#### CANCER



How do we strive for a cancer-free future?

# Together.

Cancer researchers in the Cumming School of Medicine's Arnie Charbonneau Cancer Institute and at the Tom Baker Cancer Centre, along with investigators across the University of Calgary, are addressing the entire spectrum of cancer. Our medical leaders are exploring innovative ways to better detect cancer, improve treatment, enhance patient support and, together, conquer cancer.

The University of Calgary has grown into a vital community of thought leaders and visionaries. **Energize: The Campaign for Eyes High**, is our drive to positively charge our campus community, our city and beyond, to unleash the power of the University of Calgary to prevent, detect, treat and support those with cancer. And this power can only be unleashed together.

The future of cancer research and treatment is precision medicine.

One of the most exciting advances in cancer research is precise treatment based on the unique genetic information found in each of us, and in cancers.

Precision medicine means instead of one-size-fits-all treatments, we treat individuals and cancers based on their unique characteristics. Thanks to the mapping of the human genome, we can treat some individuals with highly targeted and effective therapies. Treating people based on their unique characteristics, along with factors like health history, lifestyle and diet, will dramatically improve outcomes for those with cancer.

Despite these advances, 50 per cent of cancers cannot be prevented, detected early or treated effectively. So we are redoubling our efforts in research, leveraging the potential of precision medicine to provide the answers we seek.

Cancer has a profound impact on Albertans — 50 per cent of men and 33 per cent of women in Alberta will develop cancer in their lifetime, and one in four will die from the disease. The good news is precision medicine promises to have an enormous impact on cancer. Cancer researchers at the University of Calgary are collaborating across disciplines and faculties. The breadth and depth of our research expertise enables our teams to lead the charge against cancer – especially cancers of the lung, brain, head and neck, blood and pediatric cancers.

Together, we will create a future of health addressing every stage of the cancer continuum:

- Prevention
- Detection
- Treatment
- Patient and family support

#### Prevention

#### Exploring new ways to stop cancer before it even starts.

Prevention is our most powerful line of defence, and it's an approach we are strengthening every day. Researchers are focused on detecting cancer early when it is still easily curable, and on preventing cancer from occurring at all.

We've seen the successes: as a result of research that has taken place over the past 50 years, we now know that eliminating cigarette smoking, taking steps to minimize radon gas exposure in Alberta homes, getting HPV cancer vaccines and avoiding excessive sun exposure will prevent most cancers of the lung, cervix and skin.

Researchers at the University of Calgary are exploring new ways to make similar changes to prevent cancer in the future. For example, we know exercise can reduce the risk of some cancers, but how much and what kind will work best? Ongoing programs are revealing changes we can make in our lives that give us the power to prevent cancer, lower recurrence rates and reduce side effects of treatment.

We are also looking into a patient's future to predict cancer. Genetic information now allows us to identify patients who are susceptible to certain cancers, and to develop proactive treatments. It's like using clues in the patient's genes to solve a crime before it happens – with the hopes that the techniques can be applied to more cancers in the future.

The best way to fight cancer is to prevent it from happening in the first place. With your support, we can help people avoid having to deal with cancer at all.

Discoveries in the laboratory are translating into new modes of detecting the earliest pre-cancer changes, to prevent them from becoming cancer. Together, we can find new ways to walk away from cancer.

Using exercise to stay ahead of cancer.

Researchers at the Cumming School of Medicine have confirmed that exercising 300 minutes per week can reduce the risk of developing breast cancer. During a one-year clinical trial, epidemiologist Christine Friedenreich studied post-menopausal women who did 300 minutes per week of moderate to vigorous exercise. Results showed that participants reduced the body fat associated with an increased risk of breast cancer in postmenopausal women. Friedenreich, who is also a member of the Faculty of Kinesiology, works with cancer patients across the disease spectrum, from prevention to supporting those who have survived the disease. Her work will also examine the effects of incorporating strength training with cardiovascular training as a way to prevent cancer in the first place. Together, we are pinpointing the kinds of actions that have the greatest impact in cancer prevention.

