNA OSWALD



Shannon Fong, a general internal medicine resident, and her supervisor Professor **Anna Oswald** shared the Department of Medicine's Medical Education Publication Award for their publication "Patient-centered Education: How Do Learners' Perceptions Change as They Experience Clinical Training?," published in *Advances in Health Sciences Education*.



Early exposure to patient educators helps medical learners understand and use the principles of patient-centred care. The authors expand on this teaching approach by evaluating the persistence of initial perceptions in learners and exploring their general reflections on longer-term impacts of early patient educator exposures once they are in the clinical phase of their training. The authors used written learner reflections, group interviews, and analyses of audio recordings to identify how perspectives on patient-educators had changed and which themes identified in early training remained relevant to the clinical trainees. While new themes were identified, many themes identified by pre-clerkship learners remain relevant in their early clinical training. Further, insights from pre-clerkship experiences with patient educators evolve as learners experience clerkship with definite shifts in emphasis and new perspectives. This work supports the development of patient-centredness in undergraduate medical education.

A blue-tinted photograph of three people walking towards the camera in a hospital hallway. In the center is a man in a white lab coat with a name tag that reads 'Dr. V. Daniels'. To his left is a man in a dark suit and glasses. To his right is a woman in a purple blazer and a floral top. The background shows other people in white coats and a bright, clean hallway.

Medical Education Leadership

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The awe of discovering the human body. The honor of being trusted to give advice. The gratitude for helping someone through a difficult illness. These things never grow old.

Danielle Ofri, MD via The New York Times

Medical Education Leadership



L > R Dr. Shabnam Hamidi, Dr. Steven Katz, Dr. Vijay Daniels, Dr. Anna Oswald, Dr. Lucas Churchill

Competency-Based Medical Education Collaboration

Steven Katz, Anna Oswald
& Vijay Daniels

The Royal College of Physicians and Surgeons of Canada's (RCPSC) Competency-Based Medical Education (CBME) program is a new approach to improve physician training. CBME began launching in all of Canada's medical schools in 2017 in a seven-year rollout. Described by **Dr. Anna Oswald** as "a behaviour change within the culture of medicine," CBME develops learners' competencies through regular assessment of their capabilities in an environment where questions are encouraged and feedback is given in real time.



L > R Residents Dr. Shabnam Hamidi, Dr. Lucas Churchill, Dr. Dennis Wang. Background: Dr. Vijay Daniels, Dr. Steven Katz, Dr. Anna Oswald

Dr. Oswald is director of Competence-Based Education in the Office of Postgraduate Medical Education and also the Faculty of Medicine & Dentistry's representative on the national CBME committee. She's overseeing the CBME launch in all 58 of the Faculty of Medicine & Dentistry's postgraduate programs.

Dr. Oswald collaborated with colleagues **Dr. Vijay Daniels** and **Dr. Steven Katz** on the successful CBME launch of the internal medicine program in July 2019. The three award-winning medical educators shared the vision and enthusiasm that the new program would greatly benefit resident learning. "I felt really fortunate that Darryl Rolfson [former director of the Internal Medicine Program], Vijay and Steven were interested in being innovators and in preparing in advance with a pilot project to see what would work in a large program like internal medicine," says Dr. Oswald.

Dr. Daniels, the then-associate program director of assessment, worked closely with the tech team to adapt and test the electronic, online undergraduate medical education platform for application in the postgraduate environment. "The support of the Postgraduate Medical Education Office in trialling this was important," says Dr. Daniels. "From funding secured by Associate Dean Ramona Kearney to Anna's deep understanding of what would and would not fly in other programs—that support helped us come up with a final flexible platform that would work across all of the postgraduate residency programs."

Dr. Katz, as director of the Internal Medicine Program, masterminded the awareness campaign among residents, reminding them of the essential role

they played in CBME. When Dr. Oswald's colleagues on the national CBME committee needed help and advice preparing for CBME in their internal medicine programs, she referred them to Dr. Katz. "Steven was always willing to help them out, and as a result we were seen nationally as a leader," says Dr. Oswald. In 2019, Dr. Katz received the RCPSC's Competence by Design Innovator award, nominated by Dr. Oswald.

"Implementing that behaviour change was really successful in the Department of Medicine because of the openness to try new things early, work really closely with the resident group and constantly refine along the way," says Dr. Oswald. "By the time it came to officially launch, it wasn't that big a deal."

Dr. Anna Oswald is Professor (July 2020) in the Division of Rheumatology in the Faculty of Medicine & Dentistry's Department of Medicine. She won the University of Alberta's Rutherford Award for Excellence in Undergraduate Teaching in 2016.

Dr. Steven Katz is Associate Professor in the Division of Rheumatology in the Faculty of Medicine & Dentistry's Department of Medicine. In 2018, Dr. Katz was listed as one of Edmonton's Top 40 Under 40 by Avenue Magazine.

Dr. Vijay Daniels is Professor (July 2020) in the Division of General Internal Medicine in the Faculty of Medicine & Dentistry's Department of Medicine. Dr. Daniels was awarded a McCalla Professorship in 2019 by the University of Alberta. He also won the university's Rutherford Award for Excellence in Undergraduate Teaching in 2017.



Penny Smyth

Neurologist Penny Smyth grew interested in the idea of professionalism in her former role as program director for the neurology residency program in the Department of Medicine. In trying to resolve conflicts between residents and faculty, she would hear two sides of a story with the truth somewhere in the middle. Often the conflicts involved professionalism.

“When we hold formal sessions or workshops on professionalism, everyone assumes they already know all about it,” says Dr. Smyth. “But when you see hushed hallway conversations or closed-door conversations, it’s most often people grappling with issues of professionalism. They are trying to understand others’ apparent motives and behaviours in a situation or asking themselves if they did the right thing.”

Interest in the disconnection between what people know and how they act led Dr. Smyth to collaborate with colleague Carol Hodgson in medical education on a professionalism project. They developed real-life vignettes based on incidents collected from residents, medical students, nurses and faculty participants. After testing the vignettes on the participants, they created an educational workshop that they’ve delivered locally, nationally and internationally.

“Participants saw that others can see the same situation differently. It gave them an understanding of other people’s views and encouraged communication, which is at the heart of trying to resolve a lot of professionalism conflicts,” says Dr. Smyth, who was appointed Associate Dean of Professionalism in 2017.

Dealing with a submitted professionalism concern usually results in a meeting between the report subject and that person’s supervisor. The report subject is encouraged to explore the other side of the story in addition to their own, and to decide together with the supervisor possible outcomes and actions. No matter the level of intervention required as an outcome—from apology to extra education to a faculty action plan to disciplinary action—Dr. Smyth and her team guide the way.

The demands and intensity of her professionalism role meant that Dr. Smyth had to focus the clinical work she loves mainly on central neuroinflammatory diseases such as multiple sclerosis. She’s embarked on new projects such as a new definition of professionalism, the development of guiding values and a psychological safety initiative in the faculty. “It’s important that professionalism becomes better understood and empowers our actions,” says Dr. Smyth. “That will result in improved wellbeing for all of us—faculty and learners, and the patients we care for.”

Dr. Smyth is Associate Professor in the Department of Medicine’s Division of Neurology and Associate Dean, Professionalism in the Faculty of Medicine & Dentistry.



Giovanni Ferrara

It's been just over a year since Dr. Giovanni Ferrara arrived in Edmonton from the Karolinska Institute in Sweden to take up the directorship of the Pulmonary Division. Not only did he face a steep learning curve, he arrived just as everyone in the Faculty of Medicine & Dentistry began working flat out to be ready for the launch of Connect Care, the new provincial clinical information system.

It was an ideal time for Dr. Ferrara to experience the strengths of the division in action. He singles out the support he receives from Dr. Mike Stickland and Dr. Ron Damant as examples of why he came to the division. "People here are very collaborative, and that's not something you find everywhere. We really have a nice team of people. It contributes to a great environment where you can do great things."

Despite the current fiscal constraints, he sees a huge opportunity to improve the division's efficiency. "We're doing a lot of work on our internal processes and roles and putting in place clear goals and metrics to show our progress," he says. His reasoning is that if the system is working well, then trainees and young professionals will get better training and a better environment for clinical practice, research and collaboration. He prioritizes the mission of the Division of Pulmonary Medicine in supporting the careers of young colleagues. "The best way for our Division

to grow is to ensure the next generation will be successful," he says. "This means a concerted focus on research funding, clinician scientist training and experience, and career coaching."

The work he's leading in the Division to better organize roles and processes helps shift the focus of specialist care from the availability of an individual physician to that of a pool of doctors with the same expertise. His goal is a more equitable service and patient-centred model, where any patient requiring highly specialized care has access to it.

The University of Alberta's internationally recognized strengths in big data, machine learning and artificial intelligence were another huge draw in Dr. Ferrara's recruitment. A member of the university's SMART Network, he's developing a monitoring system for respiratory conditions on a wearable device for patients. "The goal is to predict which patients are getting worse so that we do better follow-up with them and keep them out of Emergency," he says. "This is something I've been wanting to do for a few years. Coming here has made it possible."

Dr. Giovanni Ferrara is Professor in the Division of Pulmonary Medicine in the Faculty of Medicine & Dentistry's Department of Medicine. Trained in respirology, he holds a PhD in experimental medicine from the University of Modena and Reggio Emilia. He practised in Italy before joining the Karolinska Institute in Stockholm, Sweden, as a senior consultant physician and associate professor working in the fields of tuberculosis and interstitial lung disease.

Clinical Leadership

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The aim of medicine is to prevent disease and prolong life; the ideal of medicine is to eliminate the need of a physician. *William J. Mayo*

Clinical Leadership



L > R Dr. Stuart Rosser, Dr. Rob Hayward, Dr. Narmin Kassam

Connect Care Collaboration

Stuart Rosser, Rob Hayward
& Narmin Kassam

Rob Hayward says he has been waiting his whole career for Connect Care. An internist and health informatician, Dr. Hayward was seconded from the Division of General Internal Medicine to Alberta Health Services (AHS) as Chief Medical Information Officer. Under his leadership, Connect Care, AHS's clinical information system, was launched in late 2019 in a "first wave" throughout the Walter McKenzie Health Sciences campus.

Connect Care is a “one patient, one record, one system,” that Dr. Hayward calls “an extraordinary, once-in-a-lifetime opportunity” with the potential to change all aspects of healthcare.

That potential is based on the new capability for the health system to look inwards. “We are now able to accrue high quality internal evidence to show what works best in Alberta and what are the highest priorities for our population,” says Dr. Hayward. “Connect Care provides the deep integration to make that happen.” Patients, physicians, allied health care workers—all can engage with Connect Care.

Dr. Hayward gives full credit for Connect Care’s successful Edmonton launch to AHS leadership and the thousands of people who worked day and night to train themselves and others on the new system. Among those working side-by-side with Dr. Hayward are **Dr. Narmin Kassam** and **Dr. Stuart Rosser**, also from the Department of Medicine.

Dr. Kassam leads the Edmonton Zone Medicine Quality Council – Strategic Clinical Improvement Committee which has fostered physician-led quality improvement work that has resulted in improved patient outcomes and reduced health system costs. It was a natural that she and Dr. Hayward would join forces before Connect Care’s launch. “All aspects of care are now entirely digital, from orders to patient-reported outcome surveys,” says Dr. Kassam. “It’s all part of one big system that we can learn from and that will drive quality improvement.” Trained as a “super-user,” Dr. Kassam mentored her colleagues, taking the lead on the Medicine Inpatient area of the system.

Another team member, Dr. Stuart Rosser, is a Physician Design lead and CMIO lead for Ambulatory Training within Connect Care. His interests are in informatics, privacy legislation and stewardship, and relationships with healthcare professional organizations. He and Dr. Kassam are leading their clinical colleagues forward. “We’re seeing people embrace it because it’s not tenable to conduct a complex enterprise like health care on paper anymore,” says Dr. Rosser.

While the first wave launch of Connect Care was not without stress and frustration, everyone involved was intent on making it work. “It’s all about people leading the system,” says Dr. Hayward. “They helped build Connect Care and are invested in it. They are making it a success.”

Connect Care is a “one patient, one record, one system,” that Dr. Hayward calls “an extraordinary, once-in-a-lifetime opportunity” with the potential to change all aspects of healthcare.

Dr. Rob Hayward is Professor in the Division of General Internal Medicine in the Faculty of Medicine & Dentistry’s Department of Medicine.

Dr. Narmin Kassam is incoming Chair of the Department of Medicine and Professor in the Division of General Internal Medicine.

Dr. Stuart Rosser is Associate Clinical Professor in the Division of Infectious Diseases.



