PRINCESS MARGARET CANCER CENTRE

Annual Report 2024

UHN Princess Margaret Cancer Centre

“To each and every member at the Princess Margaret, your unwavering commitment to patient well-being and your compassionate approach has left an indelible mark on my heart.”

Survivor

See cover story on page 70.

Message from the President and the UHN Board of Trustees

We would like to express our sincere thanks to every member of the team at the Princess Margaret Cancer Centre for their relentless commitment to improve treatment and outcomes for cancer patients and for their continued pursuit of cancer research and discovery. This has been another year of transformation and growth at University Health Network. Despite major advancements in treatment and prevention, cancer remains the leading cause of death in Canada.

As Canada’s leading cancer centre, we recognize our intrinsic need to grow to meet this demand and to accelerate cancer research and education. The acquisition of 522 University Avenue, a 15-storey tower located in the heart of Toronto’s Discovery District, was a critical step to advance our plan to expand cancer care and increase our research and education capacity.

At UHN, we are defined by our quality of care and the transformational experiences provided to the patients that we are privileged to serve. We congratulate the Princess Margaret on achieving the highest level from Accreditation Canada with a score of 100 percent. Building a legacy in support of UHN’s tripartite mission of care, research, and education does not happen overnight nor does it happen in isolation. We are extremely grateful to our funders, generous donors, and The Princess Margaret Cancer Foundation who are instrumental in supporting the Princess Margaret Cancer Centre.

The new Carry The Fire campaign will enable us to advance even more groundbreaking research and innovation, empower the world’s most advanced practitioners, and train those who represent the future of health care. On behalf of the UHN Board of Trustees and TeamUHN members across the entire organization, we applaud your ongoing efforts in building a lasting legacy in cancer care.

With gratitude and appreciation,

Dr. Kevin Smith
President & CEO
University Health Network

Mr. Dean A. Connor
Chair
UHN Board of Trustees

Leadership Message

For decades, the Princess Margaret Cancer Centre has been at the forefront of transformative cancer care. Through world-first discoveries, cutting-edge clinical trials, and an enduring commitment to innovation in care, we are redefining every step of the cancer journey from early detection to advanced treatments and long-term survivorship.

This year marked the 40th anniversary of the discovery of the T-cell receptor – a landmark achievement that revolutionized our understanding of the immune system and laid the foundation for modern immunotherapies. In our 2024 Annual Report, we highlight how our scientists and researchers continue to build on that legacy.

Our clinical trials programs continue to shape global standards of care and contribute to new cancer therapies. Our Radiation Medicine Program remains the largest single-site program of its kind in North America, delivering world-class patient care.

We were proud to achieve Exemplary Standing – the highest level of accreditation awarded by Accreditation Canada - with 100% of required organizational practices met. Princess Margaret was also recognized as the top cancer hospital in Canada by Newsweek.

This year we saw the reopening of the Princess Margaret Lodge following years of extensive renovations, once again offering comfortable, affordable accommodation and support for out-of-town patients. To further expand our capacity, we launched the Stem Cell 2 construction project, which will enhance care for patients with complex malignant hematology conditions.

Beyond our walls, we continue to strengthen our Princess Margaret Cancer Care Network and our Global Cancer Program, adding new partners to foster collaborations. We also established a landmark agreement with the University of Waterloo to use artificial intelligence, machine learning, and quantum technology to revolutionize cancer research, care, and education.

Looking to the future, we are preparing for the next era of cancer care with the purchase of 522 University Avenue. The Cancer Futures building will help manage the growing demand for cancer treatment and set new standards of care to improve patient outcomes. As we continue to push the boundaries of what is possible, our legacy inspires us to always move forward.

We extend our sincere thanks to our donors and The Princess Margaret Cancer Foundation for their unwavering support, and to our exceptional staff, nurses, volunteers, and learners – the heart of everything we do.

Keith Stewart, MB ChB, MBA
Director, Princess Margaret Cancer Centre
Vice President, Cancer,
Laboratory Medicine and Pathology,
University Health Network

Research Message

In 2024, our award-winning researchers continued to pursue groundbreaking studies and advance our understanding of cancer in unprecedented ways.

We were honoured to receive over $298 million in external funding, a testament to the trust placed in our work. This funding and our collective efforts have resulted in the creation of 1,261 peer-reviewed publications in high-impact journals such as *Nature Medicine*, *The Lancet*, *Science Advances*, *PNAS (Proceedings of the National Academy of Sciences)*, *New England Journal of Medicine*, and many more.

Dr. Marianne Koritzinsky found a way to disrupt cancer cells' metabolism by removing an enzyme called cysteamine dioxygenase.

Dr. Gregory Schwartz developed a new computational tool called "AnnoSpat" that can specify cell types and quantify cell organizations, making it easier to decipher cancer tissue images.

A new international collaboration with MD Anderson Cancer Center will allow us to push the boundaries of cancer research and treatment.

New research led by **Dr. Vuk Stambolic** shed light on the role of protein family Nek10 in cancer development and progression.

A new discovery led by **Dr. Gil Privé** has uncovered the link between cellular signaling pathways and protein degradation ubiquitin system that impact a wide range of disorders including cancers.

Many of our researchers received significant awards and recognitions including:

- **Dr. Lillian Siu**, President-Elect of the American Association of Cancer Research (AACR), the first Canadian to hold this role; David Karnofsky Memorial Award from the American Society for Clinical Oncology; named Fellow of the AACR, Class of 2024
- **Dr. Michael Glogauer**, National Dental Research Award from the Canadian Association for Dental Research along with the Association of Canadian Faculties of Dentistry
- **Dr. Cheryl Arrowsmith**, Dr. Chew Wei Memorial Prize in Cancer Research from the University of British Columbia
- **Dr. Mathieu Lupien**, Elected Fellow of the Royal Society of Canada
- **Dr. Trevor Pugh**, Elected Member of the Royal Society of Canada College of New Scholars, Artists and Scientists
- **Drs. Bradly Wouters**, **Jonathan Irish** and **Masoom Haider**, Fellows of the Canadian Academy of Health Sciences
- **Dr. Stephanie Xie**, NextGen Star named by AACR

Finally, I want to extend my gratitude to our scientists, research staff, and trainees for always moving forward, pushing the boundaries of their imagination and working towards a better world.

Aaron Schimmer, MD, PhD
Research Director, Senior Scientist,
Princess Margaret Cancer Centre

Courage and Determination

For many, their 30s is a decade filled with career milestones, starting or raising a family, pursuit of passion projects, and more. Natasha Luckhardt eagerly embraced this new chapter of life, but soon, an unforeseen circumstance was about to change everything.

At 32, Natasha was diagnosed with endometrial cancer.

Natasha Luckhardt shared her story as part of The Princess Margaret Cancer Foundation's 2024 Doves of Hope campaign.

Prior to her diagnosis, Natasha had created a documentary highlighting the stories of workers impacted by cancer after exposure to toxic chemicals. While she was moved by every person's story, one sentiment lingered in her mind: "When you have cancer, you never really feel like you're free." At the time, Natasha had no idea how relevant those words would be to her own life. After completing the documentary, she had a routine endometriosis removal surgery. The doctor called a month later, and broke the difficult and unexpected news - despite not having any risk factors, Natasha had endometrial cancer.

Natasha and her husband, Simon, felt a whirlwind of uncertainty and fear around the news and its potential to put their dream of parenthood in jeopardy. "Being diagnosed with cancer changed everything," Natasha says. "One day we were talking about how many children we wanted to have, and the next, looking into the possibility of sacrificing, or preserving, my fertility."

The **RECAP** (**R**isk of **E**ndometrial **CA**ncer **P**rogram) team at the Princess Margaret created a treatment plan focused on targeting the cancer from within. They proposed inserting an IUD with high levels of progesterone, followed by biopsies and MRIs every three months to monitor progress.

"I can't speak highly enough of the exceptional medical care and compassion that I received," Natasha says of Drs. Sarah Ferguson, Shima Deljoomanesh and their team.

After Natasha's cancer had cleared, she began IVF treatment. Amidst uncertainty about the future of parenthood, they received heartwarming news that stirred an overwhelming sense of happiness - Natasha was pregnant.

Nine months later, Natasha and Simon welcomed their healthy son. Because of the story behind his arrival into the world, they named him Tadhg, which means "storyteller" in Gaelic.

"As I look into the eyes of my beautiful son, I am reminded that no matter what the future holds, we will always face it with courage and determination," says Natasha.

> **"Ten years ago, managing both endometrial cancer and fertility would not have been possible. Learning that I was pregnant felt like pure joy and is a testament to the advancements in health care."**

Natasha Luckhardt
Survivor

(L to R), **Keith Stewart**, MB ChB, Director, Princess Margaret Cancer Centre (PM) and VP Cancer, UHN; **John Cho**, MD, PhD, Radiation Oncologist, PM; and Toronto Police Chief **Myron Demkiw.**

A Cancer-Free Milestone After Five Years

"I am immensely grateful for my care team at the Princess Margaret. The only way to describe the care I received is world class," said Toronto Police Chief Myron Demkiw, who celebrated his successful cancer treatment and marked the milestone by ringing the bell at the Princess Margaret.

First diagnosed with cancer of the right vocal chord in the summer of 2019, Chief Demkiw acknowledged that cancer had a "tremendous impact" on his family and friends, noting his treatment was "intense."

> **You truly are remarkable people doing extraordinary things.**
>
> **Myron Demkiw**
> Toronto Police Chief

"The research professionals I met are incredible, and the work they do to find a cure and improve treatment is inspiring…saving lives and helping people through some of the most challenging circumstances."

It was an emotional moment for Chief Demkiw, his wife, and Dr. John Cho, the Princess Margaret radiation oncologist who treated him for five years and declared the magic words: "Congratulations. You are all clear."

"I received the best possible care," Chief Demkiw said. "Every single person including nurses, doctors, technicians, and volunteers were exceptional."

Accelerating Breast Cancer Diagnosis

For Vina Mohabir, waiting for a diagnosis was just as hard as receiving one. At just 27, she was shocked to learn she had Stage 3C breast cancer.

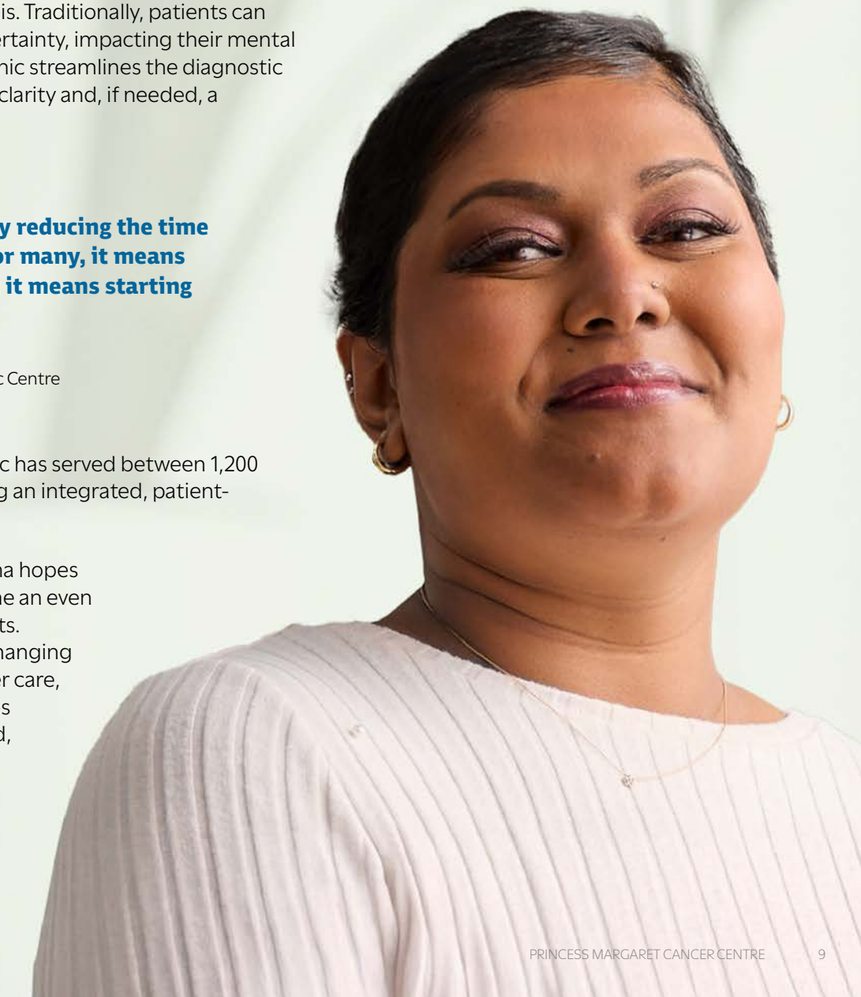
After noticing unusual bleeding, Vina was referred to Princess Margaret's Gattuso Rapid Diagnostic Centre – a clinic designed to help people find out quickly if their breast abnormality is cancerous. Once there, she received an ultrasound, mammogram, biopsy, preliminary diagnosis, and even began planning her surgery all in the same visit. Within two days of her referral, she was seen, and two weeks later, her treatment began.

