Back to the future: home-based primary care for older homebound Canadians

Part 1: where we are now

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In Canada, 93% of adults aged 65 years and older live at home, and 87% of these individuals want to stay at home for as long as possible.[1] However, many in this population have complex and interrelated health and social problems that render them frail and homebound, making this group among the most vulnerable and marginalized patient populations.[2,3] Although 95% of older Canadians have family physicians,[4] homebound individuals, by nature of their conditions, are poorly served by predominantly office-based primary care delivery models owing to substantial access-to-care issues.[2]

Without easily accessible primary care, older homebound adults often turn to less ideal episodic alternatives such as emergency department visits and hospitalizations in times of crisis.[5] However, this episodic care cycle only repeats itself owing to a lack of accessible primary care follow-up. Furthermore, hospitalizations frequently lead to rapid functional deterioration and a loss of capacity for independent living in this group, which puts these patients at serious risk of permanent admission to long-term care facilities.[6]

Home-based care is not a new concept. Several models have emerged internationally in order to address access-to-care deficiencies, postpone adverse health trajectories, and reduce overall costs.[7] Distinguishing the components and patient populations that characterize each model, however, can be confusing.[7] The aim of this commentary is to specifically review the home-based primary care model, and explain how this model of care can be feasibly adopted to better serve older homebound Canadians.

Defining the homebound elderly

One of the challenges of analyzing the health care needs of the homebound elderly is that this population remains imprecisely defined in the medical literature.[3] The most widely accepted definition is the one used by the US Medicare program, which considers an ailing or injured individual to be homebound "if leaving the home requires considerable and taxing effort," and if absences from the home "are infrequent, of short duration or to receive medical treatment."[8] However, experts recognize that even this definition might be too restrictive, as the way Medicare defines the homebound, primarily using simple physical criteria, might fail to encompass the complex interplay of medical, psychiatric, and cognitive issues, along with social frailty, that could render a person homebound.[3]

Research shows that compared with the overall older population, homebound elderly patients in general suffer from higher rates of metabolic, cardiovascular, cerebrovascular, and musculoskeletal diseases, as well as more cognitive impairment, dementia, and depression.[3] This group also has high rates of chronic medication use,[9] higher rates of emergency department use, and nearly twice the rate of annual hospitalizations as those who are not homebound.[10]

While Canadian data are unavailable, in the United States at least 1 million individuals aged 65 and older are permanently homebound,[11] with some researchers estimating the number to be as high as 3.6 million.[3] We therefore conservatively estimate that there are at least 100 000 older homebound Canadians.

Defining the model

Historically, physicians routinely and indiscriminately delivered medical care to sick patients in patients' homes, with housecalls accounting for 40% of all doctor-patient encounters in the 1940s.[12] Ever since, these visits have become less frequent as physicians developed an increasing reliance on technology, thus shifting health care provision to hospitals and offices, while traditional fee-for-service payment models reward high-volume and short-duration episodes of care.[13]

These traditional housecalls must be distinguished from modern home-based primary care models, which provide comprehensive ongoing primary care in the home and specifically target patients with complex chronic disease who are poorly served by office-based care.[14]

In order to meet the complex needs of homebound elderly patients, the provision of home-based primary care is often facilitated by organized programs that involve physician- or nurse practitioner–led interprofessional teams, frequently incorporating the support of other allied health and social care professionals.[14] These home-based primary care programs have the following overall goals:

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- providing access to ongoing primary medical care;
- maximizing independence and function;
- reducing emergency department and hospital admissions;
- enhancing patient safety and quality of life; and
- linking patients to supportive home-care services.[14,15]

However, home-based primary care is not limited to these programs, as some independent family physicians maintain ongoing care of their homebound elderly patients through frequent housecalls.

Finally, home-based primary care models must also be distinguished from other modern home-based care models, which primarily include hospital-at-home, home visit outreach, and transitional care programs, along with skilled home-care services (**Table 1**).[14-19] But none of these other models is designed or able to provide ongoing comprehensive home-based primary care.