Maher Saqqur

Maher Saqqur was part of the University of Alberta team that started the provincial telestroke program in 2005. By using telestroke technology, neurologists in Edmonton like Dr. Saqqur were able to treat patients in real time in every part of Alberta. A few years later, thanks to Dr. Saqqur, telestroke technology in Edmonton became a lifeline half a world away for the victims of war-torn Syria in the aftermath of the 2011 revolution.

Dr. Saqqur became involved early in medical aid to Syria through a Swiss-based non-government organization (NGO) called Union of Medical Care and Relief Organizations (UOSSM) that works in partnership with other NGOs such as Doctors without Borders to deliver medical and humanitarian relief in conflict areas. UOSSM has four areas of focus in Syria: trauma care, primary care, psychiatric and rehabilitation/neurology care and clinical research with data collections.

At first, Dr. Saqqur and other physicians involved with UOSSM went to Syria to help on the ground. But that became increasingly untenable as the conflict escalated and they had to attend to their commitments in their home countries.

“So many Syrian medical personnel have been killed or injured that we implemented telemedicine, starting with tele-intensive care units, in order to

deliver urgent medical treatment,” says Dr. Saqqur. This evolved into tele-neurology and tele-psychiatry in the outpatient setting.

Delivering medical care in a war zone means that infrastructures for health services are inevitably destroyed. UOSSM works with Syrian personnel to build treatment centres in existing structures that are less at risk of bombing in besieged areas: underground structures, schools, immigration centres at borders and, in one instance, a cave.

Ultimately, the structures that enabled telemedicine were also destroyed. Now Dr. Saqqur uses the video feature of *WhatsApp* to examine brain or spinal injured patients in real time with the Syrian team acting as his eyes and hands.

Dr. Saqqur used to treat three or four severe trauma cases a day. That number has fallen to one or two a week, not from any diminishment in conflict but because so many trauma treatments centres have been destroyed. “This is an urgent humanitarian crisis with more than 1.5 million disabled or injured,” says Dr. Saqqur. “Thanks to funding from the federal government and other agencies, we are able to keep building treatment centres and delivering much-needed care.”

Their nine years of experience and partnerships with NGOs and governments have enabled Dr Saqqur and his colleagues at UOSSM to expand their services beyond Syria and into Yemen, Gaza and Rohingya (Cox’s Bazar Bangladesh). “Our objective is to ensure every human in need receives medical relief,” says Dr. Saqqur.

Dr. Maher Saqqur is Clinical Professor of Medicine and Neurology in the Division of Neurology in the Faculty of Medicine & Dentistry’s Department of Medicine.



Amanda Brisebois

When she began seeing more and more patients with life-threatening chronic diseases, internist Amanda Brisebois realized that she was missing something.

"Patients kept coming back, in and out of hospital, and they had so little concept that their lives actually mattered because their disease so completely took over," Dr. Brisebois says. "Focusing on quality of life is such an important part of patient care, and I felt that even though I was the medical expert, I needed a different type of knowledge to truly help them."

Her quest for that knowledge led her to the palliative care specialty where she saw patient symptoms, spiritual and psychosocial needs integrated into care. Fourteen years after her internal medicine specialty training, she went back to complete a residency for palliative care specialty training: she is one of roughly 20 palliative specialists in Edmonton.

In addition to furthering direct patient care, Dr. Brisebois wanted to share her new knowledge, motivated by two compelling reasons. "The patient population is huge and growing. It won't be just palliative care physicians who will be doing most of this work; it's every physician—family doctor to specialist—who missed robust palliative training," says Dr. Brisebois. She became an advocate and teacher of palliative knowledge to colleagues in all areas of medicine, not just within the palliative specialty.

Her second motivation comes from the question of how we live our best lives. As someone who lives

with a chronic illness herself, Dr. Brisebois knows caregivers' palliative training helps patients incorporate illness into their lives rather than being consumed by it. "It's helped me as a physician focus on peoples' lives, not their deaths," she says.

About five years ago, with little administrative experience but believing that physician leadership was the way to create change for the better, she took up the role of medicine facility chief at the Grey Nuns Hospital. In that role she has mentored and supported colleagues to be their best selves, have their best careers and ultimately improve their wellbeing. In early 2019, she became the medical director of the Grey Nuns Hospital. Despite her heavy administrative and clinical commitments, she continues to be a highly acclaimed teacher, her enthusiasm for the medical profession resulting in her 18th teaching award in 2019.

"I don't know if I believe that there has to be some big mission in life, but I believe you make a difference on a daily basis for people," says Dr. Brisebois. "When someone shakes my hand and says I made a difference when their family member was dying, that's where I get my reward." Promoting positive health care changes and collaborative leadership gives her a similar positive outlook on the future of health care.

Dr. Amanda Brisebois is Clinical Professor in the Division of General Internal Medicine in the Faculty of Medicine & Dentistry's Department of Medicine. She is on the Royal College of Physicians and Surgeons of Canada's (RCPC) exam committee to create the new Palliative Care Subspecialty Fellow exam, as well as the General Internal Medicine RCPC Exam Committee.



Research Leadership

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A problem is a chance
for you to do your best.

Duke Ellington

Research Leadership



Dr. Gopi Sutendra and Dr. Ian Paterson

Cardio-Oncology Collaboration

Gopi Sutendra & Ian Paterson

As cancer therapies increase in effectiveness, more patients are surviving cancer. About a million Canadians are currently undergoing active cancer treatment or are cancer survivors. However, a significant number go on to develop premature heart disease, including heart failure, which can carry a worse prognosis than the original cancer. When cardiologist **Ian Paterson**, a heart imaging specialist, started seeing more and more of these patients in his practice, he sought out ways to prevent the heart damage.

A CIHR-funded study he conducted a few years ago showed that when women undergoing breast cancer treatment were given a heart medication, their hearts were protected from weakening caused by chemotherapy. But the mechanisms involved, both in heart weakening and in the protective benefits of the heart drugs, were unknown.

That changed when **Dr. Gopinath Sutendra**, a basic researcher who focuses on cardiotoxicity, was recruited to the Division of Cardiology in 2015 and began collaborating with Dr. Paterson. “Gopi had great ideas about molecular pathways involved with heart weakness that I as a clinician knew nothing about,” says Dr. Paterson. In turn, Dr. Sutendra was able to use Dr. Paterson’s patients’ blood samples in his research to identify the mechanisms involved. In 2019, Dr. Sutendra published an important paper identifying a molecular pathway involved in protecting the heart from chemotherapy.

The two are now investigating whether tumours themselves secrete factors that may also be involved in heart damage during cancer treatment. They will be looking at specific molecular features in serum that can be used to predict who might be at higher risk for cardiotoxicity.

The implications of the project are enormous. Roughly 20 per cent of women who take a breast cancer drug called Trastuzumab will develop heart weakening at some point during their treatment. The resulting interruptions or cessation of treatment reduce their chances of a cure.

“Our aim is that someday Ian can say in the clinic, ‘Based on your serum sample, we believe you’re more prone to getting cardiac dysfunction from cardiac toxicity, so we’re pre-emptively going to treat you with a heart pill,’” says Dr. Sutendra.

The relatively new field of cardio-oncology is based on collaborations between clinicians: medical oncologists and cardiologists. Drs. Sutendra and Paterson are intent on extending that collaboration. “Ian and I are seeing the whole picture from the cell to the patient,” says Dr. Sutendra. “This is what the Department of Medicine is aiming for: more of these types of collaborative efforts between basic scientists and clinicians.”

“Ian and I are seeing the whole picture from the cell to the patient,” says Dr. Sutendra. “This is what the Department of Medicine is aiming for: more of these types of collaborative efforts between basic scientists and clinicians.”

Dr. Gopinath Sutendra is Associate Professor (July 2020) and Dr. Ian Paterson is Professor in the Division of Cardiology in the Faculty of Medicine & Dentistry's Department of Medicine.



Gavin Oudit

Gavin Oudit describes his field as translational cardiovascular medicine. “We look at discoveries in the lab, extrapolate their relevance to patients and then push to develop new therapies and approaches to disease treatment.”

That’s one of the primary goals for Dr. Oudit as director of the Heart Function Clinic at the Mazankowski Alberta Heart Institute and Canada Research Chair in Heart Failure.

Last year, Dr. Oudit and his laboratory research team made one of their biggest discoveries. They identified that neutral endopeptidase and other enzymes inactivate apelin peptides that are part of an important protective pathway in the body for many organs including the heart. In collaboration with John Vederas in the Department of Chemistry, the team is designing apelin analog peptides that are resistant to the enzymes and have fewer side effects than current heart failure drugs. Their success led to the formation of a company, Pearko Therapeutics Inc. The resulting business connections have led to important funding for the company. Pearko now has exclusive patent rights from the US to develop therapies based on the apelin analogs for heart failure and pulmonary arterial hypertension.

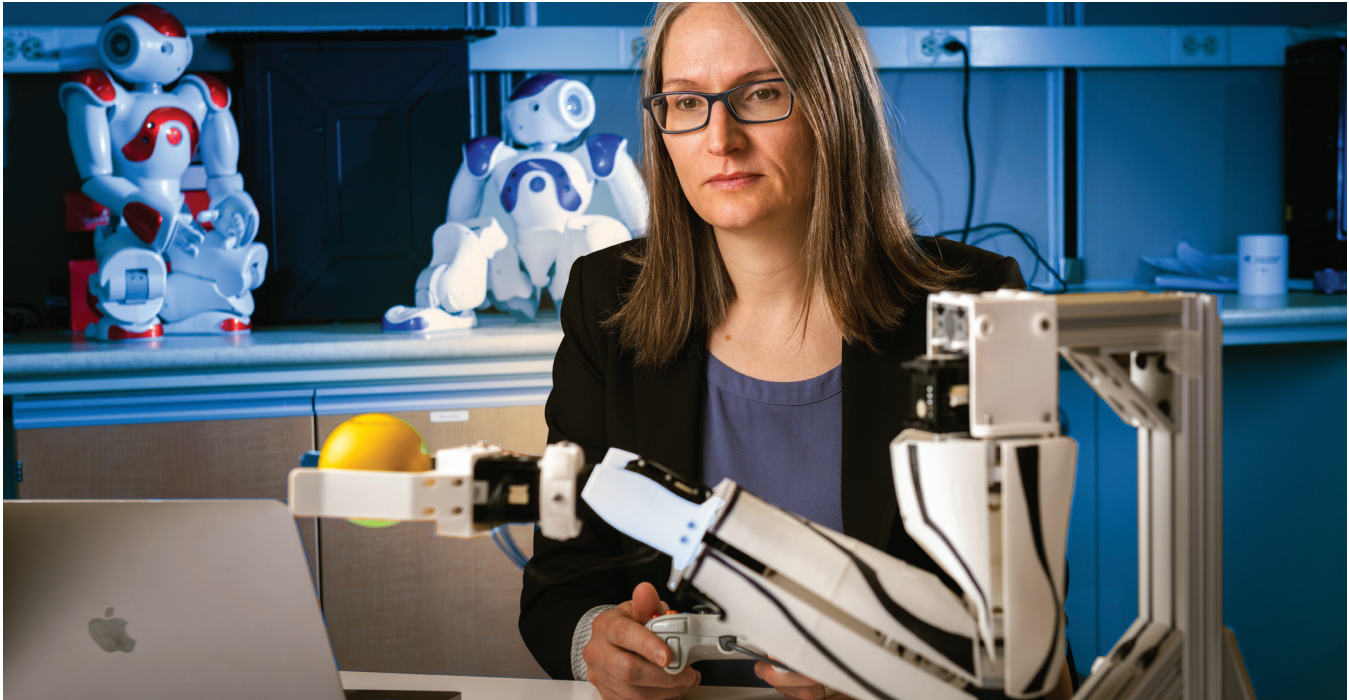
Clinical research is the second important arm of his translational activity. Dr. Oudit has created a registry of 1300 patients with heart failure

and initiated genetic counselling and testing for patients with cardiomyopathies and supportive care for patients with end-stage heart failure. One recent study involved patients with muscular dystrophy, an inherited muscle disorder resulting in a cardiomyopathy where heart muscles weaken. “These are very sick patients,” Dr. Oudit says. “Our study showed how multidisciplinary care for these patients improves their clinical outcomes.” Not only did the study result in fewer hospitalizations over a three-year period, the study participants ended up with strengthened heart muscles.

The human explanted heart program is another of Dr. Oudit’s research initiatives. Tissue samples from more than 500 hearts from people who underwent heart transplants and left ventricular assist device insertions are catalogued and studied for the molecular and cellular causes of heart failure. The repository is used in collaborations with many other research groups, including a group at Harvard, enabling the team to perform advanced genetic testing for various types of cardiomyopathies.

