



PRINCESS MARGARET CANCER CENTRE

Annual Report 2021





Message from the President and the UHN Board of Trustees

We would like to express our gratitude and admiration for the dedicated staff at the Princess Margaret Cancer Centre at UHN for another year of exceptional work amid extraordinarily challenging circumstances, capped off by the Princess Margaret being recognized in the Top 10 in the World’s Best Specialized Hospital – Oncology by Newsweek.

We celebrate all members of TeamUHN who selflessly responded to the COVID-19 pandemic while also addressing the urgent and emergent needs of patients with cancer. We would like to express special thanks to our nursing colleagues who have had great demands placed upon them due to the shortage of nurses. The determination and resilience of the staff to provide exemplary care to cancer patients and their caregivers while supporting each other has been both humbling and inspiring.

UHN was named Canada’s top research hospital for the 10th consecutive year, and for the Princess Margaret Research Institute, 2021 was a year of innovation with cancer research funding reaching over \$200 million, more than 1,200 peer-reviewed publications, and significant honours and awards to its staff and scientists. We saw the development of novel treatments for rare cancers, enhancements in virtual care and smart technology, as well as major milestones in commercialization. Significant well-being initiatives to ensure that staff was supported throughout the pandemic were also developed at the Princess Margaret and adopted throughout UHN.

We are most grateful to the generosity of our donors and the Princess Margaret Cancer Foundation, which allows the Princess Margaret to continue to pursue world-class research and education, empowering the world’s most advanced practitioners, and training those who represent the future of healthcare. A special thanks to our Foundation, Board, and Team.

As we move forward, we know we will face unique challenges. We also know we will continue to seize all opportunities to advance science and enhance care for cancer patients across all sites of UHN.

Thank you to all of the staff at the Princess Margaret – this is the year to celebrate our outstanding team!

Dr. Kevin Smith
President & CEO, UHN

Mr. Brian J. Porter
Chair, UHN Board of Trustees
President and CEO, Scotiabank



Leadership Message

We are pleased to present the 2021 Annual Report for the Princess Margaret Cancer Centre at the University Health Network (UHN). The second year of the COVID-19 pandemic continued to present challenges, with successive waves of infection and new COVID variants, resulting in the need to continually adapt how we deliver healthcare, conduct research and communicate.

Despite the challenges, our teams continued to find meaning in their work, and offer comfort and confidence to their colleagues and patients, with many redeploying to the front lines when required. New staff came on board, and unfortunately, we lost some cherished colleagues along the way.

The Princess Margaret not only kept going with an uninterrupted slate of cancer treatments, counselling and care, an interdisciplinary team mobilized in March to begin providing COVID-19 vaccinations to cancer patients. 2021 also saw significant progress in the areas of governance, expansion and integration, and advancing our strategic pillars.

Among the Highlights

- We took significant steps to improve the cross-UHN cancer patient experience including: partnering with General Internal Medicine to open a cohort cancer patient unit at Toronto General Hospital (TG); providing an environment to support the upgrading of skills and accelerating innovation in acute oncology care. Oncology patients will also have expanded access to imaging through a new PET scanner secured for Toronto Western Hospital. To ensure a voice from across UHN, we added representatives from the blood disorders and surgical oncology programs at TG and from Toronto Rehab to our executive leadership team.
- We strengthened our governance structure by launching the Clinical Practice Committee with an operational mandate to influence and drive change for cross-cutting clinical priorities. The committee brings together multi-disciplinary and multi-professional leadership from across the cancer program to put the needs of patients first by accelerating improvements in cancer care while also ensuring staff experience a positive and meaningful work-life.

- We advanced our strategic pillars, appointing medical directors to lead our new programs in Early Detection, Beyond Chemotherapy and Cancer Digital Intelligence. Meanwhile, the Cancer Experience Program continued to inspire comfort and confidence through key partnerships with the Art Gallery of Ontario (AGO), the Toronto Symphony Orchestra (TSO) and the University of Toronto Faculty of Music to enhance the role of the arts in cancer care.
- We took another step in extending our reach with the launch of the Princess Margaret Cancer Care Network. The network aims to expand care beyond the walls of the Princess Margaret and UHN and share our unique, specialized expertise and technology with like-minded cancer treatment centres across Canada.

Some of Our Major Research Achievements Include:

Our researchers and educators continued to deliver excellence, publishing more than 1,000 papers in the world's top journals, educating clinicians from around the globe and innovating to launch and advance highly successful companies.

- The opening of C labs, a wet lab space equipped for standard wet lab cell and molecular experiments. Available to clinicians who may not have designated lab space, C labs is already increasing collaboration between clinicians and scientists, leading to the insightful translational work for which the Princess Margaret is well-known.
- We reported on many research discoveries including a potential new treatment target for brain tumours, on how colorectal cancers can hibernate to protect themselves from toxic chemotherapy, and advanced understanding of pancreatic cancer by unravelling the makeup of the environment and utilities essential to tumour survival. In the area of data science and digital intelligence, we hired new talent to expand capability in computational research where, as an example, our scientists demonstrated that Artificial Intelligence (AI) could help make development of accurate radiation therapy plans more efficient.
- Princess Margaret and UHN Scientists secured more than \$150 million in investment funds for start-up companies Adela and Treadwell Therapeutics to fund innovation in early cancer detection and the translation of scientific ideas and therapeutic targets into practice-changing medicines.

We would like to acknowledge the key role The Princess Margaret Cancer Foundation plays through its philanthropic efforts that help make our programs, research and bold innovation agenda possible. We thank our donors, granting agencies, sponsors, and supporters for their continued patronage.

And finally, our immense gratitude to our staff, volunteers, and learners, many from across the globe, who have persevered through two extremely challenging years, with determination, compassion and courage. Your unflagging optimism and dedication make a significant difference to patients, their families, and our colleagues.

A. Keith Stewart, MB, ChB
VP Cancer, UHN & Director, Princess
Margaret Cancer Centre

Aaron D. Schimmer, MD, PhD
Research Director, Princess Margaret
Cancer Centre



“I’ve Got to Put One Foot in Front of the Other. I’ve Got to Do This.”

Beating the odds against Liver Cancer

In March of 2017, Kara went to her family doctor to check on symptoms of intense itching, digestion issues, and fatigue. A series of tests ensued. Blood work and an ultrasound revealed a mass, and then a CT scan and MRI confirmed - she was diagnosed with cholangiocarcinoma. “That day was the worst day of my life.”

Cholangiocarcinoma is a very rare and highly aggressive liver cancer with a five-year survival rate of less than 10%. There is no cure and the available treatments can, at best, prolong a patient’s life.

As terrible as that day was, Kara knew she needed to focus on moving forward for her daughters, despite the odds. At 37 years old with two young girls and a fulfilling teaching career, facing cancer wasn’t part of the plan. “I’ve got to put one foot in front of the other. I’ve got to do this.”

Kara was then referred to the Princess Margaret Cancer Centre, where a team of doctors had developed an experimental protocol for cholangiocarcinoma. Dr. Laura Dawson, Kara’s radiation oncologist at the cancer centre, emphasized the importance of teamwork behind this unique and very specialized treatment, “This is a multi-disciplinary effort. The liver transplant team, radiation oncology, and the medical oncology team have come together and devised a protocol (that’s) not available anywhere else in Canada.” The grueling protocol entailed a series of tests and surgical procedures, as well as four weeks of daily radiation and chemotherapy, with the end goal of having a liver transplant. There were no guarantees, but Kara saw it as her “best chance at long-term survival.”

“ This is a multi-disciplinary effort. The liver transplant team, radiation oncology, and the medical oncology team have come together and devised a protocol (that’s) not available anywhere else in Canada.”

Dr. Laura Dawson, MD, Radiation Oncologist, Princess Margaret Cancer Centre



With her family by her side and with guidance from Dr. Dawson and the entire medical team, Kara continued moving forward. As the doctors at the Princess Margaret prepared for the transplant, her family was there to support her every step of the way, from helping with childcare and cooking meals, to taking her to appointments, and even living with her in a Toronto hotel during her rigorous radiation treatment. It was only natural, then, that Kara’s sister Tanya would step up in the most ultimate way: by volunteering to be her liver donor.

“I am beyond blessed for the support and the love that I have from my family,” Kara reflects.

Family is what helped carry Kara through the entire process, and what inspired her to push back against her dire diagnosis. She became the eighth person in Canada to successfully complete the Princess Margaret’s protocol for cholangiocarcinoma. Today, Kara is NED (no evidence of disease). “When you have two human beings who depend on you, you can’t crawl into bed and cry,” Kara says, “You’ve got to keep moving.” Four years after that terrible day, against all odds, that’s exactly what she’s doing.

“What inspired me was my kids. Living for my children. My faith in myself and in the doctors.”





Finding the Silver Lining

A tale of resilience, hope and gratitude

Life has a way of giving us what we need, when we need it.

That's how Stephanie Phan, Clinical Lead of the Cancer Rehabilitation and Survivorship Program in the Department of Supportive Care at the Princess Margaret Cancer Centre, describes her redeployment.

It was early January, another pandemic year was off to a harsh and dramatic start – more than 1,000 members of TeamUHN were off work after contracting COVID-19, or in isolation due to exposure.

Stephanie was one of the many across UHN – both clinical and non-clinical – who volunteered for redeployment to help TeamUHN. She spent three weeks working on inpatient units 17A, 17B and 16P at the Princess Margaret, providing what she describes as “some much-needed relief to nurses, doing whatever was needed,” from answering patient call bells, getting water and delivering food trays, to toileting and supporting patients’ families.

“Being back on the in-patient units for the first time in 16+ years was definitely an adjustment,” Stephanie says. “But like muscle memory that has been buried, it comes back with use and familiarity.”

Looking back, Stephanie says the redeployment rejuvenated her. It taught her lessons of courage and resilience – among patients, their families and caregivers, as well as those on the UHN care teams – and gave her a deeper appreciation for her own good health. It also underscored to her that it “truly takes a village” to care for acutely ill inpatients.

“Every person and every action is all it takes to make a difference.”



“Being back on the in-patient units for the first time in 16+ years was definitely an adjustment,” Stephanie says. “But like muscle memory that has been buried, it comes back with use and familiarity.”

“For me, the experience was humbling, valuable and enlightening, with many lessons learned,” Stephanie says. “I am so grateful to have been part of the inpatient clinical team and able to help provide some relief during the nursing shortage and care for patients during this challenging time.”

Despite the fact it was “not easy or comfortable” to be wearing full personal protective equipment all day, Stephanie says “a silver lining” was reconnecting with former colleagues on the units for the first time in more than a decade. She was also grateful to be working with inpatients again.

“It was a privilege to bear witness to the courage it takes for a patient to ask for and receive help, to accept feeling and being vulnerable, to build resilience and maintain hope.”

Stephanie says, “I am reminded of the strength of family, friends and supports who lift up patients and inspire them toward recovery.”

Stephanie says even though “it felt like madness and chaos at times,” redeployment helped her refocus and “appreciate the small moments,” which will help her persevere through the pandemic.

“I choose to remain optimistic and to see the good that can come when we are facing challenges, as collectively we can get through it,” she says. “I believe that small acts of kindness will change the world.”



The Princess Margaret Gave Katherine a Second Chance at Life

Katherine was the first pancreatic cancer patient in Canada to be treated in the MR-Linac at the Princess Margaret.

In May 2016, Katherine was told she had 9 months to live after receiving a stage four pancreatic cancer diagnosis in her hometown of Belleville. Given the dire state of her diagnosis, she was immediately referred to the Princess Margaret Cancer Centre under the care of Dr. Neesha Dhani.

Everything was looking great after her treatments until June 2017, when Katherine was at her goddaughter's wedding and started to feel unwell. The next thing she knew, she was having a seizure and being rushed to the nearest hospital in Kingston where they found a tumour on her brain. The doctors said they could operate but she'd be partially paralyzed.

