Solutions for healthy aging

ANNUAL REPORT
2018-2019

A CANADIAN NETWORK
OF CENTRES OF EXCELLENCE
Our Vision
Canada’s leadership in technology and aging benefits the world.

Our Mission
To develop a community of researchers, older adults, caregivers, partner organizations and future leaders that accelerates the delivery of technology-based solutions that make a meaningful difference in the lives of Canadians.

Our Values

EXCELLENCE
Based on a strong and leading scientific research foundation

COLLABORATIVE IMPACT
Using a transdisciplinary approach, we share knowledge, ideas and resources across disciplines and stakeholder groups to generate better outcomes

CAPACITY-BUILDING
We train the best and brightest academic and industry talent

LEADERSHIP
We are recognized globally in the area of technology and aging

INNOVATION
We are engaged in a continuous process to create new ideas and solutions

INTEGRITY
We uphold the highest ethical and intellectual standards in our research and business activities

EQUITY
We are committed to equity, diversity and inclusion in all aspects of our network.
Acknowledgements

AGE-WELL gratefully acknowledges the support of its funder:

Government of Canada  
 Networks of Centres of Excellence

Gouvernement du Canada  
 Réseaux de centres d’excellence

An initiative of Canada’s research granting agencies  
www.nce-rce.gc.ca

The NCE Secretariat manages three national programs: Networks of Centres of Excellence (NCE); Centres of Excellence for Commercialization and Research (CECR); and Business-Led Networks of Centres of Excellence (BL-NCE). Through multi-disciplinary partnerships between academia, industry, government and not-for-profit organizations, NCE programs focus a critical mass of research resources on social and economic challenges, commercialize and apply research breakthroughs, increase private sector R&D, and train highly qualified people. Since its inception in 1989, NCE funding has helped create almost 2,310 companies; supported the development of more than 54,000 highly qualified personnel (HQP); invested more than $2.3 billion in research, commercialization and knowledge translation; and leveraged $2.46 billion in partner support to enhance the lives of Canadians.

And the support of its host institution:

UHN  
Toronto Rehabilitation Institute

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A message from the Scientific Directors

**By 2025, Canada will join the ranks of “super-aged” countries** like Germany and Japan where more than 20 per cent of the population is over 65. More Canadians than ever are living to the age of 85 and beyond, according to the latest Census.

This is a major achievement for Canada. The challenge is to help people live in their own homes and communities as long as possible, while staying healthy, active and safe. Technology can play a significant role in making this happen. It can support caregivers and ease pressures on our health-care system.

As Canada’s Technology and Aging Network, AGE-WELL has a broad mandate designed to respond to the pressing challenges of an aging population and to seize the opportunity that technology offers. With over 250 researchers at 42 universities and research centres across Canada, AGE-WELL is the only pan-Canadian network that brings everyone together—researchers, academic institutions, non-profits, industry, government, future leaders, older adults and caregivers—to deliver technology-based solutions that support healthy aging.

In our first four years, AGE-WELL has propelled forward the AgingTech sector in Canada. We have succeeded in part because of the diversity of our partnerships, which have grown from 80 in 2015 to almost 400 today. We have also pioneered a transdisciplinary approach to research that breaks down silos between disciplines and sectors. Crucial, too, is the active involvement of older adults and caregivers—more than 4,700—who ensure our products are practical and will be used.

And the results tell the story. Almost 100 technologies, services, policies and practices are being developed across the network. Some are already making a difference in people’s lives. In this report, you can read about products such as smart-home sensors, remote therapies and systems that connect people. AGE-WELL also supports research involving underserved populations including Indigenous communities. And we apply ourselves to privacy, ethical and regulatory issues.

AGE-WELL is accelerating innovation in multiple ways. We now support 35 startups that are commercializing much-needed products, creating jobs and making sales.

Our unique training program called EPIC (Early Professionals, Inspired Careers) prepares the next generation of Canadian researchers and entrepreneurs. AGE-WELL boasts over 750 highly qualified personnel (HQP) in our ranks. These talented young people are landing jobs across all sectors.

There’s tremendous excitement about our new Core Research Program for 2020-2023, which will tackle research questions across our eight new Challenge Areas (see page 39). The next phase of AGE-WELL represents a singular opportunity to continue the growth of Canada’s leadership in technology and aging. With a successful funding review, to be determined by fall 2019, AGE-WELL will continue to drive the AgingTech sector forward so that everyone is pulling in the same direction. It’s the only way to ensure that technologies are actually having an impact on people’s lives—and generating social and economic benefits for Canadians.●
AGE-WELL has become a globally-recognized leader in the field of technology and aging. Last year, we continued to develop significant international partnerships and relationships that strengthen our reach and relevance.

Nationally, AGE-WELL is now a go-to authority for decision-makers. Influencing public policy related to technology and aging is an important objective of the network. We have achieved this by increasing our connection and interaction with government. We are sharing our expertise and informing public policy.

Industry leaders also look to us. They view AGE-WELL as a critical player in the sector that can help them develop better solutions and improve performance.

Last year, we refined AGE-WELL’s vision and mission statements which will carry our network forward. As part of this, we embedded the principles of equity, diversity and inclusion (EDI) in our organizational values. An EDI strategy is being implemented this year.

AGE-WELL’s first five-year mandate ends in 2020. To prepare for the next phase, we began a strategic planning process last year to define our priorities for 2020-2023. Our renewal phase will build on the foundation we have created and position AGE-WELL to deliver a strong and sustainable technology and aging sector in Canada.

A message from
the Chair of the Board

From the beginning, AGE-WELL has been all about bringing everyone together to drive Canadian research and innovation in the area of technology and aging. We are fostering a community of engaged stakeholders working to create meaningful solutions to improve the lives of Canadians.

The past year was notable for stakeholder engagement. We set an attendance record at our 4th Annual Conference where over 400 attendees networked and shared knowledge.

We hosted two national competitions. The AGE-WELL National Impact Challenge invited Canadians to submit new ideas for technology-based solutions to support healthy aging. More recently, we called on Canadian startups to pitch products in a competition that recognized top innovators in Canada’s technology and aging sector.

Another highlight was the launch of an AGE-WELL innovation hub in Surrey, British Columbia focused on digital health technologies. We now have three national innovation hubs—the others are in Ottawa and Fredericton, New Brunswick. They engage stakeholders at the local level while pushing our agenda nationwide.

Across the AGE-WELL network, stakeholders play an indispensable role—partnering on projects, advising and informing our direction, and supporting the work we do.

We thank our funder, the Networks of Centres of Excellence (NCE), and gratefully acknowledge our host institution, the University Health Network. We are also indebted to the AGE-WELL Board of Directors, committee members, researchers, trainees, staff members, partners, older adults and caregivers who are working devotedly with us to create the future of aging in Canada.
by the numbers

1,591 Total Number of Publications
126 Research Projects
35 AGE-WELL-Supported Startups

380+ Partners

Government: 63
Other: 27
Not-for-profit: 103
Academia: 54
Industry: 136

99 AGE-WELL Solutions across the Product Readiness Level (PRL) Scale

Outcomes (technologies, services and policies/practices):
- 27

Experimental Implementation:
- 35

Prototype:
- 21

Incubator:
- 13

Innovation Research:
- 3

AGE-WELL Solutions:

Publications:
- 1,591

Research Projects:
- 126

AGE-WELL-Supported Startups:
- 35

Partners:
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Others: 27
AGING WELL ANNUAL REPORT 2018-2019

250+ Researchers

42 Member Universities and Research Centres across 8 Canadian provinces

4,700+ Engaged Older Adults and Caregivers

755 HQP

Highly Qualified Personnel

- 161 HQP
- 143 HQP
- 103 HQP
- 348 HQP

Includes active and alumni HQP

Professional includes research associates, technicians and summer students

202 Innovators of Tomorrow Certificates awarded

35 International Collaborations across 14 countries
A new mobile app aims to help those with early dementia or mild cognitive impairment to manage daily activities and keep track of how they are doing, providing greater independence. DataDay uses audio, text or visual prompts to remind people to carry out activities such as taking medications and preparing meals. The app was co-created by Dr. Arlene Astell (The Kite Research Institute at University Health Network and previously Ontario Shores Centre for Mental Health Sciences) and people living with dementia. DataDay will soon be widely available through Ontario memory clinics.

Daily Reminder System

Blind Spot Sensor Systems for Wheelchairs

Tight spaces, crowded areas and doorways are some of the many places that can be difficult to navigate in a wheelchair. Now there are sensor systems that can be installed on any wheelchair to provide the user with feedback about obstacles in their blind spots. Developed by Braze Mobility Inc., an AGE-WELL-supported startup, the products increase awareness, safety and confidence in mobility, says Braze co-founder and CEO Dr. Pooja Viswanathan.
Alert System for Missing Older Adults

Sixty per cent of people with dementia will wander, according to the Alzheimer Society of Ontario. Improving the chances of finding them is the goal of a new alert system developed by a group of researchers, older adults, caregivers, businesses and community organizations. Community ASAP is a localized system designed to directly engage community volunteers who receive an alert via an app on their phone or device giving them the name and description of the missing person. In 2018, the system was tested in five Canadian cities. The project is led by Dr. Lili Liu of the University of Waterloo (previously University of Alberta). Caregiver Ron Beleno is working to commercialize the system.

Robotic Glove

HERO Glove is a lightweight robotic glove designed to help stroke survivors open and close their hands with more grip force. The goal is to improve hand function so that people are better able to do daily tasks such as eating, drinking and dressing, says AGE-WELL trainee Aaron Yurkewich, a PhD student at the University of Toronto. The glove has been tested in a small clinical trial and will next be evaluated in a home setting.

Digital Games for Social Connectedness

Watch for a new tablet game coming soon from the creators of TicTacQuiz and Solitaire Quiz, digital games specifically for older adults. The latest is a multi-user escape room game based on the theme of Alice in Wonderland and designed to encourage social connectedness and learning. Created by Drs. David Kaufman of Simon Fraser University and Louise Sauvé of SAVIE Public Research Centre, the new game was tested successfully in 2018 in Vancouver and Utrecht in the Netherlands. It will soon be available online.
App for Managing Arthritis

A new smartphone app is helping people living with arthritis to manage and assess their condition better. LiveWith Arthritis Plus uses novel medical imaging to help users track their pain, lifestyle and response to treatment—so they can find better solutions and work with their clinician to get healthier. First released in 2017, the app has been enhanced based on input from hundreds of Canadian users, says Shanil Gunasekara, founder and chief executive of Vancouver-based eTreatMD, which developed the app with support from AGE-WELL.

Engaging Long-Term Care Residents with Dementia

ABBY is a wall-mounted system of interactive activities for people with dementia who live in long-term care. The goal: to engage residents, reduce disruptive behaviour and lessen front-line caregiver stress. ABBY integrates touch-screen monitors, video, music and familiar tactile activities. ABBY can display personalized content like family photos. An evaluation study shows it reduces responsive behaviours. ABBY was developed by industry partner Ambient Activity Technologies and evaluated by AGE-WELL researchers Drs. Mark Chignell and Andrea Wilkinson of the University of Toronto. More than 55 units have already been installed in Canadian long-term care homes.
Virtual Exercise

VirtualGym is a computer-guided system for older adults with chronic conditions, early-to-moderate dementia, mobility and other challenges that can prevent them from taking part in group-exercise activities outside the home. VirtualGym provides personalized exercise instruction and feedback to promote physical and cognitive health. It features an on-screen virtual coach and uses a special camera to record the movement of the older person in 3-D. The project is led by Dr. Eleni Stroulia (University of Alberta) and Dr. Lili Liu (University of Waterloo and previously University of Alberta).

Stabilizing Glove

Millions of people around the globe are affected by hand tremors, which can make it hard to eat, drink, write and do other daily activities. Steadi-One is a lightweight glove that “intelligently” stabilizes the wrist joint in people living with Essential Tremor and Parkinson’s disease. It uses vibration damping and nano-technology to provide resistance to tremors. Clinical testing is now underway. AGE-WELL-supported Steadiwear Inc., which invented the glove, expects the product to reach market in 2019.

Maintaining a Healthy Brain

What if an app could help to maintain a healthy brain as well as detect the onset of memory and cognitive declines that lead to dementia? Dr. Zahra Moussavi, professor and director of the Biomedical Engineering Program at the University of Manitoba, is working to make this happen. With support from AGE-WELL and assistance from IDFusion, Dr. Moussavi has created a series of games or brain fitness exercises for the iPad. Following a pilot study which showed “very positive results,” the plan is to make the app available in the App Store for healthy individuals. It is also being tested in a clinical trial involving people with dementia.
AGE-WELL research is solution-driven. Every project is expected to create one or more tangible technologies, services, policies or practices. The outcomes must help older adults and caregivers in their daily lives, and deliver social and economic benefits.

To date, the network has supported 126 research projects through three programs. Our Core Research Program spans five years and represents the largest funded program within our network. The Catalyst Funding Program invests in shorter-term early-stage projects, and the Strategic Investment Program Accelerator focuses on post-discovery research.
AGE-WELL projects take a transdisciplinary approach, bringing together different sectors and disciplines to solve complex problems.

Our teams stand out for the inventive minds they unite—including researchers who might not otherwise have collaborated. Every project involves at least one partner from industry, government or the community. End-users take part in all aspects of AGE-WELL research. They provide feedback on the relevancy of research proposals, participate in research investment decision-making and play an active role in research projects.

**ALMOST 100 PRODUCTS**

AGE-WELL teams are turning great ideas into real-world products.

Some innovations are already on the market and having a clear impact, like an iPad-based platform which connects older adults with family and friends, and reduces isolation. Other products are moving rapidly through the innovation pipeline, including smart-home systems, remote therapies and social robots that support aging-in-place.

Beyond technologies, our researchers are producing new policies, practices and protocols, such as first-of-their-kind guidelines to reduce wandering in people living with dementia (details on page 37). We also support research that is conducted in partnership with Indigenous communities.

In our renewal phase, AGE-WELL will shift the focus of our research funding and programming from eight Workpackages (research themes) to eight Challenge Areas. These Challenge Areas were identified through an extensive review and consultation process in 2018. They are part of a major initiative that will set the agenda in the technology and aging field in Canada.

Our future Core Research Program, unveiled in May 2019, is a set of 24 research projects that offer unique and practical innovations, and build on AGE-WELL’s success in providing older adults with technology-based solutions to improve health, quality of life and independence. These projects were carefully selected to tackle research questions across all of AGE-WELL’s eight Challenge Areas—and to shape the future of aging in Canada.

As we look to the future, we are also excited about the research that is thriving at our national innovation hubs. In early 2019, our newest hub, the Digital Health Circle, launched in Surrey, BC to address aging challenges through digital health technologies. Our other hubs in Fredericton and in Ottawa focus on technology and aging policy, and sensors and analytics, respectively. They are catalyzing new relationships at the local level while advancing AGE-WELL’s agenda across Canada.
Richard Ratcliffe, 91, has had his life transformed over the past three years thanks to FamliNet.app, an AGE-WELL-supported communications platform designed to prevent social isolation by keeping older adults in contact with family and friends.

