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Empowering Patient Self-Management: A Community Paramedicine Model of Care in Ontario

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Abstract

Community Paramedicine Remote Patient Monitoring (CPRPM) was launched in Ontario in April 2015 to address high health system usage in vulnerable patients living with chronic disease. CPRPM expands on the home visit model of community paramedicine (CP) to bridge gaps in patient care and address inefficiencies in resource utilization. At patient and systems levels, CPRPM aims to promote patient self-management of chronic diseases. Several reports driving the development of the Ontario Seniors Strategy, which include key recommendations for expanding CP programs, provided the impetus for government to deliver on their electoral platform promise to increase health care spending. *The Local Health System Integration Act*, 2006 gave Local Health Integration Networks the authority to make home and community care services accessible to Ontario residents, including the supplies and equipment required by patients and their caregivers to support their care at home. Outcome measures of CPRPM point to positive benefits for encouraging patient self-management of chronic diseases and reducing health system strain, with a return on investment of 542%. The variety of options for patient interaction and ability to lessen health system burden makes CPRPM a desirable model of care.

Le programme de télésurveillance des patients par des paramédicaux (CPRPM dans son acronyme anglais) a été lancé en Ontario en avril 2015 pour résoudre les problèmes de recours intensif aux soins par les patients vulnérables atteints de maladies chroniques. CPRPM se fonde sur le modèle de visite à domicile de la para-médecine communautaire (PC) afin de combler les lacunes dans les soins fournis aux patients et de résoudre les inefficiences dans l'utilisation des ressources. CPRPM vise à promouvoir l'auto-régulation des maladies chroniques par les patients, tant au niveau des patients que de manière systémique. Plusieurs rapport ayant conduit au développement de la Stratégie pour les Aînés en Ontario, y compris des recommandations d'extension les programmes de PC, ont motivé le gouvernement pour réaliser une de leur promesse électorale, d'augmenter la dépense en soins de santé. La Loi de 2006 sur l'intégration du système de santé local *a donné aux Réseau Locaux d'Intégration des Services de Santé la mission de rendre les services de soins à domicile et en milieu communautaire accessible aux résidents de l'Ontario, y compris les équipements et fournitures dont les patients et leurs aidants ont besoin pour fournir les soins à domicile. Les mesures de résultats du CPRPM indiquent des progrès dans l'auto-régulation des maladies chroniques et une réduction des tensions dans le système de soins, avec un retour sur investissement de 542%. La gamme d'options pour interagir avec les patients ainsi que la capacité à alléger le fardeau pesant sur le système de soins font du CPRPM un modèle de soins attractif.*

Key Messages

- The Ontario MOHLTC began funding community paramedicine expansion projects in 2014 to address health system inefficiencies and improve resource utilization by vulnerable patients with chronic diseases living in under-serviced communities.
- Patient access to paramedics in real-time fosters feelings of empowerment in learning to understand the disease process and how to self-assess and manage their condition which reduces unnecessary 911 calls and emergency transport, thereby reducing health system burden.
- Evaluation of CPRPM demonstrates significant benefits to the health system by preventing inappropriate resource utilization and realizing a return on investment of 542%.

Messages-clés

- *Le Ministère de la Santé et des Soins de Longue Durée de l'Ontario a commencé à financer des projets d'expansion de la para-médecine communautaire dès 2014, pour résoudre des inefficiences du système de soins et améliorer l'utilisation des ressources par les patients vulnérables souffrant de maladies chroniques et vivant dans des communautés mal dotées.*
- *L'accès au para-médicaux en temps voulu renforce le sens qu'ont les patients de maîtriser leur compréhension de l'évolution de leur maladie et leur capacité à auto-évaluer et réguler leur état de santé, ce qui réduit les appels au 911 et les transports d'urgence non nécessaires, et de ce fait réduit le fardeau pesant sur le système de santé.*
- *L'évaluation du CPRPM montre des gains significatifs pour le système de santé, en évitant l'utilisation non justifiée de ressources, pour un retour sur investissement de 542%*

1 BRIEF DESCRIPTION OF THE HEALTH POLICY REFORM

In April 2015, the Ontario Ministry of Health and Long-Term Care (MOHLTC) launched the Community Paramedicine Remote Patient Monitoring (CPRPM) pilot project to assess efficacy of this care model in the Ontario context. CPRPM is a care model based on a home visit type of community paramedicine (CP) program. It focuses on patients with chronic diseases who are at high risk for visiting an emergency department (ED) or being hospitalized. The program was a reform of existing CP programs in which patient health data was transmitted from home medical devices to health care providers and aimed to support patients to more actively self-manage chronic conditions and reduce health system burden by decreasing 911 calls, ED visits, and hospitalizations. The project was planned for two years, from 2015 to 2017, with program evaluation focused on system outcomes and benefits associated with using paramedics to improve access to care in the community for patients living with chronic conditions. Twelve paramedic services, representing 20% of the province's emergency medical services (EMS), were selected to participate in the project from responses to MOHLTC's call for expressions of interest from system stakeholders with innovative approaches to delivering quality, evidence-based, patient-centred care.