Katherine asked to be put in contact with Dr. Dhani at the Princess Margaret, who offered Katherine the option of Gamma Knife radiosurgery, a successful procedure that allowed Katherine to walk in and out on the same day. For the next few years, Katherine was being closely monitored, and in January 2021 a second tumour was discovered on her pancreas.

“I was told I'd have to do five weeks of radiation, but Dr. Rebecca Prince and Dr. Aisling Barry advocated for me and confirmed that I would be a suitable candidate for the MR-Linac, which was only five days of treatment instead of five weeks.”

Katherine was the first pancreatic cancer patient in Canada to be treated on the [MR-Linac](#) at the Princess Margaret, a technology that offers precise and personalized cancer treatment with fewer side effects. The Princess Margaret is one of only two sites in Canada with the new technology, there are only 11 others in use in the world.

“It's pretty impressive what the Princess Margaret offers,” says Katherine. “It was an incredible experience for such a dire situation. The staff were always wonderful, professional and warm.”

Five years after her initial diagnosis, Katherine is thrilled that she's able to run after her grandson, be there for her three kids, and go for walks with her husband.

“Quantity of life is important, but so is quality, and thanks to the innovative research treatment, and care at the Princess Margaret I have been able to enjoy both.”



First In Canada:

MR-Linac (MRL) Treatment for Pancreatic Cancer

Thanks to the immense collaborative efforts and dedication of our multidisciplinary teams, the Radiation Medicine Program (RMP) has achieved a major milestone in advancing precision radiation medicine for our patients. We look forward to providing more of our patients with access to cutting-edge radiation treatments. With thanks to our MRL Pancreas team of radiation oncologists, medical physicists, and radiation therapists: **Aisling Barry, Leigh Conroy, Tim Craig, Jennifer Dang, Laura Dawson, Ali Hosni, Harald Keller, Vickie Kong, Winnie Li, Patricia Lindsay, Victor Malkov, Cathy Carpino Rocca, Andrea Shessel, Teo Stanescu, Edward Taylor, Michael Velec, Jeff Winter, Iris Wong, and Kathy Yip.**



Photo: Kelvin Young Photography



Back row (from left): Dr. A. Berlin, M. Mohammadi, S. Simon, L. Moody, M. Lovas, S. Kooner.
 Front row (from left): A. Feng, D. Trujillo Castano, P. Cotman, S. K. Kwok, C. Jones, A. Taiwo.

First COVID Vaccines for Cancer Patients at the Princess Margaret

Within 72 hours of notification, an interdisciplinary team across the Princess Margaret launched a pilot to begin giving COVID vaccines to patients who were over 80 years old and undergoing chemotherapy. After its success and expanded criteria from the Ministry, the clinic continues to vaccinate cancer patients daily. Patient Lissy (pictured here) was one of our first to receive the vaccine.

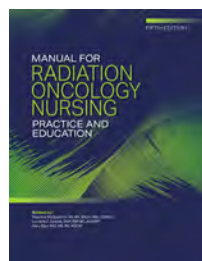
“It’s important for public safety and humanity that everyone takes the vaccine. I don’t want to take any chances, I want to reach 100 years.”

Patient Lissy

The Princess Margaret Receives COVID-19 Innovation Award

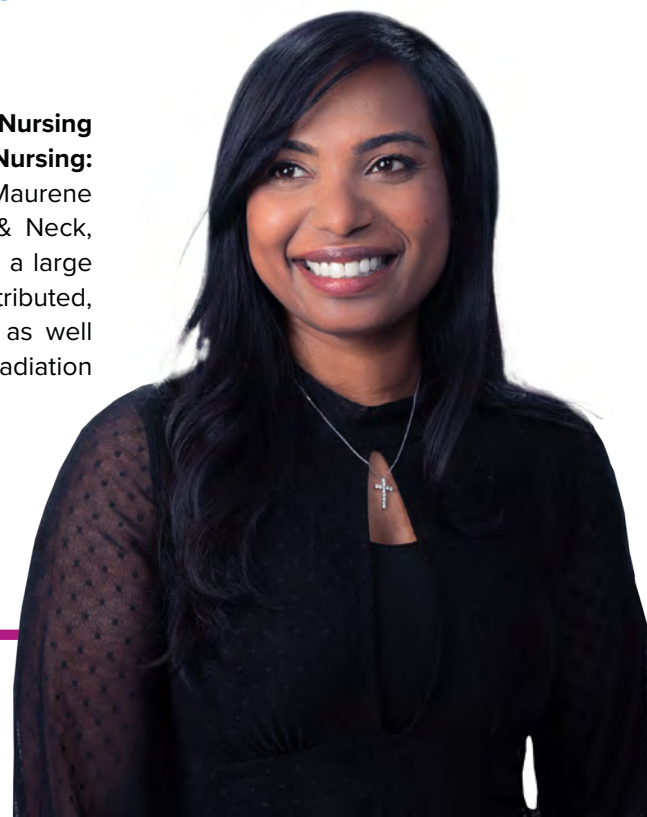
The Cancer Quality Council of Ontario has recognized the Princess Margaret Virtual Nurse-Led Clinic which is geared towards assessing and managing the symptoms of cancer patients who have tested positive for COVID-19. **Congratulations to all team members who contributed to making this initiative such a success.**

PM Staff Lead Development of Radiation Oncology Nursing Textbook



The latest edition of the **Oncology Nursing Society’s Manual for Radiation Oncology Nursing: Practice and Education** has been released. Maurene McQuestion, Clinical Nurse Specialist, Head & Neck, served as one of the textbook editors, leading a large team of Princess Margaret clinicians who contributed, including dietitians, nurses and psychiatrists, as well as geriatric medicine, clinical research and radiation therapy team members.

Anet Julius, RN, BScN, MN, CON(C)
 Director of Professional Practice, Oncology,
 Blood Disorder Programs and Supportive Care





Precision Drug Shows Promise In Treatment of Rare Cancer: Metastatic Uveal Melanoma

Ioan Siara says he doesn't mind the drive. It's about 740 kilometres – round trip – from his home in Windsor, Ontario to the Princess Margaret Cancer Centre. But the retired dentist says he likes to get behind the wheel.

"I've done it now for almost four years," Ioan says of his weekly trips to the centre.

Sometimes he drives up with his wife. Occasionally, he stops to visit friends or family. "With the COVID situation, this was the only outing that we had for some time," he says.

These trips allow Ioan to access a new treatment, which has stabilized growth of his metastatic uveal melanoma. It's something he didn't think was possible when he was diagnosed in 2017 – 15 years after he lost his left eye to the cancer. Prognosis after recurrence of the rare illness is not good and there are few treatment options.

At the time, doctors gave him a year and a half to live. "My family prepared a very nice Christmas party, the whole family was present at a cottage up north close to Muskoka," he says. "We were thinking that that would probably be my last. Well, I've made three more Christmases, including this one."

Shortly after his diagnosis, Ioan was enrolled in a stage three study at the Princess Margaret looking at the use of the drug tebentafusp to treat metastatic uveal melanoma. The drug had shown promise in an earlier international study which included patients with melanomas, including metastatic uveal melanoma. This latest research focuses exclusively on those patients with the disease. Thus far, his personal results have been encouraging, Ioan says.

"They call me the king of the clinical trial," he says, laughing about the light-hearted ribbing the Princess Margaret staff have given him about his positive response. "You could say I'm very happy with it."

“We would love, both me and my wife, to be able to enjoy our adventure a little longer.”

Ioan Siara

The study, which was published in the New England Journal of Medicine in 2021, has shown that tebentafusp has increased the currently low survival rates for people with the illness. Dr. Marcus Butler says the work is even more important because of how little study has been done on metastatic uveal melanoma treatments.

Dr. Butler says the rarity of the cancer has actually been an impediment to studying it, with small concentrations of patients treated at disparate centres, making large-scale research difficult. It's the kind of work best suited to the Princess Margaret. "We've specialized in this rare cancer, so we're the leading Canadian centre for uveal melanoma treatment," he says. "We have made a substantial contribution to this international clinical trial. Because of our comprehensive program with ocular oncology, radiation and medical oncology, we were able to provide this option to our patients."

Dr. Butler cautions that despite this initial success, this treatment may not work for all patients because it responds to each person's unique immune system. Further work will need to be done to expand compatibility for more patients. Dr. Butler says outside of this ground-breaking work, further research is being conducted by Drs. Tak Mak and Naoto Hirano to expand patient compatibility to immunotherapy treatments.

Ioan says he is glad to have taken part in the study and he's hopeful that it can lead to refinement and possible broader use for other patients. The study has given him good quality of life and importantly, more time. Time to enjoy his family and grandchildren, and pandemic allowing, perhaps time for some car trips to places other than the Princess Margaret.

“Nothing has ever worked to treat this rare cancer,” he says. “Now we have something that has greatly improved survival. That’s very important.”

Marcus Butler, MD

Dr. Marcus Butler, clinician-investigator at the Princess Margaret and a co-author of the study, said the findings have the potential to **“change the paradigm”** when it comes to treatments for metastatic uveal melanoma.





“ My driving force is that I care about the Princess Margaret patients. I love going to work, it makes me proud to work at one of the best hospitals that cares for cancer patients.”

Harry Paruag, Porter
Princess Margaret Cancer Centre



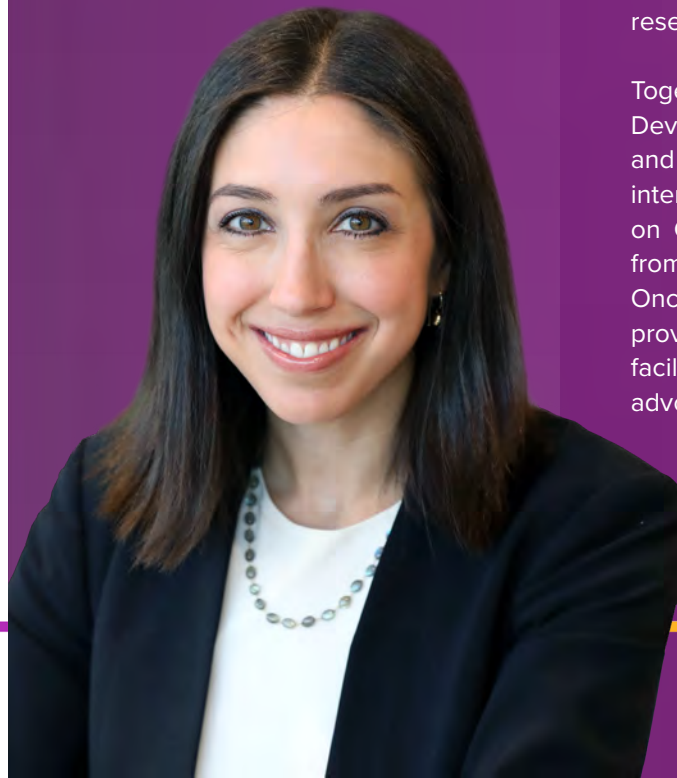
Global Partnerships

The Princess Margaret Global Cancer Program

The Princess Margaret Global Cancer Program ended 2021 with several exciting partnerships and new initiatives. Together with our partners from AC Camargo Cancer Centre in Brazil, King Hussein Cancer Centre in Jordan, Tata Memorial Cancer Centre in India, DKFZ in Germany, and Moi Teaching and Referral Hospital in Eldoret, Kenya, our virtual speaker series and multidisciplinary case conferences provided an opportunity for exchange of expertise in quality and best practice, exploration of new research initiatives, and discussion of challenging clinical cases. Our network was expanded with new partners, including Institut Curie in France, Davidoff Cancer Centre in Israel, and City Cancer Challenge Foundation.