“Translational medicine is a lot of work and demands a very integrative environment,” says Dr. Oudit. “The support we have from the department and faculty, our great trainees, the academic framework, the clinical and infrastructure support at the Mazankowski, the collaboration with great colleagues has made all of this possible.”

Dr. Oudit is Professor of Medicine in the Division of Cardiology in the Faculty of Medicine & Dentistry’s Department of Medicine and Adjunct Professor in the Department of Physiology.



Jacqueline Hebert

Through the study and development of robotic limbs, rehabilitation medicine specialist Jacqueline Hebert is transforming the quality of life for people who have limb loss. “Someone who uses a typical prosthetic arm can’t grasp or move things around the way that you or I can with a normal arm,” she says. “They end up abandoning their device as it does not help with their day-to-day function.”

Dr. Hebert is changing that. She co-founded and heads the Bionic Limbs for Improved Natural Control (BLINC) lab run by a multidisciplinary team of engineers, neuroscientists and computing scientists. Over the past few years, the BLINC team, using machine learning and artificial intelligence and working in collaboration with research teams internationally, has developed robotic limbs that give wearers the movement capabilities demanded in daily life. Their most recent advance, the introduction of sensory feedback in a robotic limb through rewiring of nerves in residual limbs, made global headlines.

While BLINC’s devices are routinely tested on patients, they are not yet household items. The robotic limbs are expensive, and funders won’t pay for them based just on great media coverage. They need proof that the investment will result in health

system savings. That’s why for the past four years Dr. Hebert and her team have been working on a project to develop a quantitative outcome measures-testing protocol to deliver evidence that the robotic limbs make a difference in all the right ways.

“The test gives us precise data on patients’ movement, the amount of visual attention they need to do tasks and how the limbs improve their daily function,” says Dr. Hebert. The data can help show that robotic limbs are cost-effective to the health system, preventing long-term injury and increasing safety since users with a more intuitive prosthesis don’t have to focus so much on the arm movement.

The outcome measures project wrapped up in 2019, resulting in a slew of validation publications in top journals and increasing recognition. “We’re being asked by centres in the US and Sweden to collaborate so they can learn to use our outcome metrics to measure the impacts of their research on patient function,” says Dr. Hebert.

The BLINC lab’s scope of activity means Dr. Hebert is involved in all aspects of translating research into clinical care: working with surgeons, device development, training, and outcome measurement. “I have a goal to develop a certain number of lines of research that all converge at the end,” she says. “I want everything we do in the lab to eventually translate to patient care.”

Dr. Jacqueline Hebert is Professor (July 2020) in the Division of Physical Medicine & Rehabilitation in the Faculty of Medicine & Dentistry’s Department of Medicine.

Division Profiles

Department of Medicine

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And once the storm is over, you won't remember how you made it through, how you managed to survive. You won't even be sure whether the storm is really over. But one thing is certain. When you come out of the storm, you won't be the same person who walked in. That's what this storm's all about.

Haruki Murakami

DEPARTMENT OF MEDICINE

2019 DIVISIONAL LEADERSHIP



Wayne Tymchak
Cardiology



Robert Gniadecki
Dermatology



Peter Senior
Endocrinology & Metabolism



Daniel C. Baumgart
Gastroenterology



Peter Hamilton
General Internal Medicine



Adrian Wagg
Geriatric Medicine



Joseph Brandwein
Hematology



Karen Doucette
Infectious Diseases



Branko Braam
Nephrology



Douglas Zochodne
Neurology



Chester Ho
Physical Medicine & Rehabilitation



Sebastian Straube
Preventive Medicine



Giovanni Ferrara
Pulmonary Medicine



Jan Willem Cohen Tervaert
Rheumatology



Cardiology

“The division was very successful in obtaining peer-reviewed funding in 2019 with the result of excellent research output,” says Division Director **Wayne Tymchak**. “National annual scientific meetings continue to be extremely well represented by our cardiology faculty. Every Canadian Cardiovascular Society clinical practice guideline is led or significantly represented by our divisional members. In addition, there is significant respect and expertise internationally in areas of acute coronary artery syndrome and heart failure syndromes research.”

To add to its strengths, the division welcomed three new recruits: cardiac gerontologist **Deirdre O’Neill**, echocardiographer **Nawal Almajed** and general cardiologist and cardiology block coordinator **Tarun Sehgal**.

Awards and honours received by division members include Canada Research Chair Tier II Award renewal for **Gavin Oudit**; Department of Medicine Basic Science Award and funding from Canada Foundation for Innovation and John R. Evans Leadership Fund for **Gopinath Sutendra**; Leadership Recognition Award for Ross Tsuyuki; Research Mentor of the Year in Cardiology and University Hospital Foundation/Servier funding for **Roopinder Sandhu**; Canadian Institutes of Health Research funding for **Ian Paterson**; and Teacher of the Year Award from Division of Cardiology students for **Isabelle Vonder Muhll**.

Appointments and promotions include **Kevin Bainey**, Director of the Cardiac Catheterization Laboratory; **Justin Ezekowitz**, Director of the Cardiac Sciences Research Institute; **Sean McMurtry**, Chair of Heart and Stroke Foundation's Scientific Review Committee and Director, Clinical Investigator Residency Program at the University of Alberta; **Evan Lockwood**, promotion to Clinical Professor, **Mikael Hanninen**, promotion to Associate Clinical Professor, **Tomasz Hruczkowski**, promotion to Associate Clinical Professor; and **Tammy Bungard**, promotion to full Professor.

Division members who had top publications include **Gopinath Sutendra** (lead author) for "Tissue-Specific Regulation of p53 by PKM2 is Redox-Dependent and Provides a Therapeutic Target for Anthracycline-Induced Cardiotoxicity" in *Science Translational Medicine*; **Paul Armstrong** (lead author) for "Counteracting Health Misinformation: A Role for Medical Journals?" in *Journal of the American Medical Association*; and **Harald Becher** (co-author) for "Contrast Echocardiography—Compendium for Clinical Practice," published by *Springer/Nature*.

Brian Sonnenberg continues his work in the community by promoting a healthy lifestyle for cardiovascular health in Edmonton high schools.

"In 2020 we will be initiating an exciting new specialized multidisciplinary clinic addressing an unmet need for patients with hypertrophic cardiomyopathy," says Dr. Tymchak. "As this disorder crosses many subspecialties, the clinic will involve representation from general cardiology, cardiac imaging (ECHO, Nuclear, MRI), adult congenital heart disease, electrophysiology and genetics." The clinic will offer the appropriate genetics screening and counselling to patients and family members. In addition to developing algorithms, a registry will provide useful information about outcomes and areas for improvement.

HARALD BECHER



Professor and Heart and Stroke Foundation Chair **Harald Becher** is an international leader in the field of advancing ultrasound technologies and translating them into clinical practice. In 2019, a team led by Dr. Becher and Dr. Kevin Bainey completed the first clinical trial on sono-thrombolysis in North America. This technology has the potential for non-invasive reperfusion in the cardiac catheterization lab. In 2019 *Springer/Nature* published the textbook *Contrast Echocardiography—Compendium for Clinical Practice* by **Dr. Becher** and **Dr. Andreas Helfen**. This book sets standards for non-invasive diagnostic cardiac imaging and integrates new visualization tools that can be used with cell phones and tablets.

PADMA KAUL



Padma Kaul is an epidemiologist and health services researcher. Her research focusses on diabetes and cardiovascular disease at every life-stage. As co-director of the Canadian VIGOUR Centre, Dr. Kaul and her team maintain comprehensive longitudinal data on population-level cohorts of patients with cardiovascular disease in Alberta and Canada. Dr. Kaul uses these data to examine issues related to access to care, health care delivery, clinical outcomes and costs. Because of her interest in women's health, Dr. Kaul has developed a population-based longitudinal pregnancy-birth cohort to examine how pregnancy factors affect the long-term health of mothers and their children.

CARDIOLOGY DIVISION

Graduate Students: 19

Fellows: 8

Residents: 13

Multidisciplinary Clinics: 3

Specialized Clinics: 8

Division Director **Robert Gniadecki** is delighted with the division's successful integration of clinical and basic research and the noteworthy results. "We are involved in clinical trials and have produced high-impact basic research in cutaneous oncology using data from patients in specialized clinics," Dr. Gniadecki says.

The research team established a method for genome sequencing of cancer cells in cutaneous lymphoma that has led to several important publications and a new understanding of the origins of this rare and deadly skin cancer.



Dermatology

Dr. Gniadecki was lead author on three major publications that included co-authors **Aishwarya Iyer** and **Dylan Hennessey, Sandra O’Keefe, Jordan Patterson, Weiwei Wang** and **Gane Ka-Shu Wong** on “Skin Colonization by Circulating Neoplastic Clones in Cutaneous T-cell Lymphoma” in *Blood*; co-authors **Lee Ringham** and **Przemyslaw Prusinkiewicz** on “Skin Patterning in Psoriasis by Spatial Interactions between Pathogenic Cytokines” in *iScience*; and co-authors **Abdelbasset Hamrouni, Hanne Fogh, Zoulika L. Zak** and **Niels Odum** on “Clonotypic Diversity of the T-cell Receptor Corroborates the Immature Precursor Origin of Cutaneous T-cell Lymphoma” in *Clinical Cancer Research*.

Graduate student **Arunima Sivanand**, who was supervised by Dr. Gniadecki, received first prize for the oral presentation “Neoantigens in Mycosis Fungoides: Whole Exome Sequencing Discovery of Immunotherapeutic Targets” at the Division of Dermatology Research Day.

The Dermatology Division’s integration of research into care has led to a high degree of engagement with the clinical community. “Academic success makes us visible globally and attracts community dermatologists to contribute their expertise to the division,” says Dr. Gniadecki. “Dermatologists in the community see medical patients, do a lot of medically necessary work and are involved in clinical trials. This is not always the case in other jurisdictions.”

Looking ahead, Dr. Gniadecki wants to have more specialized clinics for complex patients who have complicated diseases that involve the skin, such as certain connective tissue diseases, psoriatic arthritis and haematological cancers with skin involvement. These patients require much more time. “Academic dermatologists can provide such care because they are not fee-for-service,” says Dr. Gniadecki. “This is our service to the community.”

DYLAN HENNESSEY



Dylan Hennessey brought his advanced computing science and computational chemistry background to Dr. Robert Gniadecki’s lab where he is a bioinformatician, IT support and guardian of the lab’s private computer cluster. The Gniadecki translational research lab investigates the development and immunology of skin cancers as well as experimental therapies for skin T-cell lymphomas. Mr. Hennessey automates the flow of raw genetic data from one program to another (a pipeline) into a more understandable format. He is creating a pipeline that uses machine learning to see if the stage of cancer can be determined from the RNA taken from cancer tissue biopsies.

ARUNIMA SIVANAND



Arunima Sivanand is a Master of Science in Translational Medicine student in Dr. Robert Gniadecki’s lab and a medical student at the University of Toronto. Her master’s thesis identifies for the first time neoantigens in mycosis fungoides (MF), a rare and difficult-to-treat skin cancer. Her findings suggest potential for immune checkpoint inhibitor therapy during early disease stages. Ms. Sivanand came to Edmonton to develop research skills under Dr. Gniadecki’s mentorship and because of the high quality of teaching in the translational program. After graduating in June 2020, she plans to pursue a career in dermatology as a clinician-scientist and educator.

DERMATOLOGY DIVISION

Graduate Students: 2

Trainees: 1

Residents: 12

Multidisciplinary Clinics: 2

Specialized Clinics: 4



“It’s taken a lot of thought and effort to maintain our warm, caring culture during a year of great change,” says Division Director **Peter Senior**. He’s particularly proud of division members’ successful efforts in delivering clinical, teaching and research functions with skill and care.

This was reflected in the division being awarded “Block of the Year” by the Medical Students Association. **Elizabeth Rosolowsky** in Pediatric Endocrinology won Block Coordinator of the Year, building on the work of **Tammy McNab**, who received the same award the previous year.

Endocrinology & Metabolism

One of the big changes for the division was the retirement of **Edmond (Eddie) Ryan**, an endocrinology pioneer in Edmonton. That gap is offset by the strong ties between the growing number of community-based endocrinologists, many of whom trained at the University of Alberta, and academic division members. "This relationship has been really important as we can now offer community rotations for trainees," says Dr. Senior.