"High users" of the health system—those patients who have visited an ED at least twice, have called 911 at least three times, or have been hospitalized at least once in the last 12 months—are eligible for the program. Patients are equipped with oxygen saturation monitors, weigh scales, blood pressure cuffs, and/or glucometers for self-monitoring as well as a "pod" for connecting the patient with a paramedic. All devices transmit readings to the Patient Portal information management platform and paramedics provide training on use of the equipment and technology. Patient data is received in real-time, allowing paramedics to respond to acute health issues through an alert system or to follow up with routine monitoring by telephone or face-to-face visit.

Addressing non-emergent primary care needs of seniors, especially the frail elderly and other vulnerable patients, the CPRPM model empowers patients to self-manage their conditions, keeping them living in their homes for longer with an improved quality of life (QoL). CPRPM leverages the unique skill set of paramedics "to provide immediate or scheduled primary, urgent, and/or specialized health care to vulnerable patient populations by focusing on improving... health system access, care, and experiences across the continuum of care" (OCPS 2019, 8).

2 HISTORY AND CONTEXT

In 1999, the Toronto EMS pioneered a CP program to provide non-emergent services focusing on "health promotion, system navigation, and injury prevention" (Guo et al. 2017, 9). The Community Referrals by EMS (CREMS) pilot project was launched as an expan-

sion of the CP program in 2006 to address a fragmented, uncoordinated, and inefficient health care system in which patients struggled to connect with community health supports resulting in high volumes of 911 EMS calls and unnecessary transfers to EDs. This model has paramedics who respond to 911 calls making referrals to Community Care Access Centres (CCACs) for patients who they determine to need core, community-based services, including personal support, nursing, physio- or occupational therapy, and social work.

By 2014, there were 13 municipally funded CP programs in operation across the province and it was at this time that the MOHLTC began annual investments of $6M across the 14 LHINs [1] to support the development of 30 CP pilot projects. CPRPM launched in 2015 with funding support from Canada Health Infoway (CHI). Each pilot was adapted to the local needs serviced by the respective EMS provider, but all were variations on one of three traditional care models: Assessment and Referral (CREMS, for example), Home Visit (which includes CPRPM), and Community Paramedic-Led Clinics. Assessment and Referral paramedics responding to regular emergency calls from patients deemed to be living at risk will screen and refer eligible patients to the local CCAC for services that address unmet needs. Home Visit paramedics perform point-of-care testing such as blood pressure, blood glucose, and oxygen saturation and provide education or coaching to support patients to manage their condition at home. Paramedics working in CP-led, community-based clinics provide preventative health services such as wellness assessments, influenza vaccinations, and education about healthy living and chronic disease prevention.

3 GOALS OF THE REFORM

3.1 Stated

The CPRPM program goals target both patient and systems levels.
Patient-level:
"To promote self-management and understanding of the disease process to improve overall health through. . . :

1. Patient involvement in his or her own health management
2. Patient ability to understand, define, and appropriately act upon symptoms
3. Providing educational resources and promoting self-regulation and self-efficacy
4. Motivational coaching
5. Reinforcement of primary care provider [(PCP)] instructions"

(Future Health Services 2019, 13)

Systems-level:

1. "Help patients take a more active role in self-managing their conditions so they can stay [at] home longer;

[1] Local Health Integration Networks are regional health authorities established in 2007 and mandated to deliver more efficient public health care services through planning, funding, and integration.

2. Provide access to medical professionals who can provide real-time coaching and feedback to patients on how to better manage their conditions. . . ;
3. Reassure patients their health is being monitored [to] decrease stress and anxiety;
4. Build a circle of care around the patient [allowing] the community paramedic to share results with [PCPs] and family members...; and
5. Reduce costs and burden on the [health care] system through reduced [911] calls, ED visits and hospitalizations"

(Brohman et al. 2018, 7)

3.2 Implicit

The delivery of integrated and innovative health services through CPRPM is consistent with Recommendation 3 from the value-for-money audits by the Ontario Auditor General (OAG) "[to] ensure that patients receive necessary care that meets their needs and that patients are not unnecessarily transported to an emergency department, the [MOHLTC] should consider introducing emergency room diversion policies" (2013, 141). In alignment with this and additional recommendations from the Premier's Council on Improving Healthcare and Ending Hallway Medicine (Government of Ontario 2019), CPRPM programs aim to reduce strain on the system related to the number of ambulance transports to EDs.