The 2020 PM-DKFZ clinician-scientist fellows, Drs. Robert Vanner and Kira Kornienko, began their second year of the exchange program and Dr. Eric Zhao from the Radiation Medicine Program (RMP) was welcomed as the 2021 PM-DKFZ fellow, beginning in Toronto. Our research program awarded 5 seed grants for a total of \$100,000 to investigators from across the cancer program. The 2021 call focused on health disparities and will support five diverse proposals that include educational interventions, quality improvement initiatives, clinical trials, health services and qualitative research.

Together with Cancer Education, the Global Oncology Leadership Development Program welcomed 31 new fellows (90% international), and the free Global Oncology Enrichment Program had nearly 300 international participants from 14 countries. The new UICC Master Course on Comprehensive Cancer Centres ran online with faculty participation from our partner institutions. On the heels of the second Canadian Global Oncology Workshop, the Canadian Global Cancer Network was launched to provide a platform for Canadian institutions engaged in global oncology to facilitate collaboration, influence and advance opportunities for funding and advocacy in global cancer control.



Danielle Rodin, MD
Director of the Global Cancer Program



“The Princess Margaret Cancer Care Network seeks to level the playing field, ensuring patients have equitable opportunities to access the advanced care and knowledge available at a world-leading facility, regardless of where they live.”

Andrea Bezak, MDCM, MSc

Launched in 2021 and led by Dr. Andrea Bezak, the Princess Margaret Cancer Care Network aims to expand beyond the walls of the Princess Margaret and share our unique, specialised expertise and technology with like-minded cancer treatment centres across Canada. The Princess Margaret Cancer Care Network is a collective of local, regional and national partners committed to facilitating collaborative clinical care, accelerating the adoption of new technologies, engaging more patients in research through improved access to clinical trials, and advancing innovations which improve patient outcomes and provide confidence and comfort that the best care can be achieved close to home. In parallel, the Princess Margaret Cancer Care Network will work together to deliver seamless, efficient and timely navigation to access specialized care at the Princess Margaret, when and if the need arises. For healthcare providers within the partner institutions, there will be significant in-person and virtual networking, learning and best practice sharing opportunities.

For more information: www.pmcancercarenetwork.ca

Building Partnerships

Through the Princess Margaret Cancer Care Network

“We believe that within this network of institutions, providers of care, their patients and patient caregivers will derive confidence and comfort from network membership, secure in the knowledge that their care is benefitting from enhanced access to the specialized and unique skills and technologies offered at one of the top cancer centres in the world.”

A. Keith Stewart, MB, ChB
VP Cancer, UHN & Director, Princess Margaret Cancer Centre



Andrea Bezak, MDCM, MSc
Medical Director, Princess Margaret Cancer Care Network

Dr. Andrea Bezak is a Professor in the Departments of Radiation Oncology and Clinical Epidemiology & Health Care Research at the University of Toronto, and staff radiation oncologist at the Princess Margaret Cancer Centre/University Health Network. She was appointed as the Medical Director of the Princess Margaret Cancer Care Network in 2021.



Early Detection

Advancing the Future of Cancer

The Early Detection program at the Princess Margaret shifts the focus of cancer treatment and research from advanced cancers to early cancers. By detecting cancer at its initial stages, curative treatment is more achievable. The Cancer Early Detection program leverages significant advances in cancer genomics, liquid biopsy, imaging and chemoprophylactic approaches to stop cancer before it progresses or recurs. It focuses on at-risk populations, molecular residual disease, high risk gene carriers, and cancer survivors to demonstrate that cancer can be detected early and even prevented.

Raymond Kim, MD, PhD
Medical Director of Early Detection

Dr. Raymond Kim is a medical geneticist & Medical Director, Familial Cancer Clinic at the Princess Margaret. He was appointed as the Medical Director of Early Detection in 2021.



Key Highlights:

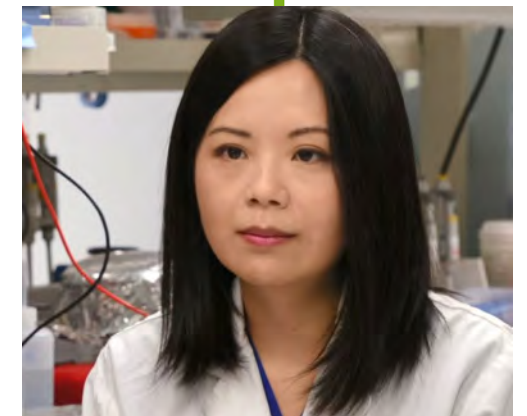
- The winner of the \$500K Agnico Eagle Grand Challenge in Cancer Interception Award was Dr. Kathy Han for her project: Circulating HPV DNA for early detection of recurrence in HPV-positive cancers.
- In late 2021 following a Genomics retreat, a Genomics Advisory Committee was formed to drive a streamlined and comprehensive approach to testing while addressing gaps, exploring funding opportunities, and partnering with external collaboration models on Whole Genome Sequencing.
- The Bhalwani Familial Cancer Clinic continues to scale and grow, establishing programs in hereditary hematologic malignancies (Graham Farquharson Blood Disorders Genetics Program); a universal germline genetic testing initiative for breast cancer patients; and to engage family physicians to follow gene mutation carriers.
- In collaboration with the Ontario Institute for Cancer Research, the Princess Margaret led a \$4.5-million grant to create the Ontario Hereditary Cancer Research Network (OHCRN), a province-wide registry for hereditary cancer. This is the first registry of its kind in Canada and will be used to understand the biology, prevention, early detection and treatment of hereditary cancers.
- Led by Drs. Phil Bedard and Dave Cescon and supported by the Karen Green and George Fischer Family Genomics and Genetics Fund, a comprehensive breast genomics program has been launched to include liquid biopsy and tumour testing of all metastatic breast cancer patients.
- A partnership with the Toronto Western Family Medicine healthcare team was initiated for health gene carriers to be followed by family physicians, the first physician, Dr. Brooke Hofbauer, was recruited to this program.

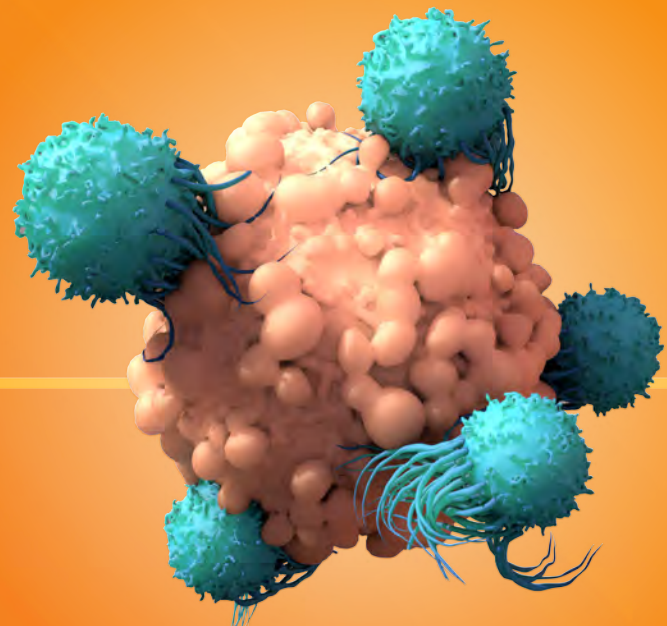
2021 Agnico Eagle Grand Challenge

The 2021 Agnico Eagle Grand Challenge in Cancer Interception was awarded to Dr. Kathy Han and a team of scientists and clinicians who seek to advance detection of human papilloma virus (HPV) in the bloodstream as a marker of tumour presence and to cure more patients with virus-related head and neck, cervical and anal cancers. Dr. Han's project capitalizes on basic cancer biology and pairs it with new cutting-edge genetic technologies.

Dr. Han's team includes Drs. Scott Bratman, John de Almeida, Ali Hosni, Anna Spreafico, John Kim, John Waldron, Stephanie Lheureux, Wei Xu and Sareh Kesharvarzi.

"Our team is really honoured to be awarded the Grand Challenge," Dr. Han says. "This award will enable us to validate the accuracy of circulating HPV DNA for detecting residual disease, and make early detection of cancer recurrence and interception a reality."





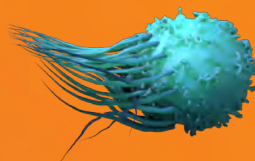
Beyond Chemotherapy

The Beyond Chemotherapy Strategic Pillar was devised to move us towards a future where we use advanced treatments to cure more patients and improve their quality of life. The team aims to do this in a number of areas, including Models of Care, Theranostics, Immunotherapy, and Precision Genomics.

The Beyond Chemotherapy mission is to uncover, trial, and expand alternative treatment interventions that are highly effective and minimize toxicities and is led by Drs. John Kuruvilla and Stephanie Lheureux, Clinical Investigators at the Princess Margaret.

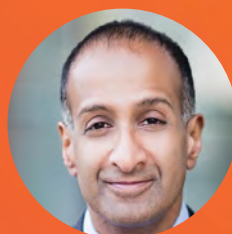
In 2021, a second Agnico Eagle Beyond Chemotherapy Grand Challenge was launched whereby a number of investigators submitted their work for consideration. Each submission was assessed on its readiness, innovation, and the opportunity to reduce the use of non-specific chemotherapy. Drs. Amit Oza, Jonathan Irish, and Brian Wilson were named winners for their work with porphysome nanotechnology.

In 2022, the Beyond Chemotherapy Pillar plans to continue fostering partnerships to revolutionize cancer treatment as we know it.



Stephanie Lheureux, MD, PhD
Co-Director, Beyond Chemotherapy

Dr. Stephanie Lheureux is a Medical Oncologist, Clinician Investigator, Site Lead of Gynecology Oncology at the Princess Margaret and an Assistant Professor, Faculty of Medicine, at the University of Toronto. She is Co-Director of the Beyond Chemotherapy Program.



John Kuruvilla, MD
Co-Director, Beyond Chemotherapy

Dr. John Kuruvilla is an Associate Professor of Medicine at the University of Toronto and a hematologist in the Division of Medical Oncology and Hematology at the Princess Margaret Cancer Centre. He is Co-Director of the Beyond Chemotherapy Program.

Team Working Toward the First-In-Human Trial of New Theranostic Tool Wins the Beyond Chemotherapy Grand Challenge

A group of UHN clinicians and scientists testing a new way to pinpoint cancerous tumours won the Agnico Eagle Grand Challenge ‘Beyond Chemotherapy’ Award.

The Princess Margaret Cancer Centre group led by Drs. Amit Oza, Jonathan Irish and Brian Wilson will use the \$500,000 award to help finance a world’s first-in-human safety trial using the new method of identifying tumours in real-time in the operating room.

Discovered in 2011 by Princess Margaret Senior Scientist, Dr. Gang Zheng, the diagnostic tool at the centre of the group’s ‘proof of principle’ is called porphysomes, an organic nanoparticle that lights up red when exposed to blue.

“You may consider porphysomes as like a ‘homing beacon,’” explains Dr. Zheng. “It will help a surgeon identify and localize the tumour and distinguish it from surrounding normal tissues. That will help the surgeon resect the tumour more completely and in a minimally-invasive way.”

This is significant because approximately 20 percent of patients with invasive cancer can still have cancer remaining after surgery, despite the best clinical practice.

The porphysome-enabled fluorescence image-guided surgery increases the precision of disease resection, can reduce disease recurrence, and improve disease-free survival. Further, this “homing beacon” is not only a superior diagnostic imaging tool, but it can also be used as a lightbased therapy with the potential for drug delivery.

Dr. Irish sees this first porphysome trial as a gateway to broader clinical applications.

“I think it has high potential to be a game-changer in oral cancer,” says Dr. Irish, “and in other areas like advanced endometrial cancer and lung cancer, where porphysomes will enable the detection of regional disease and allow the surgeon to follow the spread of the cancer lymphatically.”



