



Transforming Care Through Research and Discovery at The Princess Margaret

2023 Impact Report







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The Princess Margaret: A Global Powerhouse

As one of the top five cancer research centres in the world and Canada's largest cancer centre, The Princess Margaret is uniquely positioned to make a global impact.

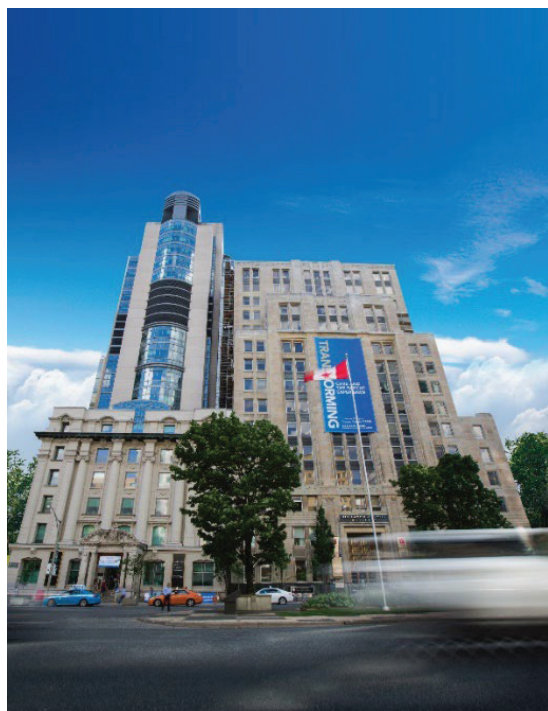
With their fierce commitment to research and patient care, our clinicians and scientists have changed what the world knows about cancer. We are home to game-changing discoveries such as Till & McCulloch's proof of the existence of stem cells, Dr. John Dick's subsequent identification of cancer stem cells, and Dr. Tak Mak's cloning of the T cell receptor, a breakthrough that advanced the development of immunotherapy. In 2018, Drs. Scott Bratman and Daniel De Carvalho developed a blood test that can detect and classify cancer at its earliest stages.

We are home to Canada's largest first-in-human cancer trial program, where early-phase trials and correlative studies are conducted for cancer treatments. This continuous research cycle, from bench to bedside and back again, benefits patients and attracts top scientists and doctors to work at The Princess Margaret. Patient participation in clinical trials at The Princess Margaret is almost 23%, which far exceeds the national averages of Canada, the United States and the UK.

The Princess Margaret's comprehensive research, education and clinical programs are strengthened through our global network that spans 500 institutions in over 100 countries. Our thought leaders are engaged around the world in research, academic and capacity-building partnerships that are shaping the future of cancer care by accelerating discoveries in the early detection of cancer and development of new treatments.

The Princess Margaret has the largest surgical oncology team in Canada and one of the largest in the world. We also lead Canada as a radiation centre, providing over 9,000 radiation treatments a year and take our place among the biggest radiation centres globally.

We have the expertise, the experience and the diverse patient populations to make great headway in the campaign against cancer. All that our scientists and physicians need are the resources to make it happen.



Cancer is Being Conquered Because of **Donors Like You**

Two in five Canadians will be diagnosed with cancer in their lifetime. On average, the Canadian Cancer Society estimates **233** Canadians die of cancer every day.

With stats like this, the end of cancer might seem very far away. But not to us.

Canadians have a greater chance of surviving than ever before — the survival rate has jumped from **25% in the 1940s to 64% today**.

This progress is thanks to the dedicated cancer researchers and clinicians who continue to push the boundaries of knowledge and because of generous donors like you.

In fiscal 2023, with the support of our passionate community, we granted **\$144.9 million** to The Princess Margaret — more funds than ever before to fuel world-leading cancer care and research.

The Princess Margaret is transforming what it means to live with cancer — but these breakthroughs only happen with support from donors like you.

The Princess Margaret is:

- Canada's largest and most comprehensive cancer centre.
- Treating more than **200 types of cancer**, including many of Canada's most complex and rare cases.
- **Treating nearly 23% of our patients** in clinical trials – far exceeding the national averages of Canada, the US or the UK.
- Home to **300 of the world's leading cancer researchers**.
- Partnering with more than **500 cancer institutes in over 100 countries** to advance leading-edge cancer research, education and care on a global scale.

MOCHA: Reaching an Important Milestone for Gastroesophageal Cancer

Gastroesophageal cancers are among the most challenging to screen, diagnose and treat. Unfortunately, the majority of patients are diagnosed at an advanced, incurable stage. Partly, the survival rate has remained low because this type of cancer is among the least researched and therefore among the least understood.

Molecular Characterization of Gastroesophageal Adenocarcinoma, or simply MOCHA, is a world-first study aimed at improving the odds. MOCHA's ultimate goal is to develop, test and implement more precise, customized therapies. The idea of these therapies is to successfully target the cancer of each gastroesophageal adenocarcinoma patient, without the harsh side effects of chemotherapy. The MOCHA team, led by Staff Physician Dr. Elena Elimova, is doing this work by examining tumour samples at the molecular level, sequencing their genetic and genomic properties to better understand how they develop, progress and respond to different drugs.