4 FACTORS THAT INFLUENCED HOW AND WHY

4.1 The issue came onto the government's agenda

Expansion of the three CP care models and adoption of CPRPM can be understood using Kingdon's framework (2003).

4.1.1 Problem stream

The provincial government and several EMS groups identified ongoing issues related to non-emergent calls to 911 from patients who were unsure about when their condition warranted medical treatment or were struggling to access primary care.

4.1.2 Policy stream

In January 2012, the Government of Ontario released *Ontario's Action Plan for Health Care*, addressing quality, access, equity, value, and choice. Dr. Samir Sinha's report to the MOHLTC and the Minister Responsible for Seniors, *Living Longer, Living Well*, followed in December 2012 with a key recommendation to develop and expand CP programs. These reports drove the development of the Ontario Seniors Strategy, which focused on keeping seniors healthy and living at home longer through the coordination of health and social services (Sinha 2012) followed by the release of *Independence, Activity, and Good Health:*

Ontario's Action Plan for Seniors in 2013. The *Action Plan for Seniors* describes three overarching goals and the initiatives that are expected to achieve them. CPRPM aligns with the Health Links initiative, which "[encourages] greater collaboration and co-ordination between a patient's different health care providers and the development of personalized care plans" (Government of Ontario 2013, 18). The success of early programs secured CP a position in the basket of funded health services in 2014, with an annual provision of $6M from the MOHLTC, which demonstrated government's commitment to supporting *Ontario's Action Plan for Health Care*.

4.1.3 Political stream

Ontario's Liberal government, elected in 2003, built a platform on increased health spending and improved care in under-serviced communities. Stakeholder consultations conducted by the Ontario Seniors Strategy team identified a number of key supporters of CP programs, including PCPs, hospitals, and home and community care providers. In alignment with elements of the MOHLTC's action plans described in *Patients First: A Roadmap to Strengthen Home and Community Care* (2015), the Ontario Hospital Association (OHA) expressed support for CP programs in the context of a rural health hub [2] model of bundled care. [3] A collaboration between the OHA and the Ontario College of Family Physicians brought together health care providers across the sector, including CCACs, Family Health Teams, hospitals, and Public Health to improve care coordination, enhance the patient experience, and optimize health outcomes. These partnerships highlighted CP programs as an essential component in the delivery of integrated health services, particularly in rural geographies where long distances between health service providers and fewer resources create barriers to patient care and better health outcomes.

4.2 The final decision was made

Funding of the CPRPM pilot project was a demonstration of the MOHLTC's commitment to acting on its plans as set out in *Patients First: A Roadmap to Strengthen Home and Community Care*, which focuses on the patient experience with services provided in the home or community to enable independent living. The decision to fund CPRPM is aligned with the stated goal of "[putting] clients and caregivers first [such that everyone] who has needs that can be reasonably met in the home or community will receive support to do so" (Ibid., 4) as well as their plan to proceed with bundled care.

[2] A rural health hub is "a local integrated health service delivery model where most if not all sectors of the health system are formally linked in order to improve patient access" (OHA n.d., 6).

[3] Bundled care is a funding method aimed at achieving seamless care by covering all of a patient's care needs with a single payment to a group of health service providers.

5 HOW THE REFORM WAS ACHIEVED

5.1 Policy instruments

The *Local Health System Integration Act*, 2006 provided LHINs the authority to make home and community care services accessible to Ontario residents, including the supplies and equipment required by patients and their caregivers to support their care at home.

5.2 Implementation plan

The pilot was planned for a 2-year period (April 2015 to December 2017) and aimed for a patient time on program (PTP) target of up to six months, consistent with other CP programs supported by CHI. Each of the 12 participating paramedic services tailored their CPRPM program according to the unique needs of their respective communities while operating within the framework for the Home Visit—Including Remote Monitoring care model (MOHLTC 2017, 17).

6 EVALUATION

6.1 Process of evaluation

Canada Health Infoway commissioned the only formal, government-led evaluation of CPRPM at the conclusion of the pilot in 2017. The report put forth by Brohman et al.'s group from Queen's University in 2018, was comprehensive and conclusive concerning the benefits of the program.