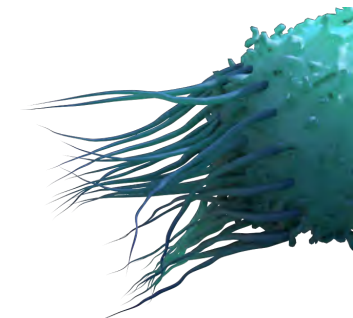
Amit Oza, MD, MBBS



Jonathan Irish, MD



Brian C. Wilson, PhD





Drug Combination Results in Longer Survival for Patients with Recurrent and Advanced Ovarian Cancer

Precision Medicine at its Best

An Ontario Institute of Cancer Research (OICR) supported research team at the Princess Margaret Cancer Centre has shown that adding a targeted drug to chemotherapy results in longer survival and a stronger response to treatment in a difficult-to-treat form of ovarian cancer.

When a patient's ovarian cancer becomes resistant to treatment, the patient has few alternative options and faces an estimated survival of less than 18 months. This is a reality for approximately one in four women with the disease.

Drs. Stephanie Lheureux, Clinician Investigator and Amit Oza, Senior Scientist and OICR TRI leader, led a Phase II clinical trial including nearly 100 women across 11 centres to evaluate the combination therapy of adavosterib and gemcitabine. Their discoveries, published in *The Lancet*, demonstrated that this combination increased survival by 4.3 months relative to chemotherapy and placebo alone. 23% of patients' cancers responded to the chemotherapy, in contrast to a 6% response rate seen using chemotherapy alone.

“By combing two drugs, we were able to change the trajectory of cancer for a high-risk group of women with advanced disease who did not have many choices left,” says Dr. Oza, who is also Medical Director of the Cancer Clinical Research Unit and Co-Director of the Bras Drug Development Program at the Princess Margaret Cancer Centre. “That is significant.”

The study provides a signal of hope for women with ovarian cancer who develop drug-resistance to treatment and included some women who had received up to eight different previous treatments which had stopped working.

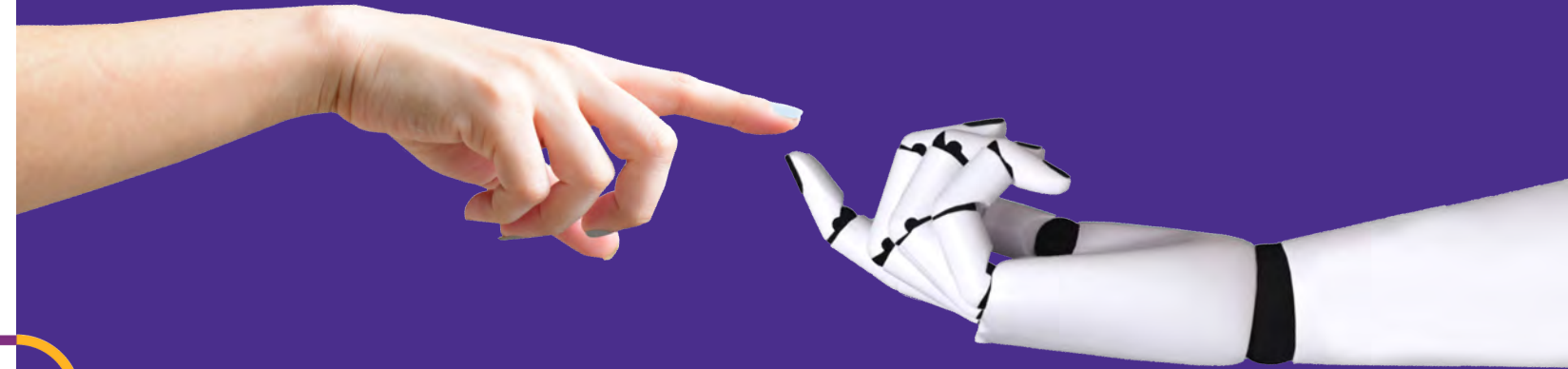
“As we learn more and more about the biology of tumours, we can target treatments more precisely to the molecular changes in a cancer to improve the type and response of our treatments. That will change outcomes for patients,” says Lheureux, who is also the Princess Margaret Site Lead for Gynecological Oncology. “I want our patients to know there is hope to find better treatment to control their cancer.”

“This discovery underscores the importance of bringing scientists and clinicians together to tackle difficult questions from different perspectives to offer new insights into the biology of cancer,” says Dr. Laszlo Radvanyi, President and Scientific Director, OICR.

In addition to improving overall survival by 4.3 months, the combination of adavosertib and gemcitabine improved progression-free survival by 1.6 months relative to chemotherapy alone.

“These outcomes give us a strong signal that we can potentially improve survival for these patients who face bleak prospects,” says Dr. Oza.

“This is precision medicine at its best,” he adds. “This is how we will develop better treatments for our patients.”



Cancer Digital Intelligence

Cancer Digital Intelligence (CDI) is a research and innovation program dedicated to enabling the best care possible for people affected by cancer. CDI aims to accelerate the application of discoveries in cancer care through the fusion of human wisdom, data and technology. The program applies a nimble strategy that is grounded in partnerships with patients, health teams and researchers to accelerate the spread and scale of digital innovation. CDI's program structure is built on a strong foundation in data science and analytics that will enable progress in three strategic domains: business intelligence, care innovation, and discovery integration.

Princess Margaret Data Science Program Advances Machine Learning

In 2021, the Princess Margaret Data Science Program completed three catalyst projects that leverage data science to advance cancer research. The MIRACLE project led by Dr. Andrew Hope, developed a machine learning model that predicts the risk of inflammatory lung disease (ILD) in lung cancer patients. Detection of ILD prior to radiation therapy is critical to understand patient specific risks related to treatment. This predictive model is being prospectively validated in the clinical setting.

The program also led advancements in data sharing, including the open publication of the RADCURE imaging dataset on The Cancer Imaging Archive, an open-access database of medical images for cancer research. RADCURE consists of over 2,500 patients with Head and Neck cancer treated with radiotherapy or chemo-radiation. This large dataset allows researchers to perform deep learning development and validation studies for prognostic modeling, auto-contouring, and other data science efforts.

Finally, the program also launched the Research Data Storage (RDS) pilot solution, providing a standardized secure way to store, share, and manage data files generated by research equipment. Developed with the FAIR (Findable, Accessible, Interoperable and Reusable) principles in mind, RDS supports advanced meta data management to optimize the use of research data.



Alejandro Berlin, MSc, MD, Medical Director, Cancer Digital Intelligence

Dr. Ale Berlin is a clinician-scientist radiation oncologist at the Princess Margaret Cancer Centre. Dr. Berlin was appointed as the Medical Director of the PM Cancer Digital Intelligence Program.



Benjamin Haibe-Kains, PhD, Scientific Director, Cancer Digital Intelligence

Dr. Benjamin Haibe-Kains is a Senior Scientist at the Princess Margaret Cancer Centre, and Associate Professor in the Medical Biophysics Department of the University of Toronto.



Grand Challenge Awarded For Digital Intelligence

Radiation Oncologists Drs. Aisling Barry and Philip Wong won the 3rd Grand Challenge of the year for a world first: a randomized trial testing a washable “smart shirt”, previously deployed by astronauts and professional athletes, that continuously monitors vital signs and is Bluetooth coupled to a digital platform.

The study will recruit radiation therapy patients to record and share biologic trends and health symptoms to help improve quality of life and ameliorate treatment toxicity.

Smart Cancer Care Team Demonstrates Advantages Of Virtual Care

The rapid shift to virtual care in response to the COVID-19 pandemic was critical to preserving access to cancer care by ensuring patients can continue to meet with the care team while at the same time decreasing traffic and facilitating physical distancing for patients who required an in person appointment.

A research study led by Dr. Alejandro Berlin showed that virtual care can be implemented rapidly, safely, with high satisfaction among patients and physicians in a highly-specialized and high-volume cancer centre. The study was published in JAMA Oncology and demonstrated that 80% of patients and 72% of physicians reported high overall satisfaction rates with virtual care. Institutional and province-defined quality standards of cancer care – such as safety incidents and referrals seen within 14 days – were tracked throughout the study and no changes were observed. Overall cost savings in travel, missed work, day care etc. for the 22,085 patients studied over two months was estimated at more than \$3 million.



“Virtual care became a safety net for patients during the uncertainty of COVID-19,” says Dr. Berlin. “Their care team was still there for them, but in a different way. For the future, we aim to examine what criteria – in addition to clinical – that make virtual care a good or even preferred option for select patients.”

AI Treatment Plans Used in Patients

Machine-learning system creates high-quality radiation therapy plans for patients in minutes

Radiation treatments are now being generated using artificial intelligence (AI) for prostate cancer patients at the Princess Margaret Cancer Centre. This advancement is the culmination of years of research led medical physicist by Dr. Tom Purdie and computer scientist Dr. Chris McIntosh of the Techna Institute, in collaboration with RaySearch Laboratories’ in-house machine learning department.

Radiation therapy is required in approximately 40% of cancer cases. Each patient receiving radiation therapy needs a treatment plan, which must carefully balance the delivery of radiation to the tumour while minimizing the dose received by nearby healthy organs. Each patient’s body shape and cancer are unique, so creating the plan traditionally requires a team of professionals working for hours or even days.

The AI planning system developed by Drs. Purdie and McIntosh dramatically reduces the time and associated costs required to generate radiation treatments: it can create a high-quality treatment plan in just minutes. The system uses AI that compares patients’ medical images with a database of previously high-quality treatment plans created by experts at the Princess Margaret. It can then use the information contained in the previous treatment plans to generate a new plan that is personalized to the patient. A preliminary study presented by radiation oncologist Dr. Alejandro Berlin, the clinical lead, found that AI treatment plans were preferred or found equivalent to human-generated treatment plans that had been used for patient care in 88% of cases according to a panel of clinical experts.

The system is now being used to generate plans of patients under the direction of Dr. Berlin. Every patient with localized prostate cancer treated at the Princess Margaret now has two plans created for them: one using the traditional manual system and another using the new machine-learning automated system. A physician reviews both plans, and chooses one for further review and quality assurance before it is used to guide radiation therapy for the patient.



The Human Touch in Cancer Care

Building the UHN Cancer Experience Program

The Cancer Experience Program aims to elevate the comfort and confidence and support the well-being of all patients, caregivers, trainees and staff as they navigate through the complex system of cancer care. This led to the creation of specialized initiatives within the **SuNDAE** framework: **S**upportive Communication; **N**avigation; **D**iversity; **A**mbience; and **E**ngagement.

“For many patients and their loved ones, the diagnosis and treatment of cancer can be a terrifying and confusing period in their lives. The Cancer Experience Program will work to ensure the interconnectedness of patients, loved ones, healthcare providers and trainees in a framework that reflects that we’re all in this together.”

Gary Rodin, MD

Key Highlights

- The Grand Challenge in Cancer Experience: The Human Touch in Cancer Care supported four projects:

A Princess Margaret Family Caregiver Support Program Drs. Janet Papadakos, Meredith Giuliani, Sarah Hales, Rinat Nissim, Breffni Hannon & Jennifer Croke

Cultural and Linguistic Diversity & Digital Health Equity Drs. Ale Berlin & Stephanie Lheureux

Proactive Access to Psychosocial Care for All Patients Dr. Madeline Li & Megan Wexler

The LIFT: Responsive Wellbeing Practices Delivered to Healthcare Workers Drs. Mary Elliott & Ale Berlin

- The Leading Edge Lecture Series** featured experts on Race and Structural Barriers to Cancer Care (Dr. Juliet Daniel, McMaster University) and on Improving Supportive Communication: Clinicians, Culture, Leadership, and Systems, (Dr. Anthony Back, University of Washington).

