Future of Health Care

ANGEL GIUFFRIA'S LIFE AS A CYBORG

With her recent upgrade to the* Bebionic*, one of the most advanced prosthetics on the market,* The Hunger Games *actress Angel Giuffria shares her experience being part of an exciting, tech-focused health care future

Mediaplanet ***What has been your experience with a bionic arm?***
Angel Giuffria It's changed my everyday interactions and how I go about life. From how people respond to me at the supermarket, to how I check my phone at the airport, it has allowed me to live in a way that has been more exciting and more efficient. People see this and think, "Wow that's cool, that must help do a lot!" I love the impression it gives, even before people get to see it function.

MP ***How has your new bionic arm differed from regular prosthetics you've had in the past?***
AG It's been great having a multi-articulating hand. It gives you the ability to do smaller tasks that people think aren't important. But with new additions and control strategies, it's much easier to use. There are even customized options which makes me more connected to the device!

MP ***Has the equipment itself posed any challenges?***
AG For the most part it works well, but there are days where I'm tired and I forget to charge up. Or I take it off on my drive and leave it in my car. Every once in a while there are little challenges to work around but people with physical differences are constantly problem-solving.

MP ***What do you see as the future of bionics and its health care applications?***
AG There are endless possibilities right now for what we can do with this type of technology in health. What's going to be amazing is the ability to replace or modify anything to do with the human body. [Science has] the ability to make bodies the best that they can to be safe, healthy, and happy.

Read the full interview online at **personalhealthnews.ca**

Publisher: **Alex Jedemann** Business Developer: **Nina Theodorlis** Country Manager: **Jacob Weingarten** Content Production Manager: **Ellen Asiedu** Lead Designer: **Michael Shea** Digital Content Manager: **Camille Co** Cover Photo: **Advanced Arm Dynamics** Contributors: **Ken Donohue, Randi Druzin, Colin Ellis, Michael Green, Ted Kritsonis, Anne Papmehl, Melissa Vekil** Photo Credits: **Mike Gallant** All images are from Getty Images unless otherwise credited. Send all inquiries to **ca.editorial@mediaplanet.com**.
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When Will Canada Step Up to the Population Health Challenge?

Understanding population health management is crucial to providing smarter care to the entire Canadian population. At Cerner, we believe that smarter care is proactive care.

Population health management is the forward-thinking application of strategies to a specific group of people with the purpose of improving their health and well-being. It must be viewed as part of a wider health and well-being strategy that considers status, income, and environmental impact. The data collected by the health and social services, education, labour, and finance ministries on these topics — though broadly siloed — are valuable sources of information that should be better leveraged to create a truly integrated system of care.

Going beyond informatics

Using predictive analytics and sharing data across the continuum of care can ensure our health care system is working proactively to help people before their conditions worsen. While most Canadian health care organizations have an understanding of where their issues lie, many seem to be wary of improving the way they aggregate and organize data. Cerner is making the data management part of the equation much easier. We help organizations focus on analyzing their data versus managing it, allowing them to develop a true population health management maturity plan.

Melissa Vekil

For more information , visit cerner.com/solutions/population-health-management.

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Driving Access to Care for Canadians

Michael Green
President & CEO, Canada Health Infoway

Canada's health care systems are fragmented and outdated. Despite the money we spend on health care, research shows that Canada ranks at or near the bottom in international comparisons of timely, equitable access to appropriate care.

For example, Canadians wait longer to receive attention in hospital emergency rooms, and fewer than 10 percent of Canadians can access health information online or email a doctor with a question.

Canada Health Infoway (Infoway) believes digital health solutions can turn things around and improve access to care and to health information for all Canadians. Improving access will result in better outcomes and healthier, more productive citizens.

Infoway is leading a national strategy called Driving Access to Care that focuses on two short-term initiatives:

- Implementing an ACCESS Digital Health[1] Ecosystem to deliver digital services such as e-visits, e-referrals, e-consultations, and e-viewing of lab results and other information; and
- Scaling a national e-prescribing service called PrescribeIT™ which promotes medication safety and makes prescribing more convenient and efficient for patients and providers.