In 2022, MOCHA hit an important milestone. When the study was launched in 2019, the initial goal was to enroll 60 patients by the end of 2021, with more to follow in ensuing years. Although COVID-19 posed many challenges, the team has now exceeded the initial goal with 78 patients enrolled. By surpassing the goal, the team is better equipped to perform the detailed analysis that MOCHA was designed to accomplish.

To date, nearly half of the patients enrolled have had metastatic cancer. This is important, as it will enable the team to gain insights into the cancer biology of patients with the most severe forms of the illness. The team not only maps out the genetics, but also the molecular characteristics, radiological characteristics and other factors that drive cancer progression.

Liquid biopsies, the next big game changer in cancer diagnostics, are an exciting aspect of the research. With liquid biopsies, doctors collect a small blood sample from patients, spin the blood down into plasma then analyze the plasma for DNA released by cancer cells, also known as circulating tumour DNA. The traces of tumour DNA give clues about diagnosing cancer, but also gives clues about the best ways that cancer can be treated.



“It’s long been our dream to look at blood samples to see if they can be used to predict treatment response,” says Dr. Elimova. “They might, for example, help us see certain cells or proteins. In turn, then we might know that we should treat patients with one type of therapy over another. That’s really the next big step for us.”

Princess Margaret Researchers Launch Liquid Biopsy Start-up

Adela, a start-up launched out of The Princess Margaret, is poised to advance precision-based, personalized medicine. The company is doing so with the technique of using liquid biopsy mentioned in the MOCHA study.

Based on the cutting-edge research of Drs. Daniel De Carvalho and Scott Bratman, both Senior Scientists at The Princess Margaret, Adela envisions a future where multiple cancers and other diseases could be detected by taking a simple blood sample. With UHN’s unique technology de-risking approach and with support from donors through the Princess Margaret Cancer Centre Innovation Acceleration Fund, Adela gained the confidence of five major investor partners and has attracted seasoned entrepreneurs to their leadership team. Together, they will further advance the innovative liquid biopsy technology for cancer detection and management first discovered at The Princess Margaret.

Adela’s mission is to develop innovative and accessible technologies that harness biology and change the way we diagnose and treat cancer. The company is planning to develop technology for use across the entire cancer continuum – for detection, diagnosis and management of cancer.

Porphysomes: A Breakthrough in Image-Guided Surgery

First developed by Dr. Gang Zheng, a Senior Scientist at The Princess Margaret, porphysomes are tiny, non-toxic nanoparticles that contain organic, light-absorbing molecules. They have many potential applications, including high-resolution imaging for treatment planning, as well as for use in precise, image-guided surgery.

After injection into the body, porphysomes accumulate at high concentrations within cancer cells over a 24- to 48-hour period. The nanoparticles act somewhat like night vision, making cancerous areas glow. PET scans and other imaging allow surgeons to pinpoint the best locations for removing cancerous growths and enable them to target tumours they might not otherwise see.

Translating the potential of porphysomes has been a long, complex process. The first head and neck trial in humans is set to start in the coming year, over 10 years after porphysomes were first developed. Along the way, intensive research has been undertaken by many, including partner institutions, such as the Ontario Veterinary College at the University of Guelph. At Guelph, porphysomes are proving effective on non-human patients with thyroid cancer. A 10-year-old beagle named Shiloh was successfully treated using porphysomes in February 2022, with other canine patients following, including Miya, a yellow lab.



For Shiloh, Miya and other dogs, porphysomes are injected into the bloodstream, where they collect in any tumours present in the dog. The molecules' fluorescent glow allows the care team to track exactly where the cancer is located. In addition to helping pinpoint the disease, the porphysomes make the tumours more susceptible to a beam of laser light that helps kill cancer cells without the need for an incision.

The head and neck has an intricate anatomy, which increases operating risks for both people and animals. By minimizing incisions, the treatment reduces the painful side effects of conventional surgery, such as scarring or potential damage to the voice box. Within the Guelph study, conventional, standard-of-case surgery is only used to ensure no tumours remain.

Importantly, the study does not involve lab animals. Shilo and Miya are people's much-loved pets. They are being treated like patients just like anybody else. Investigating dogs with thyroid cancer is a more reliable way to study naturally occurring disease and treatment, partly because canine studies translate more readily to human medicine than studies with mice.

The Cancer Experience Program: Creating Supportive Platforms for Patients and Their Loved Ones

Almost universally, the words 'you have cancer' spark stress, fear and anxiety in patients and their loved ones. While the disease itself can be frightening, the experience of cancer and its treatment can also be extremely stressful and overwhelming for patients and their loved ones.