6.2 Impact evaluation

Outcome measures evaluated by Brohman et al. (2018) point to positive impacts on the province's objectives of reducing financial strain on the health system and reducing ED visits and hospital admissions. The CPRPM pilot achieved a 26% overall reduction in 911 calls across all levels of acuity, ranging from low to very high (Ibid., 10). Most pronounced was the 15% reduction in transport rate[4] of very high acuity patients, indicating that paramedics managed acute situations in the patient's home rather than transporting them to hospital. The greatest benefit was demonstrated amongst patients living with at least three different chronic conditions, where 911 calls and ED transport[5] decreased by 44% and 47%, respectively, and transport rates decreased by 7% (Ibid., 11).

Costs to implement the program (for the targeted 6-month program participation) were estimated at $1,134 per patient (650 patients) (Ibid., 6). An estimated 467 fewer ED

[4]Transport rate is defined as "the percentage of times a patient is transported to the ED after a 911 call... the # of ED transports divided by the # of [911] calls" (Brohman et al. 2018, 10-11).

[5]ED transport refers to each instance of transportation to an ED.

transports and avoidance of 170 hospital admissions resulted in a savings of $7,274/patient (650 patients), which translates to a return on investment of 542% (Ibid., 6) where ROI % = [(total savings - total costs)/total costs] x 100. For every dollar invested in CPRPM, the system saves five dollars.

Benefits to paramedic services include a savings of 764 hours of paramedic time (Ibid., 15) through reallocating paramedics to spend time treating patients at home rather than responding to 911 calls and transporting them to hospital.

In a patient experience survey of 484 program participants, 93% of 159 respondents agreed that CPRPM increased perceived QoL, on a scale from strongly disagree to strongly agree, and 89% felt confident that their family members and/or caregivers were satisfied with the care provided (Future Health Services, n.d.). Patients reported feeling more empowered with self-managing their conditions and experienced less stress and anxiety in knowing that a health professional was monitoring them.

Given that PTP was intended to be six months, future evaluations should measure longer-term benefits. Paramedics surveyed in the evaluation noted they did not always feel comfortable removing monitoring equipment from the patient's home after the trial period ended and felt that some patients required monitoring for the duration of their life to ensure their ability to live independently (Brohman et al 2018, 21). The program should be flexible to allow patient access to ongoing monitoring to better observe long-term benefits and to continue providing care for patients with unstable conditions or who lack home supports after the program ends. It is also unclear whether health behaviours are maintained once patients are discharged from the program and the equipment is removed from the home, but results suggest that patients reverted to their pre-program baseline, with metrics indicating a return to increasing rates of ED visits and hospital admissions (Ibid., 11). Additionally, future evaluations should consider broader system impacts such as reduction of ED wait times, 30-day hospital readmission rates, and rates of diabetes-related complications.

The CPRPM project's proven success in achieving its goals of more active patient self-management and reduced financial and system burden suggests the program's future utility in managing other chronic diseases and, indeed, has garnered increasing interest for expansion to the palliative care, mental health, and long-term care environments. As of November 2019, there were 23 CPRPM programs across Ontario serving 2300 patients (OCPS 2019, 5).

7 STRENGTHS, WEAKNESSES, OPPORTUNITIES AND THREATS

Table 1 summarizes the strengths, weaknesses, opportunities and threats of CPRPM programs from the perspective of patients, paramedics, and the health system.

Table 1: SWOT Analysis of CPRPM Programs

Strengths	Weaknesses
• No self-reporting of data; technology does the reporting (patient). • Fewer chronic disease-related adverse events and improved quality of life (patient). • Fosters/enhances partnerships across interdisciplinary care team (paramedic). • Advantage of assessing the patient in their living environment / socioeconomic circumstance (paramedic). • Options for telephone call, home visit in a non-emergency response vehicle, administration of care on scene, or escalation to 911 (health system). • Decreased use of EMS and demand for LTC (health system). • Fewer ED visits and hospital admissions (health system).	• Inconsistent use of monitoring devices may generate false alerts (patient). • Alert thresholds are not "one size fits all"—must be customized by individual (patient). • Variation in education and training programs means knowledge is not standardized (paramedic). • Benefits of the technology to patient outcomes depend upon individual paramedic's interpretation of data (health system).
Opportunities	**Threats**
• Participation as a key member of the health care team (patient). • Collaboration with other health care professionals and integration into the multidisciplinary team (paramedic). • Elimination of "Code Zero" situations (no availability of EMS transport caused by offloading delays in ED) (health system).	• Limits on PTP means monitoring devices are removed from the home (patient). • Roles are not clearly defined, so may be considered a duplication of service with other health care providers (paramedic). • Lack of certainty regarding ongoing funding beyond June 2022 provincial election (health system).

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