Peter Senior was awarded the Lecturer Excellence Award from the Medical Students Association, and **Constance Chik** received the Lifetime Achievement Teaching award from the division. Dr. Senior serves on the national board of Diabetes Canada, was past chair of the organization's professional section and is the new chair of its Clinical Practice Guidelines Expert Committee. Dr. Chik was the outgoing president of the Canadian Society of Endocrinology and Metabolism. **Laurie Mereu** was honoured by the local Juvenile Diabetes Research Foundation for philanthropy.

The strong focus on research led to top publications by division members in 2019, including **Eddie Ryan** and **Roseanne Yeung** with other co-authors of "Association between Maternal Diabetes, Being Large for Gestational Age and Breast-feeding on Being Overweight or Obese in Childhood" in *Diabetologia*; **Peter Senior** with other co-authors of "The Association between Payment Model and Specialist Physicians' Selection of Patients with Diabetes: A Descriptive Study" in *CMAJ Open*; and **Arya Sharma** with other co-authors of "Perceptions of Barriers to Effective Obesity Management in Canada: Results from the ACTION Study" in *Clinical Obesity*.

ANTONIA BARNES



Antonia Barnes is an Edmonton native and a graduate of the University of Alberta a couple of times over. She will complete her final year of Endocrinology subspecialty training in June 2020. Highlights of 2019 include formally completing internal medicine residency, achieving her FRCPC designation and, most of all, having her first baby (a little boy named Alfie). Dr. Barnes is looking forward to remaining in the Edmonton community and building a practice in diabetes and general endocrinology at the Baker Clinic.

DEVON HOUDEK



Devon Houdek received his Bachelor of Science and his medical degrees from, and completed his internal medicine training at, the University of Saskatchewan in Saskatoon. He came to Edmonton in 2018 for his Endocrinology and Metabolism fellowship, which he will complete in 2020. Dr. Houdek's focus is on general endocrinology clinical experience and practice, and when his fellowship is completed, he will return to the University of Saskatchewan in Saskatoon to join their Division of Endocrinology.

ENDOCRINOLOGY & METABOLISM DIVISION

Graduate Students: 1

Clinical Fellows: 1

Residents: 4

Specialized Clinics: 8

In the rollout of Connect Care, the Division of Gastroenterology led provincial efforts to highly customize the system for the needs of digestive disease specialists, including the complete co-development of the new endoscopy lumens module for it. Division Director **Daniel C. Baumgart** attributes the division's successful Connect Care rollout partly to faculty and support staff super users. He notes that **Winnie Wong** was nominated as a leader by her peers in the University Hospital Medical Staff Society during the Connect Care initiative.

Division members had a productive year, with more than 50 publications in top-ranked journals and 30 abstracts presented at leading national and international meetings. Top publications include "Impact of Implementing a 'FIB-4 First' Strategy on a Pathway for Patients With NAFLD Referred From Primary Care" in *Hepatology Communications* by lead author **Mang Ma** (with co-authors **Puneeta Tandon** and **Juan Gonzales-Abraldes**) and "Bacteriophage Targeting of Gut Bacterium Attenuates Alcoholic Liver Disease" in *Nature*, co-authored by Dr. Abraldes.



Gastroenterology

Highlights of awards received by faculty members and front line staff include the Department of Medicine Translational Medicine Prize to **Aldo Montano-Loza** for “Factors Associated with Recurrence of Primary Biliary Cholangitis After Liver Transplantation and Effects on Graft and Patient Survival”; a successful IMAGINE SPOR grant won by **Eytan Wine, Leo Dieleman** and **Karen Madsen** for their project “Impact of Diet on Microbes in IBD”; Alberta Society of Gastroenterology’s Distinguished Researcher Award to **Puneeta Tandon**; University Hospital Foundation’s Champion of Care awards for extraordinary work as physicians to **Farhad Peerani, Juan Gonzales-Abraldes, Gurpal Sandha** and **Karen Wong**; and Champion of Care awards to 5C3 and 5C4 Inpatient Units.

The division mourned the passing of **Ronald Wensel** in August 2019. Dr. Wensel co-founded the Division of Gastroenterology in 1964 with **Richard Sherbaniuk**. Their work and vision began what is now a globally recognized centre of research, training and clinical expertise in gastroenterology. Dr. Wensel’s memory is captured in a movie by **Robert J. Bailey**, an Edmonton community gastroenterologist. It can be found on the division’s YouTube channel: <http://j.mp/UAlbertaGI-YouTube>

“In addition to our strong ongoing research expertise in liver disease, inflammatory bowel disease, gastrointestinal infection and microbiology, and nutrition,” says Dr. Baumgart, “the 2020 SARS-CoV-2 pandemic added a new direction. We hope to engage in research to investigate and manage the involvement of the digestive system in system in catastrophic viral infections.” He has just published a manuscript on the mechanisms of SARS-CoV-2-associated diarrhoea, a now recognized presenting symptom in COVID-19 patients, with his colleagues in Italy and France.

“Moreover, we’re recruiting two more inflammatory bowel disease experts, another therapeutic endoscopist and a nutrition expert to augment our workforce in these areas,” adds Dr. Baumgart. “We’re also expanding the cirrhosis care program, the fatty liver disease and autoimmune liver disease programs as well as the multidisciplinary inflammatory bowel disease clinic with our colorectal surgery colleagues and our pediatric transition clinic with pediatric gastroenterologists.”

Dr. Baumgart notes that the Division maintains several social media channels, including an active Twitter feed about publications, awards and other important divisional events: www.twitter.com/UAlbertaGI

JUAN GONZALEZ-ABRALDES



Professor **Juan Gonzalez-Abraldes** is Director of the Liver Unit. The Unit is part of the University of Alberta Hospital’s Liver Transplant Program that in 2019 achieved the hallmark of 100 transplants. Dr. Abraldes is involved in international research collaborations studying advanced liver diseases such as cirrhosis and portal hypertension. This has led to extensive publications, including a 2019 paper in *Nature* about the effect of bacteriophage targeting in the gut on alcoholic liver disease. He was awarded a Champions of Care award from the University Hospital and received the Division of Gastroenterology’s Teacher of the Year award, both in 2019.

PUNEETA TANDON



Hepatologist **Puneeta Tandon’s** innovative and award-winning approaches to liver disease provide optimal care while ensuring patient decision-making and participation. Dr. Tandon founded the University of Alberta’s Cirrhosis Care Clinic and co-leads Cirrhosis Care Alberta, which in 2019 received a \$1 million Partnership for Research and Innovation in the Health System Award. She is a member of the leadership team of Alberta’s Collaboration of Excellence for Nutrition in Digestive Diseases (AsCEND) and carries out research to promote mind-body wellness including the development of a CIHR-funded nutrition, exercise and mindfulness app called Heal-Me. Dr. Tandon was awarded the 2019 Alberta Society of Gastroenterology Distinguished Research Award.

GASTROENTEROLOGY DIVISION

Graduate Students: 21

Clinical Fellows: 3

Residents: 6

Multidisciplinary Clinics: 2

Specialized Clinics: 19

General Internal Medicine (GIM) Division Director **Peter Hamilton** notes numerous divisional accomplishments in 2019, a year he describes as “one of seismic change.” Dr. Hamilton took over as the divisional director in January of that year, after **Narmin Kassam** stepped down. “Narmin was an exemplary director, and we all extend a big thank you to her for her past and continuing contributions.”

The recruitment of **Darren Lau** and **Jonathan Wong** helped offset the enormous gap left by the death of **Sumit (Me2) Majumdar** and the retirement of **Bruce Fisher**. **Arnold Voth** retired after an exemplary career as an internist at the Royal Alexandra Hospital. Celebrations commending the accomplishments of Dr. Fisher and Dr. Voth were held on their retirement. **Robert Grynock** retired from the Grey Nuns Hospital after a stellar career in internal medicine.

Several division members were honoured with awards. **Vijay Daniels** received the McCalla Professorship, awarded to outstanding academics who have made significant contributions to the integration of teaching, research and educational leadership. **Timothy Chan** received the Teacher of the Year Award for the University of Alberta Hospital site from both the core internal medicine residents and third year MD students. He also received the Dr. Gerald Stewart Award for Resident Well-Being. **Heidi Choi** received Honourable Mention as the Teacher of the Year.



General Internal Medicine (GIM)

The Edmonton Zone Medical Quality Council Strategic Clinical Improvement Committee, headed by **Narmin Kassam**, received the Department of Medicine's Cooperation, Collaboration and Teamwork Award.

"Many of our members were and continue to be deeply involved in the Connect Care transition," Dr. Hamilton says. "They not only worked round the clock at the hospital site to help our division members become familiar with using the system, they continue to support other divisions and departments."

Division members continue to contribute to top publications. Here's a sampling:

Raj Padwal and **Finlay McAlister** on "Cost-effectiveness of Home Blood Pressure Telemonitoring and Case Management in the Secondary Prevention of Cerebrovascular Disease in Canada" in *Journal of Clinical Hypertension*; **Vijay Daniels** on "Impact of Tablet-scoring and Immediate Score Sheet Review on Validity and Educational Impact in an Internal Medicine Residency Objective Structured Clinical Exam (OSCE)" in *Medical Teacher*; and **Finlay McAlister** on "The Care Transitions Measure-3 is Only Weakly Associated with Post-Discharge Outcomes: A Retrospective Cohort Study in 48,384 Albertans" in *Journal of General Internal Medicine*.

Dr. Hamilton applauds the contributions of all the physicians in the Division of General Internal Medicine, including "**Fraulein Morales** for her exemplary long-term contribution to GIM; Timothy Chan for his contributions to education and the Connect Care transition; and **Saifal Anwar**, who exemplifies everything you want in a well-rounded professional physician—collegiality, amazing people skills and willingness to step up to the plate when asked."

The division would not be able to live up to its expectations were it not for the contributions of the administrative staff. Dr. Hamilton highlights the services of **RaeAnne Barkhouse**, **Zuzana Turakova-Baran** and all the administrative staff for their continued support and patient advocacy. The division celebrated its 25th Annual Update in Internal Medicine.

One of the highlights of 2019 was the Point of Care Ultrasound (POCUS) program that **Jonathan Wong** and **Ada Lam** initiated. This service uses an ultrasound machine at a patient's bedside for diagnostic and medical procedures. "We thank Alberta Health Services for providing the funding to support this initiative," says Dr. Hamilton. "We are looking forward to a productive and rewarding year in 2020."

RSHMI KHURANA



General Internal Medicine Professor (July 2020) **Rshmi Khurana** completed her medical training in Edmonton, Calgary and Rhode Island. Upon her return to Edmonton in 2000, she started the Obstetric Medicine Program at the Royal Alexandra Hospital (RAH), which offers comprehensive care for medically complex pregnant patients and training for medical learners. Dr. Khurana co-founded the Maternal Heart Health Clinic, in collaboration with cardiology colleagues, to care for pregnant or preconception women with cardiac disease. An active researcher, she has published on such topics as the effects of physical activity, bedrest and occupational work during pregnancy on birth outcomes.

WINNE SIA



Winne Sia is Professor (July 2020), Facility Chief of Medicine at the Royal Alexandra Hospital and founder of the University of Alberta's Obstetric Medicine Fellowship Program. She chairs the national Obstetric Medicine Fellowship Diploma Working Committee, which aims to establish an obstetric medicine diploma program with the Royal College of Physicians and Surgeons of Canada. Dr. Sia is part of the Canadian Postpartum Clinical Network's best practice guideline development team. Founder of Canada's first postpartum vascular risk reduction clinic for women who had preeclampsia in pregnancy, her research and quality improvement projects focus on long-term risk reduction for cardiovascular disease in these high-risk women.

GENERAL INTERNAL MEDICINE DIVISION

Residents: 15

Specialized Clinics: 5



Geriatric Medicine

Geriatric Medicine Division Director **Adrian Wagg** views the division's achievements in 2019 as investments in a future where the need for the speciality care geriatricians offer will skyrocket.

One achievement was the recruitment of five physicians onto the Clinical Alternative Relationship Plan (cARP) in 2019, with another three planned for 2020. "The cARP enables physicians to provide care for frail homebound adults in collaboration with home care teams," Dr. Wagg says.

Division members published 40 papers in 2019, attesting to the division's academic successes. Among them were **Dr. Wagg's** lead authorship of "Exercise Intervention in the Management of Urinary Incontinence in Older Women in Villages in Bangladesh: A Cluster Randomised Trial" in *Lancet Global Health*; **Darryl Rolfson's** co-authorship of "Identification and Management of Frailty in the Primary Care Setting" in *Canadian Medical Association Journal*; and **Angela Juby's** lead authorship of "A Review of Nutrition Screening Tools Used to Assess the Malnutrition-Sarcopenia Syndrome (MSS) in the Older Adult" in *Clinical Nutrition*. **Fiona Lawson** won the Canadian Association of Medical Educators Certificate of Merit award. The division raised \$778,000 in research grants in addition to \$125,000 in private donations for research and education.

