Home Health Monitoring (HHM)

Enabling Opportunities to drive Healthcare Transformation

A TELUS Health White Paper
Table of contents

2 Introduction

3 What is Home Health Monitoring?
   A framework for Home Health Monitoring

5 High-impact opportunities for Home Health Monitoring
   Chronic conditions and the aging population
   Interventions that reduce readmissions
   Remote Patient Monitoring & Personal Health Records

7 Moving forward with Home Health Monitoring

8 References
The future of healthcare is friendly

It is estimated that approximately 10 percent of people over the age of 40 may suffer from Chronic Obstructive Pulmonary Disease (COPD), many of whom will endure lengthy hospital stays and emergency room visits. While COPD continues to be a major draw on acute medical care in Canada, if we can minimize exacerbations and ‘lung attacks’, this will go a long way to reducing hospitalizations.

Home Health Monitoring (HHM) technology plays an important and integral role in the lives of patients with COPD and those with other chronic conditions, such as diabetes or congestive heart failure. It empowers patients to monitor their own health, from the comfort of their own home, and provide their healthcare team with detailed information about their health in real time. Healthcare providers can closely monitor patients and take action before situations become acute. HHM also contributes to patients’ peace of mind, knowing that they are always connected to healthcare professionals who are monitoring their health.

The future of healthcare is friendly. TELUS Health technology enables healthcare providers to deliver more proactive support. It empowers patients to manage their own health. And, we believe our technology can make an integral contribution to transforming Canada’s healthcare system.
Introduction

Home Health Monitoring (HHM) can have important impact on patient’s quality of life and their ability to have more control over their own healthcare. In the years to come, widespread adoption of these empowering services and technologies will be essential in order to meet patient demand and to respond to the profound demographic shift that is happening in Canada, as it is worldwide, right now.

In 2011, the baby boom generation began turning 65, marking the start of an ongoing acceleration in Canada’s aging population. This so-called ‘baby boom effect’ is anticipated to place unprecedented demands on our healthcare system in the coming years. While Canada’s seniors are living longer and are healthier than ever, they are also frequent users of the health system and cost more than any other segment of the population. Representing just 14 percent of the population, seniors use 40 percent of hospital services in Canada and account for nearly half of all provincial and territorial government health spending.

By 2036, the number of Canadians age 65 and older is expected to nearly double to 25% of the population. This shift will bring an inevitable increase in chronic disease that, in turn, will place stress on the healthcare system and intensify the pressure to control the high costs of delivering quality care. How are healthcare providers to respond?

Professionals throughout the healthcare system – from point of care, to hospital administration, to policy-makers, to funders – are grappling with this challenge. From any perspective, the heart of the challenge is the same: we are limited by systems that were once designed to respond primarily to infections and acute illnesses, which are no longer suitable for populations that are living longer and are in need of more supportive and preventative services.

This paper is one in a series produced by TELUS Health to help healthcare leaders assess the value of using Home Health Monitoring (HHM) solutions to transform the delivery of healthcare. It focuses on the opportunity HHM offers.

It is critical for healthcare leaders to understand Home Health Monitoring (HHM) because it represents a key opportunity to simultaneously improve patient outcomes and reduce the costs of healthcare. And the use of HHM technologies is gaining momentum. Some studies estimate as much as a 27% increase in adoption rates over the next five years. Three main factors are driving the accelerated growth of HHM:

- It enables healthcare providers to do more with less – more quality care proactively delivered to patients and less time and costs associated with unnecessary or preventable on-site hospital visits
- Costs are going down – the cost of the technology itself is decreasing as solutions evolve
- Patients and consumers are demanding HHM – those who already use these technologies in their daily lives have experienced a new level of empowerment for their healthcare and want to see a more wholesale change in healthcare delivery

Without question, transforming our health systems to align with these changing demands is the call to action. But how and where to make the changes are the pressing issues facing healthcare leaders today.
What is Home Health Monitoring?

Home Health Monitoring (HHM) is a form of telehealth that involves the remote exchange of healthcare data between a home-based patient and health professionals. In this paper, the term also encompasses telehealth, telehomecare, telemonitoring, and remote patient monitoring.