Life had become lonely for the war veteran and career naval officer because of profound hearing loss from “being a little too close to gunfire in Korea. It's a real social liability, so the tendency is to stay out of the conversation and that's not good,” says Ratcliffe.

Things changed when Ratcliffe began using FamliNet, an easy-to-learn platform that features pictures of the user's contacts and simple icons to access the different types of messaging.

“My father is no longer alone. FamliNet has bridged so many gaps, he now shares pictures, videos, audio and text messages with family and friends on a daily basis,” says Ratcliffe’s daughter Steph Gagne. “Words cannot express my gratitude for the ease of this program achieving something I never could.”

FamliNet was developed for use on an iPad. The program helps to re-engage those who have vision, hearing, motor skill challenges and other barriers that isolate them from the people and services they need. It requires minimal training to use—even for older adults with no computer experience.

The software program was launched by the startup Famli.net Communications Inc. and, to date, has been used by more than 100 residents at Sunnybrook Veterans Centre and a Revera retirement residence in Toronto.

“I’d be lost without it. It opened up a whole new world,” says Ratcliffe, a resident at Sunnybrook.

He exchanges messages with Gagne “many, many times during the day” and has about 50 contacts including his three children, five grandchildren, other family members, friends and business associates from Winnipeg to Cape Breton. Ratcliffe even uses the program to conduct business in-house as president of the Sunnybrook Veteran Residents’ Council.

Using FamliNet, Ratcliffe sang Danny Boy and delivered it to his granddaughter while she was in a pub in Ireland having a Guinness. When she trained to be a minister and was working on her first sermons, she recorded and sent them to her grandfather.

For their 30th wedding anniversary, Gagne and her husband took a two-week trip to England. “What gave me comfort in leaving was knowing that I could still correspond with my dad through FamliNet.”

“I felt like I was there with them,” says Ratcliffe. “Steph was sending me pictures from Trafalgar Square, Greenwich, Stonehenge, Oxford, all kinds of places in England that I had been myself. It was a great reminiscence.”

Ratcliffe and Gagne look forward to seeing FamliNet used by older adults everywhere who could benefit from the easy-to-use communications tool. Famli.net is in discussions to expand its clientele to other veterans’ hospitals, retirement homes and seniors’ organizations in Canada, and plans to launch a multi-platform version of FamliNet not only in Canada, but in Singapore through several organizations that provide community care to seniors.

“It opened up horizons for my dad. He’s now challenged and stimulated in a way that he hadn’t been for a long time,” says Gagne. “It has brightened his world.”

FamliNet was developed by TAGlab at the University of Toronto. TAGlab and Famli.net have deep roots at AGE-WELL as they are funded through the network’s Core Research Program.
Getting dressed, eating healthy meals, taking medication, tracking vital signs: these are some of the daily tasks that social robots soon will be able to help with—supporting aging-in-place, especially for older adults with cognitive impairment.

“The response to this project and the robots we’ve been developing has been exceptional,” says Dr. Goldie Nejat, director of the Autonomous Systems and Biomechatronics Laboratory at the University of Toronto. “It’s fantastic how many people want to be involved—from industry collaborators to long-term care facilities, seniors’ residences and users.”

Dr. Nejat, who holds the Canada Research Chair in Robots for Society, and Dr. François Michaud, founding director of the Interdisciplinary Institute for Technological Innovation (3IT) at Université de Sherbrooke, are leading the AGE-WELL project to create social robots, which will be on the market within two to five years.

Social robots are designed to prompt older adults with cognitive challenges to do activities of daily living, thereby promoting independence and quality of life. Many of the earlier capabilities, such as facial expression, emotion and meal preparation, were developed on Casper, a prototype robot created by Dr. Nejat’s team in collaboration with industry partner CrossWing Inc.

Next came Mia, like Casper, a 3-D printed mobile robot platform from CrossWing with customized torso and chest-level video screen, arms, head, sensors and intelligence developed by Dr. Nejat’s team. Mia is the next step toward commercialization due to its reduced size and increased computing capabilities. “Mia can do more activities; it can sense a lot more in its environment all onboard the robot.”

Using commercially available robots, Dr. Nejat’s team has further developed social robot intelligence and capabilities, and put them to the test. Leia, a Nao table-top robot often used in health care, education and research, has been customized as a “personal wardrobe assistant” to help older adults select an outfit that is appropriate for the day’s activities and the weather. While formal analysis is underway, initial feedback from testing at a long-term care facility appears positive. “It is easy to use,” says Dr. Nejat. “The robot is engaging, and people will do the activity with the robot.”

continued on next page
Leia has also been developed as an exercise coach. Using upper-body exercises with healthy adults, the system proved to be easy to use without much training and could reliably identify if participants achieved their exercise goals. Further testing is planned in a retirement or long-term care setting.

What if someone doesn’t want to do their exercises, eat or take their medication? Two Nao robots were pitted against one another to determine which persuasive techniques are most effective. Tested with members of the public, two persuasion strategies (“affect” and “logical”) out-performed others and will be further explored by Dr. Nejat’s team as part of the behaviour package for social robots.

Another commercially available mobile robot called Pepper has also been added to the team. The idea is to see how well an existing robot platform can function with all the enhanced intelligence/computing, activities and assistance components of the AGE-WELL robot project. “We hope to take Pepper into long-term care so we can deploy it and conduct more of our human-robot interaction studies,” says Dr. Nejat.

In Quebec, Dr. Michaud has been fine-tuning and testing the telepresence robot with industrial partner Vigilent Telesystems Inc. “Our telepresence robot makes it possible for a clinician or a caregiver to move in the home and interact with the person from a remote location,” says Dr. Michaud. “Functionality such as autonomous navigation, face tracking and voice tracking make it possible for the remote operator to focus on the interaction with the person and minimize interventions for navigating the robot.”

Not only can medical appointments be conducted this way, but the older adult’s vital signs—including

Robotician Dr. Goldie Nejat:

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Above: Dr. François Michaud, project co-lead, Université de Sherbrooke
Above right: Stephen Sutherland, CrossWing’s president and chief executive
their weight, temperature, blood pressure, ECG, blood sugar level and more—can be tracked by wireless Bluetooth monitoring devices, validated and transmitted into their electronic medical record.

Dr. Michaud’s team has conducted trials in 10 typical home settings. The team is preparing for field trials at Chartwell retirement residences in Sherbrooke this fall.

AGE-WELL’s social robot project owes much of its success to the participation of its diverse investigators, their industrial partners and end-users who have been involved since the beginning. “CrossWing is very fortunate to be working with AGE-WELL researchers including teams at the Université de Sherbrooke and the University of Toronto,” says Steve Sutherland, president and CEO of CrossWing Inc.

“AGE-WELL is unparalleled in Canada as a conduit for transdisciplinary collaboration...”

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“AGE-WELL is unparalleled in Canada as a conduit for transdisciplinary collaboration as we seek to deliver social robots which will enable seniors to live independently in their own homes—to feel confident and truly enjoy their independence with the friendly help of our social robots.”

Drs. Frank Knoefel (left) and Bruce Wallace with a mat filled with sensors that is placed under a bed mattress to monitor health.

SMART-HOME SYSTEMS

AGE-WELL teams are at work on an array of smart-home systems that will help older adults stay healthy and independent, while supporting aging-in-place. Some examples:

**Kitchen sensors:**
Sensors that detect temperature, electrical current consumption, and contact with the stove, fridge and other appliances can help identify potentially risky situations in the kitchen. These sensors will signal the older adult to turn off the stove, close the fridge door or take other corrective action—even alert a caregiver to intervene. If the sensors detect a change in habits in the kitchen, indicating cognitive or physical decline, a health-care provider could be notified for follow-up. **Lead: SAM3 hub**

**Smart beds:**
Pressure-sensitive mats placed under a bed mattress are being designed to monitor an older adult’s health during sleep. The mats are filled with sensors that can track how much someone moves in bed, monitor breathing patterns and detect fluid build-up. The technology is being tested as a way to prevent pressure sores and to detect and monitor conditions such as sleep apnea and congestive heart failure. **Leads: Dr. Frank Knoefel (Bruyère Continuing Care / SAM3) and Dr. Rafik Goubran (Carleton University / SAM3) Partner: Hexyoo**
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### Wandering detection and diversion:
Designed to support caregivers and people with dementia, this system uses an array of motion, contact and bed sensors to detect a sleeper’s movements if they wander out of bed. If necessary, other technologies are also activated—a night light turns on, a voice message encourages them to return to bed, or an alert is sent to the caregiver. **Lead:** Dr. Frank Knoefel (Bruyère Continuing Care / SAM^3) and Dr. Bruce Wallace (Carleton University / SAM^3)

### Intelligent emergency response system:
Using artificial intelligence and computer vision, this innovative system “learns” a person’s habits and knows when something has gone wrong. If a fall is detected, for example, the technology can interact with the person and call for help, if necessary. The system relies on ceiling-mounted sensors, eliminating the need for a fall-detection bracelet or pendant. **Lead:** Dr. Alex Mihailidis (University of Toronto)

### Virtual assistant:
ACT@Home is all about helping people with Alzheimer’s disease complete activities of daily living. The system, developed by Canadian computer scientist Dr. Jesse Hoey, is designed to verbally prompt people to carry out tasks, such as handwashing. Now, in the AGE-WELL-funded project EMOTEC, it is being further developed to align emotionally with users—taking an individual’s personality and current state of mind into account. **Leads:** Dr. Jesse Hoey (University of Waterloo) and Dr. Julie Robillard (University of British Columbia) **Partners:** Research Institute for Aging, Schlegel Villages and Tapestry Retirement Living

### Supporting seniors with severe mental illness:
It’s estimated that one in three seniors are living with a psychotic or mood disorder. Supporting them in the community is the goal of a three-year study involving smart technologies. Participants will be provided with smartphones, touch-screen monitors and health-monitoring devices. The smart technology will send prompts to the seniors, and produce data for health-care providers to monitor. **Lead:** Dr. Cheryl Forchuk (Lawson Health Research Institute) **Partners:** Canadian Mental Health Association Middlesex, London-Middlesex Housing Corporation

Laura Ault, an AGE-WELL trainee, demos a sensor-system that detects night-time wandering in people with dementia and encourages them to return to sleep.
After downhill skiing for most of her life, Wilma de Young has no intention of stopping now, even though she is in her late sixties and has osteoporosis. Her doctor encourages physical activity and de Young is a strong believer in its benefits. But she knows a hip fracture would be a serious matter and so she has been exploring ways of protecting herself. That brought her to AGE-WELL, where she learned about next-generation hip protectors—ones that attach directly to the skin.

“I really liked the idea,” she says. “I want to keep skiing. I really love it and physical exercise is not only good for the body but the mind.”

Injuries from falls are devastating and all too common among older people. Hip protectors have been shown to significantly reduce the risk of fractures from falls, but the challenge is convincing people to wear them consistently.

The stick-on hip protectors are the creation of an AGE-WELL-supported research team. Instead of garment-based hip protectors, which need frequent laundering, the stick-on ones can be worn for up to 21 days before being replaced. The researchers are working with partner Blue Tree Medical to get the product to market and make it widely available—including for people like Wilma de Young.

The work is part of a larger project called PRED-FALL focused on developing innovative technologies to predict, prevent and detect falls.

“I think that this is an exciting time, where AGE-WELL is helping to lead the way,” says Dr. Steve Robinovitch, a professor in the School of Engineering Science at Simon Fraser University and co-lead of PRED-FALL.

As PRED-FALL co-lead Dr. Fabio Feldman points out, an overriding thread of the team’s work is to focus on injury prevention, and not only on fall prevention. He encourages the same type of thinking on the part of long-term care staff—so that residents aren’t discouraged from physical activity and the benefits it can bring. Dr. Feldman is director, Clinical Quality and Patient Safety for Fraser Health.
Indigenous technology needs exploration

After she had a stroke five years ago, Edna Spencer began forgetting some words in Nakota, her first language. But now, with the help of an iPad app, she is starting to rediscover them at the age of 86.

“She likes it, she’s laughing, it’s helping her relearn,” says her son, Orval Spencer.

Both are members of the Carry the Kettle (CTK) First Nation in rural Saskatchewan and are involved in an AGE-WELL-supported project called Indigenous Technology Needs Exploration – Saskatchewan (ITNE). Orval Spencer sits on a Community Research Advisory Committee at the File Hills Qu’Appelle Tribal Council (of which CTK is a member) which is gauging attitudes towards technology.

He suspected that his mother and other Elders would be reticent, partly because of age, partly because of past experiences with residential schools. He has been pleasantly surprised.

“So far, there’s good response to it (technology), more than my expectations when we first started,” says Spencer. Conducting scientific studies in First Nations is a delicate process. The ITNE team has proceeded carefully and methodically, respecting cultural preferences and not forcing matters.

“Research has not traditionally been good for Indigenous people,” says ITNE lead Dr. Carrie Bourassa, a professor of Indigenous Health in the University of Saskatchewan’s College of Medicine.

“We had to build a relationship. It’s a very sensitive subject. It took us a long time to build that trust,” she says.

The researchers relied on members of the communities to take the lead, often gathering input through traditional sharing circles. A sharing circle is run by an Elder who would begin with a prayer and then hand a rock or a feather to individuals around the circle, inviting each person to speak without interruption.

“It’s important to have spirit in this research,” says Dr. Bourassa. “It’s such a good way to start good work.”

There has been an increase in cases of dementia in First Nations in recent years. Dr. Bourassa’s team found that many community members knew little about Alzheimer’s and related diseases and, as a result, part of the project was education.

Some asked whether the increases in dementia could be traced to the lingering trauma of the residential school experience. It is a question that will soon be pursued in a separate research project.

The ITNE group has submitted several peer-reviewed articles, including one that shares their methods for ethical engagement with Indigenous communities. The central conclusion about technology is that the First Nations surveyed are open to exploring the possibilities.

“I’m encouraged,” says Dr. Bourassa.