Our goal is to provide all Canadians with a modern, 21st century health care system that is sustainable, efficient, provides better access to care, and, most importantly, improves health outcomes.

[1] working title

Michael Green

Connect with Michael Green on Twitter @MGreenonHealth.

The House Call is Making a Comeback

Daniel Warner
Founder & CEO, MediSeen

Elise Devlin
Vice President, Clinical Strategy, MediSeen

The house call is experiencing a revival, courtesy of digital apps offering patients health care services in the comfort of their home.

Presented as a solution to overcrowded clinics and hospital emergency rooms, the vision is to create a seamless experience where patients can efficiently access quality health care services — right at home.

"Canadians are disappointed with wait times. Patients can now receive health care comfortably at home, select who treats them and when, and providers can choose whom they see, when, and where. It's a win-win for them and the system," says Daniel Warner, founder and CEO of MediSeen, a secure, digital house call platform, based in Ontario.

"Health care providers, like physicians, can build their own house call practice, by defining their coverage area, and patients can browse and select a provider, with visibility of the services, schedule, languages spoken and more," Warner explains. Each provider is carefully vetted before joining the network, providing a layer of comfort and security for patients.

A holistic, digital approach

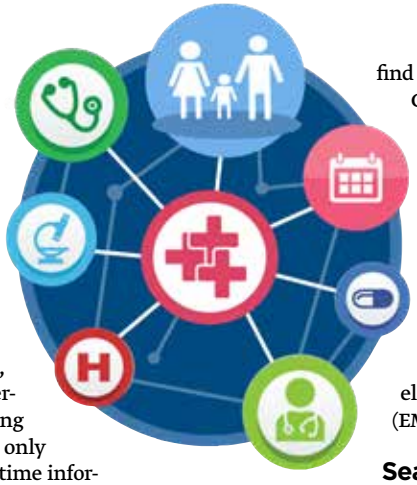
Digitizing the process allows patients to view and download their medical documentation. "This new type of multi-service, secure platform that enables patient access and self-determination doesn't currently exist in the health care space," says Elise Devlin, Vice President of Clinical Strategy at MediSeen.

Caregivers, the elderly, or those dealing with complex or chronic conditions may find added convenience in not having to travel for non-emergency care. "Our current health care infrastructure cannot expand or build fast enough to meet the growing demand," Devlin says. "The only other viable point of care is in the patient's home."

Ted Kritsonis

Digital Tools Empower Patients and Health Care Professionals

Dr. Ryan Doherty
President & Founder,
iamsick.ca



The digital revolution is bringing innovation to the health care system and a seamless experience for patients and health care provider workflows across Canada.

"I feel like this is only the beginning," says Dr. Ryan Doherty, President and Founder of iamsick.ca. "Better coordination of care, patient experience, and operational efficiencies are being realized daily, and this will only scale and accelerate as real-time information is liberated through open data mandates, digital health platforms, and application programming interface (API) partnerships."

Launched in 2012, iamsick.ca is a digital health platform that aims to improve health care access with an initial focus on primary care, acute care, and urgent care. Through its website, mobile apps, and partner apps, patients can easily find nearby health care options Canada-wide, from family doctors accepting new patients to urgent care available after-hours and during holidays to pharmacy services available in specific languages. The platform even offers walk-in clinic wait-times calculated in real-time from electronic medical record (EMR) schedulers.

Seamlessly integrating user experiences

It's a smooth experience for patients and providers. Integrated with clinical systems, the platform automates processes for primary care rostering, online appointment booking, patient queuing, and sending appointment reminders.

A for-profit social enterprise, the Toronto-based company will be national this summer, with access to the up-to-date information of health care facilities from coast to coast. The platform has APIs that offer the health care services directory and patient engagement services to partner apps and initiatives led by health care providers, agencies, vendors, and innovators.

"Open data and collaborative innovation will integrate the silos of the health care system," says Dr. Doherty, "leading to efficient care delivery and better outcomes for patients and clinicians."

Colin Ellis

For health care when and where you need it, visit iamsick.ca.