The division's ongoing outreach educational programs aimed at health literacy in seniors were augmented by a private donation for a monthly educational seminar series for Sherwood Park seniors and another donation for a research project for seniors.

Strong community ties fostered by the division have resulted in successful community participatory research projects. One project used a "train the trainer" approach where seniors taught other seniors about healthy behaviours. Another project used a photovoice study addressing barriers to healthy ageing. A new patient advisory panel for continence and continence studies was formed to guide the division's educational activities in areas of priority for seniors.

Looking ahead to 2020, Dr. Wagg and **Sangita Sharma**, from the Division of Endocrinology & Metabolism, are working with remote Indigenous communities in the Northwest Territories to introduce the community-led exercise program for continence that had successful results in Bangladesh.

AATIF HUSSAIN



Aatif Hussain joined the Division of Geriatric Medicine in 2017 as Clinical Lecturer. Dr. Hussain is program director for the Geriatric Medicine Residency Program and will be overseeing the implementation of Competency by Design and welcoming four incoming residents in 2020. He joined the Geriatric Medicine service at the Royal Alexandra Hospital where he helped expand the Geriatric Emergency Department consultation service. He also continues to see patients for geriatric consultation at the Glenrose Rehabilitation Hospital Outpatient Senior's Clinic and at a monthly outreach clinic at the Fort Saskatchewan Primary Care Network.

ANGELA JUBY



When elderly people with osteoporosis suffer a fragility fracture, they are at high risk for a subsequent fracture within a year. **Angela Juby's** clinical research documents the gap in osteoporosis care, and she develops and evaluates strategies that can help close this gap. Dr. Juby is co-lead for the Fracture Prevention Arm of the Alberta Health Services Bone and Joint Strategic Clinical Network. She leads a Fracture Liaison Service program at the University of Alberta Hospital that offers a comprehensive care model, which research shows is the most successful in future fracture prevention and health care cost savings.

GERIATRIC MEDICINE DIVISION

Undergraduate Trainees: 7

Graduate Students (PhDs): 2

Residents: 4

*Specialty, Multidisciplinary
and Outreach Clinics: 9*



Hematology

“It was a transition year,” remarks Division Director **Joseph Brandwein** about 2019. “We faced a number of challenges with the loss of academic staff due to departures and retirement. That put a great load on existing academic and clinical obligations.” **Lalit Saini, Anthea Peters and Robert Turner** left the division in 2019. One of Dr. Brandwein’s priorities for 2020 is recruitment of new academic staff.

“We were also actively involved in and put a great deal of effort into implementing Connect Care,” says Dr. Brandwein. “Because Connect Care was rolled out at the University of Alberta Hospital first, we successfully piloted the implementation of the cancer electronic medical records (EMR), called Beacon, for the province. **Nancy Zhu**, our EMR Lead, played a crucial role in this, as did others in our Division.”

On the clinical side, the division welcomed two new members: Assistant Clinical Professor **Daniel Sawler** and Assistant Clinical Professor (adjunct) **Arabesque Parker**. Dr. Sawler practices in general hematology, while Dr. Parker's primary appointment is in critical care medicine. She also has an interest and training in quality improvement work.

Division members who received honours were **Andrei Fagarasanu**, who won Postgraduate Teacher of the Year Award, RAH, and **Cynthia Wu**, who received an honourable mention in the Subspecialty Teacher of the Year Award.

Joseph Brandwein and **Lalit Saini** were among the co-authors of "A Strategy of Day 14 Bone Marrows and Early Intervention Compared to a Strategy of No Day 14 Bone Marrows and Delayed Intervention in Patients with Acute Myeloid Leukemia," published in *Leukemia and Lymphoma*. **Arabesque Parker** was first author and **Cynthia Wu** among the co-authors of "Risk Stratification for the Development of Venous Thromboembolism in Hospitalized Patients with Cancer" in *Journal of Thrombosis and Haemostasis*.

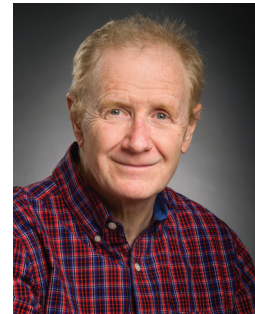
Dr. Brandwein singles out **Bruce Ritchie** for recognition for his leadership in establishing and leading ambulatory clinics for venous thromboembolism as well as developing several comprehensive multidisciplinary clinics in rare blood disorders at the Kaye Edmonton clinic.

JOSEPH BRANDWEIN



Joseph Brandwein has a major clinical and research focus in acute leukemias and is involved in many innovative clinical trials in these diseases. Dr. Brandwein has led the development of provincial and national treatment guidelines for both Acute myeloid leukemia (AML) and Acute lymphoblastic leukemia (ALL). He received funding from the Leukemia and Lymphoma Society of Canada to develop a promising new targeted therapy for AML, in collaboration with **Dr. Luc Berthiaume** from the Department of Cell Biology. He also has research funding to develop a new small interfering RNA-based therapy for ALL, in collaboration with **Dr. Hasan Uludag** from the Department of Chemical and Materials Engineering.

BRUCE RITCHIE



Bruce Ritchie founded and leads the Centre for Rare Blood and Bleeding Disorders and the associated Hemoglobinopathy, Immunodeficiency, Angioedema, Porphyria and Bleeding Disorder clinics. Dr. Ritchie is mentoring younger faculty to take over leadership of the clinics and clinical trials for these disorders. He introduced home blood product therapy and comprehensive care, hugely reducing visits to outpatient clinics and Emergency Rooms. He developed a cutting-edge biobank, the Canadian BioSample Repository, at the University of Alberta for use by investigators at the university and throughout Canada.

HEMATOLOGY DIVISION

Graduate Students: 4

Fellows: 4

Multidisciplinary Clinics: 3



Infectious Diseases

“Our primary mandate over the past five years was to strengthen academic productivity of the division, and that’s been successful,” says Division Director **Dr. Karen Doucette**. **Joel Dacks**, an evolutionary parasitologist, joined in 2019, with three other recent recruits in infectious disease research. **Carlos Cervera** and his team were awarded a Canadian Institutes of Health Research grant for work on cytomegalovirus infections in immunocompromised hosts. **Christen Klinger**, supervised by Dr. Dacks, received the Governor General’s Gold Medal, which is awarded to a doctoral graduate with the highest standing at the University of Alberta.

Dr. Doucette adds, “We have excellent clinical service delivery across the Edmonton Zone with infectious disease consulting teams at four major hospitals.” This clinical expertise was enhanced in 2019 with the recruitment of new clinical faculty, **Conar O’Neil** and **David Waldner**. Under the leadership of **Jamil Kanji** and in response to the increased reality locally and globally of infectious disease risk, the division launched the new Travel/Tropical Medicine Clinic at Kaye Edmonton Clinic. The clinic serves returning travellers and migrants referred with symptoms of tropical or travel-related infectious diseases.

Division members published 74 articles in peer-reviewed publications in 2019. **Stan Houston** was senior author on “European *Echinococcus multilocularis* Identified in Patients in Canada” in *New England Journal of Medicine*; **Ilan Schwartz** was first author of “*Blastomyces helicus*, a New Dimorphic Fungus Causing Fatal Pulmonary and Systemic Disease in Humans and Animals in Western Canada and the United States” in *Clinical Infectious Diseases*; and **Nelson Lee** was first author on “Delayed Diagnosis of Respiratory Syncytial Virus Infections in Hospitalized Adults: Individual Patient Data, Record Review Analysis and Physician Survey in the United States” in *The Journal of Infectious Diseases*.

Looking ahead, Dr. Doucette notes that recruitment and retention will be a focus. “There are expected to be departures from the division in upcoming years, so we need to develop a robust recruitment strategy in this time of fiscal restraint.”

CARLOS CERVERA



Carlos Cervera was appointed medical director for Transplant Infectious Diseases. Dr. Cervera is a clinical researcher with a major interest in cytomegalovirus and recurrent bacterial infection in transplant and other immunosuppressed patients. He has been focused on new therapies for resistant cytomegalovirus infection and successfully treated a case with third-party human leukocyte antigen-matched Cytomegalovirus-specific T cell infusion from Memorial Sloan Kettering. His main objective for the next few years is to bring new therapies for difficult-to-treat infections to Albertans, including cell therapies, bacteriophages and new biologic agents.

JOEL DACKS



Professor (July 2020) and Canada Research Chair in Evolutionary Cell Biology **Joel Dacks** joined the Division of Infectious Diseases in 2019. His research uses genomic and informatic approaches to understand the evolution and diversity of cellular machinery responsible for material transport, which is critical for all living cells, including those of parasites. In 2019, he co-authored papers on the evolutionary transition to parasitism and a description of new pieces of cellular machinery in parasites. One of his graduate students, **Christen Klinger**, is the 2019 Governor General’s Gold Medal winner. Dr. Dacks also holds honorary positions with several eminent international institutions.

INFECTIOUS DISEASES DIVISION

Graduate Students: 7

Post-doctoral Fellows: 1

Residents: 5

Clinical Fellows: 2

Specialized Clinics: 4



Nephrology

“Our team transitioned into Connect Care life with tremendous effort and cohesiveness,” says Division Director **Branko Braam**. “While we had to put a number of initiatives on pause, the smooth transition was a major accomplishment.”

Several innovative accomplishments by division members contributed to the division’s growing strengths in 2019. There was successful uptake of the division’s Home First initiative, which strives to make home-based dialysis, rather than dialysis in a clinical setting, the default. This resulted from the engagement work of **Branko Braam** and **Nikhil Shah** with many stakeholders to shift the paradigm on dialysis treatment.

Sara Davison is principal investigator on a \$4.8-million Canadian Institutes of Health Research grant for her Innovative Integrated Supportive Care Pathway by Primary Care across Alberta project. **Alan McMahon** received the Internal Medicine Best Ambulatory Care Experience 2019 Award from core internal medicine residents. He was also a contributing author on “CREDESCENCE Trial (Canagliflozin and Renal Outcomes in Type 2 Diabetes and Nephropathy),” published in the *New England Journal of Medicine*.

Two other top publications by Division members include **Allan Murray's** “Vascular Repair is Promoted by Apelin-directed Endothelial Cell Differentiation Following Immune-mediated Injury” in the *Journal of Clinical Investigation* and **Ainslie Hildebrand's** “Balancing the Benefits and Harms of Oral Anticoagulation in Chronic Kidney Disease: What Does Available Evidence Tell Us?” in *Annals of Internal Medicine*.

In 2020 the division will be focusing on strengthening its living kidney donor program. Scientifically, the division's basic-translational scientists will push their work on mechanisms of kidney damage and repair. Clinical investigators have started several quality improvement projects, including delivery of care to patients with chronic kidney disease and with end-stage kidney disease who are not treated with dialysis (the conservative pathway), with the intent of strengthening transmural care.

AINSLIE HILDEBRAND



Assistant Professor **Ainslie Hildebrand** is the director of the University of Alberta's first Glomerulonephritis Clinic. The multidisciplinary clinic treats people with this life-threatening kidney inflammation to help them avoid or delay dialysis or kidney transplant. Dr. Hildebrand's research is on long-term vascular outcomes of thrombotic microangiopathy. She is a co-investigator for the Canadian Glomerulonephritis Registry, a national registry and virtual biobank for patient-centred molecular and clinical research in glomerulonephritis. In 2019, Dr. Hildebrand was lead author of “Balancing the Benefits and Harms of Oral Anticoagulation in Chronic Kidney Disease: What Does Available Evidence Tell Us?” in *Annals of Internal Medicine*.

ROBERT PAULY



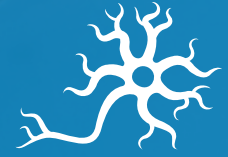
Professor (July 2020), **Robert Pauly** is the director of the Home Hemodialysis Program at the University of Alberta and Alberta Kidney Care – North where he has overseen the three-fold growth of home dialysis over the past decade. Dr. Pauly's research has focused largely on the dimensions of quality (effectiveness, efficiency, safety, accessibility, acceptability, and appropriateness) with work that is widely considered to benchmark care delivery for home hemodialysis internationally. In 2019 Dr. Pauly was appointed Assistant Dean, Faculty Wellbeing in the Faculty of Medicine & Dentistry, a new role aimed at promoting professional satisfaction and mitigating workplace burnout.