Recognizing the urgent need for empathic, inclusive, equitable, and accessible care for all, The Princess Margaret launched a dedicated, one-of-a-kind Cancer Experience Program. This unique program aims to infuse comfort and confidence into every interaction to meaningfully support the wellbeing of patients and caregivers, and to ensure that essential information and guidance is available as they navigate a complex system of care.

To improve access to information, education materials, and critical support resources, we are developing a multi-faceted approach to patient navigation. The Cancer Experience team is creating comprehensive and accessible digital tools by which information, navigation and emotional support can be accessed easily by patients and caregivers at every stage of care.

This platform will help ensure that essential resources and mental health support are available to meet the diverse needs of all patients and caregivers, including those from marginalized communities and for whom English is not the first language. By bringing together a range of existing resources and developing new tools, it will help patients and caregivers feel empowered and confident in their care at each step of the way.

Critically, the Cancer Experience team is going beyond the physical space of the Cancer Centre, facilitating navigation across the entire system of cancer care to overcome barriers to equitable, accessible and seamless support. One initiative already available is the Healing Beyond the Body “E-Team,” a lay-navigator volunteer program.

The E-Team is a roster of specially and thoughtfully trained volunteer e-coaches, recruited from diverse racial, cultural and linguistic groups, who virtually assist patients and caregivers through their cancer experience. Our E-Team coaches the mental, emotional, interpersonal and practical aspects of living with cancer, much like having a mentor or guide during a stressful and uncertain time. In the past year, our volunteer e-coaches have connected with over 160 patients and caregivers – looking ahead, the team hopes to recruit more volunteers to annually reach more than 500 patients and caregivers by 2025.

In addition to lay navigation support through the E-Team, we will provide digital access to Managing Cancer and Living Meaningfully (CALM), a psychotherapeutic intervention developed at The Princess Margaret. CALM is a semi-structured, evidence-based therapy that helps patients and their loved ones manage the challenges of metastatic and advanced cancer. A global success, CALM has already been adopted by 24 sites in 15 countries, including Australia, China, Italy, the Netherlands, and the United Kingdom. Over the next few years, the team will be working to expand CALM into a national program, making this crucial support available to patients in cancer centres across Canada.

The resources in development by our team, enabling access to critical programs like Healing Beyond the Body and CALM, are only possible because of philanthropic support from our donor community.

A New Intervention to Treat Metastatic Prostate Cancer

This year, Dr. Shabbir Alibhai, a Geriatrician and Senior Clinician-Scientist, is launching TOPCOP3 (Toward a comPrehensive supportive Care intervention for Older or frail men with metastatic Prostate cancer). TOPCOP3 is a clinical trial for older patients with metastatic prostate cancer. It is assessing the effectiveness of a new care intervention program to improve the ability of these older patients to



tolerate treatment while also reducing the burden of their symptoms (which can decrease their quality of life).

TOPCOP3 aims to enroll 160 older men who are currently receiving life-prolonging treatment for metastatic prostate cancer. Patients will be randomly assigned to receive either a remote symptom monitoring program, a geriatric assessment and co-management program, both, or standard care. These complimentary care intervention programs will be accessible on a virtual platform or by phone to allow participation from the comfort of their homes. One intervention includes weekly symptom monitoring and assistance from an oncology nurse navigator to help people manage their symptoms. Other virtual content will address topics such as sleep, mindfulness and fatigue management. The other intervention includes a holistic assessment of the older adult, including focusing on fall prevention, medication optimization and ensuring adequate nutrition and social supports. It includes monthly phone calls with an expert geriatric oncology nurse.

TOPCOP3 was launched with philanthropy. However, more recently, the Canadian Institute of Health Research generously contributed \$100,000, while a Swiss Foundation called Rising Tide Foundation for Clinical Cancer Research contributed an additional \$700,000. This illustrates the power of philanthropy to act as seed funding for critical investigator-initiated projects.

“With these additional grants, I am confident we can do everything we want to with TOPCOP3,” says Dr. Alibhai.

Thank You

Cancer is complex, a group of hundreds of diseases, influenced by lifestyle, environment and genetics. It is full of the challenges that only collaborative research, intensive training and engaged philanthropy can meet — together.

The Princess Margaret relies on our community to enable exceptional care and impact research, just as our community relies on us to provide comprehensive cancer care and exceptional patient experiences. As the leading cancer centre in Canada, it is imperative that we provide the best available cancer therapies in an environment that comforts and enhances confidence in scientific investigation for ever-improved patient outcomes.

The Princess Margaret Cancer Foundation thanks you, one of our valued donors, on behalf of the many cancer patients and their families who will benefit from your generous support of our work, both here at The Princess Margaret and throughout the world.

To learn more about the Quest to Conquer Cancer and how you can get involved, please visit us at [QuesttoConquerCancer.com](https://www.questtoconquercancer.com).



Contact Our Team

questtoconquercancer@thepmcf.ca

Charitable Organization No. 88900 7597 RR0001

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