Researcher Christine Friedenreich is exploring ways exercise can prevent breast cancer and support survivors like Louise Jeffries-House.

### Together, we will stop cancer at the earliest moment.

WE'VE MADE GREAT STRIDES IN UNDERSTANDING THE GENETICS OF SPECIFIC TYPES OF CANCERS. WITH THAT KNOWLEDGE, WE'LL BE ABLE TO LEARN MORE ABOUT PREVENTING CANCER, DETECTING IT EARLIER AND TAILORING TREATMENTS BASED ON INDIVIDUAL CANCERS.

JJ SUSAN LEES-MILLER

# Learning how to treat cancer before you develop a single symptom.

Cancer is fundamentally a disease of the DNA. Through our genes, environmental exposure or lifestyle, changes to our DNA can result in the development of cancer. Understanding these changes is crucial to fighting cancer effectively. It's exactly what a group of scientists are doing in the Arnie Charbonneau Cancer Institute's Robson DNA Science Centre. Researchers are studying the effects of DNA damage and repair and examining ways to apply these learnings to cancer prevention and treatment. We are learning more about DNA instability in selective cancers, with the hopes of improving existing therapies. Together, we are leaders in precision medicine, in the search for more powerful prevention, detection and treatment techniques.

#### Detection

### Finding ways of detecting cancer earlier, to beat it faster.

In cancer, speed saves lives. Early detection also means there are more treatment options, including those that are less invasive or debilitating. That's why some of the brightest minds in cancer research at the University of Calgary are exploring the many ways cancer attacks the body.

By developing a deeper understanding of cancer, our teams can discover new

tests and screening techniques to detect cancer earlier. We can pick up subtle signals of cancer that have never been detected before. We can learn how one cancer can lead to another. We can uncover new factors to help us screen people so we can reveal cancer when it is easily treatable.

All of this is possible through research, the most powerful cure to cancer.

### Together, we will shed new light on the detection of cancer.

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WE'RE USING INNOVATIVE WAYS OF IMAGING AND VISUALIZING TUMOURS TO DECREASE THE RECURRENCE OF DISEASE FOR PATIENTS WITH ORAL CANCER. OUR RESEARCH IS HELPING US UNDERSTAND AND REFINE OUR APPROACHES TO TREATMENT TO IMPROVE THE HEALTH OF THOSE WITH CANCER.

📕 JOSEPH DORT

# Finding a way to make invisible cancer visible.

Currently, about 30 per cent of patients who receive oral cancer surgery have their disease recur. Joseph Dort is the Cumming School of Medicine lead on a Canadawide surgical trial to explore an innovative way to solve the problem. The surgeons use fluorescence visualization (FV) or "blue light" rather than traditional white light. Under the blue light, normal tissue generates a fluorescence, which is absent in tumour or pre-cancerous tissue. By clearly seeing the cancerous tissue that needs to be removed, and sparing damage to normal healthy tissue, we can reduce the recurrence of cancer.

### Together, we will take on cancer's toughest challenges.

# Discovering new ways of taking "deadly" out of cancer.

Led by Alain Tremblay, researchers at the Cumming School of Medicine are testing new screening techniques for lung cancer, which remains the leading cause of cancer death for both men and women. Unfortunately, most cases of lung cancer are only identified at an advanced stage when treatment is less likely to be successful. Early detection through screening is key to saving lives, and this research is helping determine who are the most appropriate individuals to screen and how to administer screening in the most efficient way. This is exciting new territory as there are currently no provincial lung cancer screening programs in Canada. MOST PATIENTS PRESENT WITH VERY ADVANCED FORMS OF LUNG CANCER THAT CANNOT EASILY BE CURED. A LUNG CANCER SCREENING PROGRAM COULD SAVE LIVES BY ALLOWING EARLIER DETECTION AND TREATMENT.

JJ ALAIN TREMBLAY

#### Treatment

Cancer affects every person individually, so we are developing ways to treat each individual person.

The more we know about how cancer acts, and how it impacts each individual patient, the more precise and effective treatment can be.

