AGE-WELL: Driving innovation in the technology and aging sector in Canada

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AGE-WELL Network of Centres of Excellence, Canada

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AGE-WELL

NOT...

AGE-BAD
Aims of today’s talk

- Look at the technology and aging funding "landscape" internationally and at the local and national levels within Canada.
- Outline some of challenges in turning great science into real-world impact
- Present how AGE-WELL is driving successful innovation in the technology and aging sector
Environmental scan of Technology and Aging funders

• Funding organizations at different levels:
  – International
  – National
  – Provincial

• Looks at funding at key stages in the innovation process
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# AGE-WELL Funding Programs

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<th>Catalyst Program</th>
<th>Core project</th>
<th>SIP Accelerator</th>
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<td>Purpose</td>
<td>Scalable research projects including pilot studies, feasibility studies, and novel and innovative approaches aligned with research priorities and themes.</td>
<td>Major research and development projects</td>
<td>Supports post-discovery commercialization, business development and knowledge mobilization activities.</td>
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<td>Award Value</td>
<td>$50,000</td>
<td>100-150,000 p.a.</td>
<td>$40,000 (+ provides financial support, training opportunities and mentorship)</td>
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<td>Term</td>
<td>12 months, renewable</td>
<td>3-5 years</td>
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<td>Closing Deadlines</td>
<td>Annual (March)</td>
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<td>3x per year (April, Sept, January)</td>
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Technology & aging funding map

Production Innovation Pathway (PIP)

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<td>Generating ideas, collaborations and initial plane. Developing the vision and goals.</td>
<td>Turning ideas into formal proposals, plans, projects and initiatives. Defining the product.</td>
<td>Refining and developing ideas, policies and service models. Prototyping technologies.</td>
<td>Testing and evaluating products in real world situations.</td>
<td>Adapting the product to the real world.</td>
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Provincial Initiatives
- MSFHR
  - Catalyst Program

National Initiatives
- AGE-WELL
  - Core Research Program (CRP)
- CIHR
- NSERC
- SSHRC
- NCE

International Initiatives
- AAL-JP

Innovation to Commercialization (I2C) Program
- SIP Program
- eHealth Innovations Partnership Program
- Applied Research and Development Grant
- Centres of Excellence for Commercialization and Research program competition
- NCE Knowledge Mobilization Initiative competition
- AAL-JP
Key findings

• Still work in progress- populating and validating the map
• Proliferation of funding organizations in the aging and technology sector
• Helpful resource for the research community
• Useful for strategic positioning of investment and funding programs
Implications

- AGE-WELL funds across the Innovation Cycle
- NOT JUST ABOUT THE MONEY-
- Need to address critical points in innovation cycle
- Provide support and mentorship
- Build capacity
- Create critical mass a sustainability
There is

STRONG POTENTIAL

for technology to support

HEALTHY & ACTIVE LIVING
The Time is Now

A convergence of key trends in Canada make it the right time for the AGE-WELL NCE:

• An increasing number of older adults
• Seniors are becoming more tech-savvy
• Smart homes, AI, robotics, pervasive computing and the “internet of things” are being mainstreamed
• Health care technologies are “the next big thing” with significant global investment
• Alignment with Federal and international priorities
Aging Well

- remain independent in our lives
- actively participate in society

We can all age well, whatever our situation
The Story behind the Numbers

Proportion of children 14 years & under and people aged 65 & older in Canada

The share of seniors exceeds share of children in 2016

THE GLOBE AND MAIL, SOURCE: STATSCAN, 2016 CENSUS
Health technologies - Market sectors and size

• 1) Long-term care facilities or nursing homes, which is a $24 billion market
• 2) Home care systems (e.g. Telus’ Home Health Monitoring), which was over $12 billion in 2015
• 3) Direct-to-consumer healthcare technology (e.g. wearables such as iWatch), which will reach $25 billion worldwide by 2019
The Market: the Silver Economy