While Indigenous communities seem ready to embrace technology, there is an ongoing challenge with inadequate access to broadband. As a result, the first applications may well be via apps on phones or iPads, because they are more readily available.
REMOTE CARE

With the help of technology, older adults will increasingly be able to manage their health at home, while staying connected to health-care professionals. Here are some of the in-home approaches being developed with support from AGE-WELL:

**Knee replacement app:**
Designed by a physiotherapist, this mobile app is intended for use at home by older adults recovering from total knee replacement surgery. It will provide daily video-guided exercises, reminders and checklists. The user will be able to measure their knee movements with a mobile phone—something that could only be done before with a health-care provider. **Lead: Dr. Jonathan Rose (University of Toronto). Partner: Curovate**

**Telerobotic rehab:**
For older stroke survivors and seniors with age-related movement disorders, an advanced “telerobotic” rehabilitation system is being developed to provide supervised in-home therapy. It incorporates virtual reality, haptic robotic technology and Internet communication to improve people’s sensory and motor function. **Co-leads: Dr. Rajni Patel (University of Western Ontario) and Dr. Mandar Jog (London Health Sciences Centre)**

**Telediabetes care:**
Diabetes rates among Indigenous people in Canada are almost four-fold higher than the general population. Representing more than half of Indigenous peoples in Canada, urban (off-reserve) Indigenous people face disproportionately poorer diabetes-related outcomes. The I’M T’CARE project seeks to build capacity for telediabetes care in urban Indigenous communities. The goal: to reduce diabetes-related inequities and improve health outcomes. **Co-leads: Dr. Charlotte Jones and Dr. Donna Kurtz (University of British Columbia) Partners: Indigenous Diabetes Obesity Health 2 team and six Friendship / Métis partners and Indigenous Community Advisory Teams**

**Arthritis management:**
People with arthritis can use the LiveWith Arthritis Plus smartphone app to track how they are doing between doctor and physiotherapy visits. The app measures swelling and other physical changes. People can also learn how medications, diet and exercise affect their pain—and health-care providers can remotely assess progress. **Lead: Dr. Diane Gromala (Simon Fraser University) Partners: eTreatMD, The Arthritis Society**

**Relief for overactive bladder:**
A novel home-based, self-administered treatment is being perfected for people with overactive bladder (OAB), a condition that affects 18 per cent of Canadian adults. Developed by EBT Medical, an AGE-WELL-supported startup, the new approach involves electrical stimulation of the saphenous nerve in the leg. It is now being tested. See page 42 for details. **Co-leads: Dr. Sasha John and Dr. Paul Yoo (University of Toronto)**

**Dialysis at home:**
Home-based dialysis means greater independence for people with chronic kidney disease. But the equipment can be complex to use without adequate caregiver support. A Quebec team is working to increase the number of elderly end-stage renal disease patients who choose home-based therapy. They are using a new remote monitoring technology for the treatment of patients undergoing peritoneal dialysis. It includes an interactive interface for the patient and care team. **Lead: Dr. Fabrice Mac-Way (Université Laval) Partners: Baxter, MEDTEQ**
Using ‘serious games’ to monitor memory and cognitive health

Anyone who has accompanied a friend or relative to a memory test, or had one themselves, knows how stressful it can be. AGE-WELL research teams are hard at work on new ways to monitor cognitive health and detect changes—by using tests that could actually be enjoyable.

A team led by Dr. Frank Knoefel, a physician at the Bruyère Memory Clinic in Ottawa, is testing a tablet-based version of the well-known game whack-a-mole to measure brain abilities such as reaction time and accuracy levels. By monitoring a player over time, researchers can track the individual’s speed of processing and inhibition. The “serious” tablet game was designed by AGE-WELL researchers at the University of Alberta.

Dr. Knoefel usually conducts standard paper-and-pencil memory testing with his patients every six months or annually. He is hoping that games like whack-a-mole can help him to monitor his patients more frequently and accurately. “If I can have other data of how they are functioning, that would be a huge addition to my diagnostic skills,” he says, adding that the current paper-and-pencil tests become increasingly unreliable as a person’s cognition declines.

In Edmonton, Dr. Eleni Stroulia is also exploring the potential of “serious games” as a clinical tool. A professor of computing science at the University of Alberta, Dr. Stroulia is testing a suite of computer games as assessment and intervention tools for people with cognitive impairment. The tablet-based games include favourites like word search, bejeweled and mahjong for older adults. They were developed by Dr. Stroulia with AGE-WELL project co-lead Dr. Lili Liu and other colleagues.

The team is analyzing findings from a trial comparing outcomes of game play among healthy older adults and older adults with cognitive impairment. Meanwhile, testing of their word search game is underway in Greece and Italy.

Gaming is also being applied to a challenge that confronts hospital emergency departments: identifying whether older people are at risk for onset of delirium, an acute state of confusion or brain failure associated with increased risk of death, medical and surgical complications, confusion and memory loss. Delirium can come and go, and the “hypoactive” form is easy for clinicians to miss as patients are inactive or drowsy.

AGE-WELL investigators have been using a customized version of whack-a-mole as a new way to spot those at risk of delirium. Emergency department trials of the tablet game showed that measuring changes in patient response times and error rates
A new mobile app aims to help people with early dementia or mild cognitive impairment to manage daily activities and keep track of how they are doing, providing greater independence.

The novel technology guides users through their day. Using audio, text or visual prompts, it reminds people to carry out tasks and activities such as taking medications, going to appointments, preparing meals—as well as making healthy food choices.

Called DataDay, the app also helps people track their cognition, mood and physical activity. It captures information as users engage with it, reminding them what they’ve done and charting any changes in their condition.

Its name is a play on “day-to-day” because it structures and follows users’ daily routines.

Canadian dementia researcher Dr. Arlene Astell spent nine years developing DataDay, which was unveiled at the AGE-WELL Annual Conference in 2018. Dr. Astell co-created the app with people who have dementia.

“Most people once they have a diagnosis go home and live life with dementia. We want to give people something they can use for personal support and to keep track of how they are doing,” explains Dr. Astell who is based at Kite – UHN and previously at the Ontario Shores Centre for Mental Health Sciences.

AGE-WELL supported research focusing on the needs of older adults, caregivers and clinicians in using the app, while the Baycrest-led Centre for Aging and Brain Health Innovation financed the technical development of the app and portal. UK-based New Dynamics of Aging funded the first phase of the technology.
Beta testing of DataDay is underway in Durham Region in Ontario. The app, or a device with it installed, is being provided initially to patients of local memory assessment clinics, which will keep track of users through a special portal for those who opt in.

DataDay is made for Apple and android smartphones and tablets. “We’ve made the way you interact with it and the type of information collected responsive to what users would like. They helped shape it,” says Dr. Astell.

One of them is Alex Vanderzand, 75, of Pickering, Ontario, who was diagnosed with mild cognitive impairment in 2014 and feels that DataDay will be a “real benefit” to keep track of activities and record what he’s done each day.

“When I first got the diagnosis, I felt like I was thrown to the wolves,” says Vanderzand, who is especially concerned about being a burden to his wife Penny, 73. She’s also part of the testing process for the app and thinks caregivers will find it helpful too. “It’s going to give everybody a tool to help function,” she says.

DataDay is designed for people with a range of types of dementia, including Alzheimer’s disease, frontotemporal dementia and primary progressive aphasia. It is intended for use from the early stages of cognitive decline to moderate dementia, and for mild cognitive impairment, which many people experience before dementia.

“The aim is for people to start using DataDay as early as possible. We hope that once the app becomes part of their daily routine, they will keep using it as their dementia progresses,” says Dr. Astell, adding that it is best if a health service, such as a memory clinic, assists with set up and monitoring.

Once the early roll-out in Durham is completed in 2019, the plan is to make the app widely available through memory clinics. A French version will be created.

By capturing accurate information on how someone is doing, the app can help users, caregivers and their clinicians decide whether or not additional health services are needed. It’s hoped that this will cut down on emergency room visits, she says.

“We can give people with dementia some control over their lives—and better plan services when they need help.”

**Dealing with pain in people with dementia**

Recently, Jim Williamson’s mother Patricia has been reluctant to stand, but no one is sure why. She is 92, living with advanced dementia and communicating less and less. As a result, neither Williamson nor the staff at her care facility in Toronto have been able to determine the problem.

“Everybody is frustrated because we want to do the best we can for her,” he says.

It is a vexing challenge for caregivers: people with severe dementia often cannot speak up when something is wrong. In particular, it can be hard for them to tell someone when they are in pain.

“Pain in long-term care is very much under-treated, because people with severe dementia cannot report it,” says Dr. Thomas Hadjistavropoulos, who holds a Research Chair in Aging and Health at the University of Regina.

Dr. Hadjistavropoulos points out that undiagnosed pain can have catastrophic consequences. Pain in dementia can cause agitation and sometimes aggression. Such pain-related aggression and agitation are often misattributed to a psychiatric problem and, instead of being prescribed pain relief, those with dementia and pain are given psychotropic medications which can hasten death.

He is one of the leads on two AGE-WELL-supported projects that are on their way to improving pain detection.

One project combines artificial intelligence (AI) and analysis of pain-related facial responses to create an automated early warning system so that staff in long-term care facilities can be alerted that a resident might be in pain.

The data collection process was laborious. Working with more than 100 older adults, half with dementia and half without, Dr. Hadjistavropoulos’s team analyzed and annotated a mind-boggling 1 million, 50-thousand frames of video, noting any facial indications of pain.

As with most AGE-WELL projects, Dr. Hadjistavropoulos, who is a health psychologist, collaborated with colleagues in a completely
different field for the next step. The raw data were forwarded to a team of computer scientists at Kite – UHN, led by Dr. Babak Taati. His group is developing algorithms so that an AI system, using cameras, could detect signs of pain in people unable to verbalize their discomfort.

Dr. Taati’s team had to adapt models used to detect pain responses in faces of healthy younger people, so that they would work with older people who have dementia.

Now they aim to begin field testing at two long-term care homes in Regina later in 2019. This automated pain detection system is not diagnostic—it would send an alert to staff that a specific resident needs a closer assessment.

“This makes it far more efficient for them,” explains Dr. Taati.

It would also be a relief to caregivers and family, says Jim Williamson.

“I think it’s enormously promising. If there was some form of early warning technology that takes out some of the guesswork, that would be fantastic,” he says.

The other strand of Dr. Hadjistavropoulos’s work is a web-based training program on pain assessment, designed for long-term care staff who work in remote or rural care facilities. He says that there are serious gaps in knowledge about pain, particularly for those dealing with non-verbal patients. His team has developed an online training program that allows caregivers to improve their pain assessment knowledge and skills, without having to travel great distances to take classes in person. The program runs about two hours but can be done in 15-minute increments. It offers general information on pain in long-term care, including assessment and treatment with practice videos and interactive elements.

They worked with seven facilities in rural Saskatchewan and saw dramatic results. In some cases, facilities who were not assessing any patients for pain on a weekly basis went to assessing 90 to 98 per cent of their patients at least once a week. “In most cases there was this massive, massive, improvement after training,” says Dr. Hadjistavropoulos.

The researchers will be making the training program widely available. **
Caron Leid was well into her pregnancy and planning for the birth of her son. She was puzzled because her mother kept calling with the same question: when was the baby due? Hadn’t Leid told her many times before?

A few months later, Leid grew more worried after she left her newborn in her mother’s care in order to run a few errands.

“I said, ‘Just fix some formula and I’ll be back in half an hour. And when I came back home, she hadn’t diluted the formula. She gave it to him concentrate.’”

Leid was shocked. After all, her 57-year-old mother was a registered nurse.

They went to the doctor, who did a mini mental exam. “He said, ‘It’s Alzheimer’s. And then he turned to me and said, ‘Your life is going to change.’”

Not long after, Leid’s father died and her mother moved in with her.

That was almost 20 years ago. Leid has looked after her mother ever since. It has opened her eyes to the challenges of juggling a full-time job, parenting and caregiving for a parent.

“I wish I could unsee things that I’ve had to see,” says Leid, describing the behavioural and physical symptoms, such as wandering and seizures, as the disease progressed. “I had burnout. I was crashing.”

Writing became a way to cope and to share her insights with others. In 2014, Leid published her first book, Alzheimer’s – What They Forget to Tell You: A Personal Journey.

Leid herself does “relevancy reviews” of research proposals submitted to AGE-WELL for funding. She is also a vice-chair of the network’s Older Adult and Caregiver Advisory Committee.

In 2018, Leid received an unexpected invitation. It was from the organizers of an international medical conference taking place in France. They wanted her to deliver a keynote speech as a caregiving expert. Leid was able to go thanks to support from the AGE-WELL CONNECT Funding Program, which provides older adults and caregivers with access to new learning opportunities.

“I am proud to be a caregiver advocate and to assist others in any way that I can,” she blogged afterwards. “Participating in this conference has inspired me in many ways, and I thank AGE-WELL for all the work they do.”
CARING FOR CAREGIVERS

Millions of Canadians are caring for family members or friends. Caregiving can be deeply rewarding. It can also come at a cost to the caregiver’s own health and wellbeing. These are just some of the ways in which AGE-WELL teams are promoting quality of life for caregivers:

Customized resources:
CARE-RATE is an online platform that will connect caregivers to products and information they need to support themselves and older adults with dementia. Users will be able to describe in plain language what they need and the problem they want to solve. Then, leveraging innovative artificial intelligence and natural language processing algorithms, the platform will refine the search through simple, targeted yes / no questions. 

Co-leads: Dr. Jennifer Boger (University of Waterloo / Research Institute for Aging) and Dr. Frank Rudzicz (St. Michael’s Hospital / University of Toronto / Vector Institute / Surgical Safety Technologies)

Sharing life stories:
This project is introducing digital storytelling as a technology to facilitate knowledge-sharing around common caregiver experiences. Digital storytelling is a method that aligns with Indigenous ways of knowing. It will be integrated into training tools for caregivers and health service providers in promoting community-driven models to address the emerging health issues related to dementia diagnoses for Indigenous peoples in Canada. The tools will be disseminated in an online community toolkit of resources for Indigenous communities. 

Lead: Dr. Janet McElhaney (Health Sciences North Research Institute) Partners: Noojmowin Teg Health Centre and Maamwesying North Shore Health Services

Protecting caregivers’ backs:
One of the biggest risks caregivers face is injuring their backs while helping loved ones with activities like dressing and transferring. PostureCoach is a wearable device that teaches caregivers to protect their backs while assisting others. It provides real-time feedback through a vibration or an audio signal when caregivers are in a posture that puts them at high risk for back injury. PostureCoach is in the final stages of testing. 

Lead: Dr. Tilak Dutta (Kite – UHN) Partner: Saint Elizabeth Health Care

A snapshot of caregivers of older adults:
AGE-WELL released an infographic this year about caregivers of Canadians aged 65 and older. Among other findings, it showed that two out of three caregivers in Canada are caring for an older adult. That’s 5.4 million caregivers. Collectively, these caregivers spend at least 44.2 million hours per week on care, which would cost $23.2–$44.8 billion annually to replace. The findings were provided by AGE-WELL researcher Dr. Janet Fast and her team at the University of Alberta. Data were from Statistics Canada’s 2012 General Social Survey on Caregiving and Care Receiving.
Films show the importance of ‘meaningful objects’ for older adults and caregivers

The importance of objects in the aging process is the focus of an extraordinary series of short films that have been co-created by an intergenerational team that includes older adults and caregivers, with the support of AGE-WELL.