- Staff and Trainee Well-Being** The Well-Being Index Survey (WBI) for clinical staff was conducted at the Princess Margaret in partnership with the Peter Munk Cardiac Centre. This Well-Being initiative explores the facilitators and barriers to workplace satisfaction, efficiency, and collegiality. Led by Dr. Mary Elliott, comprehensive results from the completed survey were shared with PM leadership and dissemination to individual departments will take place in 2022.



Steve Driscoll, Canadian,
The wind does not move in one direction,
2020, Urethane on plastic panel

Gary Rodin, MD
Director, UHN Cancer Experience Program

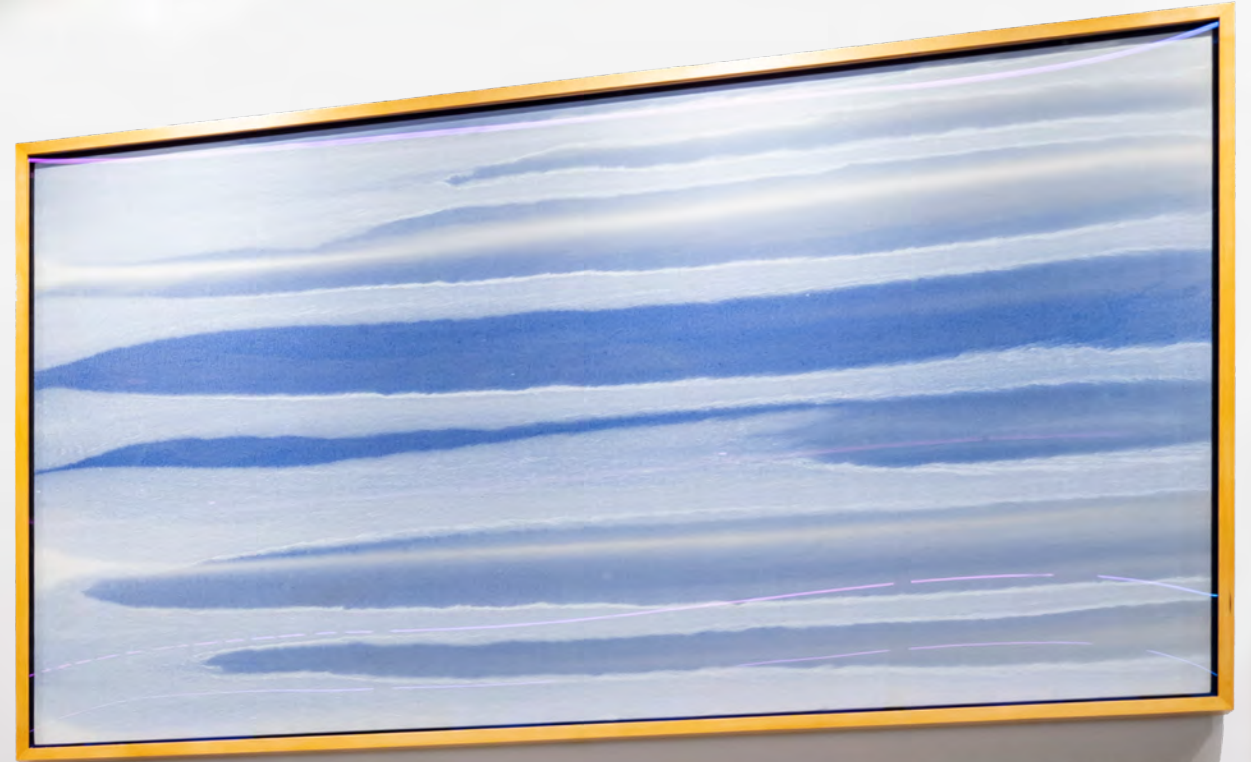
Dr. Gary Rodin is Professor of Psychiatry and Director of the Global Institute of Psychosocial, Palliative and End-of-Life Care (GIPPEC) at the University of Toronto. He is the inaugural Director of the UHN Cancer Experience Program.





Paterson Ewen, Canadian, 1925 - 2002, *Drought*, 1988 acrylic on plywood, Collection Art Gallery of Ontario, Toronto. Gift of Michael and Sonja Koerner, 2018 © Mary Alison Handford 2018/3620

Rosen Family Lounge
Supported by
Larry Rosen and Susan Jackson



K.M. Graham, Canadian, 1913 - 2008, *Benedicte, Omnia Opera (Second Arctic Series)*, 1973 acrylic on canvas, Collection Art Gallery of Ontario, Toronto. Purchase, 1973 © Art Gallery of Ontario 73/43



Engaging the Senses

Cancer and the Arts

The UHN Cancer Experience Program has engaged patient partners, local artists, generous donors, and world-renowned organizations such as the Art Gallery of Ontario (AGO) and the Toronto Symphony Orchestra (TSO) to elevate the therapeutic role of the arts in cancer care at the Princess Margaret.

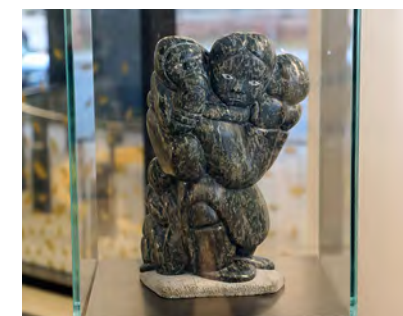
Our goal is to create an atmosphere that promotes well-being and to curate artwork that is representative of the diverse communities that we serve. We are in early stages of this program and have already seen meaningful progress.

“The ambience of our cancer centre is a critical dimension of the cancer experience. Art, music and other sensory enhancements can provide comfort and solace to our patients, caregivers and healthcare teams.”

Meena Merali, Director, Transformation and Strategic Partnerships



2021 marked the creation of a formal partnership with the TSO to enhance community engagement, research and performance. Creating calming, intentional live music interactions in the healthcare environment can significantly shift the ambience from one that is sterile or unwelcoming to one that promotes comfort and reflection. In October, musicians from the TSO participated in “Music in Cancer Care Settings”, a professional development session led by the Princess Margaret Music Therapist, SarahRose Black. In November, the TSO extended 2,000 complimentary tickets to UHN staff and provided a salute from stage to healthcare workers in recognition of their efforts during the ongoing waves of the pandemic. We look forward to deepening our partnership with the TSO to bring comfort, healing and joy to our environment through music.



In 2021, the AGO loaned the Princess Margaret two world-class signature pieces of art, *Benedicte, Omnia Opera (Second Arctic Series)* by K.M. Graham in a beautiful new patient lounge and, revitalizing the Murray Street Atrium with the painting, *Drought* by Paterson Ewen. In addition, several unique pieces of art were installed in key areas on the main floor. The striking diptych, *The wind does not move in one direction* by Steve Driscoll, takes inspiration from the Western Canadian landscape. The Inuit sculptures *Mother with Children*, by an unknown artist, and *Family* by Paulosie Sivuak uplift lounge spaces on the main floor.

Filling the Gaps in Patient-Centered Care



The Sexual and Gender Diversity in Cancer Care (SGDc) Program

Established in 2020 and led by Dr. Christian Schulz-Quach and Margo Kennedy, MSW, the Sexual and Gender Diversity in Cancer Care (SGDc) Program was created to support LGBTQ+ patients and their chosen families while receiving inclusive care at the Princess Margaret. To date, they have improved accessibility and navigation through implementing an information line and providing a curated overview of provincial and national inclusive cancer resources. They are currently developing a needs assessment among patients, caregivers, health care providers (HCP) and administrative decision-makers and are actively involved in the Synapse digital transformation process to optimize the new Health Information System (HIS) for state-of-the-art inclusivity and diversity aspects. The SGDc group was awarded the Outstanding Contribution to Cancer Education Award in 2021, and some group members were recipients of the Young Leaders Award.

Drs. Nazlin Jivraj and Jennifer Croke recently identified a gap in the delivery of patient-centered care. Preliminary evidence indicates that over half of health care providers (55%) do not feel knowledgeable about LGBTQ2+ health needs, and most health care providers (96%) are interested in receiving comprehensive education. These local findings align with research evidence suggesting low rates of HCPs asking about patient pronouns, gender, sexual orientation, and relationship identity, with only 8% feeling confident in their SGDc-specific knowledge and communication skills.

Plans to develop a Princess Margaret-specific communication training curriculum for health care providers with the first pilot module to focus on pronouns, gender, sexual orientation, and relationship identity in a patient-centered, inclusive, and engaging way. The SGDc Program looks forward to working collaboratively with care teams to make the Princess Margaret inclusive and welcoming for everyone.

Planning Supportive Conversations

One of the hardest moments in a person's life can be the moment they receive serious news about their health and ultimately, their future. The delivery of this information and subsequent supportive planning conversations needs to be empathic and patient centered, and that is exactly what Dr. Warren Lewin and the Toronto Western Hospital Palliative Care team is doing through the creation of The Conversation Lab - a new educational initiative to improve serious illness care at UHN and beyond.

The Conversation Lab exists to equip healthcare providers with practical tools and standardized communication skills training based on the best available research and evidence to allow providers to more expertly discuss what matters most with their patients and families. In parallel, they aim to provide patients and families with planning resources to help them take control of their future care.

The Conversation Lab launched in late 2021 and more information about the program can be found at www.uhn.ca/healthcareprofessionals/conversation_lab



"Our vision is a healthcare system where every clinician is trained and empowered to skillfully discuss what matters most with their seriously ill patients and their families and to know how to document these conversations in EPIC to drive quality care. We aim to build Canada's largest academic community of communication-trained clinicians and researchers with an aim to enhance the patient, family, and provider experience at UHN."

Warren Lewin, MD, CCFP(PC)
Site Lead for the Palliative Care program at the Toronto Western Hospital.



From Top, Left to Right:
C. Schulz-Quach, M. Kennedy, G. Shapiro, B. Lyver, L. Squires, A. Matthew, S. Scime, J. Croke, N. Jivraj, R. Dang, P. Lau



Ontario Health Update

Throughout the pandemic, Ontario Health and the Regional Cancer Programs across Ontario have collaborated through ongoing review of cancer activity to mediate any possible disruptions to service for Ontario patients and families. Volumes for key clinical programs including cancer screening, cancer surgeries, diagnostic imaging, systemic treatment, and radiation treatment have been reviewed collectively on a weekly, monthly, and quarterly basis to allow for ongoing prioritization and highlight areas of need. As a result of this diligent focus and the concerted effort of frontline teams across the system, through the 2021 year Ontario saw an overall recovery in many cancer services near pre-pandemic levels. In the Toronto Central South region specifically, volumes for cancer screening activity exceeded historical levels for the first time since March 2020. With this transition, Ontario Health and has committed to resuming its focus on health system performance in 2022, and will drive initiatives focused on person centred care, equity, safety, efficiency, effectiveness, and timeliness.

Indigenous Cancer Program Drum Honouring Ceremonies



Sacred drums are a significant component of traditional health and wellness, and access to drums support the integration of culturally relevant care in our health systems. The Toronto Central Regional Indigenous Cancer Program team gifted regional care site partners, including UHN, a sacred drum that First Nations, Inuit and Métis patients and families are welcome to use for traditional healing and spiritual practices during their care. This is a significant and symbolic gift, recognizing the ongoing work and commitment to build relationships and improve the care and experience of Indigenous staff and community members.



L-R: M. Anderson, S. Dhanju, A.K. Stewart, J. Vautour, Westwind Evening, Traditional Knowledge Keeper, Fishing Lake First Nation, Treaty 4 Territory, Saskatchewan, L. Benoit, Jenny Blackbird, Hand Drummer, Nêhiyaw and Finnish–Canadian, M. Lopez, B. Hodges, A. Migwans, M. Merali

Regional Indigenous Cancer Lead

Joanna Vautour, MSW, RSW

The Toronto Central Regional Indigenous Cancer Program welcomed Joanna Vautour to serve as the Regional Indigenous Cancer Lead for Toronto Central. Joanna is Anishinaabe from Serpent River First Nation, Ontario and integrates her Anishinaabe teachings in her professional practice.