NEPHROLOGY DIVISION

Graduate Students: **9**

Fellows: **5**

Specialized Clinics: **7**



Neurology

“The division’s conversion to Connect Care for inpatients and outpatients was one of our significant achievements,” says Division Director **Douglas Zochodne**. “It was a massive undertaking and Medical Informatics Lead **Wendy Johnston** was critical in seeing us through that process as was **Susan Tiller** in keeping our operations on track during our preparations for Connect Care’s launch.”

The division’s ongoing collaboration with the Neuroscience and Mental Health Institute of the Faculty of Medicine & Dentistry is important for members. Other achievements were in continuing medical education with the day-long Neurology Update session for family physicians and Vascular Days, a two-day update on stroke also for family physicians and others.

Consultant neurologist and stroke neurologist **Sachin Mishra** was recruited to the division from Calgary. Division members who were honoured in 2019 include: **Jason Plemel**, awarded a Canadian Institutes of Health Research grant; **Glen Jickling**, appointed a Member of Excellence by the American Heart Association, and a Fellow of the Stroke Council; **Janis Miyasaki**, recipient of the Louise Plewes Award from the Parkinson Association Alberta; **Jennifer McCombe**, awarded the Undergraduate Teaching Award; and **Douglas Zochodne**, awarded the Alan J. Gebhart Prize for Excellence in Peripheral Nerve Research.

Top publications by division members include: **Jason Plemel's** lead co-authorship of "Central Nervous System Remyelination: Roles of Glia and Innate Immune Cells," in *Frontiers of Molecular Neuroscience*; **Glen Jickling's** lead authorship of "Predicting stroke outcome: Role of a biomarker panel," in *Neurology*; and **Zaeem Siddiqui's** co-authorship of "Therapies Directed Against B-Cells and Downstream Effectors in Generalized Autoimmune Myasthenia Gravis: Current Status," in *Drugs*.

For 2020, the division is looking to set new stroke program milestones, chiefly through embracing the growth in such new stroke therapies and interventions including the deployment of the mobile stroke unit (stroke ambulance). "We're really focused on exploring the future of many facets of clinical neurosciences such as stroke and our other subspecialties including MS, epilepsy, neuromuscular disease, cognitive neurology and movement disorders in the Edmonton Zone," says Dr. Zochodne.

WASIF HUSSAIN



Neurologist **Wasif Hussain** specializes in concussion and headache and sees patients in prolonged recovery from post-concussion syndrome. He was awarded a 2019 Kaye Fund grant to set up a new Multidisciplinary Acute Concussion Clinic with an associated research project aimed at identifying concussion biomarkers. He is chair of the residency recruitment committee and later in 2020 will take over as program director for the neurology residency program. Dr. Hussain is site chief for neurology at the Royal Alexandra Hospital, where he's established a Neurology Clinic and helped reestablish that hospital's academic program for neurology.

WENDY JOHNSTON



Professor **Wendy Johnston** established and is director of the Amyotrophic Lateral Sclerosis (ALS) Multidisciplinary Clinic at the University of Alberta. She also established an associated collaborative research program, which is a member of the Canadian Neuromuscular Diseases Registry and of the Canadian ALS Clinical Research Network. In 2019 she was appointed chair of the ALS Clinical Research Network and joined the board of ALS Canada. Dr. Johnston runs clinical trials in ALS and leads patient-oriented research to develop better communication tools for ALS clinicians. She was medical information lead in the successful transition of neurology EMR into Connect Care.

NEUROLOGY DIVISION

Fellows: 6 (Stroke)

Residents: 19

Multidisciplinary Clinics: 3

Specialized Clinics: 8

“Last year was highly productive for our group in terms of grant funding and research,” says Division Director **Chester Ho**. A highlight was **Jacqueline Hebert’s** and **Heather Lindstrom’s** launch of the osseointegration clinic, where prosthetic attachments are anchored directly to the skeleton. “This is a new treatment in Canada,” says Dr. Ho. “Dr. Hebert has been actively advocating for osseointegration to be introduced to Edmonton and has worked tirelessly to make this clinic a reality.”

The division welcomed **Hardeep Kainth**, a spinal cord injury physiatrist who completed his fellowship in spinal cord injury medicine at the University of Washington earlier in 2019.

Five division members won awards and honours in 2019. At the international level, **Jamie Yu** won the annual Stephen Abrahamson Award for Outstanding Innovations from the University of Southern California Keck School of Medicine, Innovations in Medical Education Conference, for her abstract.

At the national and university level, **Vivian Mushahwar** was awarded one of the four new Canada Research Chairs in the Faculty of Medicine & Dentistry and a 2019–2020 Killam Annual Professorship. **Jacqueline Hebert** won the Faculty of Medicine & Dentistry’s Tier I Clinical Science Award for Excellence in Mentoring. **Lindsay Hubenig** received the University of Alberta Dr. Marnie Hinton Award for Resident Physician Health. **Joe Watt** received a 40-year long-service award from the University of Alberta. Dr. Watt established multiple clinical services in physical medicine and rehabilitation in Edmonton and traveled to China and Hong Kong for multiple teaching engagements and clinical services. **Dhiren Naidu** celebrated his 12th year as head physician for the Oilers. A sport medicine leader in Edmonton and in the NHL, Dr. Naidu’s concussion research has contributed to new concussion diagnosis protocols and changed attitudes towards concussion in sports.



Physical Medicine & Rehabilitation

Among top papers published by division members were **Ming Chan's** "Electrical Stimulation Enhances Nerve Regeneration in Cubital Tunnel Syndrome" in *Neurosurgery*; **Jacqueline Hebert** and **Patrick Pilarski's** "Quantitative Gaze and Movement Differences in Visuomotor Adaptations of Upper Extremity Prosthesis Users to Varying Task Demands" in *JAMA Network Open*; and **Adalberto Loyola-Sanchez's** "Qualitative Study of Treatment Preferences for Rheumatoid Arthritis and Pharmacotherapy Acceptance: Indigenous Patient Perspectives" in *Arthritis Care Research*.

Other major successes for the division included two Canadian Institutes of Health Research grants, the first to **Dr. Ho** and **Dr. Loyola Sanchez** for "CONnecting and Coordinating an Enhanced Network for TRansitions In Care (CONCENTRIC): A New Model for Spinal Cord Injury Care in Alberta" and the second to **Dr. Mushahwar** for "Patterned Activation of the Arms and Legs to Improve Walking after Neural Injuries." **Dr. Chan** won the University Hospital Foundation's Kaye Clinical Research Fund competition for "Conditioning Electrical Stimulation to Enhance Sensorimotor Reinnervation and Functional Outcomes in Patients with Severe Carpal Tunnel Syndrome: A Double Blind Randomized Controlled Trial."

In 2020, the division is focusing on enhancing integration of academic and community physiatrists. Clinically, division members are developing closer collaborations with surgeons and other colleagues in the acute care setting to provide more acute care coverage and to develop acute care pathways. "We're also working with Alberta Health Services and the University of Alberta on innovative opportunities to expand the scope of current programs with ideas such as cancer rehabilitation," says Dr. Ho. "One focus of our academic development

is that we want to move towards large-scale complex team grants, which are more challenging to do but ultimately more beneficial for patients."

JAIME YU



Jaime Yu joined the Division of Physical Medicine & Rehabilitation (PMR) in 2016. Her clinical focus is neurorehabilitation, specifically stroke, spasticity and peripheral nerve injury. With her passion for education and quality improvement, she has been leading innovations and improvements as a clinician educator in the MD program and the PMR residency program and as the division's quality improvement lead. A new curriculum she developed for musculoskeletal physical examination won the Stephen Abrahamson Award for Outstanding Innovation at an international Innovations in Medical Education conference in 2019. Dr. Yu also completed her Master's in Health Sciences Education degree in 2019.

CARMEN TUCHAK

(Photo Unavailable)

Associate Clinical Professor **Carmen Tuchak** is medical lead of the Glenrose Rehabilitation Hospital's (GRH) Stroke Program. Dr. Tuchak's speciality is stroke and cardiac rehabilitation at GRH and Edmonton-area hospitals. She leads the interprofessional Glenrose Stroke Distinction Committee established to maintain stroke distinction status in the Edmonton Zone and set stroke severity-based rehabilitation length-of-stay targets to improve stroke rehabilitation access and outcomes. She is a member of the Canadian Best Practice Secondary Stroke Prevention Writing Group. She greatly enjoys teaching medical trainees and is a member of the division's Residency Training Committee's Competence Committee.

PHYSICAL MEDICINE & REHABILITATION DIVISION

Graduate Students: 6

Residents: 17

Specialized Clinics: 10



Preventive Medicine

One of the achievements Division Director **Sebastian Straube** notes is the publication of **Karen Lee's** book *Fit Cities: My Quest to Improve the World's Health and Wellness — Including Yours*. Dr. Lee, who was recruited to the division in 2018, garnered national attention for her book, which credits innovative civic policies put into action as solutions to chronic health conditions.

While the faculty complement of the Division of Preventive Medicine is one of the smallest in the Department of Medicine, the division's reach is national, through the growth of a popular continuing medical education program division members created several years ago. "The Foundation Course in Occupational Medicine offers blended distance and in-person learning to community-based physicians across Canada," Dr. Straube says. The program's prominence is growing as more people graduate from it and provide occupational medicine services.

The recruitment of **Quentin Durand-Moreau** from Brest University, France, effectively doubled the tenured or tenure-track faculty in occupational medicine who provide clinical services through the Occupational and Environmental Medicine Clinic.

A poster by the Department of Psychiatry's **Charl Els, Sebastian Straube** and lawyer **Julie Menten** was awarded the Poster Prize at the 37th Annual Scientific Conference of the Occupational and Environmental Medical Association of Canada. **Alexander Doroshenko** was lead author on "Seeking the Optimal Schedule for Chickenpox Vaccination in Canada: Using an Agent-based Model to Explore the Impact of Dose Timing, Coverage and Waning of Immunity on Disease Outcomes," published in *Vaccine* in early 2020.

QUENTIN DURAND-MOREAU



Occupational medicine specialist **Quentin Durand-Moreau** was recruited to the Division from Brest, France, in 2019. He specializes in work-related mental disorders and has an extensive background in addiction medicine, industrial toxicology and industrial psychology. He has worked with the French Health Authorities on policy guidance around burnout. In 2019, he organized a symposium on work-related mental disorders held at the International Labour Organization headquarters in Geneva. Dr. Durand-Moreau is director for the Occupational Medicine Residency Program and has a clinical appointment in the Occupational and Environmental Medicine Clinic in the Kaye Edmonton Clinic.

CHARL ELS



Charl Els, Sebastian Straube and **Julie Menten** were awarded the poster prize at the 2019 37th annual conference of the Occupational and Environmental Medical Association of Canada for their ongoing research on cannabis in relation to safety at work. Their new research, based on a review of current literature, supports the earlier position statement that until more definitive evidence is available, it is not advisable to operate motor vehicles and equipment or engage in other safety-sensitive tasks for at least 24 hours following cannabis consumption, or for longer if risk of impairment persists.

PREVENTATIVE MEDICINE DIVISION

Graduate Students: 2

Residents: 8

Postdoctoral Fellows: 3

Specialty, Multidisciplinary and Outreach Clinics: 2



Pulmonary Medicine

“Our division identified clear quality improvement goals for the tertiary and quaternary clinics to bring quality of service to the highest international level,” says Division Director **Giovanni Ferrara**. “This work will continue into 2020 and will include clear definitions of medical director roles, articulation of the clinics’ goals and metrics and clear key performance indicators for every group of patients served at the University of Alberta Hospital and pulmonary outpatient programs.” These actions, Dr. Ferrara says, will enable division members to perform high quality clinical and translational research and foster career development at an international level for the next generation of respirologists.

The quality of division members’ clinical and research activities was recognized with several honours and accolades in 2019. **Richard Long**, who specializes in tuberculosis in Indigenous communities, received a Canadian Institutes of Health Research (CIHR) Pathways Grant, a Social Sciences and Humanities Research Council of Canada Connection Grant and the Paul W. Armstrong Excellence in Research Award. **Meena Kalluri** and the Multidisciplinary Interstitial Lung Disease Clinic team won the Jonathan B. Meddings Clinical Innovation Award.

Michael Stickland was also a recipient of CIHR funding with a five-year grant. **Paige Lacy**, research director of the Alberta Respiratory Centre, received the AllerGen Michelle Harkness Mentorship Excellence Award, Investigator category. **Dilini Vethanayagam** was named Physician of the Year by the Alberta Medical Association. **Ashley Gillson** received the Neil Brown Award of Excellence. The division welcomed new recruit **Angela Lau**, who recently completed her pulmonary fellowship and whose master's degree focused on tuberculosis transmission.