Dr. Megan Strickfaden, a design anthropologist at the University of Alberta and project lead, says the illustrated films are intended to show how meaningful objects can help people who are aging, particularly when an older person moves into long-term care.

“Objects hold memories and are cues to past experiences. They are ‘signifiers’ that can remind a person and others of who they are,” she says.

Objects of sentimental value can enhance interactions between older adults and professional, friend and family caregivers, says Dr. Strickfaden. In her studies, people being cared for indicated they felt a “disconnect” when objects had been removed from a setting.

Based on her research, Dr. Strickfaden wrote up texts for the films to show how books, musical instruments, flowers or even a simple necklace can help in common caregiving scenarios—for example someone who is recovering from stroke at home or someone with dementia who is transitioning to assisted living.

Mari Bergen, a screenwriter who is in her seventies, has helped Dr. Strickfaden develop scripts for the narrated films and gets involved in “every step of the process.” This includes partnering with three care facilities in the Edmonton area, where residents, caregivers and family members ranging in age from 14 to 100 design and draw as many as 500 colourful artworks for each production.

The team has grown to 87 people, including community partners and professional narrators, Dr. Strickfaden says. “It takes a village to make these films.”

Everyone participates in “collaborative reviews” to finalize the films, which range from five to eight minutes in length. Five of them are currently publicly available on Vimeo, where they can be streamed in high definition. Another two will be added soon.

Dr. Strickfaden says the first of the films have each been viewed hundreds of times from several continents. They are already being used to train caregivers at facilities that took part in the project, and she hopes others will do the same. They are also being used in university programs, and she’s writing classroom curriculum to accompany the films there and in high schools.

The films represent difficult concepts and “evoke people’s emotions,” says Dr. Strickfaden, whose own mother has moderate dementia. “Film is such a visceral medium…It’s about conveying a message.”
Music unites and uplifts people of all ages and cultures. “There’s overwhelming evidence that music is very powerful across our lives. Older people are no different from people of other ages,” says Dr. Andrea Creech, a former international orchestral musician who is a Canada Research Chair, psychologist and professor of music at Université Laval.

Making music has been shown to produce a range of social, cognitive, physiological and emotional benefits, irrespective of whether people have had musical training or not. But how can older adults create music collaboratively when they are in late life, have physical and cognitive challenges or may never have played a note before? The answer is technology.

“It’s a way into a wonderful world of making music that may not have been accessible through other means,” explains Dr. Creech. “Making music is also a very cost-effective way to address many challenges facing older people.”

With support from AGE-WELL, Dr. Creech is leading a project with four other co-investigators from four Canadian universities to study how assistive music technology can help older adults overcome barriers to making music, and enhance wellbeing and quality of life. The project focuses on a technology called Soundbeam, which emits an ultrasound beam that can be manipulated by motion and movement, and translated into sound. For example, sweeping an arm overhead can create a sequence of sounds.

“What you’re playing are recorded samples, which are stored in the control centre. There are infinite possibilities for the music you can play,” notes Dr. Creech. The beams can also be adjusted for someone who is in a wheelchair or has limited mobility.

Dr. Creech and her team are working with community partners, including a retirement community in Quebec City, the Schlegel-UW Research Institute for Aging in Waterloo and the Room 217 Foundation, a Canadian health arts organization that uses music to change the culture of care. “The community partners are absolutely integral because our first step is a needs analysis and what we can do to have an impact within each community,” says Dr. Creech.

The research team will be helping participants make music with Soundbeam in groups, and empowering them to use the technology with minimal facilitation. Using personally meaningful sounds, participants will create soundscapes together, which will be recorded.

“In a way, it’s a bit like creating a life-story or narrative with music,” says Dr. Creech. “My dream is to one day have a music room in long-term care facilities or retirement communities with resources like Soundbeam.”

Dr. Andrea Creech, a former international orchestral musician who is a Canada Research Chair, psychologist and professor of music at Université Laval.
How AGE-WELL makes unusual collaborations possible

Vast distances and differences in expertise and experience separate Dr. Julie Robillard, a neuroscientist at the University of British Columbia, and Dr. Jesse Hoey, a computer scientist at the University of Waterloo. But the two AGE-WELL investigators are combining these diverse academic specialties in their shared determination to help older adults make better use of technology.

Dr. Robillard, an expert in brain health and patient experience, and Dr. Hoey, a specialist in affective computing and artificial intelligence, met at the 2016 Alzheimer’s Association International Conference. They decided to team up to study how the emotional state of older adults affects the way they interpret health information on the Internet.

It was AGE-WELL that provided funding to make their unusual collaboration possible. Their project, called Emotional Motivation for Technology that Cares (EMOTEC), is focused on developing a “virtual assistant” that helps older people with and without dementia safely navigate the online environment.

“There was an intersection between our work that could take the questions we’d been asking to the next level,” explains Dr. Robillard. The research includes a suite of experiments conducted in collaboration with Tapestry Retirement Living, a long-term care facility in Vancouver, as well as older adults in the community and their caregivers, that test the quality of online information and align it with the emotions of end-users.

Dr. Hoey says the ultimate goal of their study is to help older people benefit from legitimate online health material while avoiding “snake-oil” remedies and resources that could prey on those with decreasing cognitive abilities.

The virtual assistant will likely be a browser “plug-in” that delivers prompts tailored to the user’s state of mind, warning when online health information isn’t considered trustworthy or appropriate for the user.

Dr. Hoey says his job is to develop the underlying computational models that predict how people will react, while Dr. Robillard deploys and tests them.

“It’s important to have the technical side and the human side,” says Dr. Hoey, noting that AGE-WELL “crucially” focuses on user engagement. “You have to be connected to people who are actually going to make use of these technologies. Otherwise you’re just building castles in the air.”

For her part, Dr. Robillard says “it’s extremely beneficial for me to partner with someone who brings such complementary expertise. It is yielding this innovative research project and will lead to an innovative deliverable.”

Dr. Julie Robillard, a neuroscientist at the University of British Columbia, and Dr. Jesse Hoey, a computer scientist at the University of Waterloo.
Launched in early 2019, AGE-WELL’s newest innovation hub is the Digital Health Circle, which is jointly championed by AGE-WELL and Simon Fraser University (SFU). The hub supports the creation of new digital technologies that have a real-life impact on current and future generations of older adults.

The mission of the Digital Health Circle is to help older adults in British Columbia and across Canada live well with independence, dignity and good health. Using cutting-edge, user-centred design methodologies, the new hub will also help B.C. companies, community and academic partners design solutions that fit the needs of their users and stakeholders.

“There is a strong focus on connecting partners, empowering communities and training future leaders,” says Dr. Sylvain Moreno, CEO of Digital Health Circle and an associate professor of professional practice at SFU’s School of Interactive Arts and Technology (SIAT). Western Economic Diversification Canada is providing $3.5 million for the new hub. The Digital Health Circle is located on SFU’s Surrey campus and also involves other B.C. post-secondary, government, industry and community stakeholders.

Innovation hubs continued

SAM³ (Ottawa, Ont.)

AGE-WELL’s Ottawa-based hub—SAM³—has established a foundation of activity in the greater Ottawa area that continues to grow and expand. The hub is driving the development of sensor-based smart technologies to keep seniors as healthy, safe and independent as possible.

Sensors and Analytics for Monitoring Mobility and Memory (SAM³) is a joint initiative of AGE-WELL, Bruyère Research Institute and Carleton University in Ottawa. It brings together researchers in the field of sensor technologies and data analytics, health professionals, industry, non-profits, older Canadians and caregivers to devise intelligent sensor systems that address mobility and memory challenges among older people.

More than 30 industry members, community organizations, government agencies and individuals are actively engaged with SAM³, which opened in late 2017.

Some of the research collaborations involve testing sensor systems in people’s homes. Take, for example, a new wandering detection and diversion system for people with dementia and their families. Other projects are conducted at Carleton University or in an apartment laboratory resembling a typical home setting at Élisabeth Bruyère Hospital, where the hub’s primary offices are located.

As with other AGE-WELL hubs and projects, older adults and caregivers are key players at SAM³. “They identify the challenge or the problem, and they tell us in the bluntest way if we’ve got an answer that works,” says Dr. Bruce Wallace, executive director of SAM³ and an adjunct professor of Computer and Systems Engineering at Carleton.

The smart-home technologies developed at SAM³ use affordable off-the-shelf equipment like sensors combined with analytics to track information about the wellbeing, cognitive abilities and mobility of older adults. For instance, a pressure-sensitive mat can detect if someone is unsteady when getting out of bed, indicating an elevated risk of falling. Family members and health professionals can then follow up and take action.

“It’s all about supporting aging-in-place,” says Dr. Wallace. “If you are living independently, you are more physically active and that in turn has positive effects on your physical health, social engagement and cognitive wellbeing.”

SAM³ also provides opportunities to Canadian companies with sensor products that can be incorporated into systems to support healthy aging. And it’s a stimulating place for graduate students and postdoctoral fellows to receive training.

APPTA (Fredericton, N.B.)

AGE-WELL’s national innovation hub called APPTA (Advancing Policies and Practices in Technology and Aging) engages regularly with provincial and territorial policy stakeholders. Eleven out of 13 provincial and territorial governments are participating in hub activities, as are several departments in the federal government.

Each year, government representatives share with APPTA their top policy priorities in aging, with topics ranging from caregiving to home care to social participation and more. The APPTA Hub develops policy options for one of the priority questions. These come complete with evidence syntheses, jurisdictional scans and SWOT analyses—looking at strengths, weaknesses, opportunities and threats—as a means of influencing policy development through knowledge translation.

This past year, APPTA focused on the topic of social isolation and how governments can leverage technology to support older adults in remaining connected to their families, friends and communities.

APPTA also launched a Community of Practice and an Internet portal for government stakeholders, where they can connect with their counterparts to work collaboratively on projects of mutual interest.

“We are excited by the enthusiasm and commitment of our government stakeholders and are always looking for ways to improve our approach while fostering an environment of innovation, knowledge translation and collaboration,” says Candice Pollack, executive director of APPTA.

In the coming year, the team will be launching their first policy lab, an initiative structured to bring together diverse stakeholders to engage in policy co-creation.
AGE-WELL has unveiled its future core research program, which is comprised of 24 integrated research projects from across Canada that are poised to deliver real-world benefits for older adults and their caregivers, and achieve social and economic impact nationally.

The projects are led by 50 researchers at 19 universities and research centres across seven Canadian provinces. In total, there are 128 partners from industry, government and non-profit organizations—almost half of whom are new to AGE-WELL. Additional partners are joining the projects as they develop.

Each research team receives up to $30,000 in seed funding until April 2020. The researchers are dedicating the year to further developing their plans, building capacity and liaising with stakeholders, including older adults and caregivers. These projects form the basis of AGE-WELL’s future Core Research Program. With a successful funding review for AGE-WELL in fall 2019, the most promising projects will receive three-year grants.

“This research builds on AGE-WELL’s success in providing older adults and caregivers with technology-based solutions to improve health, quality of life and independence,” Dr. Alex Mihailidis, AGE-WELL scientific co-director and CEO, said in announcing the projects in May 2019.

The new Core Research Program will include projects tackling research questions across all of AGE-WELL’s eight Challenge Areas (see page 39), which were determined through in-depth stakeholder consultations. A challenge, as we define it, is an important but difficult and complex problem area that demands innovation and real-world solutions. It’s not just about problems. It may be about social and economic opportunities.

Each of the new research projects will create unique and practical innovations grounded in real-life challenges that Canadians face. It could be a technology, service, practice or policy—but it must have the potential for real-world impact, for example:

- Helping older adults and family caregivers overcome barriers to employment
- Building capacity for telediabetes care in urban Indigenous communities
- Examining technologies for assessing and managing wayfinding risks for people living with dementia in their communities
- Creating interactive apps to reduce older adults’ social isolation

AGE-WELL received 74 applications proposing a broad range of technology-based solutions. The number of proposals underscores the need for funding support in the area of technology and aging.

AGE-WELL has partnered with MEDTEQ and Mitacs to create additional funding opportunities for eligible applications.
AGE-WELL places a premium on commercialization and knowledge mobilization. It’s fundamental to achieving impact. We have developed a unique approach to evaluating the progress of our projects: AGE-WELL’s product readiness level scale, which ensures that our teams are on track to deliver.

Braze Mobility Inc., an AGE-WELL-supported startup, was selected as a 2019 TiE50 Winner in the prestigious TiE50 Awards Program, an international startup competition. Braze was recognized for its blind spot sensors for wheelchairs. Here is Dr. Pooja Viswanathan (centre), CEO of Braze Mobility, accepting the award. The company is selling products across North America and plans to go global.
We focus intensely on nurturing startups.

AGE-WELL now supports 35 Canadian startups that are commercializing and launching products, generating jobs and creating wealth. Their products are having an impact. On page 40, you will meet someone who had a transformative experience when introduced to the Steadi-One “smart” glove.

Our newly-launched AGE-WELL Startup Affiliate Program is bringing even more startups into our network. It’s all part of ensuring a thriving AgingTech sector in Canada.

Competitions are another way in which we support startups. Our newest competition challenged Canadian startups to explain how their products can positively impact older Canadians or their caregivers. This event played out in summer 2019 with regional pitch competitions held in Montreal, Vancouver and Toronto. We congratulate the winning startups: Walk-Well Universe, True Angle Medical Technologies and Bisep.

AGE-WELL welcomes the winning companies into our network, where they will be nurtured to help take them to the next level and maximize their impact on the lives of older Canadians and their caregivers. We thank all the finalists, judges and also the sponsors of this event: BC Seniors Living Association, CARP, Fasken, Hacking Health, The Impact Centre, MEDTEQ, Ontario Brain Institute, TELUS Ventures and YouAreUNLTD.
We support entrepreneurship in so many ways.

**AGE-WELL now has a chief entrepreneur.** In the fall of 2018, Michael Tamblyn, president and CEO of Rakuten Kobo, was named as AGE-WELL’s inaugural chief entrepreneur. In this volunteer capacity, Tamblyn is sharing his tremendous entrepreneurial knowledge and experience by mentoring emerging innovators in our network. We underscored our commitment to entrepreneurship by launching the AGE-WELL Emerging Entrepreneur Award in Technology and Aging. Meet the first recipients on page 43.

Every year, our engagement with government grows, increasing our impact on policy. This is important: Canada must take a forward-looking approach to policy and decision-making that includes technology as part of the solution to age-related challenges. Last year, AGE-WELL interacted with all levels of government, generated multiple policy briefs and was featured in various reports and key strategy discussions on the National Dementia and Seniors Strategy files. AGE-WELL investigator Dr. Rosalie Wang represented AGE-WELL at the Senate Committee on Social Affairs, Science and Technology to discuss the importance of involving technology and assistive devices as part of the solutions for older Canadians living with disability.