Joanna brings her experience in cancer care through her time as the former Indigenous Patient Navigator for the Toronto Regional Cancer Program and as the Lead in First Nation, Inuit, and Métis Engagement for the Ontario Palliative Care Network in partnership with the Indigenous Cancer Care Unit. She continues to work in palliative care part-time for Lakehead University, facilitating palliative care training for frontline workers in First Nation communities.



L-R: M. Yadav, C. Arrowsmith, T. Prinos, R. Harding

Promising Approach to Halt the Growth of Glioblastoma Stem Cells

Researchers have uncovered a potential new treatment for glioblastoma—an aggressive and deadly form of brain cancer. Currently, the prognosis for glioblastoma remains very poor, with fewer than 10 per cent of patients surviving beyond five years. Current therapies are severely limited.

The study was co-led by Dr. Cheryl Arrowsmith, Senior Scientist at the Princess Margaret Cancer Centre and Chief Scientist at the Structural Genomics Consortium (SGC), Dr. Peter Dirks, neurosurgeon at SickKids and Dr. Panagiotis Prinos, senior research associate at SGC and the University of Toronto.

They found that chemically inhibiting the enzyme PRMT5 can suppress the growth of glioblastoma cells. While targeting PRMT5 has been previously suggested as a way to target brain and other cancers, no one has tested this strategy in a large cohort of patient tumour-derived cells that have stem cell characteristics—cells that drive cancer initiation and treatment resistance.

The research team tested a group of new experimental small molecules designed to specifically inhibit key cellular enzymes to see if any would stop the growth of glioblastoma cells. They found that specific molecules inhibited PRMT5, stopping the growth of a large portion of these patient-derived cancer stem cells. Many current drugs do not eliminate cancer stem cells, which may be why many cancers regrow after treatment.



“By inhibiting one protein, PRMT5, we were able to affect a cascade of proteins involved in cell division and growth. The traditional way of stopping cell division has been to block one protein,” says Dr. Arrowsmith. “This gives us a new premise for future development of novel, more precise therapies.”

But they also caution that actual treatments for patients are many years away, and require development and testing of clinically appropriate and safe versions of PRMT5 drug candidates that can access the brain.

Targeting Metabolism to Treat Pancreatic Cancer

It has been known for decades that cancer cells acquire changes in their metabolism to fuel and sustain their rapid growth. In their latest research, Dr. Marianne Koritzinsky and her team discovered that the same metabolic deregulation that promotes cell growth, can create novel vulnerabilities in cancer. By studying patient-derived pancreatic cancer cell lines, they found that half of these cell lines are highly dependent or “addicted” to the protein peroxiredoxin 4 (PRDX4), as a result of the altered metabolic state of the cancer cell. This addiction is vital for the cancer cell’s survival—making it a potential target against the cancer.

The team showed that targeting PRDX4 in patient-derived cancer cell lines led to toxic accumulation of oxidative stress, resulting in DNA damage, and cell death, and impaired tumour growth in preclinical models. Equally important, loss of PRDX4 had no measurable effect on normal cells.

“These findings warrant future efforts to develop new drugs against PRDX4 that could be tested in preclinical models, and eventually translated to the clinic,” says Dr. Koritzinsky. “There may be other ways to take advantage of these new biological insights, including combining this targeted approach with other DNA damaging treatments such as radiotherapy, and establishing biomarkers that can identify the patients who will benefit from PRDX4 targeting.”



Marianne Koritzinsky, PhD

Unravelling the Pancreatic Tumour Microenvironment

A research team led by Dr. Rama Khokha has discovered that the complex pancreatic tumour microenvironment is not random, but organizes itself to promote tumour progression and treatment resistance.

The tumour microenvironment comprises a network of normal body cells that are hijacked by cancer to support tumour growth. By studying pancreatic ductal adenocarcinoma—an aggressive form of cancer with poor prognosis, the research team illustrated how this network establishes “functional units” that influence how pancreatic cancer behaves.

To define the properties of the tumour microenvironment, the researchers systematically categorized the tissue appearance of the microenvironment by analyzing fibroblasts—the cells that are pivotal for maintaining the structural framework of tissues. Based on fibroblast characteristics, they identified three types of microenvironments, and each type of microenvironment supported tumours exhibiting different types of behaviour. For example, a reactive microenvironment had faster-growing tumour cells, while the deserted type comprised cells that could survive chemotherapy. They found that treating the cancer with chemotherapy led to an increase in the number of deserted microenvironment regions.

The work complements findings of other studies on the vast cellular diversity of pancreatic cancer by building an integrative framework to understand its microenvironment.

“Just as pancreatic cancer is notoriously lethal, it’s tumour microenvironment’s complexity is equally notorious,” says Dr. Khokha.

“This study shows how this tumour complexity is actually well-ordered, how it self-organizes into functional units and how it can be associated with patient outcome.”



Rama Khokha, PhD

ORCESTR: A New Platform for Reproducible Processing of Large Complex Data

Cancer data are complex to analyze and subtle differences in the way they are processed could lead to seemingly discordant results. Many of the most complex sets, such as genomic sequencing data, often arrive in very rough forms, which then take time for researchers to organize and annotate if they want to use these in their own work. However, making these complex data “analysis-ready” is often an error-prone and poorly documented process.

A team led by Dr. Benjamin Haibe-Kains designed and built a new cloud-based tool—ORChEstration Tool for Reproducible Analysis (ORCESTR)—that processes, annotates, curates and releases some of the world’s most-used biomedical data. Currently, these data sets, and how they are created and processed, are not always transparent. The complex findings they reflect are then difficult to replicate for even the most experienced labs, either slowing research or putting it out of reach for some scientists.

Reducing these barriers is key to improving cancer discoveries and making a difference for patients.

ORCESTR attempts to address that problem by providing data sets, detailed documentation and computer code, which enable researchers to see how the raw data was processed. The tool contains a variety of clinical and pre-clinical, genomic and perturbation profiles of cancer data for download. It is also customizable, offering multiple ways to process a data set to meet a researcher’s needs.

“If we make a discovery using data from ORCESTR, it’s more likely to be reproducible and impactful because we are able to document every single step that led to the discovery,” says Dr. Haibe-Kains. “The overall goal is to improve the quality of science to benefit patients.”

Expanding the Computational Biology and Medicine Program

This past year, three outstanding early-career investigators with complementary expertise in computational biology joined the Princess Margaret Cancer Centre: Drs. Gregory Schwartz, Federico Gaiti and Sushant Kumar.

Dr. Schwartz’s lab is developing computational methods to understand the impact of cancer heterogeneity on diverse responses to anti-cancer therapies.

Dr. Gaiti’s group is developing and applying single-cell multi-omics approaches to understand how malignant cellular states in cancer are determined by genetic and epigenetic alterations.

Dr. Kumar’s research lab is building integrative computational frameworks for precision oncology by leveraging large-scale genomics, transcriptomics, and biomolecular structure data to identify clinically actionable biomarkers, study tumor evolution, and predict drug response among cancer patients.



Studying Hearing Loss in Children and Young Adults Treated for Brain Cancers

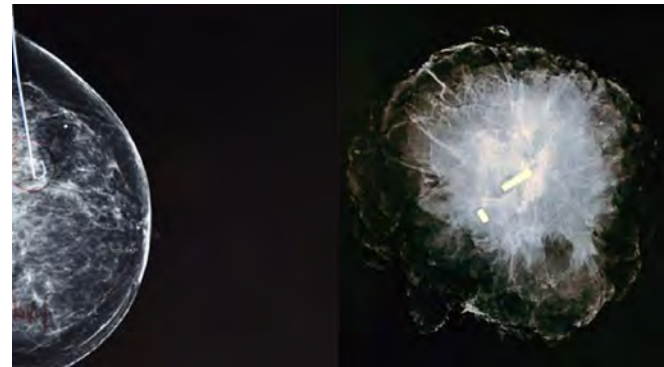
Hearing is a critical human sense for learning and perceiving our world. Unfortunately, many of the treatments used to treat brain cancer in children and young adults can cause hearing loss, including chemotherapy (cisplatin or carboplatin) and radiation (to the cochlea). Understanding and accurately estimating the risk of hearing loss is critical to designing newer and better therapies that can potentially reduce the risk of hearing loss.

In a study led by Dr. Derek Tsang from the Radiation Medicine Program at the Princess Margaret, in collaboration with Dr. Dana Keilty (radiation oncology resident) and researchers from the Hospital for Sick Children, it was discovered that high-frequency hearing loss is extremely common in children treated for brain cancers, and is exacerbated by exposure to cisplatin, carboplatin and radiation. Even small increases in radiation dose to the cochlea can increase the risk of hearing loss over time. Young children aged less than 3 years are particularly susceptible to hearing loss. Radiation dose thresholds of 30 Gy, or even 20 Gy if possible, are suggested to minimize the risk of hearing loss.

This research was used to create a calculator to estimate hearing loss risk for any individual patient. This allows oncologists to identify children who may benefit from early intervention with hearing aids or educational testing to identify learning deficits arising from hearing loss. It also allows scientists to predict the benefits of advanced treatments, such as treatments beyond chemotherapy that minimize cisplatin or carboplatin exposure. Finally, understanding the relationship between cochlea radiation dose and hearing risk highlights the promise and potential benefits of precision radiation, such as proton beam therapy, which is currently being developed at the Princess Margaret for future children and young adults with cancer.



Derek S. Tsang, MD, MSc
Radiation Oncologist at the Princess Margaret Cancer Centre



Magnetic Seed Localization Program

The Princess Margaret is the first centre in Canada to use magnetized seeds instead of wires in breast lumpectomies—a common procedure to remove non-palpable breast lumps. Using seeds rather than wires for localization results in less discomfort and often improved cosmesis. It also allows efficiency in scheduling and performing breast cancer surgery.

The Magseed-guided lumpectomy was performed for the first time in 2017 and has now been performed at the Princess Margaret on hundreds of women with breast lumps that could not be felt but were detected through a mammogram or ultrasound.

As of January 2022, the breast surgery group will adopt the use of MOLLI- a new Canadian image guided technology. The MOLLI marker is a small (3.2 mm) seed that is implanted in the breast up to 30 days prior to the operation. At the time of surgery, the MOLLI wand detects the seed and visualizes its location on a tablet – helping surgeons locate and remove the area.

This is one of many innovations that the breast surgical oncology group is implementing in treating hundreds of patients a year through the Princess Margaret Cancer Centre and UHN Sprott Department of Surgery.

Tulin Cil, MD, Gattuso Chair in Breast Surgical Oncology

Commercialization at the Princess Margaret

Princess Margaret Scientists Secure \$60M USD Investment for Start-up Company

In 2021, Drs. Scott Bratman and Daniel de Carvalho successfully launched their start-up company “Adela” (formerly DNAMx) which will use cfMeDip liquid biopsies for the early detection of cancer. Securing a significant \$60M USD investment from five major investing partners, Adela will use cutting-edge technology that combines DNA methylation screening with machine-learning algorithms to diagnose a variety of cancer types from a blood sample. This innovative liquid biopsy technique will be able to detect cancers with unprecedented precision and rapidity, revolutionizing cancer diagnosis, treatment and response monitoring. The technology also has the potential to transform the way other complex human diseases, such as autoimmune conditions, are detected and managed.