Existing research

The emergence of modern home-based care models has sparked several studies investigating the efficacy of these models. Since 2000, 5 English-language systematic reviews (3 were also meta-analyses[20-22]) of home-based care models for the elderly have been published with conflicting results.[20-24] Some of these reviews reported that home visit outreach and primary care programs did not affect mortality,[23,24] physical and psychosocial function,[23] health status,[24] or health care use and costs.[24] Conversely, other reviews concluded that these programs reduced mortality,[20,21] admissions to long-term care facilities,[20-22] and functional decline.[20,22]

However, experts recognize that the individual trials included in these reviews are extremely heterogeneous, and many of the programs studied did not aim to provide comprehensive and ongoing primary care. Furthermore, many programs were home visit outreach programs originating from the United Kingdom and Europe, where patients maintained their office-based primary care providers, and home visits were provided as a separate and independent intervention.[2,25] But these types of program generally fail to remedy the barriers to accessing primary care for the homebound, and promote fragmentation of care between those providing housecalls and the primary care provider. Experts have therefore hypothesized that inclusion of studies on British and European home visit outreach programs

Table 1. Distinguishing home-based primary care from other home-care models

	MODEL				
FEATURE	HOME-BASED PRIMARY CARE	OUTREACH HOME VISITS	HOSPITAL-AT-HOME	TRANSITIONAL HOME CARE	SKILLED HOME CARE
Functional model	Ongoing comprehensive primary care in the home[14]	Home-based multidimensional geriatric assessments	Acute medical care in the home[16]	Medical care after hospital discharge	Targeted nursing, allied health, and social care services
Care focus	Complex and interrelated chronic disease management and social care issues	Needs assessments	Acute illness or chronic disease exacerbation	Often disease specific (eg, heart failure[17] or chronic obstructive pulmonary disease[18])	Remediable conditions[14] and supporting independent living
Time course	Ongoing	Consultation with possible limited follow-up	Time-limited to the end of an acute episode	Time-limited to a designated period after discharge	Time-limited to ongoing
Personnel	Primary care provider–led interprofessional teams	Varied, but typically nursing and allied health professionals	General practitioners, specialists, nurses, and allied health professionals	General practitioners, specialists, nurses, and allied health professionals	Nursing and allied health professionals only
Goals of care	• Improve access to primary care • Maximize independence and function • Reduce emergency department, hospital, and long-term care admissions • Enhance patient safety and quality of life • Link with supportive home-care services[14,15]	• Assess needs and develop care plan (to be implemented by office-based primary care provider or specialist)	• Serve as a substitute for acute hospital care • Reduce iatrogenic events (nosocomial infections, functional decline, pressure sores, delirium, falls, etc)[16] • Reduce overall costs	• Prevent adverse outcomes after discharge from hospital (improve coordination and continuity of care, reduce readmissions)[19] • Reduce overall costs	• Support independent living

might have produced disparate results in previous systematic reviews and meta-analyses.[12,25]

Learning from the United States

Several home-based primary care programs have emerged across the United States that are characterized by common principles: 1) medical housecalls are made by the ongoing primary care provider (physician or nurse practitioner); 2) the primary care provider leads an interprofessional care team; and 3) the program is available after hours for urgent issues.[7,14] Many of these programs also have access to or the capability to perform home-based laboratory and diagnostic imaging services.[12] Several leading medical centres have developed academic home-based primary care programs, with several reporting impressive outcomes such as substantial reductions in emergency department visits,[26] hospitalizations,[2,13,26] and long-term care admissions.[2]

The largest proponent and most successful provider of home-based primary care has been the Veterans Health Administration in the United States. In the mid-1990s, a concerted effort to shift the focus and delivery of veterans' care to outpatient primary care models was pursued.[15] This important transformation was made with the foresight that older veterans would be poorly served by a health care system that was becoming increasingly reliant on inpatient and acute care models. In 1995, the Veterans Affairs System established its home-based primary care programs with the firm intent to deliver longitudinal comprehensive primary care in the home.[14]

These programs currently care for approximately 25 000 veterans across the United States,[7] and have demonstrated the ability to achieve good patient, caregiver, and systems-level outcomes. Emerging evidence from the Veterans Affairs System has reported considerable improvements in patient quality of life[27] and caregiver satisfaction,[27] as well as reductions in emergency department visits,[15] hospitalizations,[15,28,29] readmissions,[27] and long-term care admissions.[14]