HHM uses advanced Information and Communications Technologies (ICT) to bring evidence-based decision-making and support to home care services. With it, healthcare providers regularly monitor and assess a patient’s condition rather than treating an acute situation. HHM also empowers patients by enabling them to better understand their condition through education and self-monitoring. This improves patients’ ability to self-manage health conditions, and alerts professional support if there is a problem or complications. As a result, HHM allows for improved quality of life and care for each patient. At the same time, it reduces demand for expensive hospital or face-to-face services, resulting in a more efficient use of healthcare resources.

HHM usually involves monitoring devices that are kept in a home setting or that can travel with a patient and connect to a central hub. Health monitoring data is captured and stored on the device or hub. Results are forwarded to a central monitoring station, where nurses and other healthcare professionals are available to respond when they’re needed. And, monitoring vital signs and clinical assessments can take place in real time (or at the healthcare practitioner’s convenience), and are often supplemented by a physical visit from a nurse or personal support worker.

In addition, the mainstream adoption of smart phones and tablets by consumers has paved the way for testing and implementing new and expanded HHM services in almost every care setting, using a variety of technologies.

For example, solutions range from the use of text-message reminders for appointments or prescription refills, to fully integrated solutions that use biometric devices to capture patient health indicators, transmit wireless data, enable on-demand video conferencing, or provide tools for healthcare providers to analyze, diagnose and treat patients.

A framework for Home Health Monitoring

Most HHM programs can be categorized into three models of service: sub-acute, chronic, and preventive care (see Table 1). While all three areas are important, this paper focuses on the sub-acute HHM care model because it is the category that has the highest opportunity for long-term impact on the healthcare system and is also the leading area for HHM research and service delivery.

As shown in the table below, for each stage of care, this framework describes the role and characteristics of HHM including: definition, typical clinical scenario, management and monitoring approach, expected outcomes, frequency of physical assessment, monitoring devices, healthcare providers, IT system integration, and typical length of program.
<table>
<thead>
<tr>
<th></th>
<th>Sub-Acute Care</th>
<th>Chronic Care</th>
<th>Preventive Care</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Definition</strong></td>
<td>Short-term monitoring of patients immediately following an acute care episode</td>
<td>Long-term monitoring of patients with chronic conditions focus on preventing a secondary disease or exacerbation of current condition</td>
<td>Ongoing healthy lifestyle maintenance and primary disease prevention</td>
</tr>
<tr>
<td><strong>Typical Clinical Scenario</strong></td>
<td>Post-discharge management of first episode or at risk of exacerbation of chronic disease (e.g. diabetes, CHF, COPD and MI)</td>
<td>Regularly scheduled monitoring of patients with chronic condition (e.g. diabetes, obesity and mental illness) or implantable device (e.g. pacemaker)</td>
<td>Supports healthy lifestyle behaviours including proper exercise, sleep, diet and health maintenance</td>
</tr>
<tr>
<td><strong>Management and Monitoring Approach</strong></td>
<td>Starts post-discharge from critical care services and requires daily monitoring (e.g. vitals, medication and assessments)</td>
<td>Relatively stable condition with a focus on management and/or prevention according to guidelines. Vitals are monitored a few times a week</td>
<td>Scheduling and maintaining routine lifestyle activities, healthcare provider appointments, screenings and vaccinations</td>
</tr>
<tr>
<td><strong>Expected Outcomes</strong></td>
<td>Reduced readmissions and hospital visits</td>
<td>Prevention of unplanned hospital and primary care visits and secondary conditions</td>
<td>Primary disease prevention and optimal cognitive and physical function</td>
</tr>
<tr>
<td><strong>Physical Assessment</strong></td>
<td>Every few hours to weekly</td>
<td>Monthly to quarterly</td>
<td>Annual</td>
</tr>
<tr>
<td><strong>Monitoring Devices</strong></td>
<td>Commercial grade devices (e.g. blood pressure, dosimeter, weight) connected to a data storage hub</td>
<td>Mix of consumer and commercial grade devices (e.g. blood pressure cuff) connected to defined centralized electronic record system or cloud based solutions</td>
<td>Monitoring through consumer purchased and managed peripheral devices. Data may be directly linked or an independent network</td>
</tr>
<tr>
<td><strong>Healthcare Providers</strong></td>
<td>Daily nurse visits with oversight by specialists</td>
<td>Primary care services with infrequent nurse or case worker visits</td>
<td>Primary care with no home visits and potential to link to lifestyle coaches</td>
</tr>
<tr>
<td><strong>IT System Integration</strong></td>
<td>Hospital Clinical IS or Home Care IS and Electronic Medical Records (EMR)</td>
<td>EMRs and Patient Health Records (PHR)</td>
<td>PHR</td>
</tr>
<tr>
<td><strong>Typical length of program</strong></td>
<td>Up to 6 months</td>
<td>6 month to ongoing</td>
<td>Ongoing</td>
</tr>
</tbody>
</table>
High-impact opportunities for Home Health Monitoring