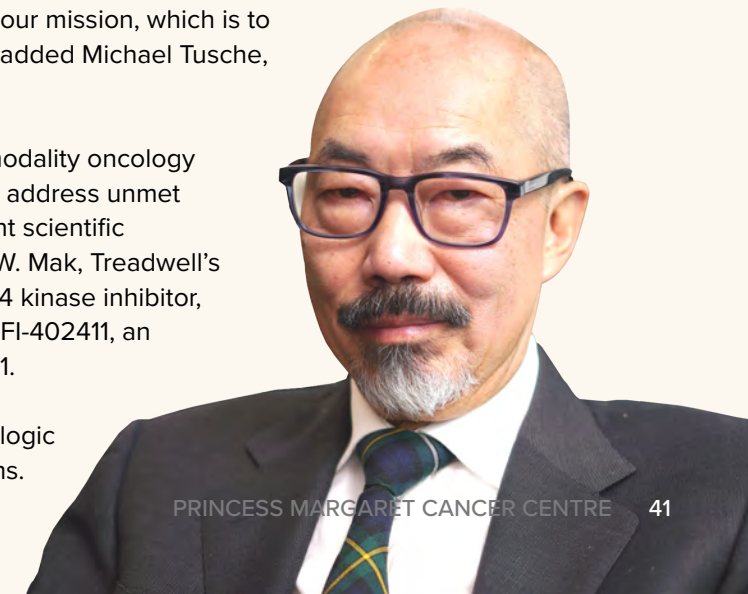
Treadwell Therapeutics Closes \$91M in Financing

UHN and Princess Margaret start up, Treadwell Therapeutics, achieved a major milestone investment of \$91 million in Series B financing in 2021. This will allow Treadwell to further advance its cancer therapeutics pipeline developed at the Princess Margaret Campbell Family Research Institute to help patients with hard-to-treat illnesses.

“Our team is very excited to announce the closing of this transformative Series B financing, and are very grateful to our investors, both old and new, for their belief, commitment and support of our goal to build a globally impactful Biotechnology organization,” said Shane Burgess, Chairman and co-CEO of Treadwell. “The funding will allow us to further the development of our product candidates, as well as to continue building out our organization in all functions with the talent necessary to support our mission, which is to translate novel scientific insights into hope for patients in need,” added Michael Tusche, PhD, co-CEO of Treadwell.

Treadwell Therapeutics is a science driven, clinical-stage multi-modality oncology company developing first-in-class and best-in-class medicines to address unmet needs in patients with cancer. Founded by a cadre of pre-eminent scientific luminaries, including Princess Margaret Senior Scientist, Dr. Tak W. Mak, Treadwell’s robust, internally developed pipeline includes a first-in-class PLK4 kinase inhibitor, CFI-400945 and a best-in-class TTK inhibitor, CFI-402257, and CFI-402411, an oral immunomodulatory kinase inhibitor with activity toward HPK1.

Treadwell also has a robust pre-clinical pipeline with multiple biologic and next generation TCR based autologous cell therapy programs.



Building Capacity in Cancer Through Education

Providing informal caregivers with the skills to support patients at home.

Inspiring our youth to become the next generation of cancer care professionals.

Development of leadership capabilities within the cancer centre and across our global networks.



Dr. Meredith Giuliani
MBBS, MEd, PhD, FRCPC



Dr. Janet Papadakos
PhD, MEd



Tina Papadakos
MA(Ed)

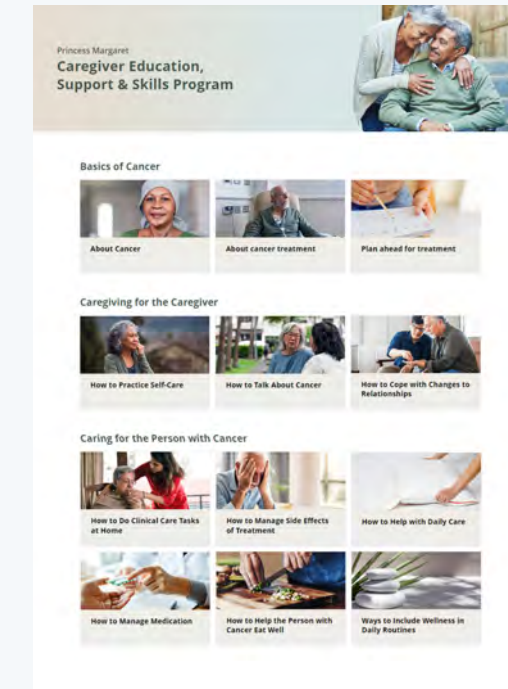
The Young Leaders in Cancer Program Leading from where you Stand

The Young Leaders (YL) program is designed to empower members to lead from where they stand, driving the innovation and change needed to accelerate cancer care. Program membership is offered to early career staff leaders at the Princess Margaret, and includes opportunities to develop leadership competencies through education, networking, and mentoring. In 2021, the Princess Margaret Young Leaders in Cancer Program included 120 members.

- In 2021, an exclusive mentorship program with Princess Margaret Elders was launched. This program paired 26 YL members with 13 Elders. Early findings indicate that mentees feel supported, encouraged to self-reflect and develop clear, actionable goals.
- A YL member was given representation on Cancer Program Executive Committee. YL member Dr. David Langelier partnered to launch the YL Cancer Experience Challenge, soliciting proposals for YL projects to improve the cancer experience. Drs. Christian Schulz-Quach, Gilla Shapiro, and Jennifer Croke were awarded \$20,000 for their proposal to improve support for 2SLGBTQIA+ stakeholders.

Essential Education for Essential Care Partners

Launching the Princess Margaret Caregiver Support & Skills Program



Informal caregivers are central members of the cancer care team and are important for delivering high quality cancer care. The significance of caregivers became a headline issue during the COVID-19 pandemic, which led to their re-classification as “essential care partners.” Yet, despite the vital role that caregivers play, they had received little to no direct support or training.

The Princess Margaret Caregiver Support & Skills Program is a digital education program that aims to address a wide range of caregiver needs that include psychological supports, cancer knowledge, decision-making skills, and technical skills such as, food safety or medication management.

Launched in November 2021, the program acts as the foundation for the Princess Margaret Caregiver Support Program, an extensive initiative designed to equip patients and caregivers to be prepared and proactive in cancer care, thereby improving their experience as they navigate the cancer journey.

pmcaregiver.ca

From High School to Healthcare

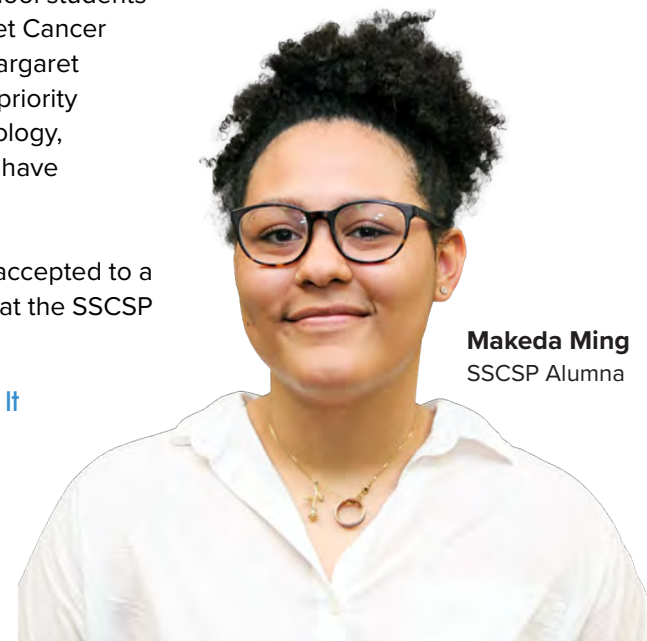
Celebrating 5 Years of the Summer Student Clinician Scientist Program

Since 2017, the Summer Student Clinician Scientist Program (SSCSP) has aimed to cultivate career interest in cancer amongst high school students to bolster the cancer workforce. Funded by the Princess Margaret Cancer Foundation, the SSCSP is a partnership between the Princess Margaret and the Toronto District School Board. Teachers from schools in priority neighbourhoods nominate students who excel in science, technology, engineering and math for paid placements of which 38 students have participated to date.

100% of SSCSP alumni respondents have applied or have been accepted to a post-secondary science or healthcare program and all agreed that the SSCSP influenced their education and career goals.

“I loved the program. I took away so much from it... It was a great start to my path towards my career.”

SSCSP Participant



Makeda Ming
SSCSP Alumna

Developing Leaders for Global Cancer Control

In 2021, the Global Oncology Leadership Development (GOLD) program successfully shifted to an entirely virtual format with surprising benefits, including greater access to experts from around the world to join interactive sessions and fireside chats. The 2020-2021 cohort included 36 participants with training experience from 22 different countries, 10 additional countries were represented by the 2019-2020 cohort bringing the GOLD program’s global reach to 32 countries so far.

The GOLD program recognized that while oncology fellows receive extensive clinical training, there are limited structured opportunities for developing the skills required to excel in leadership positions needed for global cancer control. GOLD includes faculty from around the world and aims to prepare clinical fellows and provide the opportunities to develop as leaders in cancer care, thus establishing a global community of cancer care leaders connected through mentorships and a robust alumni network. GOLD graduates join the Princess Margaret Alumni Network to maintain connections and to foster the collaborative spirit that is needed to meet unprecedented challenges facing the cancer system.

Chaya Shwaartz, MD
GOLD Alumna





Celebrating Our People

“Our immense gratitude to our staff, volunteers, and learners, many from across the globe, who have persevered through two extremely challenging years with determination, compassion and courage. Your unflagging optimism and dedication make a significant difference to patients, their families, and our colleagues.”

A. Keith Stewart, MB, ChB
VP Cancer, UHN & Director,
Princess Margaret Cancer Centre

Aaron D. Schimmer, MD, PhD
Research Director, Princess
Margaret Cancer Centre



Clinical Programs



Dr. Amit M. Oza

DEPARTMENT OF MEDICAL ONCOLOGY
HEAD OF MEDICAL ONCOLOGY AND HEMATOLOGY

The Division of Medical Oncology and Hematology (DMOH) is dedicated to providing the most advanced therapeutic approaches to patients diagnosed with solid or hematologic malignancies, and is home to internationally recognized programs in genomic medicine, immunotherapy, myeloproliferative neoplasm, and hematology programs. DMOH is also home to the largest leukemia, stem cell transplant, and malignant hematology programs in Canada. We have contributed to seminal practice changing studies and biologic knowledge through our early phase clinical trials programs. Together, we endeavour to be global leaders in improving outcomes, and advancing care through continuous innovation and research.



Dr. Fei-Fei Liu

RADIATION MEDICINE PROGRAM
CHIEF OF RADIATION MEDICINE PROGRAM

The internationally acclaimed Radiation Medicine Program (RMP) at the Princess Margaret Cancer Centre is the largest radiation treatment centre in Canada, and amongst the top three such programs in the world. Our program is committed to patient-centred care with a focus on quality, safety, and knowledge dissemination. We improve the quality of radiation therapy worldwide through innovative research, education and cutting-edge radiation practices and technologies. RMP has the world's largest MR Program with two MR-guided radiation therapy facilities onsite (a state-of-the-art Magnetic Resonance-guided Radiation Therapy (MRgRT) facility and an MR-Linac), and the world's largest deployment of the RayStation Treatment Planning System. Our program also includes 16 linear accelerators, a Leksell Gamma Knife Perfexion unit, a Gamma Knife Icon unit, an orthovoltage unit, a PET CT, an MRI 3T simulator, and three CT simulators. In addition, RMP offers a Pediatric Radiation Therapy Program, which delivers specialized pediatric radiation for children with cancer.



Dr. Girish Kulkarni

DEPARTMENT OF SURGICAL ONCOLOGY
CHIEF OF SURGICAL ONCOLOGY

Surgical Oncology is committed to providing access to leading edge surgical techniques and technologies that improve patient outcomes, with a focus on delivering comprehensive, compassionate care for our patients. With 76 dedicated cancer surgeons, our multidisciplinary surgical teams offer services for central nervous system, breast, skin and melanoma, sarcoma, urology, head and neck, thoracic, hepatobiliary, colorectal, gynecologic, ocular neoplasms, oncological reconstruction, endocrine, and dental oncology. We have an internationally recognized interdisciplinary program dedicated to clinical and translational research, innovation, and education. We endeavour to meet the increasing demand for the surgical management of cancer, and we are committed to providing the best practice of care through collaboration, outreach, and partnership with our community.