The Gattuso Rapid Diagnostic Centre, created and led by Dr. David McCready, was designed to address the psychological burden of waiting for a breast cancer diagnosis. Traditionally, patients can face weeks or even months of uncertainty, impacting their mental health, work, and family life. The clinic streamlines the diagnostic process, ensuring patients receive clarity and, if needed, a treatment plan in record time.

> **Our goal is to relieve anxiety by reducing the time from symptom to diagnosis. For many, it means less time worrying. For others, it means starting treatment sooner.**
>
> **David McCready**, MD, MSc
> Medical Director, Gattuso Rapid Diagnostic Centre
> Princess Margaret Cancer Centre

Since its inception in 2009, the clinic has served between 1,200 and 1,400 patients annually, offering an integrated, patient-centered approach to care.

Now as a breast cancer survivor, Vina hopes her experience will help her become an even stronger advocate for other patients. Her journey underscores the life-changing impact of rapid, coordinated cancer care, ensuring that every patient receives the answers and support they need, when they need it most.



CANCER FUTURES

Cancer Futures

An Opportunity for Transformation

In late 2024, UHN was excited to announce the purchase of the National Life Building located at 522 University Avenue. Designed by renowned Toronto architect, John C. Parkin, the National Life Building is heralded as an excellent example of Monumental Modernist architecture.

An opportunity for transformation, the Princess Margaret intends to focus on re-imagining cancer prevention and early detection, while streamlining care delivery and enhancing the patient experience. As we grow our clinical spaces in the main Princess Margaret sites, our new building will allow space for cutting-edge research, augmented cancer intelligence, the workforce of the future, and our growth as a global hub for cancer care and education.

About John C. Parkin

Toronto architect, John C. Parkin, was one of Canada's most important modernist architects who contributed many significant buildings in Toronto. He was appointed to the Order of Canada for his services to architecture, urban planning, industrial design and the arts, and received the Gold Medal from the Royal Architectural Institute of Canada (RAIC).

"The Cancer Futures building will help us grow and set new standards of care that will improve outcomes for oncology patients worldwide."

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

THE FUTURE OF BREAST CANCER TREATMENT

Michael Reedijk, MD, PhD, Senior Scientist, Princess Margaret Cancer Centre.

Enhanced Treatments for Triple Negative Breast Cancer

Dr. Michael Reedijk, Senior Scientist and Surgeon at the Princess Margaret, is developing more effective treatments for triple-negative breast cancer (TNBC). Unlike other types of breast cancer, TNBC is a particularly aggressive form of the disease, due to a lack of cancer cell receptors that most targeted therapies rely on to have therapeutic effects.

“Triple-negative breast cancer accounts for 15-20% of breast cancer cases but has double the mortality rate of the other types, underscoring the tremendous need for targeted therapies,” says Dr. Reedijk. “We aim to uncover drivers and specific characteristics of triple-negative breast cancer.”

TNBC tumours are often heavily infiltrated by immune cells, a unique trait compared to other types of breast cancers. The presence of specific immune cells can impact patient survival: high levels of tumour-associated macrophages are linked to worse outcomes, while increased cytotoxic T cells are associated with better survival. However, the mechanisms that regulate this are poorly understood.

Dr. Reedijk’s lab previously found that TNBC tumour cells can evade immune surveillance by secreting IL1β β molecules, which attract microphages to the tumour microenvironment, and reduce cytotoxic T cells to suppress the immune response towards the cancer cells.

Dr. Reedijk’s team recently found two ways to reboot immunity and improve the tumour’s response to immunotherapy:

1. By blocking caspase-1, a protein involved in producing IL1β, the team reduced the levels of tumour-associated macrophages and increased the tumour’s response to immunotherapy. The study used preclinical models and the results led to the initiation of a phase 1 clinical trial in November, 2024.

2. Another way to improve TNBC’s immunotherapy response, uncovered by the team, was through the regulation of the Notch signaling pathway - a key developmental pathway that is abnormal in TNBC. Cytokines, including IL1β, rely on this pathway for secretion. By inhibiting the Notch pathway and cytokine secretion, the team was able to improve the immune response with an increased level of cytotoxic T cells resulting in a reduction of tumour metastasis observed in preclinical models.

The Breaking Dawn of Modern Cancer Immunotherapies

Immunology and Cancer Care

The 40th Anniversary T-Cell Receptor Symposium celebrated the groundbreaking discovery of T-cell receptor (TCR) in 1984 that paved the way for revolutionary immunotherapies, sparked innovative treatments,and continues to offer new hope to cancer patients around the world.

The seminal work of Dr. Tak Mak from the Princess Margaret and Dr. Mark Davis of Stanford University identified the genes encoding TCR for humans and mice, respectively.

Globally-renowned T cell researchers and immunotherapy pioneers met in Toronto to celebrate the 40th anniversary of the T-cell receptor discovery. (Standing, L to R), **Jen Gommerman**, PhD, **Juan Carlos (JC) Zúñiga-Pflücker**, PhD, **Michel Sadelain**, MD, PhD, **Philip Greenberg**, MD, **Keith Stewart**, MB ChB, **Naoto Hirano**, PhD, MD, **Yusuke Yanagi**, MD, **Carl June**, MD; (Sitting, L to R), **Pamela Ohashi**, PhD, **James Allison**, PhD, **Tak Mak**, PhD, **Mark Davis**, PhD, **Hans-Georg Rammensee**, PhD, **Yueh-hsiu Chien**, PhD.

"This discovery enabled us to understand how T cells develop, how autoimmune diseases develop and the fundamental principles underlying T-cell activation," said Dr. Pamela Ohashi, Senior Scientist at the Princess Margaret. "It had a profound impact on cancer treatment, as tumour-specific T-cell receptors now guide immune responses to target and destroy tumours through various innovative approaches."

Looking back on the health transformation driven by the TCR discovery, Dr. Mak paid tribute to the many collaborators and teams he has worked with over the years.

"We look forward to future advances in the basic science of TCRs from our lab and from others, and also to bolster the case and the tools for the therapeutic use of this amazing receptor," said Dr. Mak.

Dr. Naoto Hirano, the Chair of the Immuno-Oncology Program at the Princess Margaret, was inspired to pursue a research career in Toronto thanks to Dr. Mak and his remarkable legacy.

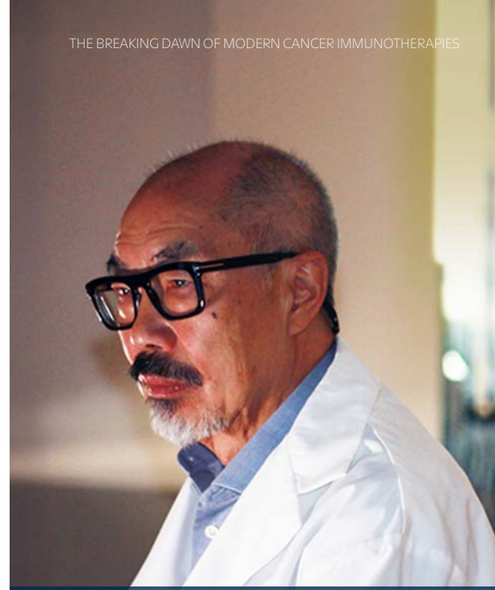
"The molecular techniques Dr. Mak introduced sparked my interest in using immunology to tackle medical challenges," recalled Dr. Hirano. "His contributions continue to influence my research in T cell-based immunotherapies, not only in cancer but extending beyond it."

By engineering TCRs to recognize tumour-specific surface proteins, T cells can be directed to target and kill cancer cells. This type of therapy, known as Chimeric Antigen Receptor T-cell (CAR T) therapy, was developed through the efforts of many immunologists and cell therapists, including Drs. Michel Sadelain, Columbia University, and Carl June, University of Pennsylvania.

At the symposium, Nobel Laureate, Dr. James Allison noted the dramatic improvement in cancer patient survival thanks to immunotherapy. "Today, 50 percent of metastatic melanoma patients treated with immunotherapy are in remission nine years out and counting," he said. "In 2011, it was just seven months."

As research in this field continues to advance, the potential to harness the power of the immune system to fight cancer more effectively is a beacon of hope for patients and their families.

Forty years on, TCR remains a foundational discovery in cancer science.



Tak Mak, PhD, a Senior Scientist at Princess Margaret Cancer Centre and member of the Canadian Medical Hall of Fame, is best known for his team's human T-cell receptor discovery.

"We are humbled and grateful that our contributions to the discovery of the TCR and its biology in health and disease have had such a significant impact."

Tak Mak, PhD
Senior Scientist
Princess Margaret Cancer Centre

A NEW LEASE ON LIFE

A New Lease on Life

CAR T-cell Therapy at the Princess Margaret

Allan Pearson spent most of his days hiking, wind surfing, or chopping wood at his home in British Columbia. He never imagined getting a life-threatening diagnosis and was shocked when told he had advanced-stage aggressive large B cell lymphoma. “The irony was I had just turned 75,” Allan says. “I remember asking myself: what else can I achieve before I turn 80?”

The cancer had spread all over Allan’s kidneys causing renal failure. Following two unsuccessful rounds of chemotherapy, his oncologist referred him to the Princess Margaret, in hopes of qualifying for CAR T-cell therapy. “I was quite full of cancer,” Allan recalls. “Everyone was shocked by how advanced it was.”

“CAR-T patients are those with high-risk disease that isn’t curable by anything else and a single treatment can take about a month,” says Dr. Michael Crump, a hematologist at the Princess Margaret.

CAR T-cell therapy can make the difference between a patient having a potentially curable disease, or an end-of-life condition. For the procedure to work, a patient needs to have functioning kidneys to dispel the chemotherapy drugs given prior to the CAR T-cell infusion in the body. Allan needed to have two stents put in his kidneys leading into his bladder to open blockages the cancer was causing.

For a month, Allan’s immune system was low and he was closely monitored by his care team at the Princess Margaret. The first set of scans to assess the response to CAR-T treatment showed significant improvement. Dr. Crump was optimistic that further improvement would follow three to six months later.

Allan has since returned to Vancouver where he is being watched by his doctors. The T cells can work for up to two years and are expected to keep fighting in his body. He continues to be active and is slowly regaining his strength, while spending valuable time with his wife and son.

Allan and his wife, Genisea, credit their success story to Dr. Crump and the staff at the Princess Margaret who helped them along the way. “It was unbelievable how good the team was,” Allan adds. “They were beyond five stars.”

The Princess Margaret has been performing CAR-T treatments on patients for five years, curing between 30 to 40 percent of their disease. Ontario Health has recently expanded its eligibility criteria for CAR T-cell therapy as a treatment for patients suffering from lymphoma and lymphoblastic leukemia inside or outside of the province.

> **“There’s still more to do in my life, this procedure absolutely saved me.”**
>
> **Allan Pearson**
> Survivor

Breaking Barriers

Improving Communication with Transparent Masks

Princess Margaret is committed to accessibility and ensuring all patients can communicate effectively with their care teams. To support patients who rely on lip-reading, Health Canada-approved transparent masks are now available in all outpatient clinics and inpatient units.

This is an important step forward as many patients depend on lip-reading, facial expressions, visual cues, and optimal hearing conditions to communicate effectively. However, the widespread mandatory masking introduced during the COVID-19 pandemic made communication more difficult for individuals who rely on these critical ways to receive information.

To address this challenge, the Cancer Care Quality & Innovation team distributed transparent masks and posters for patient awareness. Patients can request that their healthcare providers wear a transparent mask instead of an opaque one during check-in or at any point throughout their care journey.

By removing barriers to communication, all patients can receive compassionate, patient-centered care.

Decades of Dedication

Recognizing Our Volunteers

For over forty years, Pat Jeffreys has been a dedicated volunteer in the Genitourinary Clinic (GU) at the Princess Margaret, beginning at the former Sherbourne Street site. When Pat joined as a volunteer, she was a member of the former "Princess Margaret Ladies Auxiliary" where she was Vice President for several terms.

"As a volunteer, I have always enjoyed meeting with patients," said Pat, and over the years, patients in treatment looked forward to seeing her familiar face. She brought warmth and consistency when it was needed most. "It has been very rewarding," she reflected.