However, most existing studies from the Veterans Affairs System and elsewhere are observational in design and employ a before-and-after analysis (**Table 2**),[2,13,15,26-30] and there is a need for high-quality prospective randomized trials to further support this model of care. (This is further discussed in the "Research and evaluation" section of the second part of this commentary [**page 243**].[31]) Additionally, it is critical that future studies carefully consider their target populations to ensure that they are selecting appropriate study participants who will actually benefit from the home-based primary care model. (This is further discussed in the "Designing effective and scalable programs" section of the second part of this commentary [**page 243**].[31]) This is particularly relevant because the one multisite randomized controlled trial of this model of care was only able to report significant systems benefit for the model in study participants with severe disability ($P = .03$).[27] However, it is also critical that future investigations continue to look beyond systems outcomes, as many studies have reported

Table 2. Emerging evidence supporting HBPC

STUDY	DESIGN	SAMPLE SIZE (INTERVENTION/ CONTROL)	SETTING	DURATION	ED VISITS	HOSPITAL ADMISSIONS	LTC ADMISSIONS
Beck et al, 2009[26]	Observational	468/0	Marion County, Indianapolis	7 y	Decreased 15%	Decreased 8%	Not measured
Chang et al, 2008[28]	Retrospective review	183/0	Washington VA Medical Center	2 y	No significant difference	Decreased 44%	Not measured
Cooper et al, 2007[29]	Retrospective review	20 783/0	All veterans in the US HBPC program	1 y	Not measured	Decreased 27%	Not measured
De Jonge and Taler, 2002[13]	Observational	480/0	Washington Hospital Center	3 y	Not measured	Decreased 30%	Decreased 10%
Hughes et al, 2000[27]	Multisite randomized controlled trial	981/985	16 US VA medical centres	4 y	Not measured	No significant difference (but decreased 22% in severely disabled)	Not measured
North et al, 2008[15]	Observational	104/0	Denver VA Medical Center	1 y	Decreased 48%	Decreased 84%	Not measured
Rosenberg, 2012[30]	Observational	248/0	Victoria, BC	1 y	Decreased 20%	Decreased 40%	Not measured
Wajnberg et al, 2010[2]	Retrospective review	179/0	Bronx, NY	22 mo	Not measured	Decreased 23%	Decreased 20%

ED—emergency department, HBPC—home-based primary care, LTC—long-term care, VA—Veterans Affairs.

considerable benefit on quality of life for patients and their caregivers.[26,27]

In 2006, Veterans Affairs home-based primary care programs treated 20 783 patients, and the intervention resulted in a 27% reduction in hospital admissions and a 69% reduction in inpatient days in their programs nationwide.[29] The home-based primary care program at the Denver Veterans Affairs Medical Center reported that in 2003 the program cared for 104 patients and reported 1-year cost savings of $1 065 513, with 98% of these savings being attributed to reductions in hospitalization.[15]

Recognizing the success of these programs, the most recent US health care reform legislation—the Patient Protection and Affordable Care Act of 2010—included a provision to test a remuneration incentive and operational model for home-based primary care, known as the Independence at Home program.[7] This demonstration program is adopting the core standards that characterize other successful US programs, including using physician- or nurse practitioner–led teams who are available 24 hours a day, 7 days a week.[7] This demonstration program aims to reduce emergency department visits and avoidable hospitalizations and readmissions, improve patient outcomes, and reduce health care costs.[7] A similar investment in home-based primary care in Canada could better ensure the long-term sustainability of our health care system.

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Competing interests

Dr Nowaczynski is Clinical Director of House Calls—a physician-led home-based interprofessional primary and specialty care program serving frail, marginalized, and housebound older adults in Toronto, Ont. **Drs Nowaczynski** and **Sinha** are 2 of the 4 Co-principle Investigators of a $395 000 BRIDGES grant entitled "Bridging Care for Frail Older Adults: A Study of Innovative Models Providing Integrated Home-based Primary Care in Toronto."

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