HHM represents a key opportunity to simultaneously improve patient outcomes and reduce the costs of healthcare. By moving health monitoring activities outside hospital walls, the healthcare system can better manage the pressures driven by an increasing aging population. With HHM, practitioners can discharge patients from hospitals sooner, which in turn reduces the use of costly acute care resources and health services.

...people with two or more conditions represent only 12% of Canadians, but account for almost one-half of hospital days...

There are three broad areas of opportunity to enable healthcare services in the home and community setting and deliver high impact results for the healthcare system. These are:

- Helping patients who are frequent users of the health system – those with chronic conditions
- Applying HHM services to interventions with the greatest likelihood to reduce readmissions
- Leveraging established technologies that are “HHM-ready”

### Chronic conditions and the aging population

Chronic conditions affect at least one-third of Canadians. The proportion of people with chronic conditions is steadily increasing as is growing life expectancy. In 2005, 71% of adults aged 60 to 79 and 82% of adults 80 years and older had at least one chronic condition. As shown in the chart below, the most common chronic conditions for Canadians over 65 years of age are hypertension, arthritis and diabetes.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Prevalence for &gt; 65 yo</th>
<th>Number of Canadians (Millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypertension</td>
<td>51.5%</td>
<td>2.5</td>
</tr>
<tr>
<td>Arthritis</td>
<td>42.5%</td>
<td>2.1</td>
</tr>
<tr>
<td>Diabetes</td>
<td>17.8%</td>
<td>0.9</td>
</tr>
<tr>
<td>Asthma</td>
<td>7.4%</td>
<td>0.4</td>
</tr>
<tr>
<td>Mood Disorder</td>
<td>5.5%</td>
<td>0.3</td>
</tr>
<tr>
<td>Heart Disease</td>
<td>4.8%</td>
<td>0.2</td>
</tr>
<tr>
<td>Stroke</td>
<td>4.2%</td>
<td>0.2</td>
</tr>
<tr>
<td>Anxiety</td>
<td>4.2%</td>
<td>0.2</td>
</tr>
<tr>
<td>COPD</td>
<td>4.0%</td>
<td>0.2</td>
</tr>
<tr>
<td>Total Chronic Disease</td>
<td>141.2%</td>
<td>6.9</td>
</tr>
<tr>
<td>Population of Canadians 65 yo and older</td>
<td>14.4%</td>
<td>4.9</td>
</tr>
</tbody>
</table>


Frequently, people with these conditions also have at least one other condition. For example, people with high blood pressure or arthritis have been shown to have at least one other condition more than half of the time, and people with diabetes or heart disease have at least one other condition approximately 75% of the time.

By moving health monitoring activities outside hospital walls, the healthcare system can better manage the pressures driven by an increasing aging population.
It is this relatively small proportion of Canadians that claims a high proportion of healthcare services. An analysis of the Canadian population shows that people with two or more conditions represent only 12% of Canadians, but account for almost one-half of hospital days (44%), more than one-third of nurse consultations (36%) and one-quarter of GP (24%) and specialist consultations (25%).

More than 75% of people who are over the age of 65 live with a chronic condition. And, over half of those individuals live with more than one condition at the same time. Without HHM, this patient group will place extreme pressure on the system with their requirements for costly acute care. With HHM, these patients can self-monitor, receive proactive treatment and avert health issues that would otherwise develop into an acute situation.

**Interventions that reduce readmissions**

The following 12 interventions have been implemented and assessed to be valuable in reducing patient readmissions. These are shown in the table below according to three stages of sub-acute patient management: pre-discharge, transition bridging, and post-discharge.