**AGE-WELL has an entire innovation hub dedicated to policy innovation.** Based in Fredericton, N.B., Advancing Policies and Practices in Technology and Aging (APPTA) is putting technology and aging research into the hands of people who can use it.

Two new programs are encouraging policy innovation among our trainees. We awarded the first-ever Michael F. Harcourt Policy Fellowship and named three trainees as recipients of the new AGE-WELL Visions for Change Policy Challenge.

As always, AGE-WELL reaches many audiences through our annual conference, where the focus is on sharing knowledge and forging connections. Our continuing webinar series connected with a broad audience. Network members shared their expertise widely through a record number of media interviews in 2018, reaching millions of readers and viewers worldwide.
New dementia guidelines offer strategies to reduce the risk of getting lost

In Canada, over 750,000 people live with dementia. An estimated 60 per cent will go missing at least once, according to the Alzheimer Society of Toronto. “Watch the news and you’ll hear about another older adult with dementia who has gone missing,” says Dr. Noelannah Neubauer, an AGE-WELL trainee who is working to improve the situation.

As part of her PhD work at the University of Alberta, Dr. Neubauer has developed comprehensive easy-to-use guidelines that offer proactive strategies to reduce the chances that someone with dementia will get lost. The guidelines were created in collaboration with provincial Alzheimer’s societies, police organizations, social workers, health-care professionals, caregivers and people living with dementia.

“These are the first guidelines of their kind that simplify the vast number of strategies out there,” says Dr. Neubauer, whose research revealed there are over 300 types of high- and low-tech strategies for persons with dementia at risk of getting lost.

“You can be at risk of getting lost but still live a good life,” she stresses. “It’s making sure you implement proactive strategies that focus on a balance between safety and independence.”

Her guidelines come in the form of a checklist. They focus on behaviours and circumstances—such as whether the person with dementia lives alone or frequently gets overwhelmed—to determine a person’s level of risk. Strategies, like locating-technologies, are then matched to each level of risk. There are different versions of the guidelines for people living with dementia at home, with family or in a care home.

Dr. Neubauer is working with several provincial Alzheimer’s societies and other groups to disseminate the guidelines.

She is passionate about helping people with dementia live safely in the community for as long as possible, while reducing the chances of them getting lost.

In her own life, Dr. Neubauer has seen friends of her grandparents experience cognitive impairment. “Being so close to them, I just wanted to find a way to keep them as safe and healthy as possible.”

Dr. Neubauer recently obtained a PhD in Rehabilitation Science, working under the supervision of AGE-WELL researcher Dr. Lili Liu.
Policy matters: An ‘unparalleled’ educational experience

AGE-WELL piloted three programs in 2018-2019 to encourage trainees to think about the policy implications of their work. One example: the Michael F. Harcourt Policy Fellowship, named for our inaugural Board chair and now network patron. The fellowship was established to encourage a postdoctoral fellow—not currently working on policy or policy-related research—to create a policy engagement plan. The inaugural recipient is Dr. Nicole Dalmer, who is completing a postdoctoral fellowship at Trent University in Peterborough, Ont. Dr. Dalmer received $20,000 to explore how older adults can be better included in the policy co-creation process.

In collaboration with the innovation hub APPTA (Advancing Policies and Practices in Technology and Aging), AGE-WELL also launched the Policy Education Program, which taught trainees to write policy briefs on their research and allowed them to present them to government. Similarly, the new Visions for Change Policy Challenge is a joint initiative of AGE-WELL and APPTA which supported three trainees to work closely with policy experts and learn first-hand how research ideas become policy options for implementation.

For Ann Marie Corrado, winning a Visions for Change Policy Challenge award was a major boost. “As a result of the mentorship and support that I received, I was able to successfully lead a policy report that will inform evidence-based decision-making related to housing options for seniors with disabilities who wish to independently age-in-place,” says Corrado (Western University), a former AGE-WELL trainee who is now the Innovation Spread and Scale lead for the Peter Gilgan Centre for Women’s Cancers at Women’s College Hospital in Toronto.

Other winners of Visions for Change Policy Challenge awards were Emma Smith (University of British Columbia) and Andrew Magnaye (University of Alberta). Smith examined premature transitions to long-term care, while Magnaye looked at policy matters relating to informal caregiving.

The aim of the Challenge is to build capacity for more evidence-informed policy that betters the quality of life of older adults in Canada. Each Challenge winner learns how to prepare a policy report, as well as how to present to policy audiences. Says Corrado: “I would recommend this Challenge to all AGE-WELL trainees as this educational experience is unparalleled!”

Top: Dr. Nicole Dalmer, inaugural recipient of the Michael F. Harcourt Policy Fellowship, with Michael Harcourt.

Left: Visions for Change Policy Challenge winners Emma Smith, Andrew Magnaye and Ann Marie Corrado.
THE EXCITING FUTURE

Challenges and solutions: Creating the future of aging in Canada

Early last year, AGE-WELL embarked on an ambitious project: to identify key Challenge Areas that the network will tackle to set the agenda for the future of technology and aging in Canada.

What is a Challenge Area?

A Challenge Area is an important but complex problem area that demands innovation and deployment of real-world solutions. A challenge in this context is not just about research questions; it may be about economic opportunities and making a positive contribution to Canadian society and government policy.

The Challenge Areas grew out of a comprehensive review of policy priorities across governments in Canada and internationally, relating to seniors. These priorities were validated with research, government, non-profit and industry stakeholders and with older adults and caregivers.

From hundreds of priorities, a shortlist of 18 Challenge Areas was presented at public consultations in Vancouver, Edmonton, Winnipeg, Toronto and Montreal in the summer of 2018. To gather additional input, AGE-WELL also conducted a public online survey. With feedback from over 1,000 stakeholders, a final set of eight Challenge Areas was created and announced in front of more than 700 delegates at the Canadian Science Policy Conference in November 2018.

AGE-WELL aims to tackle the following eight Challenge Areas by aligning technology, policy and practice, and service delivery models to create sustainable change:

1. Supportive Homes & Communities
2. Health Care & Health Service Delivery
3. Autonomy & Independence
4. Cognitive Health & Dementia
5. Mobility & Transportation
6. Healthy Lifestyles & Wellness
7. Staying Connected
8. Financial Wellness & Employment

“These Challenge Areas are a call to action and AGE-WELL’s foundation for a future national strategy on technology and aging in Canada,” Mimi Lowi-Young, chair of the AGE-WELL Board of Directors, told listeners.

“These are areas where technology can make a significant difference and will push the scientific envelope,” added Dr. Alex Mihailidis, scientific co-director and CEO of AGE-WELL. For AGE-WELL, a challenge is difficult to accomplish yet offers hope of being ultimately solvable, captures popular imagination and political support, and demands transdisciplinary collaboration.

The eight Challenge Areas will drive AGE-WELL’s research and innovation agenda for 2020 and beyond. Focusing primarily on these eight Challenge Areas will allow AGE-WELL to make a quantum advance when it comes to supporting older adults and caregivers in Canada—and achieving social and economic impact.

Mimi Lowi-Young, chair of the AGE-WELL Board of Directors, addressing over 700 delegates at the Canadian Science Policy Conference in November 2018.
During his 40-year career as a paramedic, John Kirkconnell faced many challenges that come with such a demanding job. But for him, there was one extra: a tremor in his hands.

“I have a family history of Essential Tremor. I was able to trace it back to my great-great-grandmother,” he explains. “By the time I got to my forties, I was as bad or worse than my dad was when he was in his sixties.”

As the condition worsened, his hands would shake when he checked someone’s pulse. “People thought I was nervous, but my partner just reassured them, ‘No, it’s just a tremor he has.’”

But it wasn’t just a tremor when it came to Kirkconnell’s personal life.

“If you go to a restaurant or into a coffee shop, it’s hard to pick up a coffee without spilling it or eat something without slopping something on me. You feel like people are staring at you, thinking ‘What’s wrong with him?’ You become very self-conscious.”

Kirkconnell tried medication but couldn’t handle the side effects. He underwent neurosurgery twice and it worked—until the tremor returned.

Searching the Internet for solutions, his wife, Lynne, discovered a stabilizing glove being tested in Toronto, not far from their home in Guelph, Ont.

Invented by Steadiwear Inc., an AGE-WELL-supported startup, the Steadi-One glove “intelligently” stabilizes the wrist joint in people living with Essential Tremor and Parkinson’s disease. It uses a combination of vibration damping and nano-technology to provide resistance to hand tremors.

Kirkconnell decided to give the glove a try.

“There was still a minor shake there, but the longer I wore the glove, the better it got. I don’t worry as much when I’m out somewhere,” he says. “Just the day-to-day function of being able to eat and shave without worrying about cutting myself so much. It’s been a real life-changer for me.”

Kirkconnell, who is now retired, has worn several versions of the glove, giving feedback on each one to the development team. “I think it’s beneficial for them to have someone who can test the product for them,” he says.

Steadi-One has done well in beta tests and a clinical trial is getting underway. Plans call for the glove to reach market in 2019, says Mark Elias, CEO and co-founder of Steadiwear. The company is incubated at the Impact Centre at the University of Toronto (U of T), and also receives support from the Ontario Brain Institute.
From senior care to pharma, new speech-analyzer tool addresses gaps, meets needs

It begins with small mistakes. People forget their medication, miss an appointment or have trouble managing their diabetes. Eventually the errors compound and for many older adults, even slight cognitive impairment leads to a negative health outcome.

This is the scenario Winterlight Labs is aiming to prevent with its newest pilot project. Partnering with VHA Home HealthCare, the company is testing its proprietary natural speech analyzer with 50 Ontario seniors throughout 2019. The goal is to refine the tool’s effectiveness as a clinical decision support tool.

“We’re addressing a gap in the market,” says Winterlight Labs CEO Liam Kaufman. “When someone has a diagnosis of dementia, we know they need help managing their health care. But if they are only slightly cognitively impaired, they often fall through the cracks.”

Winterlight Labs’ assessment is quick and easy to administer. Seniors spend two to four minutes describing pictures on an iPad. The platform uses artificial intelligence to extract and analyze more than 540 linguistic cues from their recorded speech, accurately distinguishing early signs of dementia from typical aging. If early cognitive impairment is detected, additional home care or other supports can be provided to pre-empt an adverse health event.

The goal is to have a commercial product ready for the senior care market by early 2020, says Kaufman. In the meantime, the AGE-WELL-supported startup is making strong inroads in the pharmaceutical sector. “By using our platform in early validation studies, they’re able to see effects in a shorter time period on smaller populations,” explains Kaufman.

In 2019, Winterlight Labs entered a collaboration with Janssen Pharmaceuticals Inc. to collect objective, quantifiable physiological and behavioural data—referred to as a digital biomarker—so that people with early-stage Alzheimer’s disease can be identified, before symptoms appear and when therapies have the most benefit. The company’s speech analyzer is also being used in several U.S. clinical trials to examine the efficacy of new drug therapies to treat forms of dementia.

“This is an important growth milestone for us, but we couldn’t have arrived here without the early-on investment from supporters like AGE-WELL,” says Kaufman, noting that some pharmaceutical deals have reached $500,000.

Founded in 2015 by Kaufman, scientific advisor Dr. Frank Rudzicz and CTO Maria Yancheva, Winterlight Labs has grown to 12 full-time employees with more hires expected before the end of 2019. Operating out of JLABS in Toronto, the company is also supported by the Ontario Brain Institute, Ontario Centres of Excellence and U of T.
On paper, the symptoms of overactive bladder (OAB) don’t seem all that serious. But spend a day in the life of someone who has it and you quickly realize how troubling the condition can be.

“Some patients wake up every hour to go to the bathroom,” says Dr. Paul Yoo, president, chief scientific officer and co-founder of EBT Medical Inc., an AGE-WELL-supported startup and U of T spin-off that is working to bring novel OAB solutions to market.

It’s estimated that nearly one in five Canadians over 35 are affected by the condition, which often causes anxiety, social withdrawal, depression and even falls from rushing to the washroom. Dr. Yoo, along with EBT Medical co-founder and chief innovation officer Dr. Sasha John, is on a mission to improve their quality of life.

The company’s easy-to-use, patented treatment—called SaphStim—is less invasive than implantable OAB treatment devices and doesn’t cause the side effects associated with prescribed medications. It works by applying low amplitude electrical pulses to stimulate the saphenous nerve in a patient’s leg which in turn inhibits bladder function. The conductive pads are provided along a sleeve worn around the calf and are controlled by a device similar in size to a cellphone.

After successfully completing a study at Toronto’s University Health Network, in which 12 patients applied the stimulator 30 minutes a day over three months, the company recently launched two larger trials. One is being conducted in partnership with a urology clinic in downtown Toronto and the other is a multi-site trial at clinics across North Carolina, New Jersey and Pennsylvania.

One study participant calls the technology life-changing. “I know it works because I’m not running to the bathroom all of the time and I’m not leaking,” she says.

EBT Medical is using the trial data to refine its technology, and plans to offer an affordable, self-administered treatment that is connected to a patient’s smartphone for remote monitoring by a urologist.

In 2018, the company won a $100,000 MassChallenge award, recognizing it as a top startup of the 128 admitted to the Boston-based acceleration program and it is now securing its first round of institutional funding.

“We wouldn’t be on this commercialization journey if it hadn’t been for combined support from AGE-WELL and the University of Toronto early on,” says Dr. Yoo.

Dr. Paul Yoo, president, chief scientific officer and co-founder of EBT Medical Inc.
Emerging entrepreneurs

Three young stars were selected to receive $25,000 awards through the new AGE-WELL Emerging Entrepreneur Awards. The program supports the development of emerging entrepreneurs to create and grow innovative startups which will bring positive social and economic benefits to Canada. The 2018–2019 recipients are:

**Chao Bian,**
*PhD candidate, U of T, and co-founder of Nightingale.ai*
Bian and his multidisciplinary team are building an AI-powered tool that helps clinicians conduct geriatric functional assessments on patients in various care settings. The tool helps busy clinicians determine if patients are showing signs of functional decline, which may indicate a need for interventions or more assessments.

**Maziar Hafezi,**
*Researcher at The Kite Research Institute at UHN and U of T Master’s student*
Hafezi’s goal is to develop technologies to reduce the disease burden and to improve quality of life of older people with chronic respiratory disorders. He and his team have built a wearable device that will monitor inpatients’ respiration, predicting opioid-related respiratory depression, and alerting the patient and caregiver to react.

**Dr. Pooja Viswanathan,**
*CEO and co-founder, Braze Mobility Inc.*
Dr. Viswanathan developed an obstacle-avoidance system for wheelchairs. Launched in 2017, the add-on system can transform any powered or manual regular wheelchair into a “smart” wheelchair able to help prevent collisions. The system uses sensors to detect obstacles and provides visual, audio or vibration feedback to drivers.