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iamsick.ca

Personalized Medical Cannabis Treatment Plan Critical to Success

Since an Ontario court ruled it was unconstitutional to block access to cannabis for medical patients, the use of medical cannabis has grown dramatically in this country.

Since 2001, Canadian doctors have been prescribing it to treat many conditions, ranging from seizure disorders and nausea caused by chemotherapy to anxiety, depression, PTSD, and insomnia. It has proven particularly effective as a treatment for arthritis and chronic pain. It's clear that medical cannabis is a viable treatment option that has a bright future in health care.

Receiving the right prescription and treatment plan is essential

Although medical cannabis is becoming more prevalent, and a growing number of Canadians are interested in it, the solution is more than a prescription.

There are many strains of cannabis and dozens of cannabis compounds including CBD and THC. A particular strain could affect three patients in three different ways depending on genetics, other medications being taken, and other health factors.

One size does not fit all, and this makes it difficult for patients to find the best treatment plans for their respective conditions without guidance. With the legalization of recreational cannabis looming, the amount of information being released is expanding by the day, which makes the challenge even greater. To benefit fully from medical cannabis, patients should consult with specially-trained physicians who can help them develop personalized treatment plans to ensure they get the most relief and most effective results possible.

This is the mission of Apollo Cannabis Clinics, a network of cannabis-trained physicians across Canada who take an evidence-based approach to treatment with medical cannabis. Many of their patients are suffering from chronic pain and looking for an alternative to opioids.

Apollo Founder and President Bryan Hendin says his clinics, which provide ongoing education, support, and monitoring for patients, have helped to improve the quality of life for many patients.

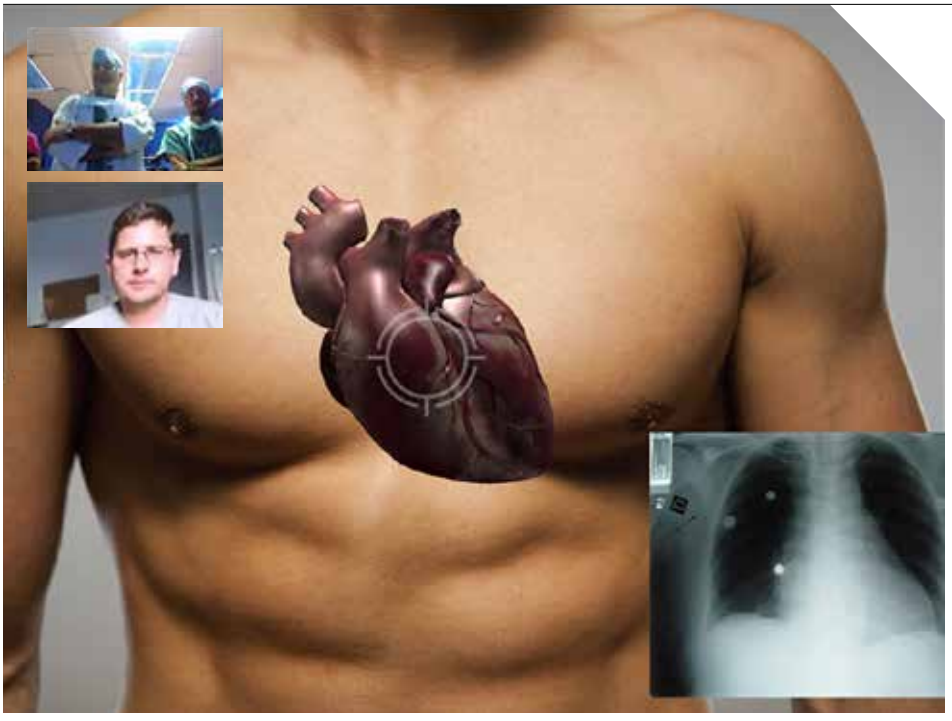
"We can show through validated research that 80 percent of patients have been able to reduce or discontinue opioid use after a month of treatment with medical cannabis," he says. The clinical observational study was conducted by Apollo's research division and is now in peer review.