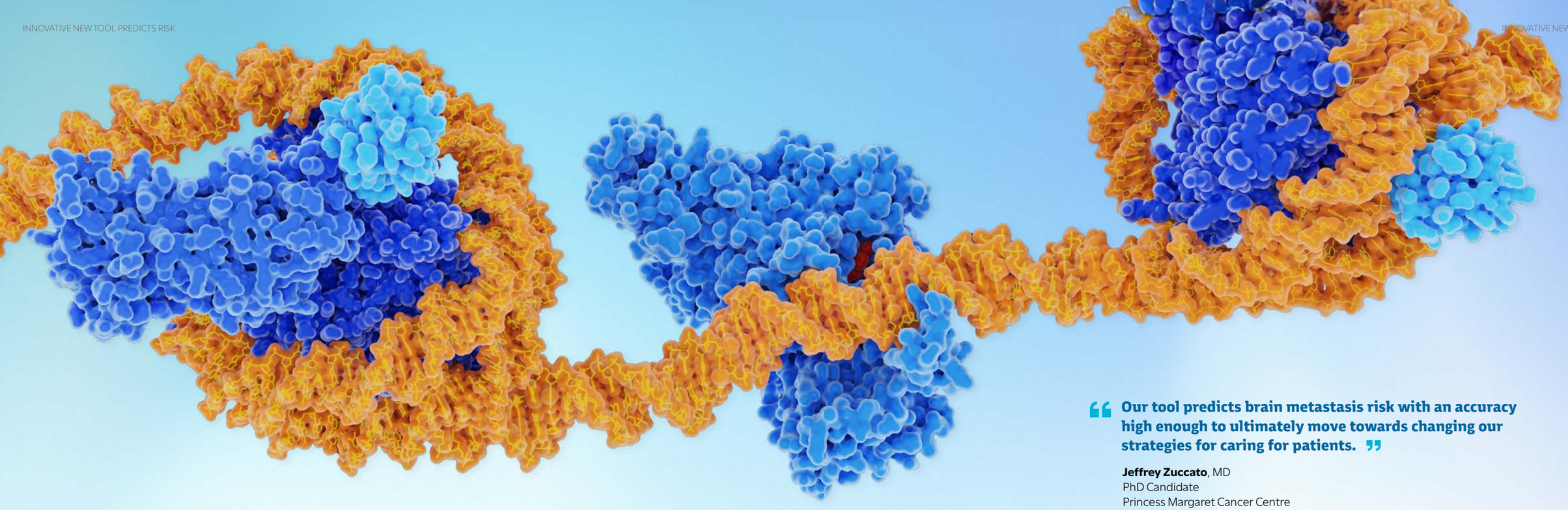
"I appreciated the opportunity to support the GU clinic with Dr. Padraig Warde and the team, which I found very fulfilling," she said. Pat speaks fondly of her many years with Dr. Warde, and continues to volunteer with his former fellows, now leaders, at the Princess Margaret.

At UHN, the Volunteer Resources program has nearly 500 people who work in a wide range of volunteer roles. Every volunteer makes a key contribution toward the positive experience of patients and supporting staff.

"I volunteer because our patients depend on seeing us regularly. I never miss a day."

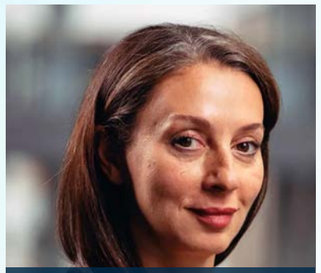
Pat Jeffreys
Volunteer
Princess Margaret Cancer Centre

INNOVATIVE NEW TOOL PREDICTS RISK



Innovative New Tool Predicts Risk

Lung Cancer and the Brain



Gelareh Zadeh, MD, PhD
Senior Scientist
Princess Margaret Cancer Centre

Brain metastases, cancer that has spread to the brain, are common and account for the majority of brain tumours. They significantly impact patient outcomes, with an average survival of 10 to 16 months.

Predicting brain metastasis remains a major challenge. By the time brain metastases are detected, patients are already experiencing headaches or other neurological symptoms. There has been an important need for molecular biomarkers of brain metastasis to improve outcomes for these patients. While DNA methylation findings are used to diagnose and assess the onset of other cancers, they had not yet been comprehensively evaluated for predicting brain metastases in patients with cancer.

In a new study published in *Nature Medicine*, researchers led by Dr. Gelareh Zadeh, senior study author and Senior Scientist at the Princess Margaret, examined modifications to DNA, specifically DNA methylation alterations, to predict risk of developing brain metastases from lung adenocarcinoma (LUAD). This will offer new approaches to managing patients and improving health outcomes.

Dr. Zadeh's team developed and validated a computational model to predict patients' brain metastasis risk within five years of their cancer diagnosis, based on the DNA methylation signals in their tumour. They found that their model was considerably more accurate than the stage-based approach currently used in clinical practice.

"Our tool predicts brain metastasis risk with an accuracy high enough to ultimately move towards changing our strategies for caring for patients," says Dr. Jeffrey Zuccato, a PhD candidate in Dr. Zadeh's lab.

The researchers also identified DNA methylation alterations in patient plasma and built an additional set of models that can be used for reliable, non-invasive liquid biopsy of brain metastases using blood samples. They are now moving towards translating this work into clinical practice and developing approaches to use these tools in clinical decision-making to improve patient outcomes.

"Understanding an individual patient's risk has the potential to transform care by enabling us to tailor our management approach to improve patient survival and quality of life," explains Dr. Zadeh.

"This exciting development gives us the opportunity to predict cancer spread, and attempt to intervene early to prevent it, putting us in a better position to manage this challenging condition," adds Dr. Vikas Patil, Scientific Associate at the Princess Margaret and co-senior author of the study.

Our tool predicts brain metastasis risk with an accuracy high enough to ultimately move towards changing our strategies for caring for patients.

Jeffrey Zuccato, MD
PhD Candidate
Princess Margaret Cancer Centre

Jeffrey Zuccato, MD
PhD Candidate
Princess Margaret Cancer Centre

Vikas Patil, PhD
Scientific Associate
Princess Margaret Cancer Centre

Photodynamic Therapy

Treating Eye Tumours with Light

Melanoma is the most lethal form of skin cancer. It originates from melanocytes – cells that produce melanin. Although melanoma occurs predominantly in the skin, it is also the most prevalent eye malignancy in adults.

Researchers at the Princess Margaret, along with collaborators at Universidade de São Paulo, have found a method to treat pigmented melanoma using very short pulses of laser light to activate photosensitive compounds in photodynamic therapy (PDT).

"PDT is a cancer treatment that works by using light to kill cancer cells," says Dr. Layla Pires, Scientific Associate at the Princess Margaret and first author of the study. "However, it has not been very effective against pigmented melanoma because the pigment in the cancer cells, called melanin, absorbs too much of the light, making it less effective."

"Although these eye tumours are relatively small, they are very difficult to treat," says Dr. Cristina Kurachi, professor at the Universidade de São Paulo in Brazil and co-senior author of the study. "Current treatments involve radiation therapy or the removal of the eye. Additionally, 50 percent of patients develop metastatic disease, which leads to an average survival of only 13.4 months from time of metastatic diagnosis."

The research team sought a way to better use light therapy for the treatment of eye tumours. They investigated an alternative type of PDT using extremely short pulses of light. The ability of the light to kill the melanoma cells and the destruction of tumours were assessed using various molecular markers of cell death and staining of tumour tissue.

Results showed that tumours were eradicated in these preclinical models. It was also a highly localized effect that prevented damage to surrounding normal eye tissues.

"We found that when very short pulses of light are used, melanin can efficiently absorb two light photons simultaneously within a given laser pulse," says Dr. Brian Wilson, Senior Scientist at the Princess Margaret and co-senior author of the study. "This absorbed energy is then transferred to the photosensitizer molecules to kill the cancer cells. Instead of blocking the light, melanin now acts as a 'go-between' molecule that activates the therapeutic reaction."

This study is the first to demonstrate the use of light therapy for treating pigmented tumours in the eye. It also uncovers a novel mechanism in which the light energy is first absorbed by the melanin pigment in the tumour cells as an intermediate step toward activating the photosensitizing molecules.

"We hope this new, minimally invasive treatment will translate into the clinic, and patients with eye tumours will benefit from its potential to eradicate the primary tumour and prevent metastatic spread," says Dr. Pires.

Keith Stewart, MB ChB, (center) Vice President, Cancer, UHN and Director, Princess Margaret Cancer Centre gets a tour of the new eLearning course with **Brendan Lyver** (front) and (standing, L to R), **Gilla Shapiro**, PhD, **Margo Kennedy**, MSW, and **Christian Schulz-Quach**, MD, MSc, MA.

New eLearning Course Empowers More Inclusive Care

The Sexual and Gender Diversity in Cancer Care (SGDc) Program at the Princess Margaret launched an eLearning course to help health care providers gain experience in four key topics of inclusion: pronouns, sexual orientation, gender identity, and relationship diversity.

The interactive video game uses avatars that allow learners to take on various roles and interact with patients who have different identities and life stories. The modules offer experience creating an inclusive environment for care providers in any medical program but are particularly vital for those working with people who have cancer.

"In cancer care, we have a really significant mortality gap between the general population and some of our patients who identify as part of the queer community and may experience barriers in the cancer care system," says Dr. Christian Schulz-Quach, SGDc Program Director.

The eLearning course was two years in development. Members of the SGDc Program collaborated with software developers, design students at OCAD University, and patients who offered ideas and feedback based on their own lived experience.

"There's no grade or score," says Brendan Lyver, a section editor with the SGDc Program. "It's about letting people practice, and practice getting it wrong, so they can become more inclusive in their communication with patients."

In addition to the new eLearning course from the SGDc Program at the Princess Margaret, another tool for health care providers has been developed. BOW provides a quick snapshot of key identity factors and an example of how they relate to cancer care.

> **"That's why this is so important. It's not just about fun. It's about using gamification to change mortality rates and close the gap."**
>
> **Christian Schulz-Quach**, MD, MSc, MA
> Program Director and Co-Founder, SGDc
> Princess Margaret Cancer Centre

Collaborative Palliative Care Launches at Toronto Rehab

Teams from Toronto Rehab, Toronto Western Hospital, and the Princess Margaret introduced a collaborative six-month pilot project to provide rehab and palliative care services to patients at Toronto Rehab-University Centre (TR-UC). This initiative was launched when staff raised concerns regarding challenges in the provision of holistic care to patients with advanced disease.

Princess Margaret's Palliative Care staff provided expert training for TR-UC staff, and select units will now routinely integrate supportive and palliative care consultation for patients living with advanced cancer.

The successful six-month pilot project, led by Toronto Western Palliative Care site lead Dr. Warren Lewin, anticipates data collection to follow, and possible expansion to other sites.

Warren Lewin, MD, (third from right), the Palliative Care Site Lead at Toronto Western Hospital, with the team on 8 South at Toronto Rehab, University Centre.

Science is a Team Sport

Collaboration and Innovation to Fight Against Cancer

The Research Institute at the Princess Margaret Cancer Centre hosted 13 scientists from The University of Texas MD Anderson Cancer Center for the Allan Slaight Breakthrough Forum. This symposium, designed to foster collaborations between researchers from both institutions, featured talks in three streams: novel therapeutics, metabolism and hypoxia, and tumour ecosystem.

A highlight was the announcement of the inaugural Princess Margaret Cancer Centre and MD Anderson Cancer Center Joint Seed Grant recipients. The funding, made possible by the Allan Slaight Breakthrough Fund and MD Anderson, aims to promote cross-institutional collaborations in both discovery and translational research.

> **“We look forward to the groundbreaking advancements that will emerge from these collaborations, pushing the boundaries of cancer research and treatment. We can accomplish more by working together.”**
>
> **Aaron Schimmer**, MD, PhD
> Research Director
> Princess Margaret Cancer Centre

The Allan Slaight Breakthrough Forum brought together scientists from the Princess Margaret Cancer Centre and The University of Texas MD Anderson Cancer Center to foster research collaborations between the two institutions.

Accelerating Bold Ideas into Tangible Solutions

Philanthropy Fuels Global Innovation

Research and clinical investigators have long been at the forefront of global discoveries. However, securing funding for early, preclinical research can often be challenging due to the high risks and high costs of this phase. In addition, gaps in funding can delay the scaling of new technologies.

The creation of the Accelerator Fund, a philanthropic fund that exclusively supports commercialization efforts at UHN, will help promising innovations reach patients faster and maximize their commercial potential.

Support for start-up companies such as Adela, co-founded by Princess Margaret Senior Scientists Drs. Daniel De Carvalho and Scott Bratman, can help advance cutting-edge cancer detection technology and change the trajectory of cancer care.

From these and other commercial successes, UHN Commercialization has helped generate nearly $111 million in licensing revenue since 2018, with a substantial portion reinvested back into cancer research.

Dr. Bradly Wouters, Executive Vice President of Science and Research at UHN, emphasized the strategic focus on fostering collaboration and accelerating the commercialization of research. “Through the Accelerator Fund, we support early-stage projects, providing funding, mentorship, and access to essential resources,” says Dr. Wouters. “This support enables researchers and innovators to de-risk their discoveries, attract investment, and ultimately, bring life-changing therapies to those in need.”