### Table 1 - ICT innovations according to techno-economic clusters

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<th>Cluster</th>
<th>Example</th>
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<tr>
<td>Housing</td>
<td>e.g. ICT systems augmenting the home environment such as smart home systems and connected home solutions (smart living environments for the elderly &amp; Internet of Things); housing schemes with ICT enabled services such as remote energy management, safety monitoring, entertainment, service / domestic robotics</td>
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<td>Mobility &amp; tourism</td>
<td>e.g. ICT augmented age-friendly tourism such as hotel rooms incorporating intelligence through an ICT platform; augmented age-friendly mobility such as assistance systems for older drivers; barrier-free environments and seamless / accessible mobility such as provision of accessible information to travellers and inter-modality exchanges</td>
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<td>Health &amp; long-term care</td>
<td>e.g. ICT for chronic disease management and remote programmes supporting adherence to treatment; Telecare such as advanced home safety monitoring solutions and ICT-supported integration of care delivered by different parties (health, social, third-sector); personal health systems/medical devices such as implantables; big data analytics &amp; solutions such as decision support systems for patients, professionals and health system planning; service robotics supporting stationary / home care; robot-assisted rehabilitation; ICT systems enabling personalised medicine/treatment; VPH / in-silico medicine / Digital Patient</td>
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<td>Wellbeing, prevention &amp; self-care</td>
<td>e.g. ICT enabled patient empowerment and self-management services such as online counselling; personalised digital coach for physical, mental and social wellbeing (Avatar); personal health devices; mHealth apps; ICT-enabled nutrition support and analytics; digitalised social protection systems; innovations on early markers of ill health</td>
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### Cluster | Example
---|---
Citizenship & consumerism | e.g. virtual communities & digital neighbourhood platforms for community building; social participations and mutual support; personalised interfaces and service processes for commercial and public online services (e.g. ATM machines) and online services such as e-banking, e-commerce and e-government; age-friendly designed electronic gadgets and ICT devices; mobile apps for Active Ageing
Employment, education & training | e.g. accessibility and inclusiveness of the labour market (regulations, change of perception on older people, ageism); wide-spread reconciliation of paid work and informal care; virtual communities and mutual support; ICT and robotics fostering employment capacity; ICT research and innovation & ageing (e.g., customisable user interfaces, co-design); (e)Skills and (e)Leadership skills / Education for active ageing/ employment; ICT-enabled services for caring

![Diagram of ICT innovations](image-url)
The opportunity is **HUGE**

Global silver economy valued at $7 trillion per year, reaching a projected $15 trillion by 2020.

The global market for elder-care technology products is expected to grow to $10.3 billion in 2020 from nearly $4.4 billion in 2015, at a compound annual growth rate (CAGR) of 18.8% from 2015 to 2020.
From Reactive to Proactive Care

Quality of Life

Home Care
- Independent, Healthy Living
- Chronic Disease Management
- Community Clinic
- Doctor’s Office

Technology

Residential Care
- Assisted Living
- Skilled Nursing Facility

Acute Care
- Specialty Clinic
- Community Hospital
- ICU

Cost of Care / Day
- $1
- $10
- $100
- $1,000
- $10,000
Failure to Launch

There are very few devices available, with many of them being too expensive and difficult to use.
Disruption
NEXT EXIT
Disruption requires NEW WAYS OF THINKING And DOING
Challenges

• The needs of older adults are complex, and are even more so in the face of specific impairments and diseases.

• More often than not, an understanding of users’ needs is not part of a project.

• There has been a “silo” mentality in this field that has resulted in poor outcomes.
Older adults (and their caregivers) are becoming more tech savvy. There are growing expectations on the integration of technologies into their daily lives.
Disruptive Technologies

....when introduced, either radically transforms markets, creates wholly new markets or destroys existing markets for other technologies
New Delivery Models

The majority of new technologies to support older adults are:
• NOT medical devices
• being developed as consumer products

More importantly, there is a grassroots movement in the field where consumers (e.g. caregivers) are building their own solutions.
A Changing Research Landscape

- Transdisciplinary teams - engineering, IT, clinical sciences, social science, humanities, business
- Significant end-user involvement
- Cross-country collaboration – Active and Assisted Living Joint Programme (AAL-JP) in Europe
What is AGE-WELL doing to support HEALTHY & ACTIVE LIVING?
Networks of Centres of Excellence

“To mobilize Canada’s research talent in the academic, private and public sectors and apply it to the task of developing the economy and improving the quality of life of Canadians”
AGE-WELL: Aging Gracefully across Environments using Technology to Support Wellness, Engagement, and Long Life

The vision of AGE-WELL is to harness the potential of technology to provide high-quality and sustainable services and solutions to meet the needs of the current and future generations of older adults in Canada.