<table>
<thead>
<tr>
<th>Pre-Discharge</th>
<th>Transition Bridging</th>
<th>Post-Discharge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient Education</td>
<td>Transition Coach</td>
<td>Timely Follow-up</td>
</tr>
<tr>
<td>Discharge Planning</td>
<td>Patient-Centred Discharge Instructions</td>
<td>Timely PCP communication</td>
</tr>
<tr>
<td>Medication Reconciliation</td>
<td>Provider Continuity</td>
<td>Follow-up Telephone Calls</td>
</tr>
<tr>
<td>Appointments Scheduled Before Discharge</td>
<td></td>
<td>Patient Hotline</td>
</tr>
</tbody>
</table>

Table 3 - Interventions to reduce 30-day Re-Hospitalizations

While opportunities for impact abound, the reality is that data is complicated. As leaders consider the digitization of healthcare overall – and HHM in particular, they face systemic challenges on multiple levels. Given that the Canadian healthcare system, like those around the world, was established long before ICT was a consideration, it comes as no surprise that introducing new technologies, enabling interventions and sharing the data captured during these activities is complex. Data is often captured in separate information systems even within a single healthcare organization. Similarly, HHM systems are generally not integrated into hospital, primary or home care services, or integrated into funding models or a health system’s IT architecture.

Against this intricate backdrop, remote patient monitoring and personal health records stand out as opportunities to put HHM to work effectively and relatively quickly.

**Remote Patient Monitoring & Personal Health Records**

Personal Health Records (PHRs) and Remote Patient Monitoring (RPM) are two application areas that are maturing and present compelling opportunities for HHM.

PHRs are user-friendly, online solutions that give patients a way to manage their own health information. A self-controlled snapshot of an individual’s health record, Canadians with a PHR can add such information as their birth date, emergency contacts, health history, and lists of allergies, conditions and chronic diseases. Allowing patients to take everyday healthcare into their own hands, Canadians can also use PHRs in emergencies, when travelling, or when working with physicians unfamiliar with their health histories.

In addition, the evolution of RPM technology has improved dramatically in recent years. In the context of Home Health Monitoring, when RPM information is integrated into primary care systems it provides access to real-time patient data. This allows clinicians to evaluate a patient’s status and adjust their treatment plan as required, which can have pre-emptive health impacts. Promoting real-time data exchange between HHM, RPM and hospital systems ensures that patients are discharged safely, with the right level of care and support to transition successfully to their homes.

Taking this a step further, enabling data exchange between a RPM device and PHRs allows patients to become more engaged and knowledgeable in their health and treatments. Information from the remote monitoring system can be formatted and displayed on a patient’s PHR so that they can review the information themselves and self-manage their care. Information communicated to the PHR can also alert the patient to seek clinician or emergency care.
Moving forward with Home Health Monitoring

As HHM programs expand, moving from pilot projects to integrated and standardized programs, people throughout the healthcare sector will better understand how and where to best optimize the technology’s value to patients.

Standardization is another critical factor in enabling HHM integration with other patient-facing systems and there is much work yet to be done here. That said, there is industry support to improve the integration of personal health systems with healthcare systems.

Continua Health Alliance (CHA) is an industry non-profit organization comprised of technology, medical device and healthcare industry leaders who are dedicated to making personal telehealth a reality. Although not a standards body, CHA does select existing commercially available standards and, working within them, adds definitions and then tests and certifies interoperability of devices among member companies.

From a technical standpoint to gain the greatest value and actualize the savings and benefits of HHM there must be an upfront design effort to ensure strong implementation. Technology must be user-friendly and easily integrated into clinical workflows with the right level of support, training and incentives to ensure high-level adoption by clinicians and ongoing participation by patients.

Since 2000, TELUS Health has invested more than $1 billion in healthcare and continues to make ongoing investments. Our commitment is to provide the best healthcare information technology solutions in Canada and leverage our unparalleled telecommunications network to give healthcare providers life-saving reach nation-wide from coast to coast to coast. To learn more about our solutions, our services and our unwavering commitment, please visit our website: http://www.telushealth.com/health-solutions/telehealth-and-home-care-monitoring or contact Nicholas Zamora, Chief Clinical Advisor of TELUS Health at nick.zamora@telus.com, 416 399-6905.
References


3. Integration through Information Communication Technology for Home Care in Canada, Canadian Home Care Association 2008 Report.


5. A. Broemeling et al, 2008; Population Patterns of Chronic Health Conditions, Co-morbidity and Healthcare Use in Canada: Implications for Policy and Practice.


15. Canadian Institute for Health Information, All-Cause Readmission to Acute Care and Return to the Emergency Department (Ottawa, Ont.: CIHI, 2012).