The Accelerator Fund is supported by The Princess Margaret Cancer Foundation and the UHN Foundation.

A Ten-Second Identification of Pediatric Brain Tumours with Picosecond InfraRed Laser

Arash Zarrine-Afsar, PhD
Senior Scientist
Princess Margaret Cancer Centre

Researchers at the Princess Margaret have developed a method to distinguish between different types of pediatric brain cancers. These important findings could assist surgeons in determining the most suitable and personalized treatment strategies for pediatric neurosurgery.

"Existing intraoperative pathology consultation techniques do not rapidly provide molecular information to inform surgical decisions in real time," says Dr. Arash Zarrine-Afsar, Senior Scientist at the Princess Margaret and senior author of the study, whose lab developed a technique called Picosecond InfraRed Laser mass spectrometry (PIRL-MS), which can analyze the molecular composition of a small amount of tissue. PIRL-MS consists of a handheld probe that uses a laser beam to vaporize tumour tissue, and the mass spectrometry analysis can then identify the sample's components in up to 10 seconds.

"In this study, we examined the utility of PIRL-MS as a rapid method for differentiating major pediatric brain cancer types of medulloblastoma, pilocytic astrocytoma, and ependymoma," says Dr. Michael Woolman, former Doctoral Student and first author of the study. "We analyzed the lipid (fat molecule) profile of patient tissue from previous surgeries and identified a range of molecular markers involved in tumour classification."

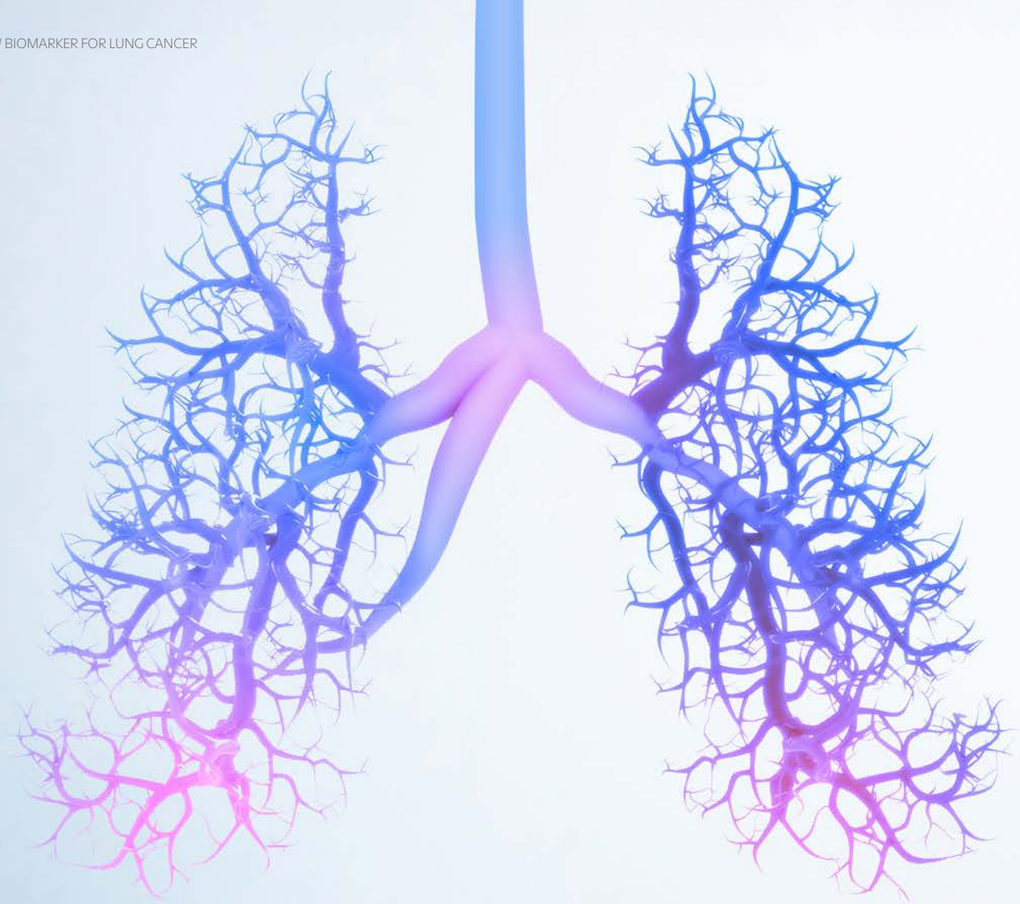
The researchers found that PIRL-MS could identify specific molecular features unique to each cancer type and proposed a protocol for a 10-second classification of seven types of pediatric brain cancers. The team further identified situations where PIRL-MS analysis could influence the aggressiveness of surgical intervention that could benefit the patient's overall survival.

Michael Woolman, PhD
Research Associate
Princess Margaret Cancer Centre

> **"These findings have significant implications for pediatric neurosurgery and treatment decisions and could ultimately improve patient outcomes."**
>
> **Arash Zarrine-Afsar**, PhD
> Senior Scientist
> Princess Margaret Cancer Centre

"Without the support of Drs. James Rutka and Michael D. Taylor at the Arthur and Sonia Labatt Brain Tumour Research Centre (BTRC) and The Hospital for Sick Children, this study would not have been possible," says Dr. Zarrine-Afsar.

PIRL-MS technology led to the founding of Point Surgical Inc. as a joint venture between UHN, Unity Health Toronto, and Light Matter Interaction Inc.



A Potent New Biomarker for Lung Cancer

A study from the Princess Margaret has identified a new potential biomarker and therapeutic target for lung and other cancers.

This biomarker is the enzyme Nek10, a member of a family of proteins implicated in aspects of DNA damage response, cell division, and signaling.

“Previously, our lab found important roles for Nek10 in regulating the cell cycle in response to UV damage,” says Dr. Vuk Stambolic, Senior Scientist at the Princess Margaret and senior author of the study. “Additionally, we noticed high levels of this protein in the lung and found that in lung cancer cells, it plays a key role in modulating p53, an important protein for protecting genome integrity.”

A POTENT NEW BIOMARKER FOR LUNG CANCER

While it is known that cancer cells frequently exhibit disruptions in cell cycle regulation and cell death, the specific involvement of Nek10 in these processes remains predominantly unexplored.

“We found that a deletion of Nek10 in lung cancer cells showed a significant elevation in levels of a protein called β-catenin,” says Dr. Previn Dutt, Scientific Associate at the Princess Margaret and first author of the study.

“This observation was particularly noteworthy due to the critical role of β-catenin in cell fate determination, regulating the stem cell population, and cell adhesion during development and tissue maintenance. Dysregulation of β-catenin can contribute to the development of diseases and has been shown to impact a variety of cancers.”

The team then sought to understand Nek10’s role in regulating β-catenin levels as this could provide valuable knowledge on how these proteins interact to impact cancer cells. Through a series of molecular experiments conducted on lung cancer cells, the study demonstrated that Nek10 directly modifies β-catenin at a specific site, and that this modification – called phosphorylation – prevents its abnormal accumulation.

“Subsequent results indicated that the absence of Nek10’s phosphorylation of β-catenin hinders its interactions with proteins responsible for its degradation,” adds Dr. Dutt.

Researchers further elucidated the impact of Nek10 loss in cells and tissues through assays aimed at assessing their tumour-forming ability. They found that when Nek10 was deleted, there was a reduced ability of cells to grow, invade and spread.

“Targeting the Nek10 pathway presents a potential avenue for regulating β-catenin levels and thereby influencing cancer progression,” concludes Dr. Stambolic.“ This discovery is significant because it identifies a previously unrecognized function for Nek10, suggesting its potential as both a prognostic marker and therapeutic target in various cancers, including lung cancer.”

Previn Dutt, PhD
Scientific Associate
Princess Margaret Cancer Centre

Vuk Stambolic, PhD
Senior Scientist
Princess Margaret Cancer Centre

Revolutionizing Cancer Care with AI and Quantum Technology

The Princess Margaret and the University of Waterloo have formally launched a unique partnership to use artificial intelligence (AI), machine learning, and quantum technology to revolutionize cancer research, clinical care, and education. This partnership aligns with our commitment to leverage the power of digital intelligence and data science to revolutionize human decision-making in cancer care.

"By sharing our expertise, technology, and resources, we are contributing to a future of better health outcomes for Canadians by maximizing efficiencies and unlocking new potential," said Dr. Vivek Goel, President and Vice-Chancellor of the University of Waterloo.

> **Together, we are setting the stage for the next era in cancer care.**

Keith Stewart, MB ChB
Vice President, Cancer, UHN
Director, Princess Margaret Cancer Centre

(L to R), **Keith Stewart**, MB ChB, Vice President, Cancer, UHN and Director, Princess Margaret Cancer Centre and **Vivek Goel**, CM, MD, President and Vice-Chancellor, University of Waterloo sign the memorandum of understanding.

"Our joint efforts will accelerate advancements in cancer treatment, diagnostics, and patient care, pushing the boundaries of what is possible in medical technology," he added.

The partnership initiative will facilitate educational opportunities for students, providers, and trainees, and build upon existing co-op programs, including offering stimulus grants to foster future collaborations.

As part of this shared vision, the Princess Margaret's Cancer Digital Intelligence program has partnered with Dr. Scott Hopkins from the University of Waterloo and Dr. Arash Zarrine-Afsar from UHN to develop an intraoperative diagnostic AI tool. This cutting-edge tool will provide rapid cancer classification, transforming surgical decision-making to improve patient outcomes.

The University of Waterloo's partnership with the Princess Margaret aims to enhance cancer research and tackle urgent health care challenges.

Using Machine Learning to Predict Tumour Response

For patients with metastatic cancer, individual tumours have different sensitivities to cancer therapies, which can lead to poor treatment outcomes. To improve precision oncology, scientists at the Princess Margaret introduced a new computational method to predict tumour-specific responses to treatments in patients experiencing metastasis.

The team, led by Drs. Benjamin Haibe-Kains and David Shultz at the Princess Margaret, used radiomic biomarkers from medical images like CT scans to predict tumour-specific treatment resistance in patients with leiomyosarcoma, a cancer that arises from smooth muscle cells that has spread to multiple sites.

"We looked at 202 lung metastases in 80 patients, examining both pre-treatment and treatment follow-up CT scans. We then applied advanced machine learning techniques to develop a model to predict the progression of each metastasis," says Caryn Geady, a PhD student in Dr. Haibe-Kains' lab.

For each lesion, or tumour area, that was analyzed, the relative change in lesion volume from the baseline was evaluated as a treatment response metric. Researchers then tested their models for their ability to accurately predict tumour response. The model demonstrated a 4.5-fold increase in predictive capability, highlighting its potential to anticipate tumour-specific responses.

"This research shows that predicting individual tumour responses offers a novel strategy to manage metastasis," says Dr. Shultz.

> **It has the potential to guide selective targeting of treatment-resistant cells alongside systemic therapy.**

David Shultz, MD, PhD
Clinician Investigator
Princess Margaret Cancer Centre

Advancing Radiation Medicine

The Princess Margaret Radiation Medicine Program became the first in Canada and one of the first in the world to acquire HyperSight imaging technology on a C-arm linear accelerator. HyperSight imaging provides diagnostic-quality CT images to monitor changes in the tumour during treatment. Together with the implementation of Ethos on-line adaptive technology, this cutting-edge technology positions us to be a world leader in precise, personalized, and adaptive cancer care for patients.

“It is exciting to work with such a talented team to give state-of-the-art care to cancer patients in Ontario, and through our research and education, to positively impact cancer patients around the world.”

David Kirsch, MD, PhD
Head, Radiation Medicine Program
Princess Margaret Cancer Centre

Ontario Health Update

Advancements in Cancer Screening

In October 2024, the Ontario Breast Screening Program lowered the starting age for screening from age 50 to 40. Through this change, Ontarians aged 40 and older can make an informed decision regarding breast cancer screening through discussion with their primary care provider or a Health 811 resource. To ensure teams across the Toronto Central region were ready for this change, the Toronto Central Screening team hosted a number of consultation sessions and advocated for additional funding from Ontario Health. Since implementation, the number of screening mammograms has increased provincially by approximately 10,000 screens each month; a figure that is equivalent to a 15% increase. With downstream impacts expected on imaging services in particular over the next two years, program volumes and progress will be closely monitored.

Local Advancements in Smoking Cessation

Access to smoking cessation supports represents a key quality metric for cancer care due to the association between smoking and poorer patient outcomes and the development of secondary cancers. Regional Smoking Cessation Lead, Dr. Lawson Eng, and team piloted a nurse-led clinic within the Princess Margaret to facilitate patient referrals to smoking cessation supports. Monica Ku, RN, ran a virtual half-day clinic over six months to connect with patients who had screened positive for tobacco use and had not yet been referred for support. Of the patients contacted, one in five accepted a referral resulting in over 100 additional patients being connected with cessation supports. Due to the success of this initiative, the clinic has now been extended and runs as part of routine care.