In addition to a cash prize, the Emerging Entrepreneur Program provides recipients with additional mentorship and training from various members within the AGE-WELL network, including AGE-WELL’s chief entrepreneur and CEO of Rakuten Kobo, Michael Tamblyn. Recipients also have access to AGE-WELL member benefits and specialized services such as legal guidance, commercialization and knowledge mobilization support, access to prototyping labs and entrepreneurship training.

Dr. Viswanathan says it will allow her to focus full force on growing her startup into a bigger company that can make its much-needed innovations widely available—“giving opportunities for independent mobility to all.”
AGE-WELL 2018

Conference showcases innovation in action

AGE-WELL’s 4th Annual Conference set an attendance record, attracting over 400 researchers, trainees, older adults, caregivers and representatives from industry, government and non-profit organizations. Held in Vancouver in October 2018, AGE-WELL 2018 showcased a multidisciplinary program of research and innovation from across the network. Along with demos and scientific talks, there were fast-paced science slams and workshops, all designed to maximize networking, knowledge exchange and collaboration among AGE-WELL stakeholders.

The conference included a live pitch event. Eight finalists competed in the grand finale of the AGE-WELL National Impact Challenge for over $100,000 in cash and in-kind services. Marlena Books won for a digital reading platform designed for people with later-stage dementia. Runner-up was Nightingale.ai: the Smart Clinical Assessment Assistant for an “intelligent” and portable device for conducting assessments of older adults’ physical function and cognition. People’s Choice Award went to ARCtag, an automated, rapid-communication tool to enhance safety during guided hikes and outdoor recreation tours for seniors.

The challenge was sponsored by: Bereskin & Parr LLP, CARP, the Impact Centre, Revera, Sun Life Financial and TELUS Ventures.

Sponsors of AGE-WELL 2018 were: Bereskin & Parr LLP, Canadian Association on Gerontology, CARP, the Impact Centre, MEDTEQ, Revera, Sun Life Financial, TELUS Health, TELUS Ventures, United Way of the Lower Mainland and YouAreUNLTD.

Best Demo Award went to MouvMat, an interactive digital gaming surface designed to improve the physical and cognitive health of older adults. Shown here are team members Arezoo Talebzadeh (left) and Dr. Charlene Chu.

Virtual reality systems, smart-home sensors, wearables, apps to connect seniors—those were just some of the products on display.
Dr. Brendan Byrne, entrepreneur-in-residence at TELUS Health, gave a thought-provoking keynote speech. A doctor by training and an entrepreneur by profession, Dr. Byrne spoke about aging—what it is, determinants of health and strategies for good health.

Impact Challenge winner Rachel Thompson of Marlena Books (front, centre) with runner-up Chao Bian of Nightingale.ai (front, right) and Shaun Fickling (front, left) of ARTag, People’s Choice Award recipient, with judges.

Researchers reported progress on a wide range of projects, including testing of technologies that enhance cognitive health, studies to better understand falls in older adults, and a recent survey of caregiver goals and priorities.

Eye-catching technologies: PATHFINDER is a smart lighting system for fall prevention and wayfinding for seniors.

When Rachel Thompson couldn’t find “dementia-friendly” books for her grandmother, she created her own specialized books—and founded Marlena Books in 2016. The stories are all written by Canadian authors.
Innovation is not just about technologies, it is about people.

AGE-WELL has distinguished itself with a unique training program called EPIC (Early Professionals, Inspired Careers) that is preparing innovators of tomorrow. Consider the numbers: EPIC has made an impact on the lives of more than 750 trainees from 70 institutions across eight Canadian provinces, Australia, Denmark, France, the United Kingdom and the United States.

EPIC trains bright young researchers and professionals— we call them highly qualified personnel, or HQP—in applied environments. The program provides HQP with the knowledge and skills to drive innovation in their careers, both within and beyond academia. We have now conferred Innovators of Tomorrow certificates on 202 trainees, attesting to their transferable skills and comprehensive knowledge in technology and aging.

Building successful careers

Our HQP are securing positions in industry, academia, government and non-profit organizations (see feature article on page 47). Some are joining startups or launching their own. They are winning competitions and awards, and establishing themselves as experts in the field. Five AGE-WELL research projects are now led or co-led by former HQP.

The EPIC program exposes HQP to multidisciplinary research environments, industry and community partners. Through experiential learning opportunities, EPIC emphasizes the development of skills, ideas, teamwork and relationship-building that are the building blocks of a successful career.

We are always looking for ways to add to the EPIC experience. In 2018, we established several new programs, including: The Michael F. Harcourt Policy Fellowship, the AGE-WELL Visions for Change Policy Challenge and the Emerging Entrepreneur Award.
AGE-WELL trainees launching careers, applying skills

AGE-WELL trainee alumni are hitting the ground running—landing exciting jobs across Canada in industry, academia, health care, government and community organizations. As they pursue their journeys to become the next generation of leaders in technology and aging, these young researchers and professionals are helping to make life better for older adults and caregivers. To date, AGE-WELL has recruited more than 750 funded and affiliate trainees, also called highly qualified personnel (HQP), into its EPIC training program—Early Professionals, Inspired Careers.

Dr. Andrea Wilkinson

“AGE-WELL is integral to my success and I'm so pleased to be involved with the network and its abundant support,” says Dr. Andrea Wilkinson, an HQP alumna, co-founder and CEO of the company BrainShape®, an innovative online resource and podcast about brain health and fitness for adults aged 60 and over.

“AGE-WELL is and has been a hugely important cornerstone of the growth of the BrainShape idea,” she adds, noting that her concept of the company has been elevated by her experience with the network.

As an AGE-WELL trainee, Dr. Wilkinson, who holds a PhD in Psychology with a specialization in cognitive aging, conducted several research projects to develop technologies for older adults with cognitive impairment. These projects involved working with diverse research teams and industry partners.

“AGE-WELL gave me ample opportunity to see the value and potential of product development and commercialization in order to change people’s lives. That has really inspired me to think about how to move my company forward.”
Olivier Nguyen also thinks about AGE-WELL in his role as an applied research scientist at the Montreal company Element AI.

“One thing AGE-WELL really tried to highlight is the importance of products that are useful and make an impact on society. I’ve learned to ask myself how the work I do is going to affect the person who will use it.”

Nguyen says that being part of multidisciplinary teams, conducting applied research and dealing with uncertainty in research, such as “digging for solutions when things are not completely clear, and seem hard and unsolvable,” are all lessons from AGE-WELL that he appreciates every day.

Nguyen earned a Master’s of Applied Science in Electrical and Computer Engineering while he was an AGE-WELL trainee conducting research on older adults’ acceptance of wearable devices for monitoring health data.

At Element AI, he works with the natural language processing team. The company delivers artificial intelligence (AI) software products that augment decisions to make businesses stronger, safer and more agile. In December 2018, Element AI received $5 million in a repayable contribution from the federal government to expand internationally. The goal is to grow from 528 to 900 jobs—building Canada’s reputation as a global leader in the field of AI and making “a better world with AI.”

For Arjun Puri, who was an AGE-WELL trainee while earning a Master’s of Science in Health Systems and Public Health at the University of Waterloo, there are also many valuable takeaways that he applies to his role as senior business consultant, IT and eHealth Innovation at Alberta Health Services.

“The diversity of my experiences at AGE-WELL has been extremely beneficial to my professional development and career pathway—understanding the importance of the business side, commercialization, knowledge mobilization and collaboration.”

Puri says “the learning opportunities to do user-centred design, especially in the Summer Institute where we engaged with an older adult who had a negative health outcome and worked on solutions with them, were enlightening and empowering.”

One of the greatest benefits of his time with AGE-WELL was the transdisciplinary collaboration. “That has certainly prepared me for what I am doing at Alberta Health Services now because as a project manager and a business process lead, I am able to organize diverse teams of expertise that are absolutely necessary for a project or initiative’s success.”

Puri’s project teams leverage innovation to help improve patient outcomes for a variety of target populations including seniors. “Without a doubt, I think my work will continue to be supportive of improving health outcomes for older adults.”
Making life better is a key priority for **Dr. Piper Jackson**, an assistant professor in computing science at Thompson Rivers University in Kamloops, B.C.

“That is THE criteria that has guided my decision-making in terms of what to study: is it going to help other people?” says the former trainee who did postdoctoral research under the supervision of AGE-WELL scientific co-director Dr. Andrew Sixsmith.

Along with teaching, Dr. Jackson conducts research which uses machine learning and other advanced data science methods to simulate, generate and predict health record data for older adults, whether they receive care at home or reside in long-term care.

“These methods can support planning and decision-making for health authorities, and the data is invaluable for developing and testing health-care technology and systems,” he says.

How did AGE-WELL influence his decision to focus on research in aging?

“AGE-WELL was key in making it clear the importance and the potential of working in this field. Collaborating with people from many different academic fields, people from industry, the community, and older people and their care partners was incredibly helpful and a wonderful opportunity,” says Dr. Jackson.

“AGE-WELL has been invaluable in bringing us together, providing structure and a point of contact to get these projects started.”

For **Rebekah Churchyard**, who holds a Master of Social Work in Gerontology, her affinity for older people and her focus on the field of aging appears bred-in-the-bone.

“My grandma was my best friend and my grandpa lived with dementia for 12 years, so watching her, my mom and her sisters provide care, and also caregiving myself, really motivated me to understand more.”

As an AGE-WELL trainee and researcher at Ontario Shores Centre for Mental Health Sciences, Churchyard helped with projects including a review of digital tools to support people with dementia and a study to examine potential language-related stigma surrounding a diagnosis of dementia.

“My time with AGE-WELL helped me appreciate and understand the different levels of government and their involvement with aging when it comes to policy. I learned a lot about stakeholder engagement, knowledge translation, methodology, data quality and how research works as an engine. But the most important thing I learned is that older adults need to be able to make their own choices.”

Churchyard is putting her AGE-WELL experience, knowledge and skills to work as project manager of Toronto’s Neighbour to Neighbour 2.0 (N2N 2.0), with lead agency The Neighbourhood Group. N2N 2.0 is an interagency collaborative project that supports isolated older adults living in the community with visiting, safety and social security programming and services.

Churchyard also applies her AGE-WELL learnings to volunteer roles as first vice-president of the Board of Directors, Toronto Council on Aging, and as a founding member of World Young Leaders in Dementia.
Eighteen students from across Canada, the United States and the United Kingdom took part in the 4th AGE-WELL Summer Institute, held in July 2019 in Montebello, Quebec.

The theme of the one-week intensive project-based learning experience was social connectedness. While studies show that participation in community activities positively influences health and socioeconomic outcomes for older adults, approximately 20 per cent of seniors in Canada currently experience social isolation.

Working in multidisciplinary teams, the trainees engaged with mentors to define a problem and develop a solution aimed at keeping seniors and caregivers connected and engaged in their favourite activities.

Older adults and caregivers played a key role during the week, sharing their experiences and expertise. Trainees worked through the design process—from problem definition to brainstorming, developing business models and knowledge mobilization plans, to pitching their projects.
Teams worked late into the night preparing their pitch presentations.

Team Echidna won the pitch competition for designing “Lighthouse,” which is personalized artwork for fostering long-distance social engagement between geographically separated families. When family members are at home, Lighthouse detects presence through motion sensors and displays dynamic light to create feelings of connection across distance. A nudge function lets loved ones signal when they are “thinking about you.” Both a unique art piece and a technology for social connection, Lighthouse “brings you closer to home.”

“The access to expertise from older adult stakeholders and well-recognized faculty all around Canada was unmatched by anything I’ve experienced.”
– Sujin Lee, occupational therapist and PhD student, Georgia Institute of Technology
One of our newest partners is CARP, well known for the work it does to promote financial security, better access to health care and freedom from discrimination as people age. Sun Life Financial also joined with us and we are proud to be partners on their new Lumino Health digital health network.

And this just in: AGE-WELL has partnered with Best Buy Canada, the country’s largest consumer technology retailer. AGE-WELL and Best Buy Canada will work towards several high-level goals including: determining and delivering effective technologies and services for older Canadians, and helping to grow Canada’s technology and aging sector.

AGE-WELL has also teamed up with a new publishing brand called YouAreUNLTD designed to disrupt and redefine what it means to get older. AGE-WELL is the lead institutional sponsor on this exciting initiative. The lead brand sponsor and distribution partner is Wellwise™ by Shoppers Drug Mart.

Four issues of YouAreUNLTD magazine were distributed in 2018 and 2019 to Wellwise™ by Shoppers Drug Mart, Shoppers Home Health Care and Shoppers Drug Mart stores in Ontario, British Columbia and Alberta.
Our partners turned out in full force for the AGE-WELL Annual Conference, which attracted over 400 attendees. AGE-WELL 2018 was a shining example of multi-sectoral networking and knowledge exchange. Key among the attendees were older adults and caregivers who are so actively involved in everything we do.

**And our engagement with decision-makers continues to grow.** In 2018, **AGE-WELL hosted its first-ever Day on the Hill**, which drew MPs, Senators, policy advisors and others. Network members took part in a wide range of policy discussions. AGE-WELL also contributed to a Canadian Academy of Health Sciences report on “Improving the Quality of Life and Care of Persons Living with Dementia and their Caregivers.” The federal Minister of Health requested this report to inform the National Strategy for Alzheimer’s Disease and Other Dementias Act.

Globally, **AGE-WELL’s reach continues to grow.** In the last year, our members presented at the United Nations, participated in international collaborations and shared their research around the world. We were thrilled to host a workshop at the International Federation on Ageing’s 14th Global Conference on Ageing. AGE-WELL is involved in the European Commission’s Active and Assistive Living (AAL) Programme through a highly-productive partnership with the Canadian Institutes of Health Research (CIHR) Institute of Aging. In fall 2018, this resulted in AGE-WELL and CIHR funding a three-year Canadian research project to support active, healthy and independent living of older adults (see story on page 57).
International leadership

AGE-WELL has advanced to become a globally-recognized network that accelerates innovation in the field of technology and aging.

Some examples:

AGE-WELL is delighted to be one of the Canadian organizations partnering with the Northern Health Science Alliance to drive international knowledge exchange, innovation and support research collaboration in healthy aging between Canada and the North of England. The aim of a memorandum of understanding announced in June 2019 is to share knowledge in research and development of health tech acceleration and adoption, build relationships and research partnership opportunities to address international challenges and to create potential channels for future commercial collaboration.

AGE-WELL researcher Dr. Jennifer Boger (University of Waterloo / Research Institute for Aging) with NHSA representatives.
AGE-WELL investigators

Dr. Rosalie Wang (University of Toronto / The Kite Research Institute at University Health Network) and Dr. Michael Wilson (McMaster University) presented at a side-event of the 11th UN session of the Conference of State Parties on the Convention on the Rights of Persons with Disabilities in New York. The event was co-hosted by March of Dimes Canada and the Essl Foundation. Drs. Wang and Wilson spoke about how policies and program approaches can enhance equitable access to assistive technologies for older adults living with a disability.

