TECHNOLOGY-ENABLED HOME CARE

Supporting independence and improving health outcomes in the home setting

Canadian Home Care Association
canadienne de soins et services à domicile

Advancing Excellence in Home Care

> *"Expanded technology-enabled home care offers a promising pathway to bend the cost curve for ever-growing health care expenditures. Independent of the economic benefit, the moral value of enabling older members of society to live in grace and dignity in their own homes, with a ripple effect on their caregivers, is arguably the most important – if unquantifiable – benefit of home care."*
>
> *(Kayyali et al, 2011).*

Innovation is essential to a high-performing economy, a sustainable health care system, and ensuring Canadians have access to high quality health and social care. Without investments in innovation, our health care system will continue to be ranked in a lower percentile in areas such as timeliness of care, efficient care and safe care relative to that of its peer countries (The Commonwealth Fund, 2014). Innovative solutions are needed now more than ever to address our current 'epidemiological transition' (Mattke et al., 2010). That is, an aging population which is living longer with increasing chronic (long-term) care needs (Mattke et al., 2010). Exacerbating the challenge of our epidemiological shift is a shortage of health human resources and barriers to providing health services to vulnerable populations in rural and remote regions of Canada. Technology-enabled community-based care solutions can be the breakthrough our system urgently needs to reduce the growth rate of health care costs, while raising productivity and improving health outcomes.

Wi-Fi and mobile-connected devices will generate **68% of Internet traffic,** by 2017
(KPMG & Mowat Centre, 2014)

In 2013, **5,000 patients** were enrolled in 19 Remote Patient Monitoring programs across 7 provinces and territories
(Canada Health Infoway, 2014)

Technological innovations enable people to be more independent, remain in their homes longer and be more engaged in the self-management.

76 % of seniors reported they use social networking sites to keep in touch with family and friends.
(Revera, 2012)

10% of Canadian adults used medical devices that captured and transmitted data to their healthcare team for monitoring.
(Harris/Decima, 2014)

Meeting the Needs of our Aging Population

Seniors, those aged 65 and older, account for a growing proportion of the Canadian population. Between 2011 and 2031, all members of the baby boomer generation – Canada's largest birth cohort, born between 1946 and 1965, will turn 65 (CIHI, 2011). Today, 15% of the Canadian population is age 65 and older (Statistics Canada, 2013). By 2036, this number will increase to almost 25%, or 10 million people (Statistics Canada, 2013).

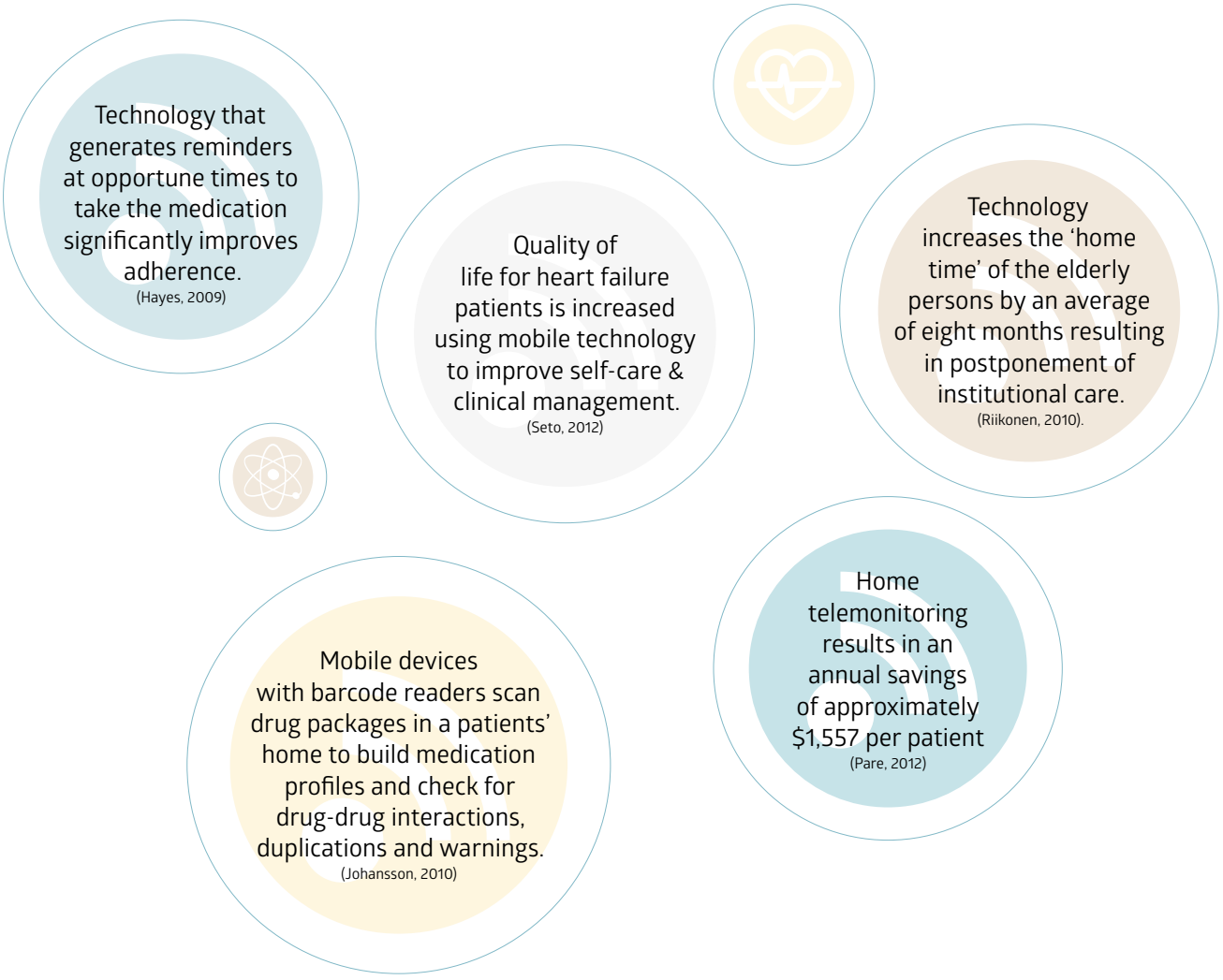
As Canadians are living longer, the rates of chronic diseases, for example diabetes, congestive heart failure, high blood pressure, chronic obstructive pulmonary disease and dementia, will increase (CIHI, 2011-b). Seniors are four times more likely to report having at least one chronic condition than adults age 18 to 24 (CIHI, 2011-b). Currently, nearly one quarter (24%) of all Canadian seniors report being diagnosed with three or more chronic conditions (multi-morbidity), and 50% of seniors reported having either 1 or 2 chronic conditions (CIHI, 2011-b).