Suman Dhanju, MBA, PMP
Director, Regional Cancer Program
Princess Margaret Cancer Centre

Honouring Indigenous Peoples

Toronto Central Regional Indigenous Cancer Program

In 2024, the Toronto Central Regional Indigenous Cancer Program (TCR-ICP) was invited to present "A Step Towards Honouring Indigenous Peoples' Rights to Spiritual Care Practices in Healthcare Settings" at the World Indigenous Cancer Conference in Naarm (Melbourne), Australia. This opportunity enabled the TCR-ICP to connect with and learn from Indigenous cancer researchers, clinicians, and advocates about the experiences of Indigenous peoples living with cancer across the globe.

A visit with the Aboriginal Health Team and tour of the Peter MacCallum Cancer Centre (Peter Mac) in Australia provided valuable insights into the unique spaces designed for treating young people with cancer. The visit highlighted the importance of Indigenous visibility and representation through Aboriginal artworks.

Leonard Benoit, Regional Indigenous Navigator, Toronto Central Regional Cancer Program.

Later in 2024, the Peter Mac Aboriginal Health Team visited Toronto, where they met with care site partners in the TCR and participated in the ICP's '3rd Annual Bundle Feast'.

The Bundle Feast ceremony signifies the inclusion of traditionally relevant medicines into cancer hospitals. This is an important step toward culturally appropriate care and reconciliation for indigenous peoples. The Peter Mac team joined 10 hospitals to continue to honour and support the ceremonial drums, which were gifted to each hospital from the ICP program.

With these collaborations, the TCR-ICP looks forward to continued growth and learning from partners across the world.

Pictured on the left: "In the wooden bowl are 'tobacco ties.' Tobacco is a sacred plant medicine used in prayer and ceremonial offerings. It is wrapped in a cloth, which is referred to as a tobacco tie or bundle. Various colours of cloth can be used for the ties. For this event, orange cloth is used to honour the healing journey of the Survivors, their families, and those who did not survive the violent trauma, loss, and grief resulting from the Canadian government-operated Residential Schools in partnership with the Anglican, Catholic, Methodist, and Presbyterian churches, among others who forcibly removed Indigenous children from their families and communities to Residential Schools from the 1870s – 1990s." **Joanna Vautour**, Regional Indigenous Cancer Lead

Representatives of the Princess Margaret Cancer Care Network at the 2024 Annual Partners Meeting: Grand River Hospital, Mackenzie Health, Newfoundland & Labrador Health Services, Oak Valley Health, Southlake Health, and William Osler Health System.

Princess Margaret Cancer Care Network

The Princess Margaret (PM) Cancer Care Network is a collective of local, regional, and national partners dedicated to enhancing access to clinical care, advancing clinical trials, and sharing educational resources. Through this shared commitment, our Network partners work together to address the unmet needs of patients, care partners, and healthcare providers.

In the fall, representatives from Network Partner sites gathered at the Princess Margaret to explore opportunities for collaboration. The meeting fostered meaningful discussions on enhancing patient care, driving innovation, and sharing best practices and resources. The session concluded with a strong sense of shared purpose, laying the foundation for future initiatives in the coming year.

In 2024, the PM Cancer Care Network continued to grow by welcoming its fifth Network Partner, the William Osler Health System in Brampton, Ontario.

To learn more about the PM Cancer Care Network visit **www.pmcancercarenetwork.ca**

Global Cancer Program

Expanding to Sub-Saharan Africa

The Princess Margaret Global Cancer Program works together with our international partners to improve health, achieve equity in cancer care, and train the next generation of cancer leaders.

Building upon the momentum of the 2023 Global Partners Consultation, working groups were established to enhance collaborations with global partners. Strengthening these partnerships through shared expertise and best practices has furthered our commitment to achieve equity in cancer care.

This year, the Global Cancer Program joined the African Research Group for Oncology (ARGO), a National Cancer Institute-recognized consortium in Nigeria, which aims to foster equitable partnerships and collaborative research studies in the area of global cancer. This relationship will develop collaborative research and education initiatives in sub-Saharan Africa.

In addition, five innovative projects received foundational funding to improve global access to high-quality cancer care totaling $100,000. This year's proposals focused on implementation science, health equity, and global collaborations exploring the psychosocial and palliative aspects of advanced cancer.

Global oncology partners from Brazil, Jordan, India, and Canada gathered to share findings and expertise at the UICC (Union for International Cancer Control) World Cancer Congress held in Geneva, Switzerland (pictured below).

(L to R), **Danielle Rodin**, MD, Director, Global Cancer Program, Princess Margaret Cancer Centre; Prof. **Victor Andrade**, CEO, AC Camargo Cancer Center; Prof. **Asem Mansour**, CEO, King Hussein Cancer Center; **Keith Stewart**, MB ChB, Director, Princess Margaret Cancer Centre; and Prof. **CS Pramesh**, Director, Tata Memorial Hospital.

A Home Away From Home

Princess Margaret Lodge Reopens to Welcome Cancer Patients

The Princess Margaret Cancer Centre Lodge is located in downtown Toronto, a short distance from the Princess Margaret.

As Canada's premier cancer centre, the Princess Margaret delivers life-saving care to patients from across the country. For patients traveling from out-of-town to receive treatment, the Princess Margaret Cancer Centre Lodge offers a "home away from home," providing comfortable and affordable accommodations.

Following four years of complex renovations, the newly transformed Lodge reopened in April 2024 with expanded space and upgraded amenities. Originally built in 1957, the Lodge now offers 120 beds, and an enhanced patient experience complete with Wi-Fi, new kitchenettes, and ensuite bathrooms.

Patients receive three catered meals and access to a free shuttle bus service to the cancer centre. The Lodge features a billiards and games room, wellness space for meditation, fitness facility, and a piano room and lounge. It fosters a sense of connection, healing, and community among patients. Many residents come to the Lodge alone but find support and companionship with others going through similar experiences.

The Princess Margaret Lodge transformation was supported by our philanthropic community and The Princess Margaret Cancer Foundation.

Colleen Dickie, MSc, Director of Operations, Radiation Medicine Program, Princess Margaret Cancer Centre, at the Princess Margaret Lodge Reopening in April 2024.

"Ensuring people facing cancer feel supported throughout their entire journey is our top priority. The Lodge eases the burden of finding comfortable and affordable accommodations that they otherwise may not have been able to access."

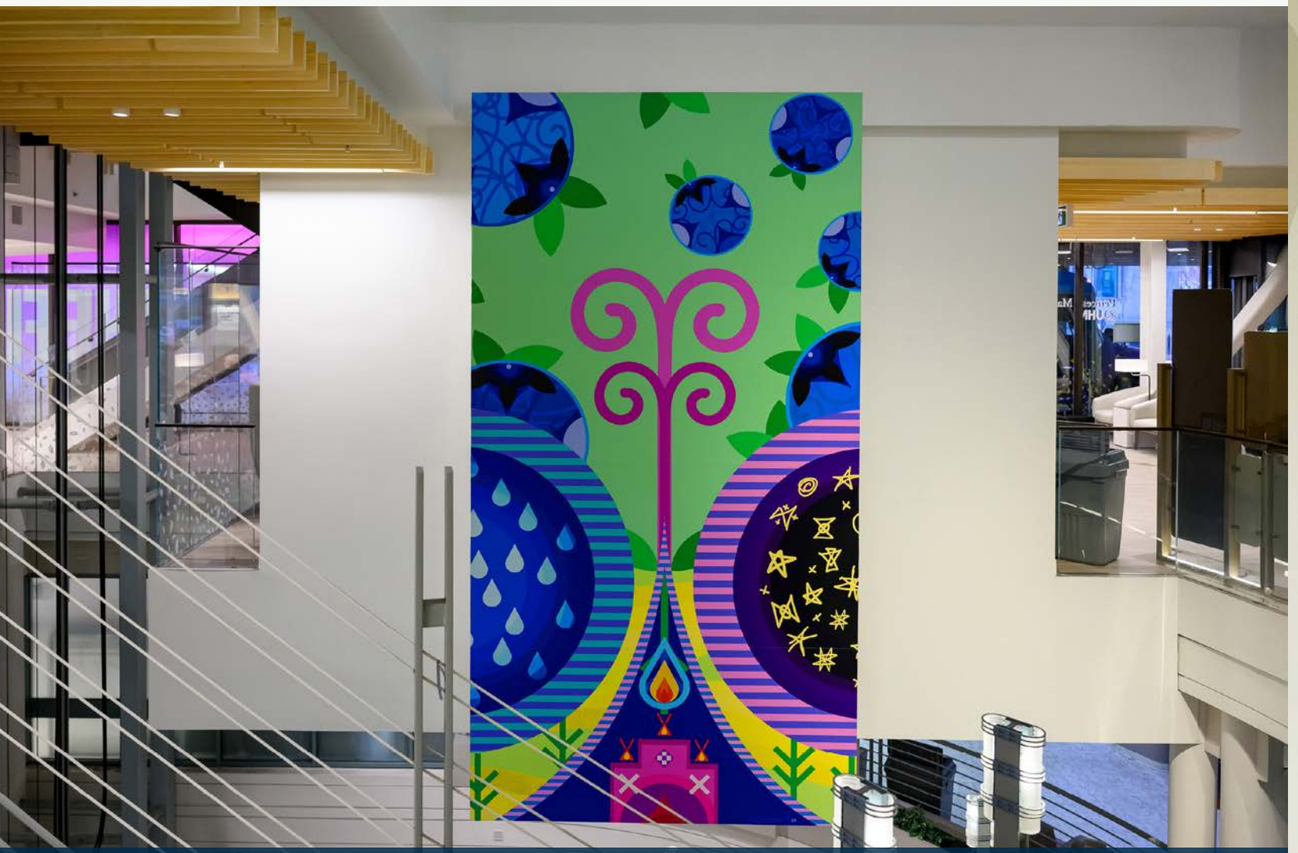
Miyo Yamashita, PhD
President & CEO
The Princess Margaret Cancer Foundation

The Princess Margaret Lodge reopened in April 2024 after four years of extensive renovation, infrastructure improvements, and amenity upgrades.

The Healing Power of Art

The Cancer and the Arts program at the Princess Margaret has added two new artworks aimed at providing comfort, hope, and healing.

The new art installation, titled *Blueberries with Nan*, is a vibrant and thoughtful piece by Mi'kmaq artist Jordan Bennett that incorporates elements from Mi'kmaq visual culture to highlight the growth and beauty that can result from change and hardship. Images of blueberries represent Bennett's fond memories of his grandmother and the time spent learning about their land while picking blueberries. At the end of each blueberry-picking season, the fields would be burned, teaching Bennett about the cycle of life, death, and renewal. For him, blueberries represent medicine, power, and hope. He envisions his artwork encouraging others to take a moment to breathe and embrace the optimism of new growth.



Jordan Bennett, Mi'kmaq/Canadian, *Blueberries with Nan*, 2023. The artwork is courtesy of Jordan Bennet and RxART Canada.

The Princess Margaret has also added a large-scale wall mural leading to the Magic Castle, a dedicated childcare space welcoming children, including pediatric patients, while their families attend appointments or visit loved ones.

The hand-painted garden by Toronto-based artist Pam Lostracco is titled *Healing Plants from Around the World* and features humble, flowering plants that are known in many communities for their healing medicinal properties and subtle beauty: Jacaranda, Yarrow, Echinacea, Evening Primrose, Lavender, Calendula, Chamomile, and Flax. The artist hopes that patients, staff, caregivers, and other visitors to the cancer centre will feel the plants' unique healing properties.

Pam Lostracco, Canadian, *Healing Plants from Around the World* (acrylic paint), 2024.

Joy
at Work


TRACH OR TREAT
O2
Halloween
I SMELL MUCOMYST
I GIVE PEOPLE THE ABCBIES


25
KM


CIHR
IRSC

Early Career Mentorship and Boldly Moving Forward

Melissa Iazzi knew she wanted to pursue a career in scientific research in rare terminal illnesses following her sister's diagnosis of Stage 4 Ewing sarcoma cancer. "I became fixated on the questions, 'Why don't we know more about this disease?' and 'Why are there not more treatment options available?'" Melissa recalls.

Melissa went on to receive her PhD in molecular science and realized she wanted a career in research. "I wanted to become a leader and help empower other women to pursue science," she says. Her fellowship supervisor, Dr. Brian Raught, a Senior Scientist in the Princess Margaret Department of Medical Biophysics, encouraged her to apply for the Princess Margaret's Biosciences Oncology Leadership Development (BOLD) Program.