Keiran Halloran was lead author on two top publications in 2019. He was first author of "Molecular Assessment of Rejection and Injury in Lung Transplant Biopsies" in *The Journal of Heart and Lung Transplantation* and senior author of another study in the same journal, co-authored by other division members (**Justin Weinkauff, Ali Kapasi, Alim Hirji** and **Dale Lien**), "Elevated Pre-Transplant Left Ventricular End Diastolic Pressure Increases Primary Graft Dysfunction Risk in Double Lung Transplant Recipients." **Michael Stickland** was lead author of "Intra-pulmonary Arteriovenous Anastomoses and Pulmonary Gas Exchange: Evaluation by Microspheres, Contrast Echocardiography and Inert Gas Elimination" in *Journal of Physiology*.

KIERAN HALLORAN



Lung transplant medicine specialist and researcher **Kieran Halloran's** interests are pre-transplant risk assessment and the physiological and molecular manifestations of lung transplant dysfunction. Dr. Halloran was first, senior or co-author on eight papers and nine abstracts published in 2019. He had an invited editorial in *Journal of Heart and Lung Transplantation*, the highest impact factor journal in the transplantation field. He is co-principal investigator on a 2019 grant funded by Merck for a study led by Dr. Carlos Cervera on cytomegalovirus (CMV) infection. Dr. Halloran is a reviewer for several journals and granting agencies and supervisor for several research trainees.

MEENA KALLURI



Among Associate Professor **Meena Kalluri's** achievements in 2019 was the publication of "From Consulting to Caring: Care Redesign in Idiopathic Pulmonary Fibrosis" in the *New England Journal of Medicine Catalyst*. She presented at the American Thoracic Society meeting and was an invited speaker at several other international meetings. Dr. Kalluri was honoured with the Department of Medicine's Jonathan B. Meddings Clinical Innovation Award for the Interstitial Lung Disease Clinic and the Osler Resident Award for education. She co-authored the *Burden of Idiopathic Pulmonary Fibrosis in Canada* report developed in collaboration with the Canadian Pulmonary Fibrosis Foundation and Hoffmann-La Roche Limited.

PULMONARY MEDICINE DIVISION

Graduate Students: 15

Residents: 10

Multidisciplinary Clinics: 4

Specialized Clinics: 8



Rheumatology

“Our successes last year included academic educator **Anna Oswald’s** promotion to Professor and **Elaine Yacyshyn’s** receipt of the David Cook Award for her quality improvement work,” says Division Director **Jan Willem Cohen Tervaert**. “Although it was a challenging year with the announcement by the government that patients should be switched from biologics to biosimilars and the implementation of Connect Care, all went extremely well thanks to the efforts of all division members.”

Other achievements by division members include **Dr. Oswald’s** Stephen Aaron Teacher of the Year Award; **Carrie Ye’s** Alberta Medical Association (AMA) Section Rheumatology Award for Clinical Innovator; **Alison Clifford’s** AMA Section Rheumatology Award for best publication; and **Sarah Troster’s** AMA Section Rheumatology Award for Future Leader.

Dr. Cohen Tervaert is collaborating with new division recruit **Mohamed (Mo) Osman** to establish a translational laboratory. One of the first projects is an investigation of the link between mitochondria and fatigue in patients with vasculitis, a type of blood vessel inflammation, and other systemic autoimmune diseases such as systemic sclerosis. Clinical assistance for this project is provided by **Naima Mohazab**, whose position is funded by the Dutch Kidney Foundation. Post-doctoral fellow **Charmaine van Eeden** and a research assistant, **Desiree Redmond**, were recruited to perform experimental work in the lab, and **Lamia Khan** started a PhD project investigating mitochondrial dysfunction in systemic sclerosis.

Clinical trials started in vasculitis (two randomized control trials and one diagnostic study). In addition, **Mo Osman** went to Genoa, Italy, to learn capillaroscopy, a technique used to examine the smallest blood vessels in the fingers, which is an accurate diagnostic method to detect abnormalities suggestive of systemic autoimmune diseases in patients with Raynaud's phenomenon.

Top publications in the division were **Walter Maksymowych's** (first author) "MRI Lesions in the Sacroiliac Joints of Patients with Spondyloarthritis: An Update of Definitions and Validation by the ASAS MRI Working Group" in *BMJ's Annals of the Rheumatic Diseases*; **Alison Clifford's** (first author) "Outcomes among 196 Patients with Noninfectious Proximal Aortitis" in *Arthritis & Rheumatology*; and **Carrie Ye's** (last author) "Hydroxychloroquine is a Safe and Effective Steroid-sparing Agent for Immune Checkpoint Inhibitor-induced Inflammatory Arthritis" in *Clinical Rheumatology*.

"For 2020 and beyond we will continue building our translational research capacity," Dr. Cohen Tervaert says. "A priority for me is to start more clinical trials in Edmonton. We participate in randomized controlled trials for vasculitis lupus, osteoarthritis and ankylosing spondylitis. I would be very happy if we also can participate in trials for more common conditions as rheumatoid arthritis, psoriatic arthritis and gout, among others."

ALISON CLIFFORD



Alison Clifford completed a rheumatology fellowship at Dalhousie University and a vasculitis fellowship at the Center for Vasculitis Care and Research at the Cleveland Clinic before joining the Division of Rheumatology as an Assistant Professor. Dr. Clifford's clinical and research focus is on vasculitis. In 2019, the Division's Vasculitis Clinics continued to expand, with the goal of providing rapid assessment and treatment to patients with all types of vasculitis. In collaboration with the Departments of Radiology and Diagnostic Imaging, Cardiology and Oncology, she is studying the utility of imaging tracers for detecting large vessel inflammation.

MOHAMED (MO) OSMAN



Clinician scientist **Mohamed (Mo) Osman** joined the division in 2019. A rheumatologist, he has additional training in the laboratory, in clinical immunology, and in nail fold video capillaroscopy (NVC), an essential tool in the diagnosis and care of people with immune-driven connective tissue diseases. He established the translational systemic sclerosis clinic in 2019 and collaborates with **Dr. Meena Kalluri** in a rheumatology/respirology Interstitial Lung Disease Clinic. He advises and consults with colleagues across Northern Alberta in adult clinical immunology. Dr. Osman's research focuses on immune dysregulation in patients with connective tissue diseases and the use of NVC in care.

RHEUMATOLOGY DIVISION

Graduate Students: 1

Fellows: 5

Specialized Clinics: 6

Multidisciplinary Clinics: 3

Stats & Funding Department of Medicine

“

Modern medical advances have helped millions of people live longer, healthier lives. We owe these improvements to decades of investment in medical research.

Ike Skelton

RESEARCH FUNDING

Alberta Health Services
 Alberta Innovates
 Alberta Innovates Bio Solutions/Alberta Alzheimer's Research Program
 Alberta Innovates Bio Solutions/Alberta Prion Research Program
 Alberta Innovates Health Solutions
 Alberta Innovates Health Solutions/Accelerating Innovations into CarE (AICE)
 Alberta Innovates/Partnership for Research and Innovation in the Health System
 Alberta Innovates/Pfizer Translational Research Fund Opportunity
 Alberta Innovates/Training and Early Career Development
 Alberta Prion Research Institute
 American College of Gastroenterology
 Arthritis Society
 Brain Canada Foundation
 Canadian Stroke Prevention Intervention Network
 Canada Foundation for Innovation
 Canada Research Chairs
 Canadian Association of Gastroenterology
 Canadian Cancer Society
 Canadian Dermatology Foundation
 Canadian Foundation for AIDS Research (CANFAR)
 Canadian Foundation for Pharmacy
 Canadian Geriatrics Society
 Canadian Institutes of Health Research
 Canadian Liver Foundation
 Canadian Nutrition Society
 Canadian Obesity Network
 Canadian PBC Society
 Canadian Pulmonary Fibrosis Foundation
 Canadian Society of Transplantation
 Canadian Urological Association
 Cancer Research Society Inc
 CHDI Foundation Inc.
 Cleveland Clinic Foundation
 Crohn's and Colitis Canada
 Diabetes Canada
 Government of Alberta/Economic Development & Trade
 Heart & Stroke Foundation Canada
 Hypertension Canada
 International Society of Nephrology
 Leukemia & Lymphoma Society of Canada
 Lung Association Alberta & NWT
 MITACS Inc
 Multiple Sclerosis Society of Canada
 National Parkinson Foundation
 Network of Centres of Excellence
 National Sciences and Engineering Research Council (NSERC)
 Public Health Agency of Canada
 Social Sciences and Humanities Research Council (SSHRC)
 University Hospital Foundation
 W. Garfield Weston Foundation

NEW TO THE DEPARTMENT IN 2019

Deirdre O'Neill, Cardiology, Assistant Professor
 Darren Lau, General Internal Medicine, Associate Professor
 Emily Christie, Nephrology, Clinical Lecturer
 Quentin Durand-Moreau, Preventive Medicine, Assistant Professor
 Giovanni Ferrara, Pulmonary Medicine, Professor
 Mohammed Osman, Rheumatology, Assistant Professor
 Joel Dacks, Infectious Diseases, Associate Professor

LEFT THE DEPARTMENT IN 2019

Bruce Fisher, General Internal Medicine, Professor Emeritus
 Liam Rourke, General Internal Medicine
 Anthea Peters, Hematology
 Ngan Lam, Nephrology, Adjunct Professor
 Ken Butcher, Neurology, Academic Faculty

ACADEMIC PROMOTION

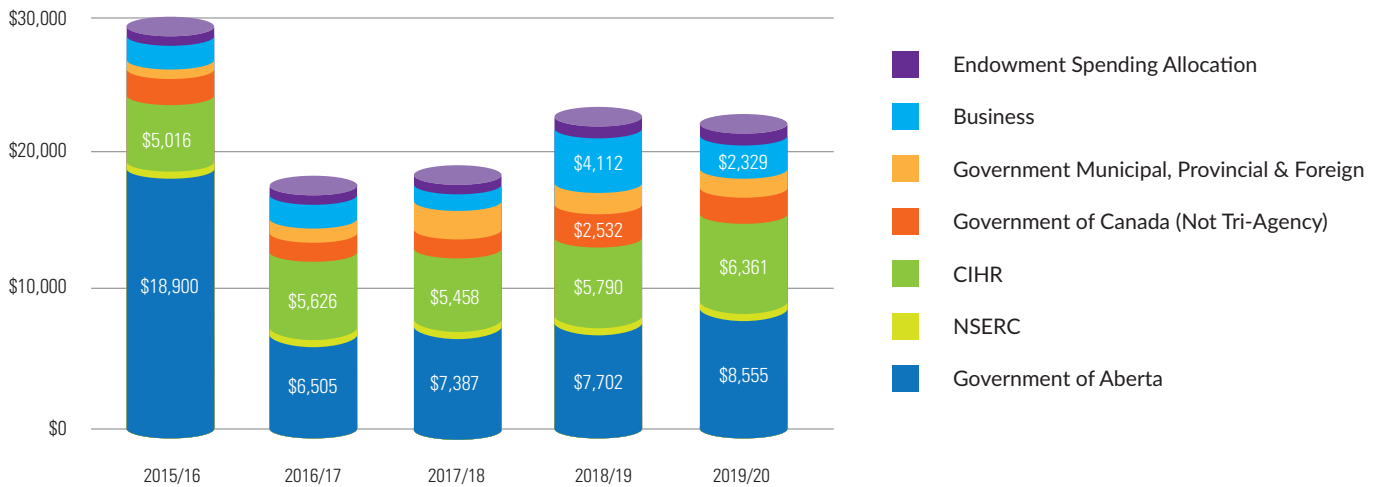
Mohit Bhutani, Pulmonary Medicine, Professor
 Tammy Bungard, Cardiology, Professor
 Alexander Doroshenko, Preventive Medicine, Associate Professor
 Mahua Ghosh, Endocrinology & Metabolism, Associate Professor
 Glen Jickling, Neurology, Associate Professor
 Khurshid Khan, Neurology, Professor
 Anna Oswald, Rheumatology, Professor
 Sebastian Straube, Preventive Medicine, Professor
 Justin Weinkauff, Pulmonary Medicine, Professor