Chronic diseases can lead to premature death, decrease the quality of life of those who have them, and have a negative economic impact on families and on society as a whole (CIHI, 2011-b). The cost of illness, disability, and death due to chronic diseases exceeds $80 billion annually (CADTH, 2008). Evidence has shown that the amount of health care services Canadians will use is largely driven by the number of chronic conditions they have, not their age (CIHI, 2011-b).

Chronic conditions are often impacted by lifestyle choices and should be effectively managed in the home and community. Preventing, delaying and reducing the severity of chronic conditions will enhance the quality of life of individuals as they age, and reduce the demand on limited health care resources.

Why Technology-Enabled Home Care?

There is increasing research evidence that shows the potential of technological innovation in accelerating the quality and efficiency of care. According to the World Health Organization (2011), the use of technologies to support the achievement of health objectives has the potential to transform health service delivery across the globe. As technology has become an integral part of our lives, so too can it have significant impact on our health and social care systems. The following facts demonstrate this:



Technological advancements have created new options for care delivery. Today's innovations enable the integration of monitoring and therapeutic systems, provide educational opportunities for providers, care recipients and their families, and facilitate effective and timely communication and data flow between members of the health care team. These mobile, user-friendly solutions can fundamentally change our approach to health care, supporting a more efficient and person-centred approach regardless of the care setting.

With the emergence of new technologies there are seemingly endless possibilities to support people in their homes. A variety of new technological innovations facilitate the shift of care from institutional and professional settings to individuals' homes. Individuals can achieve more independence, remain in their homes longer, and be more engaged in the self-management of their conditions. The technologies also empower action and support family caregivers in their multiple roles.

Many countries around the world are experiencing an *'epidemiological transition'* characterised by an aging population that is living longer and with chronic care needs (Mattke et al, 2010). Reflecting a blend of need and opportunity, researchers, businesses and government decision-makers are increasingly identifying ways in which new information and communication technologies can improve people's health, while at the same time improve efficiencies and reduce the costs of care. The most compelling opportunities for health care are the new technologies that can:

- Integrate monitoring, diagnostic and therapeutic systems.
- Promote and respond to real-time data and communication flow among providers, families and individuals receiving care.
- Enhance education and training through multi-media.

Chronic illnesses especially, can be addressed through monitoring and other technological interventions in the home. The technologies not only support independence but also act as viable, cost effective alternatives to the higher-cost institutional settings. As new technologies become more pervasive throughout society, it's no surprise that their potential for changing the provision of health care is being recognized by decision-makers at many different policy and programmatic levels. Indeed, the key informants interviewed for this paper agreed that scarce resources and increasing demand on the system by an aging population will necessitate a shift in how care is delivered.