"The BOLD program has helped me grow as a leader and a person by fostering the key components needed to be a supportive and impactful leader," Melissa says. She credits mentors, such as Drs. Natasha Leighl and Audrey Astori, who helped her shape her vision of a career as a scientist. "It is important to understand through other scientists what your career can look like one day."

As she moves forward, Melissa hopes to take on more leadership opportunities while advancing her research commitment to Ewing sarcoma.

> **"There's no challenge that is too big to conquer if you put your mind to it."**
>
> **Melissa Iazzi, PhD**
> Postdoctoral Researcher
> Princess Margaret Cancer Centre

The BOLD program was developed by the Princess Margaret Cancer Education Program and an advisory committee composed of postdoctoral researchers, senior scientists, and the Office of Research Trainees. Since 2022, 44 participants have completed the program, learning about self-awareness, communication, collaboration, and other leadership skills to become better mentors for the next generation of scientists.

Care for Caregivers

The Caregiver Education, Support, and Skills Program

Caregivers play a critical role in the cancer care team, offering both emotional and practical support. However, the demands of caregiving can lead to significant stress and burnout, which can make their engagement in educational programs difficult. Recognizing these barriers, the Princess Margaret Cancer Education Program aims to provide tailored support that addresses both the practical and emotional needs of caregivers.

The Caregiver Education, Support, and Skills Program is a pioneering initiative designed to empower caregivers of cancer patients. The goal is to prepare caregivers with the tools and knowledge needed to provide effective support to patients, while also promoting their own well-being. This comprehensive program offers over 300 resources covering essential topics such as cancer treatment knowledge, decision-making skills, self-care strategies, and clinical care techniques.

The Caregiver Program is currently undergoing a phase 2 evaluation to assess caregiver engagement and ensure the resources are meeting their needs. Given the emotional complexity of caregiving, the phase 2 evaluation will focus on understanding which aspects of the program are most effective in alleviating caregiver stress while enhancing their ability to support their loved ones. The findings will play a critical role in identifying the most effective ways to provide ongoing support to caregivers.

Lillian Siu, MD
Director, Phase 1 Program
Princess Margaret Cancer Centre

Dr. Lillian Siu

Revolutionizing Patient Care at the Dawn of the Molecular Era

Dr. Lillian Siu is the first Canadian to be named President-Elect of the American Association for Cancer Research, the largest cancer research organization in the world. “It is both daunting and exciting,” says Dr. Siu of this prestigious global role. “I’m excited to learn different aspects of cancer research and foster collaboration with other cancer centres.”

Dr. Siu was inspired to become an oncologist in her teenage years when her mother was diagnosed with breast cancer. Dr. Siu accompanied her mother to hospital visits including chemotherapy treatments at the Princess Margaret. “I felt very comfortable in the environment,” says Dr. Siu, who went on to a career in medicine. “I knew it was my calling to study cancer.”

Dr. Siu has dedicated her life’s work to early drug development. When she began her career, there were only chemotherapy drugs. “There was no immunotherapy or antibody drug conjugates. It was at the dawn of the molecular era that empowered drug discoveries.”

Since then, Dr. Siu has become a global leader in drug development and has seen life-changing advances that have revolutionized patient care. In addition to her active research in early-phase clinical trials, she has been leading genomics initiatives and immuno-oncology trials.

Most recently, Dr. Siu was the recipient of the 2024 David Karnofsky Memorial Award from The American Society of Clinical Oncology (ASCO). This prestigious recognition is a testament to her unparalleled dedication and contributions to the field of oncology and cancer research.

Advancing Precision Treatment of Brain Tumours with PET Imaging

In a first for Ontario, the Princess Margaret Cancer Centre has introduced positron emission tomography (PET) imaging to guide radiation treatment for meningiomas, a common type of benign brain tumour. Unlike MRI and CT scans, PET provides detailed images of the tumour and surrounding bone, allowing radiation oncologists to precisely target tumour cells.

Dr. Derek Tsang, a radiation oncologist at the Princess Margaret, notes that while PET scans have traditionally been used for chest, head-and-neck, abdominal, or neuroendocrine tumours, they have not been used for brain tumours.

“Small meningiomas, or meningiomas after surgery, are not well seen on CTs or MRIs, which are much easier to access in terms of diagnostic tools,” Dr. Tsang says. “We could be missing some of the tumour if we’re not seeing all of it - especially if it’s in the bone - and that’s where it’s the hardest to see.”

While meningiomas are generally considered benign, in rare cases, they can become malignant and spread throughout the brain or spine.

For Christie Poirier, one of the first meningioma patients at the Princess Margaret to receive PET-guided treatment, the impact was profound. With a family history of brain cancer, she felt reassured knowing that PET imaging provided a more precise assessment of her condition.

“I feel more secure knowing they’re using the best tools to monitor and treat my tumour,” she says. “It’s comforting to know nothing is being overlooked.”

Dr. Patrick Veit-Haibach, Director of the PET/MR Program at UHN and Deputy Radiologist-in-Chief, says expanding access to nuclear medicine scans is invaluable for meningioma patients and will inform better treatment options in the future.

“PET imaging gives radiation oncologists the opportunity to treat tumours in challenging areas where surgery is not an option anymore,” says Dr. Veit-Haibach.

Dr. Derek Tsang, (L), a Radiation Oncologist at Princess Margaret Cancer Centre, and **Dr. Patrick Veit-Haibach**, Deputy Radiologist-in-Chief at UHN, are among the first in Ontario to perform this procedure.

Princess Margaret Achieves Highest Accreditation with Exemplary Standing

The Princess Margaret achieved Exemplary Standing with 100% of required organizational practices met, the highest level of accreditation. This designation is awarded to organizations that exceed Accreditation Canada's requirements and reflects our unwavering commitment to delivering world-class cancer care with the highest standards of safety and quality for our patients.

The Exemplary Standing designation was granted following a week-long assessment, where over 100 staff and patients engaged with Accreditation Canada surveyors to evaluate 200 cancer care standards across outpatient, inpatient, systemic therapy, radiation therapy, and palliative care. Surveyors recognized many strengths across the Princess Margaret, including exceptional patient partner involvement and patient-reported experience measures (PREMs) to guide quality improvement, strong multidisciplinary collaboration in safety and education, and extraordinary patient care.

This remarkable achievement is a testament to the dedication of our entire community in showcasing what they do best every day. As we celebrate this success, we remain committed to delivering exceptional patient care and continuous quality improvement.

ACCREDITED WITH EXEMPLARY STANDING

ACCREDITATION AGRÉMENT CANADA

Excellence in Care

Oncology Nursing

Nurses across UHN exemplify excellence in care by delivering holistic, specialized, and compassionate care to patients and families affected by cancer. Beyond their clinical duties, many have devoted considerable effort to pioneer research, drive quality improvement projects, innovate clinical practice, advance education, and demonstrate leadership in nursing.

The Oncology Nursing Research Centre of Excellence (ONRCE) at the Princess Margaret is Canada's first centre devoted to support the research and development of oncology nursing.

The ONRCE is led by Anet Julius, Director of Professional Practice; Dr. Samantha Mayo, RBC Financial Chair in Oncology Nursing Research; and Kadyan Winkley, Program Coordinator.

In 2024, the 21st annual Oncology Nursing Day Awards, "From Coast to Coast: Uniting Our Practice," featured an Oncology Nursing Forum to highlight achievements, research, and leadership. It was an opportunity to showcase excellence in clinical care, advocacy and scholarship, including the Advanced Practice Nursing Fellowship in Oncology, a fellowship for nurses to advance their skills in oncology advanced practice roles.

> **"We are privileged to witness the courage and strength of our patients and their loved ones. We participate in their cancer journey, from treatment, symptom management, end-of-life care/survivorship, and are there every step of the way."**
>
> **Anet Julius**, RN, BScN, MN, CON(C)
> Director of Professional Practice, Nursing and Health Professions, Princess Margaret Cancer Centre

(L to R), **Kadyan Winkley**, BA, Program Coordinator, ONRCE; **Anet Julius**, RN, BScN, MN, CON(C), Director of Professional Practice; and **Samantha Mayo**, RN, PhD, RBC Financial Chair in Oncology Nursing Research, Princess Margaret Cancer Centre.

A Paradigm Shift in Cancer Treatment Strategies

Cytotoxic T cells are a type of white blood cell that play a key role in the surveillance and elimination of abnormal cells, including cancerous ones. Some tumours can evade T cell recognition and attack, which can lead to disease progression. One strategy in cancer immunotherapy is adoptive cell therapy (ACT), which involves using a patient's own immune cells to fight cancer. In ACT, immune cells are collected from the patient's blood or tumour tissue, modified or activated to enhance their ability to fight tumours, and then infused back into the patient.

"Although successful in some cases, we aim to improve the way ACT is made to increase its effectiveness long term," explains Dr. Pamela Ohashi, Senior Scientist at the Princess Margaret and senior author of this study published in *Cell Reports Medicine*.

Previous research indicated that directing interventions toward metabolic stress pathways, like nutrient deprivation or energy production, can enhance the ability of T cells to control tumours. The team set out to study an important molecule called GCN2 (kinase general control non-depressible 2). They began by investigating amino acid depletion, specifically the lack of arginine, which is recognized for its crucial role in immune cell function.

"We knew that when GCN2 is activated, it generally reduces overall protein production, leading to the expression of molecules that coordinate various cellular activities, like protein uptake," explains Dr. Michael St. Paul, Postdoctoral Researcher at the Princess Margaret and first author of this study. "However, the specific role of GCN2 in cytotoxic T cells remains unclear."

By moving activated cytotoxic T cells from standard medium to one depleted of arginine, scientists noted an increase in the production of immune-regulating molecules (cytokines) and enhanced energy production through oxidative metabolism.

"Interestingly, this metabolic shift persisted indicating a sustained change in the metabolism of T cells," explains Dr. Sam Saibil, Staff Oncologist at the Princess Margaret. "This means that harnessing the intrinsic capabilities of the immune system could lead to more targeted and durable therapeutic interventions."

This study helped to shed light on potential therapeutic strategies for enhancing immune responses against cancer. "Our research opens doors to enhancing various forms of cancer immunotherapy by targeting GCN2, signaling a potential paradigm shift in cancer treatment strategies," concludes Dr. Ohashi.

(L to R), **Michael St. Paul**, PhD, Postdoctoral Researcher; **Pamela Ohashi**, PhD, Director, Tumor Immunotherapy Program; and **Sam Saibil**, MD, PhD, Staff Oncologist, Princess Margaret Cancer Centre

A PARADIGM SHIFT IN CANCER TREATMENT STRATEGIES

Improving Outcomes for HPV-Related Cancers

Human Papillomavirus (HPV) is a virus known to cause cervical cancer, and when tumour cells undergo changes or die, they release fragments of DNA into the bloodstream. Despite effective treatments such as chemoradiation, approximately 30 to 40 percent of cervical cancer patients experience a relapse of the disease.

Early detection is critical for effectively managing and treating cancers. However, common clinical factors such as cancer stage can be inadequate predictors of relapse.

Researchers from the Princess Margaret have made significant strides in the early detection and prediction of cervical cancer relapse by validating HPV circulating tumour DNA (ctDNA) as a marker to identify patients with a high chance of disease relapse.

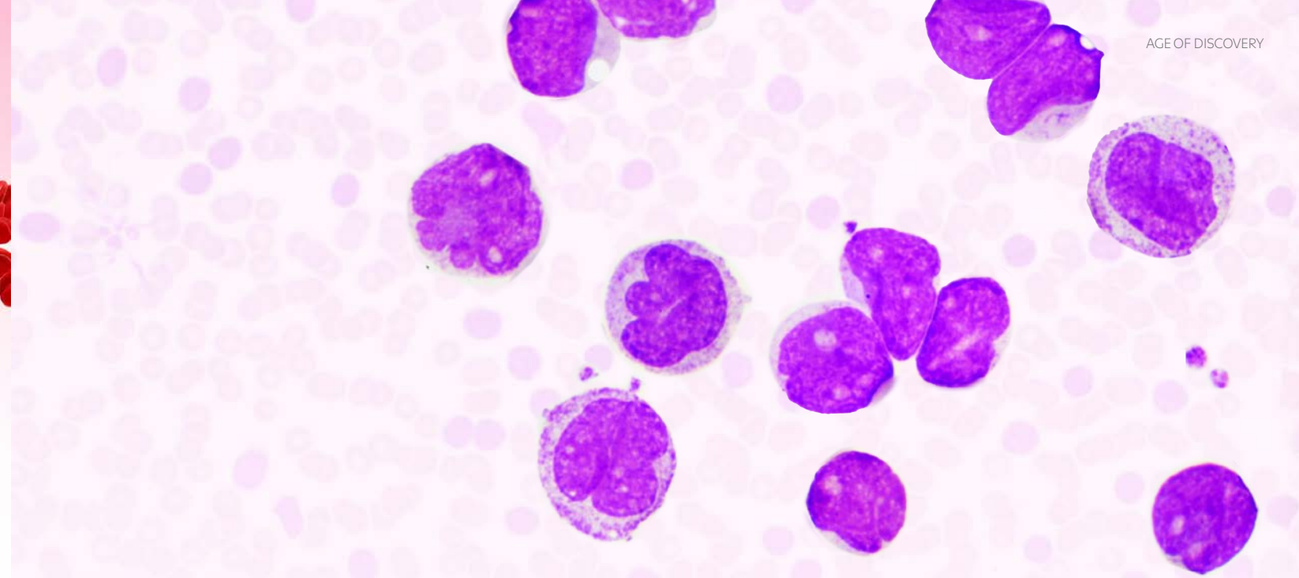
"By examining blood samples from patients with cervical cancer following chemoradiation treatment, we explored the relationship between the presence of HPV ctDNA and progression-free survival (PFS)," explains Dr. Kathy Han, first author of the study published in the *Journal of Clinical Oncology*. "PFS is a key measure that indicates the duration of time when a patient is without signs of disease progression. Shorter PFS is reflective of a higher risk of disease relapse."