AGE-WELL was the only Canadian organization to submit a brief to the United Nations Secretary-General’s High-level Panel on Digital Cooperation. Our submission highlighted issues of privacy and the ethical implications of digital technologies, particularly in vulnerable populations. It was prepared by AGE-WELL in collaboration with the AGE-WELL National Innovation Hub: Digital Health Circle in Surrey, British Columbia.
Dr. Noelannah Neubauer, an AGE-WELL trainee who recently earned a PhD at the University of Alberta, has co-founded the **International Consortium on Dementia and Wayfinding (ICDW)**. Dr. Neubauer established the Consortium in 2018 with co-founder Katie Gambier-Ross, a PhD student at the University of Edinburgh. The ICDW provides a global platform for multi-agency collaboration and knowledge exchange. Its members include researchers, people with lived experience, private sector organizations, search and rescue agencies, health care and community organizations. Funding from AGE-WELL and the University of Edinburgh helped get the ICDW launched. 

**AGE-WELL’s Developing Regional Innovation Ecosystems (DRiVE)** team has formed an international consortium of researchers and is working with Communitech to explore best practices to encourage the involvement of women in regional innovation ecosystems. DRiVE is co-led by Dr. Josephine McMurray (Wilfrid Laurier University) and Dr. Heidi Sveistrup (University of Ottawa / Bruyère Research Institute). Their team explores how to build local capacity for innovation in health and aging technology. Communitech is a private-public partnership based in Ontario’s Waterloo Region that helps tech companies start, grow and succeed.

Dr. Noelannah Neubauer and Katie Gambier-Ross

Dr. Josephine McMurray

Dr. Heidi Sveistrup
An electronic workout to stay fit longer

Can a video-based training program help older adults live healthier lives?

Canada is playing a key role in an international research collaboration investigating whether a new platform can help older adults live longer independently—all while having fun.

The program combines physical and cognitive exercises and is available on a mobile tablet. It’s designed to maintain and improve strength, balance, attention and other skills to prevent falls, frailty and cognitive decline.

The project brings together researchers in Canada, Belgium and Switzerland, community groups and MindMaze, a Lausanne-based brain technology company. AGE-WELL and the Canadian Institutes of Health Research have partnered to fund the project through the Active and Assisted Living (AAL) Programme.

“We know that physical activity and cognitive stimulation is critical to prevent the effects of aging,” says Dr. Sylvie Belleville, a psychology professor at Université de Montréal and director of research at the Institut universitaire de gériatrie de Montréal. Dr. Belleville is the lead Canadian researcher on the project.

The program comes with a virtual coach and uses a built-in camera and sensors to provide real-time feedback to users. Seniors in Canada, Belgium and Switzerland are already downloading it as part of a clinical trial to test the program’s efficacy, usability and sustainability.

“Train [ing] older adults to increase their multi-tasking capacity and how to prioritize their attention can help reduce the risk of falls,” says Dr. Belleville. For example, one game involves riding a bicycle or a motorbike at different speeds and detecting various objects in different environments.

Seniors in Canada, Belgium and Switzerland are already downloading it as part of a clinical trial to test the program’s efficacy, usability and sustainability.

“The bicycle game is based on research done in our laboratory. We developed a cognitive training program and we rigorously showed that it improves the brain—but it was not a fun game,” says Dr. Belleville. The researchers explained the concept of the training program to their partners at MindMaze, who made it into an enjoyable and engaging game.

“I really believe that we need to offer older adults ways to maintain their autonomy, quality of life and health,” says Dr. Belleville, a Canada Research Chair in Cognitive Neuroscience of Aging and Brain Plasticity. “If we can reduce frailty, and increase steadiness of gait and multi-tasking capacity, we will have a huge impact on the rate of falls and quality of life worldwide.”

Training older adults to increase their multi-tasking capacity and how to prioritize their attention can help reduce the risk of falls, says Dr. Belleville. For example, one game involves riding a bicycle or a motorbike at different speeds and detecting various objects in different environments.
A key moment last year was the decision to prioritize eight areas for AGE-WELL to focus on with the goal of “moving the dial” when it comes to supporting older adults and caregivers in Canada—and achieving social and economic impact. The announcement of AGE-WELL’s eight “Challenge Areas” was made in November 2018 by Board chair Mimi Lowi-Young before an audience of over 700 attendees at the Canadian Science Policy Conference in Ottawa.

The Challenge Area initiative came out of an extensive review looking at federal and provincial policy priorities and consulting with 1,000 researchers, partners, older adults and caregivers across Canada. It is an ambitious agenda; these Challenge Areas set the agenda for the future of technology and aging in Canada, and will form the basis of AGE-WELL’s research program and complementary activities as we transition to our renewal mandate from 2020-2023.

In all aspects of planning for the future, the Board has provided crucial strategic direction. For example, last year Board members oversaw the refinement of AGE-WELL’s vision and mission statements. The Board guided us through a series of public consultations that were part of the planning process to define our priorities for 2020-2023.

Last year, we also embedded the principles of equity, diversity and inclusion (EDI) in AGE-WELL’s organizational values. More recently, we undertook a review to assess the degree to which our network operationalizes the principles of EDI. This led to developing a dedicated EDI strategy.

AGE-WELL also benefits tremendously from two advisory committees to our Board: the Research Management Committee (RMC) and the International Scientific Advisory Committee (ISAC). Both play a critical role in ensuring research excellence and impact. Last fall, distinguished researcher Dr. Robyn Tamblyn assumed the role of chair of the ISAC.
Effective management

AGE-WELL’s small network management office provides backbone support for the wide array of network activities so that AGE-WELL is on track for producing social and economic benefits for Canadians.

AGE-WELL is also guided by its stakeholders through six advisory committees: our Workpackage and Crosscutting advisory committees, Partner Advisory Committee, Older Adult and Caregiver Advisory Committee, HQP Advisory Committee, and the Commercialization and Technology Development Committee.

AGE-WELL is determined to be a model of good practice for the field in areas such as stakeholder involvement, collaborative team working and performance management.

By 2023, we aim to deliver the legacy of a strong and sustainable technology and aging sector in Canada comprised of: world-leading researchers, future leaders in innovation, an engaged stakeholder community and a national roadmap for technology and aging.

Leadership profile

With a background in health policy research, Dr. Robyn Tamblyn has long recognized the need for academics, industry, health professionals and others to work together to improve the health and wellbeing of older adults.

It’s the kind of collaboration that she especially embraces as the chair of AGE-WELL’s International Scientific Advisory Committee (ISAC) and a member of the AGE-WELL Board of Directors, roles she assumed in the fall of 2018.

“AGE-WELL’s work is very much in my area of passion,” says Dr. Tamblyn, who attributes AGE-WELL’s success to the number of researchers, industry and other partners in the network and its “visionary leadership,” which is raising Canada’s profile in the field of technology and aging.

She’s most impressed that AGE-WELL’s focus “goes way beyond health care” to include lifestyle and environmental factors, such as social support and mobility. “That’s so essential to quality of life for anyone, especially seniors,” she says, citing the example of an add-on feature that can transform a regular wheelchair into an “intelligent” wheelchair that enhances safety and independence.

Dr. Tamblyn’s interest in multi-sectoral collaboration is borne in part from her own research focused on chronic disease management and prescription drug use.

“The health-care system could benefit deeply from the partnership model that AGE-WELL exemplifies,” says Dr. Tamblyn, a professor of medicine in the Department of Epidemiology and Biostatistics at McGill University.

“It directly addresses one of the biggest frustrations I have, which is the failure of technology partners to develop solutions for real challenges.”

An important area of Dr. Tamblyn’s ground-breaking research has been the “simply shocking” rates of inappropriate prescription drug use by seniors related to health-care system fragmentation, which leads to medication duplication. Computerized drug management has been slow to come about, given “the mismatch between what technology companies are developing and what the needs are,” she says.

Dr. Tamblyn came to know AGE-WELL in her former role as scientific director of the Canadian Institutes of Health Research (CIHR) Institute of Health Services and Policy Research. CIHR has partnered with AGE-WELL through the Active and Assisted Living (AAL) Programme to support international research that will benefit aging baby boomers. The project explores whether a new video-based training program can help older adults live healthier lives (see story on page 57).

For Dr. Tamblyn, AGE-WELL is well-placed to co-partner on the ambitious project, given the network’s track record in creating practical products to support healthy aging.

“AGE-WELL gets technology working to solve real-world problems,” she says.
WP 1: NEEDS-OA
Understanding the Needs of Older Adults
To most effectively harness the power of technology and translate it into practical solutions, it is crucial that the people who will be using it are consulted and fully involved from the early stages right through product testing and marketing. NEEDS-OA is centred on understanding the needs of older adults related to technology, and on developing tools to include them in technology development.

WP 2: NEEDS-CG
Understanding the Needs of Caregivers
Family caregivers are critical to the health and support of older people. The aim of NEEDS-CG is to gain greater insight into how to better support caregivers. The goal is to support the development of novel technologies that can provide more effective and efficient care, reduce the burdens and consequences of care, and also enhance the quality of life of caregivers. We are developing strategies to assist caregivers in making more informed decisions on the selection of technologies.

WP 3: TECH-FAI
Technology for Supporting Functional Autonomy and Independence
Approximately one-quarter of Canadian seniors report having some kind of physical, cognitive or sensory impairment that affects their ability to perform common activities of daily living. TECH-FAI research focuses on two areas: technologies that can support older adults in the home and community with cognitive tasks, and technologies that address physical impairments and disabilities faced by older adults that often severely restrict their mobility and ability to remain independent.

WP 4: TECH-APS
Technology for Active Participation in Society
Social interaction and support are consistently identified as key aspects of seniors’ quality of life. Lack of communication has been shown to lead to isolation and loneliness, which can result in problems such as depression and cognitive decline for older adults. TECH-APS explores novel technologies that encourage and enable greater social interaction for older adults, and support social participation, including technologies for collaborative play, learning and knowledge sharing.
AGE-WELL research projects are organized into eight Workpackages, supported by four Crosscutting Activities: knowledge mobilization; commercialization and technology transfer; transdisciplinary working; and training and mentorship.

For more details, visit [www.agewell-nce.ca](http://www.agewell-nce.ca)

**WP 5: TECH-DD**  
**Technology for Reduction and Prevention of Disease and Disability**  
Chronic conditions such as cardiovascular diseases, diabetes or physical injuries due to falls and other accidents have significant costs for people, the health-care system and the Canadian economy. However, close monitoring of chronic conditions can significantly reduce their effects. In addition, regular activity and exercise in older adults is associated with an overall improvement in health, functional capacity, quality of life and independence. TECH-DD is producing technologies and tools that will help to actively engage older adults in society.

**WP 6: TECH-MCH**  
**Technology for Maintaining Good Mental and Cognitive Health**  
Currently, 747,000 Canadians have some type of cognitive impairment, including dementia. This number is expected to double to 1.4 million by 2031. Furthermore, 20 per cent of Canadian seniors are living with a mental illness, anxiety and depression. Pain tends to be under-reported and not treated, resulting in agitation and aggression, while mood disorders often go untreated. TECH-MCH will result in new technologies in an area that has been largely ignored in the technology and aging field.

**WP 7: POLICY-TECH**  
**Health Systems, Practice, Policy and Regulatory Issues**  
While technological innovation offers tremendous new opportunities, there are challenges in relation to policy, regulation and decision-making in the care of older persons. It is also important to understand how different sectors and stakeholders can work together to develop innovative solutions. POLICY-TECH will deliver in-depth information that will be crucial for AGE-WELL partners as they attempt to bring new technologies and tools to the market. The research will also drive new health-care policies.

**WP 8: ETHICS-TECH**  
**Ethical, Cultural and Social Aspects of Technology**  
The use of new and advanced technologies in the care and support of older adults poses significant social and ethical questions, particularly in areas such as robotics, artificial intelligence and sensors that collect potentially sensitive data. ETHICS-TECH is developing advice and methodology to assist researchers and policymakers who are exploring aging, disability and technology. The research also investigates ethical, privacy and security factors that are most likely to contribute to disparities in the usage of emerging technologies.
## STATEMENT OF FINANCIAL POSITION

**AGE-WELL NCE Inc.**

As at March 31

<table>
<thead>
<tr>
<th></th>
<th>2019</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ASSETS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Current</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cash and cash equivalents</td>
<td>227,322</td>
<td>274,454</td>
</tr>
<tr>
<td>Due from University Health Network</td>
<td>7,981,468</td>
<td>8,105,867</td>
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<tr>
<td>Unspent research grants held at participating institutions</td>
<td>1,773,711</td>
<td>1,392,801</td>
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<tr>
<td>Accounts receivable</td>
<td>173,581</td>
<td>80,736</td>
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<tr>
<td>Prepaid expenses</td>
<td>16,258</td>
<td>26,030</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>10,172,340</td>
<td>9,879,888</td>
</tr>
</tbody>
</table>

| **LIABILITIES AND NET ASSETS** |          |          |
| **Current**                   |          |          |
| Unearned revenue              | 32,180   | 43,416   |
| Accounts payable and accrued liabilities | 307,918 | 215,050 |
| **Total current liabilities** | 340,098  | 258,466  |
| Deferred contributions        | 9,504,514 | 9,421,438 |
| **Total liabilities**         | 9,844,612 | 9,679,904 |

| **Net assets**               |          |          |
| Unrestricted                 | 327,728  | 199,984  |
| **Total**                    | 10,172,340 | 9,879,888 |

On behalf of the Board:

Mimi Lowi-Young, Chair, Board of Directors

Barbara Stymiest, Chair, Finance and Audit Committee

Please refer to the audited financial statements on the AGE-WELL NCE website: [www.agewell-nce.ca](http://www.agewell-nce.ca)
## STATEMENT OF OPERATIONS AND CHANGES IN UNRESTRICTED NET ASSETS

**AGE-WELL NCE Inc.**

**Year Ended March 31**

<table>
<thead>
<tr>
<th></th>
<th>2019</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>REVENUE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Networks of Centres of Excellence grant</td>
<td>7,419,892</td>
<td>8,102,942</td>
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<tr>
<td>Grant from other partners / organizations</td>
<td>131,550</td>
<td>142,926</td>
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<tr>
<td>Other sources of funds</td>
<td>135,766</td>
<td>121,376</td>
</tr>
<tr>
<td><strong>Total Revenue</strong></td>
<td>7,687,208</td>
<td>8,367,244</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>2019</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EXPENSES</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Research and training</td>
<td>5,982,290</td>
<td>6,839,914</td>
</tr>
<tr>
<td>Networking meetings and events</td>
<td>504,657</td>
<td>339,286</td>
</tr>
<tr>
<td>Communications</td>
<td>150,249</td>
<td>100,641</td>
</tr>
<tr>
<td>Professional fees</td>
<td>54,906</td>
<td>29,254</td>
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<tr>
<td>Travel</td>
<td>20,565</td>
<td>34,150</td>
</tr>
<tr>
<td>Administration</td>
<td>846,797</td>
<td>936,672</td>
</tr>
<tr>
<td><strong>Total Expenses</strong></td>
<td>7,559,464</td>
<td>8,279,917</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>2019</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Excess of revenue over expenses for the year</strong></td>
<td>127,744</td>
<td>87,327</td>
</tr>
<tr>
<td>Unrestricted net assets, beginning of year</td>
<td>119,984</td>
<td>112,657</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>2019</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Unrestricted net assets, end of year</strong></td>
<td>327,728</td>
<td>199,984</td>
</tr>
</tbody>
</table>

Cash and in-kind contributions from partners held and spent at network member institutions are not included in these statements.