Promoted effective July 1, 2019

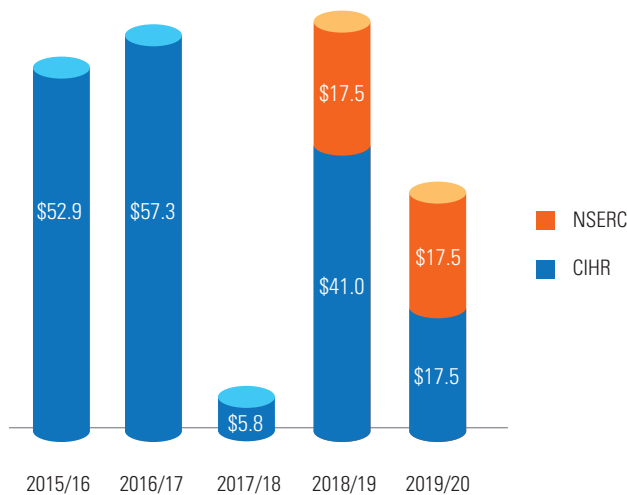
CLINICAL PROMOTION**Abdel-Rahman Aly**, Physical Medicine & Rehabilitation, Associate Clinical Professor**Peter Ao**, General Internal Medicine, Assistant Clinical Professor**Clarissa Augusto**, General Internal Medicine, Assistant Clinical Professor**Amanda Brisebois**, General Internal Medicine, Clinical Professor**Vasile Captan**, General Internal Medicine, Assistant Clinical Professor**Timothy Chan**, General Internal Medicine, Assistant Clinical Professor**Vivek Dhawan**, Pulmonary Medicine, Associate Clinical Professor**Mikael Hanninen**, Cardiology, Associate Clinical Professor**Mark Hnatiuk**, Hematology, Assistant Clinical Professor**Holly Hoang**, Infectious Diseases, Associate Clinical Professor**Tomasz Hruczkowski**, Cardiology, Associate Clinical Professor**M. Wasif Hussain**, Neurology, Assistant Clinical Professor**Tiffany Kwok**, Dermatology, Assistant Clinical Professor**Pen Li**, Pulmonary Medicine, Assistant Clinical Professor**Evan Lockwood**, Cardiology, Clinical Professor**Norman Madsen**, Rheumatology, Assistant Clinical Professor**Magdalena Michalska**, Nephrology, Associate Clinical Professor**Tom Nowacki**, Neurology, Assistant Clinical Professor**Subagini Parameswaranathan**, Endocrinology & Metabolism, Assistant Clinical Professor**Anu Parhar**, Pulmonary Medicine, Associate Clinical Professor**Noreen Rajwani**, Pulmonary Medicine, Assistant Clinical Professor**Nikhil Shah**, Nephrology, Assistant Clinical Professor**Sarah Troster**, Rheumatology, Assistant Clinical Professor**Andrew Wassef**, General Internal Medicine, Assistant Clinical Professor**Jaled Yehya**, Pulmonary Medicine, Associate Clinical Professor*Promoted effective July 1, 2019***RECRUITMENT & ATTRITION SUMMARY**

	RECRUITMENT				TOTAL	ATTRITION				TOTAL
	Male		Female			Male		Female		
	AMHSP	FFS	AMHSP	FFS		AMHSP	FFS	AMHSP	FFS	
2009/10	9	3	9	3	24	5	0	1	0	6
2010/11	2	6	6	9	23	1	0	0	1	2
2011/12	2	14	1	12	29	5	1	8	4	18
2012/13	3	2	3	1	9	3	4	6	4	17
2013/14	4	0	2	1	7	2	3	3	1	9
2014/15	6	2	4	7	19	10	0	2	0	12
2015/16	9	5	11	8	33	5	3	2	3	13
2016/17	3	11	5	6	25	1	0	1	7	9
2017/18	8	17	3	10	38	2	5	4	6	17
2018/19	4	14	1	6	25	6	0	3	1	10

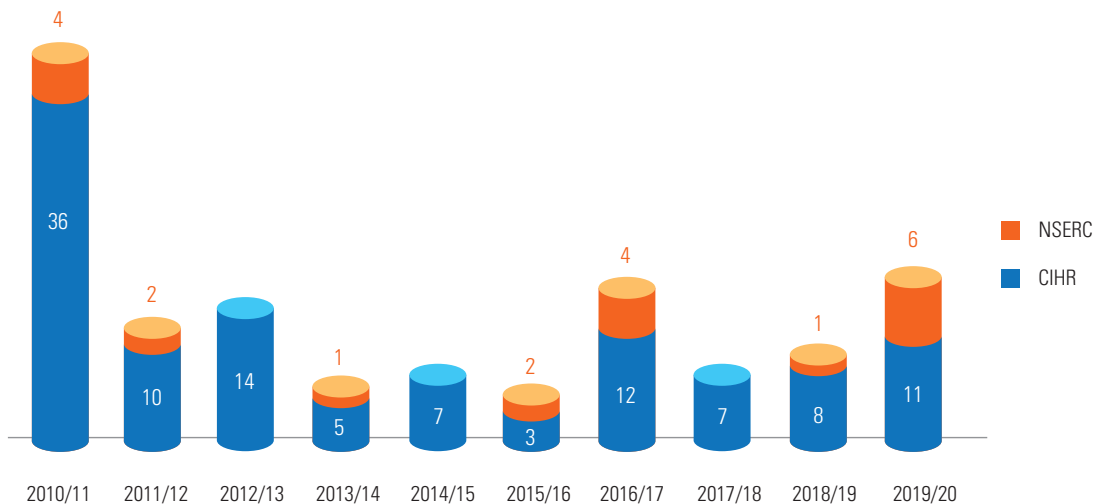
TOTAL DEPARTMENT OF MEDICINE RESEARCH REVENUE (\$THOUSANDS)



CIHR & NSERC GRADUATE STUDENT SCHOLARSHIPS – PAST 5 YEARS (\$THOUSANDS)



CIHR & NSERC OPERATING GRANTS (NUMBER OF PI HOLDERS – NEWLY AWARDED PER FISCAL YEAR)



ENDOWED FUNDS AND CHAIRS

FUND NAME	PRINCIPAL VALUE MARCH 31, 2020
AstraZeneca Chair in Asthma Research	\$3,000,000.00
Atkin BFA WarrenCatz MS Research	\$2,935,027.14
Brown WF Lecture Physical Medicine and Rehabilitation	\$50,669.30
Cars-Rheumatic Disease	\$14,535.07
Edwards AM Lecture Clinical Education	\$107,026.39
Gastrointestinal Visionary	\$115,895.00
King EG Memorial Endowment	\$165,212.85
Majumdar S Me2 Legacy Endowment	\$123,652.02
Muttart Chair Clinical Immunology Endowment	\$1,675,100.00
Royal Canadian Legion Kidney Research	\$405,021.95
TOTAL	\$8,592,139.72

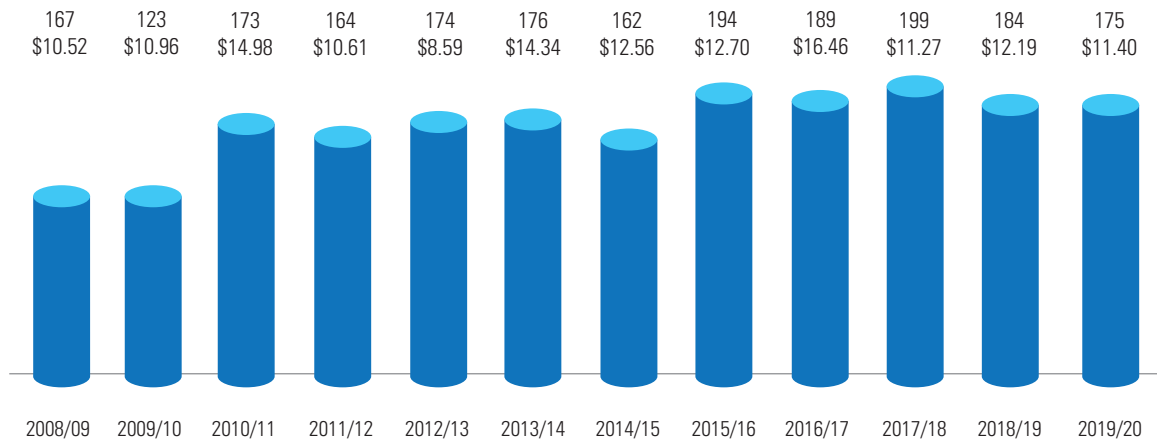
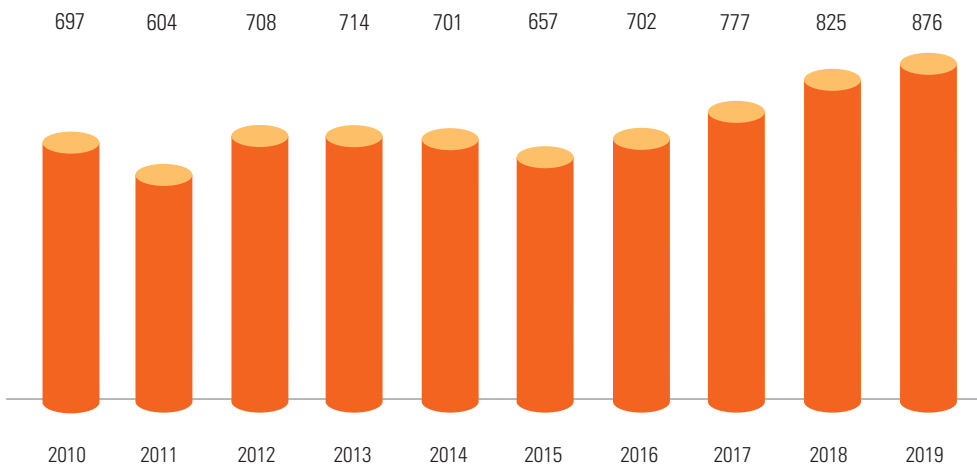
OTHER ENDOWMENTS	PRINCIPAL VALUE MARCH 31, 2020
Alberta Health Services Chair in Aboriginal Health	\$3,000,615.75
Alberta Health Services Chair in Cardiac Health Outcomes	\$1,501,036.74
Alberta Health Services Chair in Cardiac Sciences	\$1,500,376.75
Alberta Health Services Chair in Healthy Aging Research	\$3,001,118.10
GlaxoSmithKline/RxD/CIHR Chair in Airway Inflammation	\$1,393,792.87
Heart and Stroke Foundation of Alberta, NWT & Nunavut Chair in Cardiovascular Research	\$1,562,650.12
Henri M. Toupin Chair in Neurology	\$2,389,739.91
Kidney Health Research Chair—Translational Research & Health Outcomes	\$8,299,578.15
Spinal Cord Injury Chair	\$3,023,813.54
Tripartite Chair in Occupational Health	\$573,428.50
Mazankowski Alberta Heart Institute Medical Imaging Consultants Research Chair	\$1,500,000.00
TOTAL	\$26,239,307.44

2019 CANADA RESEARCH CHAIRS

Dr. Evangelos Michelakis, Cardiology	Tier 1, Chair in Applied Molecular and Mitochondrial Medicine
Dr. Vivian Mushahwar, Physical Medicine & Rehabilitation	Tier 1, Chair in Functional Restoration
Dr. David Westaway, Neurology	Tier 1, Chair in Prion Disease
Dr. Joel Dacks, Infectious Diseases	Tier 2, Chair in Evolutionary Cell Biology
Dr. Gavin Oudit, Cardiology	Tier 2, Chair in Heart Failure
Dr. Patrick Pilarski, Physical Medicine & Rehabilitation	Tier 2, Chair in Machine Intelligence for Rehabilitation

AIHS TRANSLATIONAL HEALTH CHAIRS

Dr. Gopinath Sutendra, Cardiology	Chair in Cardio-oncology
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CLINICAL TRIALS FUNDING (NEW CLINICAL STARTS/YEAR – INCOME/YEAR \$MILLIONS)**PUBLICATIONS****GRADUATE STUDENT SUMMARY**

Currently Enrolled	82
MSc Program	40
PhD Program	42
# of Students Who Published in 2019	40
Total Publications	116
Total Students (including graduated, withdrawn, & transferred)	115
Average Publications per Student	1.01
Active Postdoctoral Fellows	31



COVER PHOTOS

FRONT

Dr. Gavin Oudit

Professor of Medicine in the Division of Cardiology in the Faculty of Medicine & Dentistry's Department of Medicine and Adjunct Professor in the Department of Physiology.

BACK

Dr. Penny Smyth

Associate Professor in the Department of Medicine's Division of Neurology and Associate Dean, Professionalism in the Faculty of Medicine & Dentistry.



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FACULTY OF MEDICINE & DENTISTRY
Department of Medicine

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