As cervical cancer remains a prevalent health issue, this research represents a significant step forward in the ongoing efforts to enhance detection methods and ultimately, improve patient outcomes. Further, these findings may serve as a foundation for future studies exploring tailored treatment strategies based on HPV ctDNA testing.

> **"These results can significantly improve the outcomes for individuals with virus-related cancers."**

Kathy Han, MD, MSc
Clinician Scientist
Princess Margaret Cancer Centre

Kathy Han, MD, MSc
Clinician Scientist
Princess Margaret Cancer Centre



Age of Discovery

A Home Grown Promise for Acute Leukemia

Acute myeloid leukemia (AML), an aggressive cancer, and myelodysplastic syndromes (MDS) are a group of disorders affecting bone marrow function. Treatment outcomes may vary based on the types of gene mutations a patient carries. A study from the Princess Margaret has found a potential treatment for patients with relapsed or treatment-resistant AML and MDS.

Although AML can be cured in 35 to 40 percent of patients under the age of 60, up to 15 percent of patients over 60 may have a median overall survival of five to 10 months. There is no standard treatment for patients with relapsed or treatment-resistant AML. MDS can range from mild cases to more serious forms that can progress to AML. The only curative option for these patients is stem cell transplantation.

"Previous research in tumour samples and drug characteristics of CFI-400945 makes it a promising candidate for cancer treatment," says Dr. Karen Yee, Clinician Investigator at the Princess Margaret and senior author of the study. "To examine this, CFI-400945 was tested in tumour models and a phase I clinical trial in high-risk patients with relapsed and untreatable AML."

The tumour model studies indicated that CFI-400945 is effective, with a treatment response in cells with TP53 gene mutations, suggesting that PLK4 is a potential therapeutic target in TP53 mutant AML.

The clinical trial was conducted with 13 individuals with relapsed and treatment-resistant AML. "We found that three out of nine patients evaluated for efficacy saw complete remission," says Dr. Yee. "One other patient showed a greater than 50 percent improvement in white blood cell counts."

This study, published in the journal *Leukemia*, underscores the promising role of CFI-400945 as a potential treatment for a typically challenging form of AML. Moving forward, researchers are investigating CFI-400945's efficacy and safety in larger patient cohorts, as well as in combination with other therapies.

Karen Yee, MD
Clinician Investigator
Princess Margaret Cancer Centre

Precision Therapy for Lung Cancer

Non-small cell lung cancer (NSCLC), the most common type of lung cancer, is usually diagnosed in advanced stages, often after it has spread to other parts of the body. Standard treatments such as chemotherapy, targeted therapy, or immunotherapy lose effectiveness over time, leading to oligoprogressive disease, where cancer develops resistance and grows in certain areas.

Led by Princess Margaret investigator Dr. Jillian Tsai, a new phase 2 clinical trial conducted at Memorial Sloan Kettering Cancer Center in New York offers hope and new possibilities for patients facing this challenging diagnosis.

"Our goal in this study was to evaluate whether stereotactic body radiotherapy (SBRT), a type of precision radiotherapy, can control cancer growth in specific areas, while allowing the drug treatment to continue working in the rest of the body," explains Dr. Tsai, Lead of the Allan and Ruth Kerbel Palliative Radiotherapy and Oligometastasis Program (PROP) and Medical Director of the Princess Margaret Cancer Registry.

SBRT is a type of radiotherapy that utilizes advanced image guidance to deliver precise, intense doses of energy beams to cancer cells while minimizing damage to healthy tissue. The research results from the Consolidative Use of Radiotherapy to Block Oligoprogression (CURB) trial, published in *The Lancet*, demonstrated that SBRT could effectively stop cancer growth better than drug therapy alone.

In the trial, which involved 106 patients with NSCLC, patients who received SBRT experienced restricted cancer growth for 10 months, compared to 2.2 months in the group receiving only standard drug therapy.

The findings emphasize that adding SBRT to the treatment plan for oligoprogressive NSCLC could significantly improve outcomes. Looking ahead, Dr. Tsai, together with the Canadian Cancer Trials Group (CCTG), will be conducting a phase 3 trial to validate these findings in a larger population of patients with lung cancer.

The CURB trial results underscore the advantages of involving radiation oncology early in the treatment of metastatic cancers. While historically focused on palliative care, the evolution of advanced, targeted, and higher-dosage radiotherapy techniques represents an opportunity to proactively prevent symptoms and potentially impede disease progression.

Jillian Tsai, MD, PhD, MSc
Radiation Oncologist
Princess Margaret Cancer Centre

Canadian-Developed Novel Combination Therapy Improves Survival

Refractory Multiple Myeloma

Multiple myeloma is a type of cancer that affects plasma cells, which are a type of white blood cells that produce antibodies to fight infections. Patients with multiple myeloma can be resistant to the standard anti-myeloma drugs and they can have relapses. There is an urgent need for combination strategies that incorporate novel drug targets for patients who are refractory to their treatment.

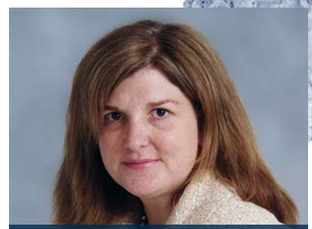
In a study published in *Nature Medicine* led by Drs. Suzanne Trudel and Donna Reece at the Princess Margaret, a combination therapy including belantamab mafodotin (belamaf), pomalidomide and dexamethasone (Pd) has shown promising results for refractory multiple myeloma patients. Belamaf, an antibody drug conjugate that targets B-cell maturation antigen, has emerged as a new therapeutic for relapsed multiple myeloma. Pomalidomide and dexamethasone (Pd) are immunomodulatory drugs that have been used in the treatment of multiple myeloma.

The trial, which enrolled 87 patients across Canada, found that the belamaf-Pd combination therapy resulted in promising efficacy with an impressive overall response rate of 85.3%. The majority of patients (73.5%) achieved high quality response rates and longer survival.

"This is highly favorable in patients who have received three prior lines of therapy, of whom 63% were refractory to three classes of anti-myeloma drugs," says Dr. Trudel. The team also tried to find an optimal dosing schedule to mitigate the side effects that comes with belamaf. They found that moderate and severe ocular symptoms occurred less when using an extended dosing schedule without compromising the therapeutic effect.

Overall, the study's findings suggest that the belamaf-Pd combination therapy could be a game-changer in improving outcomes for patients with relapsed multiple myeloma.

Dr. Trudel also led a large international trial of belantamab published in the *New England Journal of Medicine* which resulted in worldwide regulatory approvals.



Suzanne Trudel, MSc, MD
Clinician Scientist
Princess Margaret Cancer Centre

Donna Reece, BA, MD
Clinician Investigator
Princess Margaret Cancer Centre

CRACKING THE CODE OF LYMPHOMA

Cracking the Code of Lymphoma

New Therapies to Target Lymphoma Cells

Lymphoma is a common cancer affecting about 12,000 Canadians each year.

Dr. Robert Kridel, a Clinician Scientist at the Princess Margaret, and his team recently published three studies which reflect the significant progress being made in lymphoma research.

“Lymphomas are a type of blood cancer that affect the lymphatic system, a crucial part of the immune system,” says Dr. Kridel. “It happens when lymphocytes, a type of white blood cell, grow uncontrollably, forming tumours. Lymphomas are a diverse group of diseases, making treatment challenging because each type can be very different. Some are aggressive but treatable, while others are slow-growing but incurable.”

Dr. Kridel’s research centers on understanding this diversity of lymphoma.

“We study lymphoma’s diversity to predict how patients will respond to treatment,” says Dr. Kridel. “We are also working on new therapies that precisely target lymphoma cells.”

Robert Kridel, MD, MPH, PhD
Clinician Scientist
Princess Margaret Cancer Centre

> **“I am incredibly proud of the team. They have worked tirelessly to bring these studies to fruition.”**

Robert Kridel, MD, MPH, PhD
Clinician Scientist
Princess Margaret Cancer Centre

Clinical Practice and Operations

In the first study published in *Leukemia*, Dr. Kridel’s team, with first author and Postdoctoral Researcher, Dr. Michael He, investigated an approach to treat lymphomas in patients with a specific gene mutation. Past research showed that blocking the enzyme HDAC3 can be effective against these lymphomas. However, certain cancer cells show resistance to the treatment. The team found that turning off a gene called GNAS made resistant lymphoma cells more sensitive to HDAC3 inhibitors, which could lead to better treatments for patients.

The second study published in *Blood Cancer Journal*, led by Dr. Kridel and first author Victoria Shelton, a computational biologist in his lab, examined why follicular lymphoma varies so much in symptoms and patient outcomes. Using a statistical model to analyze genetic differences in tumour samples, the researchers identified five distinct genetic subtypes, each with unique mutations. These subtypes were linked to specific clinical features, such as disease stage and treatment response, which may help guide treatment decisions.

In their third study published in the *British Journal of Haematology*, Dr. Kridel’s team, with first author Dr. Samantha Hershenfeld, a hematology fellow, analyzed gene mutations in 117 patients to see if they could predict how well radiotherapy treatment would work for early-stage follicular lymphoma. The findings suggest that gene mutations did not predict patient outcomes and that other biomarkers, such as those derived from the tumour microenvironment, may be better indicators.

“I am incredibly proud of the team,” says Dr. Kridel. “They have worked tirelessly to bring these studies to fruition.”

National Hockey League Commissioner **Gary Bettman** visiting the lab of **Dr. Gelareh Zadeh**, Senior Scientist, Princess Margaret Cancer Centre.

Hockey Fights Cancer

The V Foundation for Cancer Research, the National Hockey League, and the National Hockey League Players' Association (NHLPA) have granted Dr. Gelareh Zadeh, a Senior Scientist at the Princess Margaret, US$800,000 for research focused on identifying more personalized treatment options for adults with brain tumours. This is the first research grant awarded through Hockey Fights Cancer by the V Foundation, a U.S. cancer charity.

"With this grant, we could dramatically improve meningioma treatment, a significant shift forward in neuro-oncology," says Dr. Zadeh.

Dr. Zadeh's team has identified four subtypes of meningiomas (brain tumours), and treatment depends on these subtypes. "This project will help us determine whether any of those subtypes are going to respond to a particular treatment, whether a blood test can determine the outcome and, more importantly, whether intervention will help a patient," she says.

Commissioner Bettman shared that his mother died of brain cancer four decades ago, and noted that many NHL players have lost family members to cancer and have seen former players die of the disease.

> **"This gives us an opportunity to further cutting-edge cancer research by making investments using the power of the NHL."**
>
> **Marty Walsh**
> Executive Director
> National Hockey League Players' Association

Cross-UHN Collaboration

Supporting Cancer Patients with Acute Needs

Princess Margaret Cancer Centre and Toronto General Hospital were proud to officially open the Acute Oncology Inpatient Unit, an initiative that ensures cancer patients experiencing complications can receive treatment from experts in acute medicine management.

"We are proud of this collaboration across UHN and recognize the many staff who helped make this possible and work every day to care for cancer patients with acute needs," says Dr. Amit Oza, Head of the Division of Medical Oncology and Hematology at the Princess Margaret. "It is a great example of UHN's continuity of excellent care."

The 32-bed unit ensures cancer patients can benefit from specialized treatment from teams such as General Internal Medicine, hospitalists, fellows, nurses, pharmacists, and allied health teams.

"Consolidating cancer care for acute oncology patients and offering specialized team care is the benefit of this new unit, for both our staff and ultimately our patients," says Marnie Escaf, Senior Vice President, at UHN.

Teams gathered for the ribbon-cutting ceremony to officially open the Acute Oncology Inpatient Unit at the Toronto General Hospital.