Our vision includes the creation of capacity for Canada to further establish its position as a global leader.
by the Numbers*

*as of September 2017

398
HIGHLY QUALIFIED PERSONNEL (HQP)

141
Industry & Community Partners

44
Federal & Provincial Departments & Agencies

$36.6M
FUNDING (2015-2020) from the Networks of Centres of Excellence [NCE]

150+
RESEARCHERS

Canada's Technology and Aging Network

37
MEMBER UNIVERSITIES AND RESEARCH CENTRES across Canada

$22M+
CASH AND IN-KIND Contributions from Partners
AGE-WELL Projects

57 active projects:

- 25 Core Research Projects (3-5 years)
- 32 Catalyst and Strategic Investment Program (SIP) projects (1 year – mainly post discovery projects)

Diversification of our innovation pipeline to increase our potential for real-world impact and results.

Network growth from Y1-Y3: +132%
Av. Annual growth from Y1-Y3: +44%
1. What are the needs of older adults and caregivers?

WP1 – Understanding the Needs of Older Adults

- **Project:** Older Adults' Active Involvement in Aging and Technology Research and Development

WP2 – Understanding the Needs of Caregivers

- **Project:** Assistive Technologies that Care for the Caregiver
2. What technologies and services should be used?

**WP3 – Technology for Supporting Functional Autonomy & Independence**

- **Projects**: Smart Homes, Robotics, Artificial Intelligence, Smart Wheelchairs

**WP4 – Technology for Active Participation in Society**

- **Projects**: Social Connectedness App, Digital Social Games, Digital Storytelling
2. What technologies and services should be used?

WP5 – Technology for Prevention, Reduction of Disease and Disability
• Projects: Fall Detection, Compliant Flooring and Stick-on Hip Protectors, Rehabilitation Systems, Health Monitoring Systems, Wearable Technologies

WP6 – Technology for Maintaining Good Mental and Cognitive Health
• Projects: Information Communication Technology (ICT) applications for screening, assessment and intervention for cognitive health
3. How can we foster innovation?

WP7– Health Systems, Practice, Policy, and Regulatory Issues

- **Project:** Policy and Regulatory Issues in Enabling Technological Innovation

WP8– Ethical, Cultural, and Social Aspects of Technology

- **Project:** Privacy, Security, and Ethics of the use of Emerging Technologies: Development and Validation of a Framework for Research and Policy
AGE-WELL PRODUCTS
Imagine the Potential

AGE-WELL teams are developing technologies across a range of applications:

- Robotics & Assistive Technology
- Smart Homes
- Software & Big Data
Smart Homes
Big Data in the Home

Actigraphy devices

Localization sensors

Bed Sensors

Physiological sensors

Phone sensors

Walking sensors

Activity sensors

Cell phone as prompting device and for location tracking

User PC: Experience sampling; cognitive testing; social engagement; coaching

Door sensors

Medication tracking device
WinterLight Labs

A tablet-based speech-assessment technology that detects and monitors cognitive impairment.

The software:

• extracts and analyses hundreds of variables from speech
• produces results in less than 10 minutes
• reliably identifies Alzheimer’s disease, aphasia and Parkinson’s disease with 82% to 100% accuracy.
Automated Pain Detection System

An unobtrusive automated system that uses facial recognition technology to monitor pain in people with severe dementia who reside in long-term care facilities. The system will operate continually, identify pain behaviours, and notify nursing staff.