Dr. Camilla Zimmermann

DEPARTMENT OF SUPPORTIVE CARE
HEAD OF SUPPORTIVE CARE

The Department of Supportive Care (DSC) is dedicated to relieving physical and psychological distress and improving quality of life for patients and families throughout the trajectory of illness. The DSC provides a holistic and comprehensive team-based approach to care for patients and their families. Our Department is comprised of Psychosocial Oncology, Palliative Care, and Cancer Rehabilitation and Survivorship. The DSC has become an internationally recognized program for research and education, developing and testing novel approaches to treatment and training learners from all over the world. In addition, we have gained international acclaim for novel programs such as the Adolescent and Young Adult Program, Geriatric Oncology Program, Caregiver Clinic, Sexual & Gender Diversity in Cancer Care Working Group, as well as the Global Institute of Psychosocial, Palliative and End-of-Life Care (GIPPEC).



Anet Julius

COLLABORATIVE ACADEMIC PRACTICE
DIRECTOR OF PROFESSIONAL PRACTICE

The Collaborative Academic Practice (CAP) portfolio is rooted in the strength and contribution that each profession brings to the whole. CAP leads the synthesis of practice, education and research within the individual professions and collectively integrates practice amongst the health professions. The CAP portfolio consists of 15 health professions comprised of more than 650 people, including: Nursing, Medical Imaging Technology, Respiratory Therapy, Occupational Therapy, Physiotherapy, Radiation Therapy, Speech Language Pathology, Social Work, Spiritual Care, Clinical Nutrition, Therapeutic Recreation, Kinesiology, Anesthesia, Psychology, and Chiroprody.

Princess Margaret Leadership

Princess Margaret Executive Committee

A. Keith Stewart (Chair) – VP Cancer, UHN & Director, Princess Margaret Cancer Centre

Aaron Schimmer – Director of Research

Fei-Fei Liu – Head, Radiation Medicine Program

Amit Oza – Head, Medical Oncology and Hematology

Girish Kulkarni – Head, Surgical Oncology

Camilla Zimmermann – Head, Supportive Care

Anet Julius – Director of Professional Practice, Oncology, Blood Disorder Programs and Supportive Care

Taymaa May – Surgical Oncology Lead, Toronto Central South

Lesley Moody – Clinical Director, Solid Tumour, Ambulatory and Supportive Care

Colleen Dickie – Director of Operations, Radiation Medicine Program

Lisa Tinker – Clinical Director, Malignant Hematology and Blood Disorders Program

Monika Krzyzanowska – Medical Lead, Quality

Meena Merali – Director, Transformation and Strategic Partnerships

Meredith Giuliani – Medical Director, Cancer Education

Gary Rodin – Director, Cancer Experience

Zsolt Hering – Director, Finance

Richard Ward – TGH, Blood Disorders & UHN Ambulatory Strategy

David Langelier – Jr. Faculty Member, Toronto Rehab/Survivorship

Miyo Yamashita – President & CEO, The Princess Margaret Cancer Foundation

Clinical Practice Committee

CLINICAL PRACTICE AND OPERATIONS

Monika Krzyzanowska (Chair) – Medical Lead & Chair, Cancer Quality Program

Lesley Moody (Co-Chair) – Clinical Director, Solid Tumour, Ambulatory and Supportive Care

Lisa Tinker – Clinical Director, Malignant Hematology and Blood Disorders

Colleen Dickie – Director of Operations, Radiation Medicine Program

Anet Julius – Director of Professional Practice, Oncology, Blood Disorder Programs and Supportive Care

A. Keith Stewart – VP Cancer, UHN & Director, Princess Margaret Cancer Centre

Nazek Abdelmutti – Senior Manager, Clinical Strategy and Innovation

Iqra Ashfaq – Implementation Lead, Clinical Strategy and Innovation

UHN PROGRAM LEADS

Ilan Weinreb – Division Head, Anatomic Pathology, Laboratory Medicine & Pathobiology

Ur Metser – Site Director of Medical Imaging

MEDICAL LEADS

Anne Koch – Breast Site Lead

David Goldstein – Endocrine Site Lead

Vikas Gupta – Leukemia Site Lead

Stephanie Lheureux – Gynecology Site Lead

Anca Prisca – Lymphoma/Myeloma Site Lead

John Waldron – Head and Neck Site Lead

Antonio Finelli – Genitourinary Site Lead

Sami Chadi – Lower Gastrointestinal Site Lead

Laura Dawson – Upper Gastrointestinal Site Lead

Marc De Perrot – Lung Site Lead

Peter Ferguson – Sarcoma Site Lead

Normand Laperriere – Central Nervous System & Ocular Site Lead

Marcus Butler – Skin/Melanoma Site Lead

Breffni Hannon – Supportive Care Site Lead

Jonas Mattsson – Director of Allogeneic Transplant Program

Neesha Dhani – DMOH Medical Director of Inpatient Care

Alejandro Berlin – Medical Director of Cancer Digital Intelligence



The Princess Margaret Cancer Foundation

The Princess Margaret Cancer Foundation is the largest and leading cancer charitable foundation in Canada, responsible for 37 per cent of total charitable dollars raised for cancer in this country. As its new President and Chief Executive Officer, I am honoured to serve such a successful, mission-driven organization that supports one of the top 5 cancer research centres in the world, the Princess Margaret Cancer Centre.

Cancer is the leading cause of death in Canada and is responsible for 28.2% of all deaths. But we are making progress. Since the cancer mortality rate peaked in 1988, it has decreased 37% in men and 22% in women. In the 1970s, less than a quarter of people with cancer survived, but over the last forty years, survival has more than doubled – today 64% will survive.

At The Princess Margaret Cancer Foundation, our vision is to Conquer Cancer In Our Lifetime. With the help of our donors, event participants and lottery ticket buyers, we can picture a world where closer to three-quarters of Canadians will survive cancer over the next 20 years and a growing number of Canadians will be able to live with cancer as a chronic disease, in much the same way people are able to live with diabetes or heart disease. We will achieve this vision by funding game-changing research, attracting and training the next generation of cancer “superstars” and delivering world-leading care.

There is something very special about The Princess Margaret – a spirit of hopefulness that inspires every member of our Foundation team to do the best job we can each and every day. We believe that if the next level of impact in cancer is going to happen anywhere, it will happen at The Princess Margaret, where we serve one of the most diverse patient populations in the world.

The Princess Margaret story is one of diversity and belonging, as well as ongoing optimism, innovation, and resilience, especially when one considers that we are entering the third year of a global pandemic. Our Foundation continues to thrive because our supporters believe in the promise of a better tomorrow based on the dedication, determination and expertise of our partners at The Princess Margaret.

As we look to the future, I am personally grateful for The Princess Margaret, as I know many others are too. Together, we can do so much, not just for Princess Margaret patients, but for cancer patients across Canada and around the world.

With deepest gratitude,



Miyo Yamashita, BA, MA, PhD
President & CEO,
The Princess Margaret Cancer Foundation

Opening ceremonies,
Road Hockey to Conquer Cancer



Together, We Can Do So Much

A Patient-Focused \$50 Million Makeover

This year, the generosity of the Foundation’s donors enabled the first phase of the Princess Margaret Cancer Centre’s Space Transformation to become a reality. This \$50 million project recognizes that the physical environment is integral to the patient and family experience. The renewed space infuses comfort and confidence into every part of the patient’s cancer journey and reflects the world-leading care provided at The Princess Margaret. With a warm and healing atmosphere, the transformed space includes the addition of a state-of-the-art Outpatient Pharmacy, the Patient and Family Library, new clinics, and comfortable lounges with charging stations. It also includes gallery spaces, with artwork on loan from the AGO welcoming people entering from Murray Street.

A \$10 Million Gift Has Us Soaring

We’re thrilled to have a corporate partner who shares The Princess Margaret’s vision to Conquer Cancer In Our Lifetime. Bold research is underway thanks to the support of Agnico Eagle’s \$10 million corporate gift, which launched two Agnico Eagle Grand Challenge grants that support high-impact areas of research: early detection and less-toxic treatments. Their investment has already yielded high returns, with the funding of **Dr. Kathy Han** and her team, winners of the Intercept Cancer Grand Challenge, whose project aims to advance early detection of the human papillomavirus (HPV) and to treat more patients with virus-related head and neck, cervical, and anal cancers. **Drs. Amit Oza, Johnathan Irish, Brian Wilson** and their team, winners of the Beyond Chemotherapy Grand Challenge, aim to replace imprecise cytotoxic therapies with nanotechnology-based, image-guided, targeted tumour destruction.



Princess Margaret by the Numbers: 2021



CLINICAL CARE

256,935

Clinic & Virtual Visits

- 76,232** Radiation Therapy Visits
- 53,433** Systemic Therapy & Transfusion Visits
- 5,967** Surgical Procedures



RESEARCH

\$218M

Research Funding

- 213** New Clinical Research Studies
- 1,262** Peer-Reviewed Publications
- 2,914** Patients Entered in Clinical Trials
- 7,581** Patients in Clinical Research Studies
- 22.9%** Patients Treated in Clinical Trials

EDUCATION

119,087

Global Reach via Virtual Educational Resources

- 410** Research Trainees
- 128** Health Profession Students
- 84** Residents
- 118** Nursing Students
- 119** Fellows





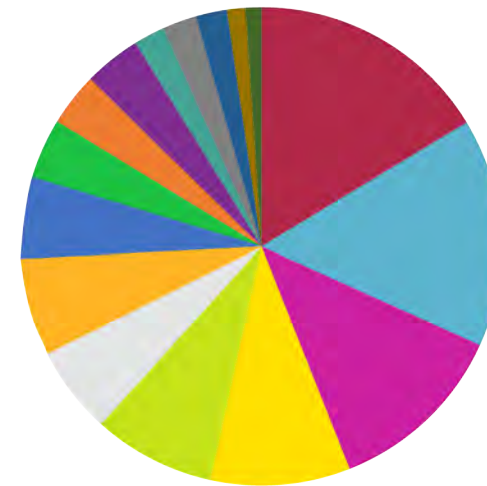
OUR PEOPLE

- 196** Oncologists
- 637** Health Professions Staff
- 575** Nurses
- 1,193** Researchers / Research Staff

3,272 Total



PATIENT VOLUMES



New Malignant Diagnosis*
by Disease Group Chart

- 4,166** Non-Neoplastic
- 1,710** Benign
- 11,792** Malignant*

12,791

New Patients

- Digestive System
- Genitourinary
- Breast
- Thorax
- Gynecologic
- Leukemia and Other Hematology
- Head and Neck
- Lymphomas
- Endocrine Glands
- Musculoskeletal
- Skin, not Melanoma
- Melanoma Skin
- Myeloma
- Central Nervous System
- Ophthalmologic
- Other

SIZE

207

Beds Across UHN

304,600 SQ. FT.

Research Space

PUBLICATIONS & CITATIONS

From 2016 to 2020

> 26.7% of Articles are Highly-cited (top 10%)

- 5,646** Published Papers
- 178,142** Citations



Acknowledgements

We would like to thank the Princess Margaret Annual Report Committee, in particular the incredible support from our team from Cancer Education who produced a wonderful result. **Vince Addario, Christian Cote, Adam Latuns, Nicole Liscio, Maria Madden, Meena Merali, Tina Papadakos, and Sharon Wright.**

Photo: Max Tanenbaum Garden at the Princess Margaret Cancer Centre