Hendin emphasizes that Apollo patients have been able to take control of their health by working with physicians and cannabis experts to develop personalized treatment plans. Each plan is based on the patient's specific needs and comfort with medical cannabis, which is critical to success.

Research will continue to prove that medical cannabis is effective. But Hendin says that, to get the best possible result, physicians and patients must go through the process together. He encourages patients seeking relief from pain and other conditions to seek information available from clinics like Apollo to learn how a medical cannabis treatment plan may help.

Randi Druzin

IN PARTNERSHIP WITH apollo Cannabis Clinics



Virtual care solutions like Reacts provide physicians with advanced communication capabilities.

Will Doctor-Led Innovation **Save Our Health System?**

"People don't have to take time off work, or drive to the doctor's office."

Dr. Yanick Beaulieu
President, Innovative Imaging Technologies Inc.

Dr. Sonny Kohli
Co-founder & Chief Medical Officer, Cloud DX

Chances are your doctor's office still uses a fax machine. And it's no surprise, as technological innovation isn't usually something associated with our public health system. But according to Scott Livingstone, CEO of the Saskatchewan Health Authority, we are at a turning point where we're beginning to leverage technology to develop innovative solutions. Innovation in health care leads to better, more accessible care and a more efficient health system for those working in it.

"Recent advances, such as cloud-based technologies, provide us with some exciting opportunities," says Livingstone. "And there is a willingness among many of our physicians to try new ways to communicate with patients. With the recent amalgamation of 12 health regions into a single province-wide health authority, we are better positioned than ever to scale out these technologies across Saskatchewan and enhance care for our patients."

Canada's vast landscape has long posed challenges for the delivery of health care, but the use of smartphones and tablets is bridging the physical divide between patients and health care providers.

Technology bringing us closer together

Technology is solving some of the biggest challenges within health care, including access to treatment and the silos that exist between health care providers. "I have patients travelling two to three hours each way to see me for a 30-minute appointment," says Dr. Guruswamy Sridhar, a Saskatchewan physician. "But in many cases, this can now be done remotely. Virtual care will save our health system, and the quality of care will be the same or even higher, as access increases and costs are reduced."

Helping to fuel these bright ideas is a company called Joule, a subsidiary of the Canadian Medical Association, which helps stimulate physician-led innovation and removes barriers so new concepts can be scaled up and implemented. Physician-led companies like Innovative Imaging Technologies (IIT) and Cloud DX are just two of the latest examples of innovative solutions in digital health that are fundamentally changing health care in Canada.

"You may go to your doctor's office for an initial diagnosis, but then we can have a follow-up appointment done remotely at a time that is convenient for you," says Dr. Yanick Beaulieu, Founder of IIT and creator of Reacts, a collaborative platform with innovative tools, such as augmented reality, for remote virtual guidance and supervision, and training interactive tools designed to suit the collaborative needs of health care professionals and patients. Reacts enables convenient communication between doctors, patients, and teams of health care providers. "People don't have to take time off work, or drive to the doctor's office," he explains. "The system allows for video conferencing, file sharing, and remote teaching for both patients and health care providers."