Gaining a greater understanding of how cancer develops leads to far more specific and effective treatments. By increasing our understanding of cancer in the realm of precision medicine, we can develop new and better therapies. This allows us to detect changes at the cancer cell level and identify the key cancer drivers that can be targeted by precision therapies. A clear picture of precisely what stage the cancer is at leads to more accurate, non-invasive treatments and improved patient care. Researchers are even exploring how unique combinations of drugs can have greater success than using individual drugs in isolation. For example, researchers in the Clark H. Smith Brain Tumour Centre have studied tumour cells from 100 different patients with glioblastoma, the most common and deadly form of brain cancer among adults. Scientists have tested drugs on the cells of cancer patients to determine how best to target the disease, discovering a combination that could extend life by 30 per cent.

Faculty of Science doctoral student Sesha Gopinathan and Carrie Shemanko, associate professor of integrative cell biology, are studying how breast cancer cells contribute to bone breakdown Together, we will leave no path unexplored in our search for new treatments.

# Offering hope to patients now and in the future.

Before a treatment is made available for public use, it first goes through rigorous testing to ensure its safety and effectiveness. This testing known as a clinical trial – provides the latest in treatments, drugs and therapies, in the hope for positive outcomes for both patients and the greater public. As director of the Tom Baker Cancer Centre's Clinical Trials Unit, Gwyn Bebb knows that clinical trials are the reason for improvements in cancer treatments. More than 100 trials are underway at the Tom Baker Clinical Trials Unit. These studies provide thousands of patients access to the latest treatment innovations in addition to increasing the knowledge and expertise to effectively treat millions of others. ALL PROGRESS IN CANCER TREATMENT IS THE RESULT OF CLINICAL TRIALS. WE APPLY PROMISING SCIENCE DEVELOPED IN THE LAB TO A SPECIFIC CANCER SETTING IN ORDER TO DETERMINE WHICH TREATMENTS MAKE A DIFFERENCE. CLINICAL TRIALS PROVIDE HOPE FOR BOTH PATIENTS AND THEIR FAMILIES, AND FOR EVERYONE WHO HASN'T YET EXPERIENCED CANCER.

📕 GWYN BEBB

Together, we will change "terminal cancer" to just "cancer."

NO TWO PATIENTS ARE THE SAME, SO THEIR CANCERS WILL DIFFER IN SEVERITY, PROGRESSION AND THE MUTATION OF THEIR CELLS. OUR HOPE IS THAT BY SEQUENCING GENETIC INFORMATION, WE'LL BE ABLE TO PERSONALIZE THERAPIES FOR PEOPLE WITH CANCER.

J NIZAR BAHLIS

# When it comes to cancer treatments, we're making it personal.

Multiple myeloma is a terminal cancer that spreads throughout the bone and bone marrow. Nizar Bahlis and his team are making advances to change the terminal nature of multiple myeloma through an innovative drug combination treatment. Bahlis and his team collected samples from more than 400 patients for a tissue bank. Using a new machine, he will be able to sequence these samples to uncover genomic abnormalities that can be targeted for therapy. The knowledge will help us discover what causes multiple myeloma in patients and why some drugs work so much better than others, leading to personalized therapies in the future.

#### Support

#### Arnie Charbonneau Cancer Institute member Linda Carlson works with cancer patients and survivors to advance the psychosocial support of their experience and recovery

### We are making sure people win the battle of survival as well.

Cancer can bring chaos to the lives of individuals and their families. The debilitating treatments combined with dealing with a disease that kills causes stress that can rip apart any semblance of ordinary. We are tackling the impact cancer can have on lives by exploring new ways to support patients and their families throughout their cancer journey.

Researchers at the University of Calgary are exploring a broad range of tools for cancer patients, focusing on support during and after cancer, quality of life and stress reduction, as well as psychological and biological outcomes like immune function and stress hormones. Mind-body and complementary therapies offered to survivors include mindfulness meditation, yoga, exercise, acupuncture, Reiki, nutritional counselling and support groups. The results are boosting healthy minds and bodies.