"We're at a point where technology is ready to support a fundamental shift to a virtual health care system. The growth rate in telemedicine represents a good example of this shift."

—CHCA Member

There is increasing evidence pointing to new technologies assisting individuals in maintaining their independence at home. The well-known benefits of this include a better quality of life, increased independence and safety and, reduced costs for providing care in another setting such as a long term care facility or an acute care hospital. Monitoring systems may also help to organize care more efficiently and to identify deteriorating abilities of individuals very early to trigger preventive measures (Hein et al, 2010).

Innovative Technology-Enabled Home Care Solutions

I. TELEHOMECARE AND MOBILE HEALTH

Enhancing patient access to health services in the community.

This innovative patient management approach uses technologies to monitor patients at a distance and is particularly beneficial for patients who are unable to travel, or those living in rural or underserved urban areas.

New technologies that support 'telemonitoring' include mobile smart phones and personal digital assistants (PDAs) that enable the accurate transmission of a diverse array of data (e.g., physiological, biological and behavioral data and images) from individuals (patients and clients) to health care professionals so that their conditions can be monitored and evaluated in a timely manner, sometimes in real time. Mobile technologies such as cell phones hold considerable appeal because of their portability, their high computational power and, the relative low cost when compared to dedicated remote monitoring hardware. The fact that they enable patients and clients to be monitored anywhere that there is cellular reception, which is generally universally accessible, is also appealing (Seto et al, 2010). Mobile technologies engage patients in the management of their health and promote self-care among through education and training tools, as well as self-monitoring system.

Successful pilot projects using this technology have been implemented in various regions across Canada, resulting in an estimated annual system cost avoidance of $55 million and personal travel cost savings of $70 million (Gartner Inc. & Praxia Information Intelligence, 2011). In 2010, there were about 94,000 Telehealth consults in rural and remote areas of Canada (Gartner Inc. & Praxia Information Intelligence, 2011). Videoconferencing that eliminates the need for travel has been shown to reduce wait times for specialist consultations anywhere from 20–90% (Gartner Inc. & Praxia Information Intelligence, 2011).

II. TELEMEDICINE

Ensuring a safe home care environment for seniors with complex medical conditions.

Incorrect medication adherence is one of the major causes of illness and of treatment failure (Hayes et al., 2009). Innovations such as electronic medication prompt reminder systems have shown significant improvement in medication adherence. The medication prompt reminder uses user friendly technology (i.e. watch, a phone, TV) that is customized to the individual patient and their family caregivers.

Technology that allows for real-time monitoring and communication between a home bound senior and their family is part of New Brunswick's 'Home First Strategy'. This approach enables frail seniors to live independently in their homes without fear of injury.

III. SENSOR TECHNOLOGIES

Enabling independence and self-management for seniors with cognitive and physical challenges.

A networked system of sensors can range from wearable devices to the use of motion sensors in one's home, or even extend throughout his or her property. Sensor technologies can measure any number of characteristics and detect heart attacks, seizures, or falls and send alarm signals to caregivers or medical response teams.

Wearable sensors, such as pendant or bracelet-type, have for some time provided peace of mind for seniors and caregivers who fear a fall injury or medical emergency. GPS devices in ID bracelets or watches, or even in shoes, now help to keep track of the whereabouts of people with dementia. Alberta Health Services is currently evaluating the use of GPS technology to support dementia clients and their caregivers. From preliminary results, this is an effective approach to a growing challenge of meeting the need of seniors with dementia.

IV. SOCIAL NETWORKING AND COMMUNICATION TECHNOLOGIES

Keeping seniors healthy through social connections.

Communication technologies such as senior-friendly smartphones, computers with accessibility features and social networking sites have helped seniors to keep in touch with family, friends, and the world. Motivation for health behavior-change can be increased through access to the success stories found in an individual's social network (Stewart, 2009; Frost, 2008). Effective applications of this type of innovation are occurring in isolated areas across the country. According to a recent study, investment in technologies that can help older people live independently is one of the top three changes which are needed to combat age discrimination (Revera and the International Federation on Ageing, 2012). 76 % of seniors reported they use social networking sites to keep in touch with family and friends (Revera, 2012).

What are the Benefits?

Technology-enabled home care emphasizes prevention, independence and quality of life. For frail seniors with complex care needs, this innovative approach can mean the difference between being an active participant in their community or living their remaining years isolated or in institutional care. There are numerous studies that demonstrate care and cost effectiveness with a range of technological innovations in a variety of different contexts. Overall, well-known benefits of technologies include:

- Proactive care management through ongoing, automated monitoring of health conditions.
- Rapid care responses based on the generation of alerts for the individual and health professionals.
- More effective care provision through the reduction of errors, elimination of duplication and decrease in travel costs.
- Enhanced self-care and person-centred care through access to information, coaching and other enabling vehicles.
- Improved safety for falls and medication management in a patient's home.
- Improved health outcomes and patient satisfaction.
- Increased access to appropriate care in rural, remote and hard to service areas.
- Cost savings by reducing inappropriate hospital visits, facilitating early hospital discharge, and delaying the need for long-term institutional care.
- A potential solution to addressing health human resource shortages.