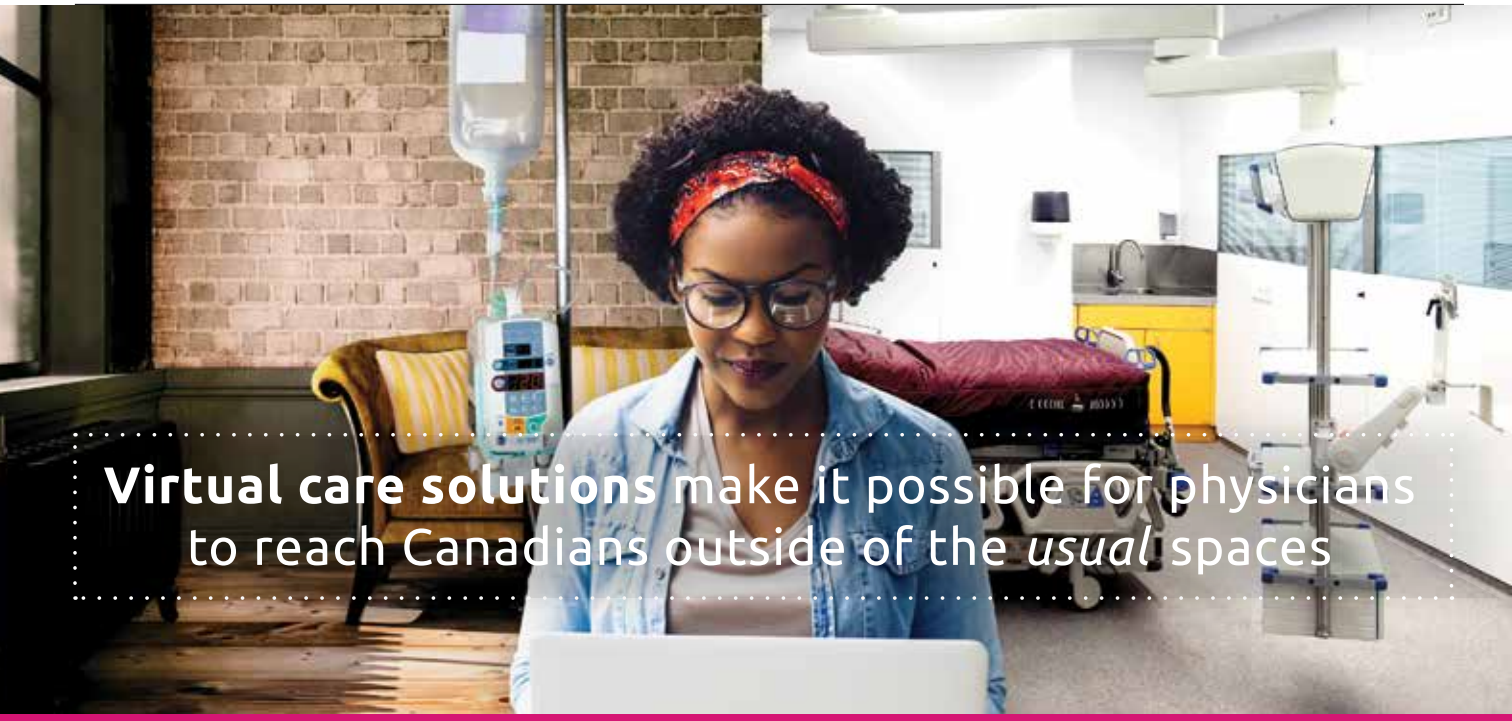
Dr. Beaulieu sees the benefit of this technology for people in rural communities, seniors living in cities, and those with mobility issues. "If we inject the right technology, we can see huge benefits and the savings will be significant," he says. "We are bringing Canada to the next level of virtual care."

Taking control through empowerment

Driven by a passion for innovation in hospitals, Dr. Sonny Kohli is the Co-founder and Chief Medical Officer of Cloud DX. He sees hospitals filled with many people who have conditions that could be better treated in the comfort of their homes. "Already, we can monitor our vital signs at home and send the data in real-time through our phones or tablets to a clinician" he notes. "With this same technology, we will be able to safely monitor patients with heart disease or chronic obstructive pulmonary disease, so they will only need to come to the hospital when medically necessary, and soon patients will be able to cough into their phones and have it detect respiratory ailments. This is what the future of health care looks like."

Physician-led innovation often has greater adoption, because they understand the types of solutions that will meet the needs of patients and clinicians. The advances that are being made will provide better outcomes, greater efficiencies, and overall cost savings, for patients and the system itself. And the exciting thing is, we will be able to see the impact right away.

Ken Donohue



Imagining a New Era of Health Care

Although there is no doubt of its potential, we have yet to see the proper utilization of artificial intelligence (AI) in health care. The use of AI in the industry will usher in a new era, with companies like Imagia leading the way using data drawn from routine medical imaging and reports.

There are challenges to developing and implementing technology as part of routine care, including access to quality data, staying clinically relevant, and getting solutions directly to patients and physicians. While access to data will help solve system-focused problems, solutions need to reach patients to make a real difference.