Support for family members of cancer patients has also been a key focus. Whether it's a spouse, grandparent, sibling or other loved one, the effects of cancer reach far. Researchers are studying how compassion, storytelling and support of family units can improve their experiences.

The need to provide strength for those diagnosed with cancer, and their families, is driving researchers to discoveries that will help us all.

### Together, we will give those fighting cancer the strength to win.

# UCalgary research leads to addition of 6th vital sign.

Distress is now cited as the 6th vital sign indicating a patient's health and well-being, along with the other five vital signs (temperature, respiration, heart rate, blood pressure and pain). Arnie Charbonneau Cancer Institute Barry Bultz leads the work to build a greater understanding of how distress impacts cancer patients and their families, and how Screening for Distress leads to improvement in quality of life for those living with cancer. Screening for Distress means that patients will be referred to the right professional for their symptoms in a timely way. In recognizing distress as the 6th vital sign and treating patients for factors causing distress, health and well-being is notably increased. Screening for Distress has been adopted by agencies across Canada and around the world.



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> WE ARE WORKING TO TREAT THE PATIENT IN TERMS OF THEIR PHYSICAL NEEDS, BUT ALSO THEIR EMOTIONAL AND PSYCHOSOCIAL ONES. SCREENING FOR DISTRESS IS AN IMPORTANT VITAL SIGN FOR THOSE WITH CANCER AND LIVING WITH CANCER, AND A WAY FOR US TO TREAT THE WHOLE PERSON.

JJ BARRY BULTZ

### Together, we will heal hearts.

# Helping all those affected when cancer attacks children.

When a child is diagnosed with cancer, it affects family, friends and even communities. Strained relationships, employment and financial difficulties, stress and emotional exhaustion are just some of the experiences that occur when a child has cancer. It's an area of research where the University of Calgary is a leader, thanks to the work of Nancy Moules in the Faculty of Nursing. Moules has focused her studies on the impact of cancer on the children, as well as their families. By helping families stay strong, children can be strong.

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WE KNOW THAT WHEN CANCER STRIKES, IT DOESN'T JUST AFFECT THE PATIENT – BUT EVERYONE CLOSE TO THEM AS WELL.

**JJ** NANCY MOULES

Tomorrow's Cancer Visionaries \$50 million

#### Healthy Communities **\$20** million

Research Centres of Excellence

million

YOU

### \$150 million

# Take your place among the leading philanthropists of your time.

You will help us attract the rising stars and emerging leaders who will boldly push into exciting new fields of discovery. Our research is changing cancer outcomes, here in our community and around the world. You may have been touched by cancer, or simply want to make a difference for others. Let us show you how your support will help make cancer a disease of the past.

Cancer has a cure - people like you.

# Together, we can change the future of cancer.

The advances we are making are incredible, but cancer remains one of the top killers of Canadians. With you, we will change that. We are inviting your support for the following:

#### Tomorrow's Cancer Visionaries -\$50 million

A future with better cancer outcomes depends on the people who will bring new discoveries to a community in need:

- Scholarships and bursaries will help train the future leaders in cancer research and care
- Awards and recruitment packages will attract the next generation of researchers and clinicians who will find new solutions to pressing questions in cancer
- Funding for highly skilled technicians, research nurses and others with the unique expertise required to deliver innovative cancer research programs

#### Research Centres of Excellence -\$80 million

Highly integrated research teams will enable new discoveries in cancer. Knowledge sharing across the continuum of cancer research will ensure new models for prevention, detection, treatment and support are delivered to the community. Research teams will be organized in a number of centres that will include:

- Innovations in cancer detection
- Advanced clinical studies
- Cutting-edge technologies
- Precision oncology and experimental therapies
- Models of care and patient experience

#### **Healthy Communities - \$20 million**

We will develop healthy communities by promoting awareness and disseminating knowledge to stakeholder communities. These programs will include:

- Lifestyle and Risk Reduction
- Patient Support and Life after Cancer

With you, more cancers will be prevented, and treatments more effective and less harmful. Cancer survivors will look forward to a bright future. We invite you to leave a lasting legacy of hope. **JOIN US.** 

### Join us, and together we will tackle cancer.

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