'The pervasive sensing technologies found in smart homes offer unprecedented opportunities for providing health monitoring and assistance to individuals experiencing difficulties living independently at home.

(Szewcyzk et al, 2009)

A Vision and Road Map

It is easy to envisage a future health system fully immersed in a range of technologies that improve care, support greater levels of self-care, reduce hospitalizations and emergency room use and reduce medical errors. The challenge is to get there from here. As we embark upon this exciting journey, a number of key questions should be considered in the development of a strategy road map.

AWARENESS

- How do decision-makers at various policy and operational levels learn about new and emerging technologies?
- Where do they find relevant and reliable information?
- What implementation strategies and evaluation frameworks are most appropriate?
- How is the scope and resource allocation determined to support the new model of care?

SCALABILITY

- How can a successful pilot project be generalized and scaled beyond the initial site?
- What is the weight of evidence required for decision-makers to make substantial investsments in implementing a new technology-based way of providing care?
- Which technology applications best meet the identified needs, given the breadth of available options to choose from?
- How will stakeholders gather and share evidence supporting the clinical and cost effectiveness of the new technology and care model?

SUSTAINABILITY

- How will payment and incentive models sustain long-term adoption across the continuum of care?
- How will regulatory / administrative frameworks support new technology?
- What strategies will promote patient receptiveness to new models of care delivery?

Recommendations

There is an enormous opportunity for a transformative shift in the way health care is provided. Strategic investments in technological innovations will enable individuals to be more independent in their homes, remain in their homes longer, and be more engaged in the self-management of chronic conditions. Technology innovations also empower action and support the vital role of family caregivers in providing support and care for individuals in their homes. To advance this agenda, the Canadian Home Care Association (CHCA) proposes the following recommendations to policymakers, funders and home care leaders to stimulate the uptake of technology-enabled home care and realize the benefits.

Develop a blueprint that can be adapted and applied locally to accelerate technology-enabled home care across Canada. Given the enormous opportunities and inherent challenges of implementing and sustaining technology-enabled home care, it is necessary to create a cohesive plan that can be applied to a variety of health delivery contexts. Lead by the CHCA, in collaboration with a variety of stakeholders, this work would address key considerations on awareness, assessment, scalability and sustainability of technology-enabled home care.

Fund innovation for technology-enabled home care. Innovation in the home and community care sector is not a single event or activity, it is a process. It requires strategic investment, incremental goals, rigorous evaluation, policy changes and change management. It must involve dedicated efforts from many stakeholders from both the public and private sectors. A targeted innovation fund provided by the federal government supporting technology-enabled home care will facilitate the adoption of innovation and result in scalable applications that can be shared and implemented across Canada.

Leverage the CHCA Home Care Knowledge Network as a central repository to enable home care stakeholders to access information on new and evolving technologies. As referenced in this paper, there are numerous applications and studies involving a range of technology-enabled home care. Decision-makers need access to information on technology and tools to assess, implement and scale solutions within their unique context. The newly forming CHCA Home Care Knowledge Network is a resource that can be utilized to fill this need. Through the formation of local network hubs and sharing of knowledge across the country, both evidence and experience will be available to decision-makers. The CHCA is committed to identifying resources to enable this role and ensure that governments and health care organizations are not asking the same questions and duplicating effort.

There is enormous potential to fundamentally improve our health care system through the effective use of information and communication technologies. Incremental and transformative changes are both technically feasible. Challenges to change exist, but if the evidence is available, if the political will exists, if decision-makers are supported with appropriate information and if there is a long-term vision in sight, there is every reason to believe that patients, providers and our health system will realize the benefits of technology-enabled home care.

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The Canadian Home Care Association is a national not-for-profit membership association dedicated to ensuring the availability of accessible, responsive home care and community supports to enable people to safely stay in their homes with dignity, independence, and quality of life. Members include governments, administration organizations, service providers, researchers, educators and others with an interest in home care.

The Canadian Home Care Association advances excellence in home care and continuing care through leadership, awareness, advocacy and knowledge.

The CHCA brings value to the home care sector and our members by:

- Increasing the understanding of the role and value of home care.
- Informing and influencing policy and practice.
- Initiating conversations that catalyse change.
- Facilitating continuous learning through partnerships and networks.

For more information on the CHCA:

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