Currently, there is a limited scale of collaboration between clinicians, AI researchers, and health care industry experts. By fostering a collaborative environment between these groups, AI solutions — driven by clinician insight — can be developed to enable personalized care.

A personalized health care journey

Imagia's Evidens ecosystem brings creative minds in AI and health care together to drive the discovery and adoption of clinically relevant biomarkers.

When it comes to oncology, AI-based solutions will be used by medical-device and pharmaceutical manufacturers to provide more accurate diagnoses for personalized treatment options, clinical decision support for doctors, and help with early detection. Each patient journey is personal and needs to be supported by personalized AI-backed health care.

For more information about Imagia, please visit **imagia.com.**

Melissa Vekil

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The **Future of AI** and **Health Care**

Ying Tam
Managing Director, MaRS Health Venture Services

Ying Tam is the Managing Director of MaRS Health Venture Services, where he works with entrepreneurs to build high-impact, high-growth ventures and innovative health ecosystems

Mediaplanet ***How is artificial intelligence revolutionizing the health landscape?***

Ying Tam Artificial intelligence is able to augment researchers' and clinicians' capacities by sifting through vast amounts of data to quickly and reliably surface the important information. AI is making the biggest difference in improving clinical efficiency and sounding the alarm about early signs of disease.

MP ***What challenges may arise from the use of AI in health care?***

YT The successful adoption of AI in health care introduces technological, regulatory, ethical, and system challenges. The data infrastructure required to manage and store the vast datasets needed by AI could require massive upgrades by health care institutions. There are also a variety of questions around the oversight of AI — how do we clinically validate an AI solution? What do we do if an AI error or bias negatively impacts a patient's outcomes or even causes harm?

MP ***How will these issues affect the Canadian health care industry?***

YT As a single-payer health care system, Canada has an AI advantage in its large repository of diverse health data. Despite this, the development cycle for AI technologies will place strains on an already stressed system. But as health care costs continue to rise and we risk falling behind in health care delivery, AI offers solutions we can't afford not to embrace.

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USING 3D PRINTING TO HELP PEOPLE WITH GLAUCOMA

Dr. Michael Reber
Senior Scientist,
Donald K. Johnson
Eye Institute

Glaucoma is a serious eye disease that leads to irreversible blindness, but those affected may soon be able to avoid that fate. The disease is the result of degeneration of the ganglion cells, which connect the retina to the brain. The standard treatment is to try to slow down the cell degeneration by decreasing the elevated inter-ocular pressure.

Senior Scientist Dr. Michael Reber and his team at the Donald K. Johnson Eye Institute at Toronto Western Hospital are developing an innovative new approach to improve treatment. "Our approach is to find a way to help those ganglion cells regenerate or slow down their degeneration," says Dr. Reber.

In 2011, Dr. Reber was part of a study exploring how the use of silk nanofibres could promote the survival and repair of injured ganglion cells. "We found that these silk fibres not only gave the cells physical support, but the cells also used nutrients that can be added to the fibres," he explains.

Partnering with engineering professionals

The question was how to reliably produce those silk fibres on a massive scale. "At the time, it was being done using an old-fashioned method that wouldn't allow you to produce silk fibres in big quantities," says Dr. Reber.

To advance his research, Dr. Reber is partnering with engineering and industry professionals to develop a 3D bioprinter to produce these nanofibres. "It uses a procedure called electrospinning, which pulls a droplet of liquid silk through a very high voltage field into very fine strings with a diameter of below one micron, relevant to the size of the ganglion cells in the retina," says Dr. Reber.

The goal of Dr. Reber's team is to eventually transplant these enriched nanofibres into people living with glaucoma and other retinal diseases to slow down cell degeneration and prevent blindness. "3D printing will certainly help push this forward," he notes.

Anne Papmehl

Discovering How to Restore Eyesight Through **Cell Transplantation**

Dr. Valerie Wallace
Co-Director, Donald K.
Johnson Eye Institute &
Donald K. Johnson Chair
in Vision Research

Inset | Microscope image of retina cells.