The Network follows the deferral method of accounting for contributions which include government and other grants. Deferred contributions represent unspent resources externally restricted for program expenses in future years. Changes in the deferred contributions balance are as follows:

<table>
<thead>
<tr>
<th></th>
<th>2019</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Balance, beginning of year</strong></td>
<td>9,421,438</td>
<td>9,456,134</td>
</tr>
<tr>
<td>Amounts received during the year – NCE</td>
<td>7,597,018</td>
<td>8,111,672</td>
</tr>
<tr>
<td>Amounts received during the year – Non NCE</td>
<td>37,500</td>
<td>99,500</td>
</tr>
<tr>
<td>Amounts recognized as revenue during the year</td>
<td>(7,551,442)</td>
<td>(8,245,868)</td>
</tr>
<tr>
<td><strong>Balance, end of year</strong></td>
<td>9,504,514</td>
<td>9,421,438</td>
</tr>
</tbody>
</table>

The first tranche of funding from NCE was received March 26, 2015.

Please refer to the audited financial statements on the AGE-WELL NCE website: [www.agewell-nce.ca](http://www.agewell-nce.ca)
Member Universities and Research Centres
Baycrest Centre for Geriatric Care
Bruyère Research Institute
Carleton University
Centre de recherche de l’Institut universitaire de gériatrie de Montréal (CRIUGM)
Children’s Hospital of Eastern Ontario Research Institute
Collège Mérimée
Dalhousie University
First Nations University of Canada
George Brown College
Health Sciences North Research Institute
Laurentian University
London Health Sciences Centre
McGill University
McMaster University
Montreal Heart Institute
Ontario Shores Centre for Mental Health Sciences
The Research Institute of the McGill University Health Centre
Ryerson University
Simon Fraser University
Sunnybrook Research Institute
TELUQ
Trent University
Université de Montréal
Université de Sherbrooke
Université du Québec à Montréal
Université Laval
University Health Network
University of Alberta
University of British Columbia
University of Calgary
University of Guelph
University of Manitoba
University of New Brunswick
University of Northern British Columbia
University of Ottawa
University of Regina
University of Saskatchewan
University of Toronto
University of Victoria
University of Waterloo
Western University
Wilfrid Laurier University

Partners
6Harmonics
AbbVie
Able Innovations
Access Community Therapists Limited
Active and Assisted Living Programme (AAL)
Active4Care
Aditum Health
ADL Smartcare
Adrenalease Inc.
AdvantAge Ontario
Aerial Technologies Inc.
AGE-WELL National Innovation Hub, Digital Health Circle
AGE-WELL National Innovation Hub, SAM³
Aging 2.0
Aix-Marseille University
Alberta Association on Gerontology
Alberta Health Services
Alberta Innovates
Alberta Therapeutic Recreation Association
Algonquin College
AllerGen NCE
Alzheimer Society of British Columbia
Alzheimer Society of Calgary
Alzheimer Society of Canada
Alzheimer Society of Durham Region
Alzheimer Society of Manitoba
Alzheimer Society of Ontario
Alzheimer Society of Saskatchewan
Ambient Activity Technologies
Amintro Inc.
Amylor Inc.
Annapolis Valley Health
Ashbourne (Assisted Living)
Association pour l’intégration sociale d’Ottawa (AISO)
Atlantic Institute on Aging
Aunege
Autonomous_ID
Barrier and Community Family Health Team
Baxter Corporation
Baycrest Centre for Learning Research and Innovation
BC Care Providers Association
BC Ministry of Health
BC Silver Alert
BC Support Unit
BC Therapeutic Recreation Association
Behavioural Supports Ontario
Bereskin & Parr LLP
Best Buy Canada
Bignotion Technologies Inc.
BioCanRx NCE
Blackberry
Blue Tree Medical Inc.
BOA Technology
Bosch Engineering GmbH
Boston Scientific Canada
Bowmont Seniors Assistance Association
Braze Mobility
Breton Ability Centre
British Columbia Academic Health Sciences Network
Burnaby Multicultural Society
Burnaby North Secondary School
Cambridge Brain Sciences
Canadian Agency for Drugs and Technologies in Health
Canadian Assistive Devices Association
Canadian Association of Occupational Therapists
Canadian Association of Retired Persons (CARP)
Canadian Association on Gerontology
Canadian Centre on Neurodegeneration in Aging (CCNA)
Canadian Fall Prevention Curriculum
Canadian Frailty Network
Canadian Homecare Association
Canadian Mental Health Association Middlesex
Canadian Respiratory Research Network
Canadian Standards Association (CSA) Group
CanAssist
Cardiac Arrhythmia Network of Canada - CANet
CareBand Inc.
Caregiver Omnimedia Inc.
Caregivers Alberta
Carers Canada
Cariboo Friendship Society
Carya Society of Calgary
CBDS Health Inc.
CBI Health Group Inc.
Cedarhurst Dementia Care Home
Centivizer Inc.
Centre de réadaptation Constance-Lethbridge
Centre de réadaptation Lucie-Bruneau
Centre de recherche interdisciplinaire en réadaptation du Montréal métropolitain (CRIR)
Centre de recherche sur le vieillissement (CdRv)
Centre de santé et de services sociaux de la Montagne (CSS-DLM)
Centre de santé et de services sociaux de la Montagne (CSSS-DE) de l’Énergie
Centre facilitant la recherche et l’innovation dans les organisations (CEFRI0)
Centre for Aging + Brain Health Innovation (CABHI)
Centre for Assistive Technology and Connected Healthcare, University of Sheffield
Centre for Digital Media
Centre for Education and Research on Aging & Health, Lakehead University
Centre for Hip Health and Mobility
Centre for International Research on Care, Labour and Equalities (CIRCLE)
Centre for Research on Educational and Community Services (CRECS)
Centre for Social Enterprise Development
Centre intégré de santé et de services sociaux de Laval (CIUSSS-Laval)
Centre intégré universitaire de santé et de services sociaux de la Capitale-Nationale, CIRRIS and IRDPQ (CIUSSS-CN)
Centre intégré universitaire de santé et de services sociaux du Centre-Ouest de-l’Île-de-Montréal, CRCL (CIUSSS-CO)
Centre intégré universitaire de santé et de services sociaux du Centre-Sud-de-l’Île-de-Montréal (CIUSSS-CS-CRLB)
Centre intégré universitaire de santé et de services sociaux du Centre-Sud-de-l’Île-de-Montréal (CIUSSS-CS-IRGLM)
Centre intégré universitaire de santé et de services sociaux du Centre-Sud-de-l’Île-de-Montréal (CIUSSS-CS-IURDPM)
Centre interdisciplinaire de recherche en réadaptation et intégration sociale (CIRRIS)
Centre de Excellence on Partnership with Patients and the Public
Centre on Aging, University of Manitoba
Centre Universitaire Jean-François Champlain Community Care Access Centre
Chartwell Retirement Residences
Choices in Community Living
Christie Gardens Apartments and Care
CiCan Career Launcher
CIHR Institute of Aging (IA)
CIHR Institute of Health Services and Policy Research (IHSPR)
Circle of Care
City of Toronto, Long Term Care Homes & Services
Clinisys EMR Inc.
Coast Capital Savings Innovation Centre, University of Victoria
Cobourg Police
Communitech
ComSanté, Université de Québec à Montréal
CONNECT for Mental Health Inc.
Consequential Robotics
Covenant Health
CrossWing Inc.
Data Performers
Databrary
Deliberatus Design
Delta View Care Centre
Dementia Connections
Design Enjue
Developmental Disabilities Association (DDA)
DJP Designs
Durham Regional Police Services
Elder Technology Assistance Group (ETAG)
Emmetros Limited
Employers for Carers UK
Employment and Social Development Canada
Engage Biomechanics
Entrepreneurship Hub, University of Ottawa
Eos Analytics
eTreatMD
Extendicare
Famli.net
Fasken Martineau LLP
File Hills Qu’Appelle Tribal Council
First Nations Health Authority
Fondation Berthiaume-Du Tremblay
Fondation Luc Maurice
Fonds de recherche du Québec - Santé
Fraser Health Authority
Frog Hollow Neighbourhood House
G. F. Strong Rehabilitation Centre
gDial Inc.
GeronTech LTD
Gilbreath Centre for Studies in Aging, McMaster University
Glenrose Rehabilitation Hospital
GlycoNet NCE
Government of Alberta
Government of Yukon Department of Health and Social Services
Granville Gardens
Greater Fredericton Social Innovation (GFSI)
Groupe Convex
Guanghua International Education Association
Hacking Health
HealthTech Connex
Heuristext Inc.
Hexoskin
Hexyoo Scientific Inc.
Hospital Clinic for Alzheimer Disease and Related Disorders, University of British Columbia
HotPathz, Inc.
Humber River Hospital
IBM Canada Ltd
IDFusion Software
i-Edit
IMAGINE Citizens
Indes
Inertia Engineering
Information and Communications Technology Council (ICTC)
Information Technology Association of Canada (ITAC)
Innovation Blvd
Innovation Factory
Institut sur le vieillissement et la participation sociale des aînés, Université Laval
Institute for Life Course and Aging, University of Toronto
Institute on Aging & Lifelong Health, University of Victoria
Interaxon
Interior Health Authority
JDQ Systems Inc.
JLG Health Solutions Inc.
**Partners continued**

- Johnson & Johnson
- Kamloops Aboriginal Friendship Society
- Keebee
- Kids Brain Health Network
- Ki-Low-Na Friendship Society
- Kingston General Hospital
- Kinova Inc.
- Kintec Footwear and Orthotics
- Korah Limited
- Laboratoire d’innovations par et pour les aînés (LIPPA)
- Lakeside Long Term Care Centre
- Language Instruction for Newcomers to Canada (LINC)
- Les jardins de la côte
- Lesya Dyk O.T. Services Inc.
- Lifestyle Options Retirement Communities
- Lillooet Friendship Centre Society
- LocateMotion
- London and Middlesex Housing Corporation
- Ludoscience
- Lumentra
- MAC H2OPE Clinic
- March Of Dimes
- Mavencare
- McMaster Institute for Research on Aging
- McMaster Optimal Aging Portal
- MEDEC
- Medic Alert
- MEDTEQ
- Memory and Company
- MERGE-3D
- Merz Pharma Canada
- Metis Community Services Society of BC
- Microsoft
- Mindful Garden Digital Health Inc.
- Mindful Scientific
- Ministère de la Santé et des Services sociaux (MSSS)
- Minoru Pace Activity Centre
- Mircom
- Mitacs
- Mobisafe System
- Mount Pleasant Neighbourhood House
- Mowat Centre
- Mozilla Inc.
- MultiMension Inc
- My MatchWork Inc.
- Myant
- N’Minoeyaa Indigenous Health Access Centre
- Nak'albun School
- Nak'azdli Elders
- Nak'azdli Health Centre
- Nak'azdli Whut'en
- National Association for Search and Rescue (NASAR)
- National Initiative for the Care of the Elderly (NICE)
- National Institute on Ageing, Ryerson University
- Neighbourlink North York
- New Brunswick Health Research Foundation
- New Vista Society
- North Hamilton Community Health Centre
- North Okanagan Friendship Centre Society
- Northern Health Authority
- Northwood
- Nova Scotia Centre on Aging, Mount Saint Vincent University
- Novalite Inc.
- OCAD University
- Office municipal d’habitation de la Côte-de-Beauport
- Ontario Bioscience Innovation Organization (OBIO)
- Ontario Brain Institute
- Ontario Centres of Excellence
- Ontario Dementia Advisory Group (ODAG)
- Ontario Institute of Regenerative Medicine (OIRM)
- Ontario Long Term Care Association
- Ontario Ministry of Health and Long-Term Care
- Ontario Peer Development Initiative
- Ontario Society of Occupational Therapists
- Ontario Telemedicine Network (OTN)
- Open Roboethics Institute
- Oregon Center for Aging & Technology (ORCATECH)
- Orthofab Inc.
- Otsuka Americas Pharmaceutical
- Ottawa Police Service
- Palmerston Bay Inc.
- Parkinson Quebec
- Parkinson's Clinic of Eastern Toronto and Movement Disorders Centre
- Partners Advancing Transitions in HealthCare
- Patterson Medical
- Philips Healthcare
- PhysioAtlas
- Port Moody Heritage Society
- PRAXIS Holistic Health
- Prism Medical
- Project Whitecard Digital
- Pronura Diagnostics Corp.
- Providence Care
- Quanser Consulting Inc.
- Quebec Network for Research on Aging
- Queen's Family Health Team
- Rakuten Kobo
- RBC
- Regina Qu’Appelle Health Authority
- Regroupement des aidantes et aidants naturel(le)s de Montréal (RAANM)
- Regroupement stratégique INTER Réseau provincial de recherche en adaptation-réadaptation (REPAR)
- Retirement Concepts
- Revera Inc.
- Rick Hansen Institute (RHI)
- Riverview Health Centre
- Rogers Communications Inc.
- Royal Ottawa
- Rx-V
- SafeTracks GPS Canada Inc.
- Saint Elizabeth Health Care
- Samsung Electronics
- Samsung Research America
- Saskatchewan Health Authority
- Saskatchewan Ministry of Health
- SATech
- Schlegel Villages
- Secours.io
- SeeLogics Inc.
- Seniors Care Network
- Seniors Health Knowledge Network
- Sermax
- Sharbot Lake Family Health Team
- Sheridan College
- Shoppers Drug Mart
- Silver Harbour Seniors’ Activity Centre
- Silvermark Inc.
- Smart Computing for Innovation (SOCIP)
- Smart Environments Research Group, Ulster University
- SMARTONE Solutions Inc.
- Social Enterprise Institute
- Société Inclusive
- Société pour l’apprentissage à vie (SAVIE)
- Socio-Digital Research (SDR) Inc.
- Southern Medical Program, University of British Columbia
Statistics Canada
Steadiwear
STF Technologies
Sun Life Financial
Sunnybrook Health Sciences Centre, St John’s Rehab
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Tactica Interactive Inc.
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