- Improve quality of life
- Improve work environment & productivity of clinical staff
- Affordable technology
An affordable add-on system that can transform any commercial wheelchair into a “smart” wheelchair.

The system:

- Detects obstacles and offers feedback to the driver
- Helps prevent collisions
- Increases safe and independent mobility
The Steadiglove – an affordable, lightweight, compact and battery-free glove that responsively stabilizes tremors.

The glove can help those with Essential Tremor and Parkinson’s disease. It uses novel patent pending damping technology which reduces tremors while allowing voluntary motion.

- Discreet and lightweight system
- Adaptively reduces tremors without battery requirements or negative side effects
- Early beta results show 80% amplitude reduction in tremors
Reconnecting Elders and Youth through Digital Storytelling

Dr. Shannon Freeman and Jenny Martin, Director of the Nak’azdli Health Centre are conducting partnered research that results in meaningful change. The project involves:

• Grade 6 and 7 students record Elders telling their stories
• The students add photos, video, music and sound effects to create digital stories that are five to eight minutes long
• Stories are shared at community events and posted on the Nak’azdli First Nation website, creating a digital legacy
Enhancing Equitable Access to Assistive Technologies (AT)

Dr. Rosalie Wang and Dr. Michael Wilson’s team have published a series of documents on enhancing equitable access to AT, including:

- Jurisdictional scan of programs
- Citizen brief
- Citizen panel summary
- Evidence brief
- Stakeholder dialogue summary
- Video interviews
- Infographic
ADDRESSING THE CHALLENGES
The current landscape needs to change in order for these new innovations to make it to the marketplace.
Moving from research to real-world impact

CHALLENGE: Innovation is difficult in the aging and technology sector and there are many barriers to change

What are these challenges? What are the potential solutions? What is Age-Well doing to meet these challenges?

.....Researchers, Partners and Trainees (HQP)
Working with RESEARCHERS- Changing the research culture

CHALLENGE: How do we mobilize a diverse team to work together towards AGE-WELL goals?

SOLUTIONS

• Culture change- transdisciplinary working as the key ethic
• Provide support and mentoring in critical areas- Knowledge Mobilization, Commercialization, Transdisciplinary Working, Training
• Work with researchers and stakeholders to develop a program of translational research and training

KEY AGE-WELL INITIATIVE

• Managing the PATHWAYS to INNOVATION
Working with PARTNERS- Creating Meaningful Partnerships

CHALLENGE: How can we work with partners and stakeholders to maximize AGE-WELL’s social and economic impact

SOLUTION:
• Comprehensive partnership strategy, including appropriate human resources to manage partnerships, clear expectations outlined in partnership agreements, partner engagement in decision-making processes

KEY AGE-WELL INITIATIVE
• AGE-WELL INNOVATES
Working with TRAINEES - Training a new generation of Highly Qualified Persons (HQP)

CHALLENGE: Creating new forms of training that meets the changing needs of the sector and our HQP

SOLUTIONS:

• Provide training that breaks down academic silos
• Build awareness and skills in commercialization and knowledge mobilization
• Training that recognizes that most HQP will work outside the academic sector

KEY AGE-WELL INITIATIVE

• EPIC Training Program
“The AGE-WELL EPIC program will train highly qualified personnel (HQP) to be industry, academic, and community leaders in the development and introduction of technology to the health system and marketplace.”
A New Generation of Trainees

• AGE-WELL seeks to “produce” trainees that will be important for all stakeholder communities, including academia, clinical, and industry sectors.

• AGE-WELL will equip trainees with transdisciplinary skills and expertise needed to be relevant across sectors through an experiential training program.
AGE-WELL National Innovation Hubs

- Advancing Policies and Practices in Technology and Aging (APPTA) hub
  - Launched in May, 2017 in Fredericton, New Brunswick

- Sensors and Analytics for Monitoring Mobility and Memory (SAM3) hub
  - Launched in November, 2017 in Ottawa, Ontario
Core Facilities

- promote national and international interactions for AGE-WELL
- provide physical and/or virtual venues for researchers to meet, collaborate and exchange ideas
Want to know more about AGE-WELL?

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