About 500,000 Canadians live with some kind of visual impairment. Many of these visual impairments involve diseases of the retina — the thin, delicate tissue lining the back of the eyeball — such as age-related macular degeneration and retinitis pigmentosa.

"All the parts of the retina are very important but the parts that concern a lot of people with retinal disease are the photoreceptors," says Dr. Valerie Wallace, Co-Director of the Donald K. Johnson Eye Institute at Toronto Western Hospital and the Donald K. Johnson Chair in Vision Research. Photoreceptors are light-responsive neurons. "Without them, you are completely blind," says Dr. Wallace.

Through basic research in the lab, Dr. Wallace and her team are investigating whether transplanting healthy photoreceptors into a diseased retina can restore vision.

Transplanted cells growing connections

For this to work, cells have to grow connections and connect to what's left of the patient's retina. "Then they have to be able to respond to light and, through those new connections, re-establish the flow of information from those new neurons to the parts of the brain that interpret light as vision," says Dr. Wallace. "It's a very tall order."

Remarkably, Dr. Wallace and her team are finding that transplanted cells do survive and exchange some of their contents to the recipient retina. "This is a new way of thinking about how cell transplantation works," she says.

The implications for this discovery are exciting. "By understanding this exchange, we hope to not only discover better ways to treat retinal diseases but even prevent them from progressing in the first place," says Dr. Wallace.

Research innovations like these — which depend on philanthropic support — are critical to ensuring that Canadians with degenerative eye diseases face a brighter future. "Discovery research is the only way that we are going to change the outcomes in the long term for patients with devastating eye diseases," says Dr. Wallace.

Anne Papmehl

To learn more about the Donald K. Johnson Eye Institute, visit **tgwhf.ca/dkjei** or call **416-603-5220.**

Dr. Philip Awadalla
National Scientific Director, Canadian Partnership for Tomorrow Project

Dr. Craig Earle
Vice President, Cancer Control at the Partnership

The Future of Prevention is Almost Here

Imagine knowing years in advance that you are likely to develop a serious disease and then discovering the lifestyle changes you can make to lower the chances of that happening. The Canadian Partnership for Tomorrow Project (CPTP) is aiming to create a future where links between the onset of disease and factors related to lifestyle, genetics, and the environment are much clearer.

As the largest health research platform in Canadian history, CPTP includes more than 300,000 participants between the ages of 30 and 74 who were recruited through five regional cohorts representing eight provinces (BC Generations Project, Alberta's Tomorrow Project, Ontario Health Study, CARTaGENE, and Atlantic PATH). Over the next 25 years, some participants will develop cancer or other diseases and the accumulation of CPTP data and biosamples will allow researchers to conduct important population-health studies. They will determine links between the onset of illness and risk factors — including those that can be modified like diet and exercise, those that can't be modified due to genetics, and those that are largely based on environmental exposure.

"The data can touch every aspect of future health research because it gives you a time capsule to go back and see what people were doing before they developed certain diseases," says Dr. Craig Earle, Vice President of Cancer Control at the Canadian Partnership Against Cancer. The organization is a critical investor in, and the founder of, CPTP.

CPTP building 'world-class' health resource

CPTP data and biosamples were used in a study that determined that air pollution can alter DNA. Dr. Philip Awadalla, National Scientific Director of CPTP, notes that gene expression signatures largely follow where you live, rather than your ancestry. Dr. Awadalla is with the Ontario Institute for Cancer Research and the University of Toronto — the university recently became the national scientific home of CPTP. "By tracking the health of participants over an extended period of time, we will be acquiring knowledge that could help with disease prevention down the road," he says. Dr. Awadalla envisions that CPTP will enable a future where doctors will be armed with new genetic tools or biomarkers in order to advise patients on the steps they can take to prevent the onset of various diseases in the same way they now advise patients to stop smoking to avoid lung cancer.

"CPTP is a great example of pan-Canadian cooperation to build a resource for health research that is world-class and unique for medicine," says Dr. Earle. "It is going to be yielding benefits for decades to come."

Randi Druzin

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