(L to R), **Natalia Kusendova-Bashta**, MPP Mississauga Centre; **Adrian Foster**, Mayor, Clarington, Ontario; **Peter Pattison**, President, Interventional Oncology, Boston Scientific; **Jason Van Wart**, President and CEO, Laurentis Energy Partners; **Todd Smith**, Ontario Minister of Energy; **Sylvia Jones**, Ontario Deputy Premier and Minister of Health; **Keith Stewart**, MB ChB, Director, Princess Margaret Cancer Centre; and **Jonathan W. Cirtain**, PhD, Senior VP and Chief Development Officer, BWX Technologies, Inc. (BWXT) and President and CEO, BWXT Medical Ltd.

PARTNERSHIPS LEAD TO A MEDICAL GAME CHANGER

Partnerships Lead to a Medical Game Changer

Made-in-Canada Isotope Announced at the Princess Margaret

Todd Smith, Energy Minister, and Sylvia Jones, Deputy Premier and Minister of Health for the Province of Ontario, were welcomed to the Princess Margaret for the announcement of a made-in-Canada nuclear isotope that can help treat liver cancer.

Liver cancer is an underfunded and under-recognized form of cancer, and the fourth most common cause of cancer death globally. The Darlington nuclear generating station with Laurentis Energy Partners will create an isotope, known as Y-90, an essential component in a life-saving treatment for liver cancer patients. This targeted therapy uses radioactive medical isotopes that can be injected directly into a tumour, instead of blasting the tumour with radiation, which can risk killing surrounding healthy cells.

Although BWXT Medical and Boston Scientific already manufacture the treatment in Ontario, they previously had to import their supply of isotopes from nuclear reactors outside of Canada. “The production of medical isotopes in Ontario is another way our government is leveraging innovation to connect more people to the life-changing care they need, when they need it,” said Minister Jones.

Jason Van Wart, Laurentis President and CEO, and Peter Pattison, President of Interventional Oncology at Boston Scientific, noted that the collaboration will help provide a broader range of medical isotopes.

The field of theranostics, using radio pharmaceuticals to treat cancer, is exploding worldwide. With multiple uses in imaging and different kinds of isotopes, “we anticipate exponential growth in this field,” said Dr. Keith Stewart, Director of the Princess Margaret.

Liver cancer patients at the Princess Margaret now benefit from this targeted therapy, along with 100,000 liver cancer patients around the world. Clinical trials are already underway to use this therapy for other types of cancer, including prostate and brain cancer.

> **“We are proud of the leading-edge cancer care we provide.”**
>
> **Keith Stewart**, MB ChB
> Director, Princess Margaret Cancer Centre

The Princess Margaret Cancer Foundation

At The Princess Margaret Cancer Foundation (PMCF), Canada's largest cancer charity, it is our privilege to support the life-changing work of the Princess Margaret Cancer Centre, one of the world's leading cancer research and treatment centres. For more than 70 years, The Princess Margaret's breakthrough discoveries have helped change the way the world understands, prevents, diagnoses, and treats cancer.

However, despite many advances, the number of cancer cases is rising worldwide, with a concerning increase among younger generations. By 2050, it is projected that new cancer cases will surge globally by 77%, with millennials facing the most significant increase, underscoring the critical importance of The Princess Margaret.

We are at a pivotal moment for cancer research and care. Decades of philanthropic funding, research progress, and clinical innovation have led to a deep understanding of cancer and have uncovered effective ways to confront it. At the same time, artificial intelligence, genome sequencing, and other technologies have become both more affordable and incredibly powerful - enabling us to harness key cancer insights for large-scale impact.

Through philanthropy, fundraising events, and our renowned lottery program, we are confident that we can provide even more resources to transform outcomes and create a world free from the fear of cancer.

CARRY THE FIRE

The Carry The Fire champions at the launch of the new PMCF campaign supporting our vision for a world free from the fear of cancer. (L to R), **Tessa Virtue**, **Chris Hadfield**, **Wendel Clark**, **Ellie Black**, **Darryl Sittler**, **Donovan Bailey**, **Piper Gilles**, **Sangita Patel**, and **Miyo Yamashita**. (Photo: Garcia Creative Media)

This is why we've introduced an exciting new brand that we call Carry The Fire, which represents the spirit of hope, optimism, and determination that we witness every day at The Princess Margaret. It was inspired by The Princess Margaret's exceptionally talented, dedicated staff who, regardless of their roles, are willing to go to the ends of the earth for cancer patients and their loved ones. And, of course, it was inspired by our patients themselves who demonstrate unparalleled strength and resilience - they are our true North Star.

The colour palette of Carry The Fire is based on a sunrise, because nothing is more hopeful than the dawning of a new day when everything – and anything – is possible. This inspiring new brand will be implemented across all the Foundation's public engagement and fundraising initiatives and will serve as a beacon of hope for cancer patients here in Canada and around the globe. It will also be a springboard for a historic fundraising campaign The Princess Margaret will launch publicly in 2026.

Carry The Fire is a rallying cry for all Canadians to join us in a collective effort to transform cancer outcomes and ensure brighter tomorrows for cancer patients everywhere. Together, we know we can create a world free from the fear of cancer.

Miyo Yamashita

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

Princess Margaret Cancer Centre

DIVISION OF MEDICAL ONCOLOGY & HEMATOLOGY

Dr. Amit M. Oza

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. DMOH houses the largest "single-site" Clinical Fellowship Program in Canada, proudly training the next generation of innovative medical oncologists and hematologists from around the world. It is home to internationally recognized programs in genomic medicine, immunotherapy, myeloproliferative neoplasm, and hematology. 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.

RADIATION MEDICINE PROGRAM

Dr. David Kirsch

Head of the Radiation Medicine Program

The internationally acclaimed Radiation Medicine Program (RMP) at the Princess Margaret Cancer Centre is one of the largest radiation treatment centres in North America. Our program is committed to patient-centered care focusing on quality, safety, discovery, and knowledge dissemination. We improve the quality of radiation therapy worldwide through innovative research, education, and cutting-edge radiation practices and technologies. RMP has one of the world's largest dedicated MR Programs 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 an MRI 3T simulator, as well as the world's largest deployment of the RayStation Treatment Planning System. Our program has 15 linear accelerators including 2 Ethos on-line Adaptive linear accelerators, a Leksell Gamma Knife Esprit unit, a Leksell Gamma Knife Icon unit, an orthovoltage unit, an MRI 3T simulator, four CT simulators, and two brachytherapy high dose rate (HDR) remote afterloaders. In addition, RMP offers a Pediatric Radiation Therapy Program, which delivers specialized pediatric radiation for children with cancer; and a Palliative Radiotherapy and Oligometastasis (PROP) Program, which delivers rapid access to palliative radiotherapy and specialized care for patients with oligometastasis.

DIVISION OF SURGICAL ONCOLOGY

Dr. Girish Kulkarni

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 80 dedicated cancer surgeons, our multidisciplinary surgical teams offer services for central nervous system, breast, melanoma and skin, 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.

DEPARTMENT OF SUPPORTIVE CARE

Dr. Camilla Zimmermann

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. Our interdisciplinary clinical team includes social workers, psychiatrists, psychologists, palliative care physicians, nurses, and other allied health professionals. The DSC has become an internationally recognized program for research and education, developing novel approaches to treatment, and training learners from all over the world. We have received international acclaim for programs such as the Adolescent and Young Adult Program, Geriatric Oncology Program, Caregiver Program, Sexual Health Program, Sexual and Gender Diversity in Cancer Care Program, and the Global Institute of Psychosocial, Palliative and End-of-Life Care.

COLLABORATIVE ACADEMIC PRACTICE

Anet Julius

Director of Professional Practice, Nursing and Health Professions

The Collaborative Academic Practice (CAP) portfolio is rooted in the strength and contributions 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 16 health professions, 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, Chiropody, and Personal Support Workers.

Princess Margaret Leadership

Executive Committee

Keith Stewart (Chair)	Director, Princess Margaret Cancer Centre and Vice President of Cancer, UHN
Aaron Schimmer	Director, Research
David Kirsch	Head, Radiation Medicine Program
Girish Kulkarni	Chief, Surgical Oncology
Amit Oza	Head, Medical Oncology and Hematology
Camilla Zimmermann	Head, Supportive Care
Jennifer Catton	Clinical Director, Solid Tumour and Supportive Care
Suman Dhanju	Clinical Director, Blood Disorders Program
Colleen Dickie	Director of Operations, Radiation Medicine Program
Zsolt Hering	Director, Finance
Anet Julius	Director of Professional Practice, Nursing, and Health Professions
Lisa Tinker	Clinical Director, Malignant Hematology, Genetics, and Dentistry
Meena Merali	Director, Strategy and Transformation
Meredith Giuliani	Medical Director, Cancer Education
Alejandro Berlin	Medical Director, Cancer Digital Intelligence
Neesha Dhani	Chair and Medical Lead, Clinical Practice Committee
Auro Viswabandya	Medical Director, Cancer Quality Program
Gary Rodin	Director, Cancer Experience
Erik Yeo	TGH, Blood Disorders and UHN Ambulatory Strategy
Miyo Yamashita	President and CEO, The Princess Margaret Cancer Foundation
Christopher Yao	Jr. Faculty Member, Department of Surgical Oncology

Clinical Practice Committee

Clinical Practice and Operations

Keith Stewart	Director, Princess Margaret Cancer Centre and Vice President of Cancer, UHN
Neesha Dhani (Chair)	Medical Lead and Medical Director of Acute Oncology and Inpatient Care
Jennifer Catton (Co-Chair)	Clinical Director, Solid Tumour and Supportive Care
Lisa Tinker	Clinical Director, Malignant Hematology, Genetics, and Dentistry
Suman Dhanju	Clinical Director, Blood Disorders Program
Colleen Dickie	Director of Operations, Radiation Medicine Program
Anet Julius	Director of Professional Practice, Nursing, and Health Professions

Program Leads

Ilan Weinreb	Division Head, Anatomic Pathology, Laboratory Medicine & Pathobiology, UHN
Ur Metser	Site Director, Medical Imaging, UHN
Kelly Lane	Director of Operations & Projects, Cancer Digital Intelligence

Medical Leads

Anne Koch	Breast Site Lead
David Goldstein	Endocrine Site Lead
Vikas Gupta	Leukemia Site Lead
Stephanie Lheureux	Gynecology Site Lead
John Kuruvilla	Lymphoma/Myeloma Site Lead
John Waldron	Head and Neck Site Lead
Antonio Finelli	Genitourinary Site Lead
Sami Chadi	Luminal Gastrointestinal Site Lead
Raymond Jang	Hepatobiliary Pancreas Site Lead
Marc de Perrot	Lung Site Lead
Rebecca Gladdy	Sarcoma Site Lead
Barbara Ann Millar	Central Nervous System/Eye Site Lead
Marcus Butler	Skin/Melanoma Site Lead
Breffni Hannon	Supportive Care Site Lead
Jonas Mattsson	Director of Allogeneic Transplant Program
Vishal Kukreti	Director of Epic Cancer Clinical Informatics
Natasha Leighl	Systemic Therapy Quality Lead
Andrea Bezjak	Medical Director, PM Cancer Care Network
Auro Viswabandya	Medical Director, Cancer Quality Program

(L to R), **Tommy Alfaro Moya**, MD, **Igor Novitzky-Basso**, MB, ChB, PhD, **Dennis Kim**, MD, PhD, **Jonas Mattsson**, MD, PhD, **Arjun Law**, MBBS, MD, **Wilson Lam**, MD, at the Allogeneic Blood & Marrow Transplant Patient Survivorship Day.

The Celebration of Life

Featured on this year's Annual Report cover are over 450 patients, families, caregivers, and staff from the Hans Messner Allogeneic Transplant Program who gathered together for the annual Allogeneic Blood & Marrow Transplant Patient Survivorship Day. *"To hear our brave survivors - from every walk of life and every age group - recount their stories was powerful and inspiring. We were overcome with love, joy, and pride to hear stories of people's incredible resilience, optimism, and courage," an attendee recalled.*

Survivor Mark DiVito underwent a life-saving stem cell transplant and spent over 100 days in recovery, and he is now two years post-transplant and thriving. Inspired by his journey and the care he received, Mark brought together a network of colleagues and suppliers to give back to the program that helped save his life.

The extraordinary commitment of $1,000,000 to support the Hans Messner Allogeneic Transplant Program at the Princess Margaret came from Mark and Katia DiVito, along with Vic De Zen and family (Vision Profile Extrusions Ltd.), Brite-Con Sales Inc., Futureline Plastics Inc., and Team Global.

This generous gift will enable groundbreaking advancements in treating blood-based cancers and help more patients reach life-changing milestones.

Acknowledgements

We are very grateful to the Princess Margaret Annual Report Committee for their dedication to produce a beautiful result.

Thank you to Vince Addario, Mimi Yeujun Guo, Adam Latuns, Natasha Musrap, Tripti Saha and Sharon Wright.

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