

# Care by Design

## *New model of coordinated on-site primary and acute care in long-term care facilities*

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### Abstract

**Problem addressed** A recently implemented model of care in long-term care facilities (LTCFs) called *Care by Design* addresses concerns about a previously uncoordinated care system, a reduction in family physician services, and high rates of ambulance transports to emergency departments.

**Objective of program** Care by Design is designed to increase access to care and continuity and quality of care by family physicians, reduce unwanted and unnecessary transfers to the emergency department, and lessen the burden on care teams including physicians and nurses in LTCFs.

**Program description** The core of Care by Design is a dedicated family physician for each LTCF floor, with regular on-site visits; physician on-call coverage, 24 hours a day, 7 days a week; and standing orders and protocols. Care by Design also includes a comprehensive geriatric assessment tool, an interdisciplinary team approach, access to a dedicated extended care paramedic program to respond to urgent care needs, and ongoing performance measurement.

**Conclusion** Care by Design aims to improve on-site care for LTCF residents and family physicians' experiences with providing care in several ways, including increased clinical efficiency, communication, and continuity, and appropriate support within the interdisciplinary team model.

### EDITOR'S KEY POINTS

- Care by Design is a new model of primary and emergency care delivery in long-term care facilities (LTCFs) in Halifax, NS, that has been implemented to provide comprehensive, skilled, timely, resident-centred care and make appropriate use of specialized health care resources in serving residents in LTCFs.
- Care by Design has improved the quality of and access to primary and emergency care for residents in LTCFs, leading to a reduction in transports to the emergency department. The model has benefits for LTCF residents, their families, LTCF staff, and family physicians, as well as for the emergency health services system and emergency departments, including improved communication and more efficient care delivery meeting the wishes of residents.

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## Le programme *Care by Design*

*Une nouvelle façon de coordonner les soins primaires et actifs dans des établissements de soins prolongés*

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### Résumé

**Problème à l'étude** Le programme *Care by Design*, un modèle de soins récemment instauré à l'intention des résidents d'établissements de soins prolongés (ESP), veut répondre à une situation antérieure caractérisée par des soins mal coordonnés, une réduction des services dispensés par des médecins de famille et un trop grand nombre de transports ambulanciers vers les urgences.

**Objectif du programme** Le programme *Care by Design* est conçu pour faciliter l'accès à des soins continus de qualité fournis par des médecins de famille, diminuer le nombre de transports inutiles ou non désirés vers les urgences et réduire la charge de travail des équipes de soins des ESP, médecins comme infirmières.

**Description du programme** *Care by Design* repose principalement sur un médecin de famille dévoué qui prend en charge un étage de l'ESP, qu'il visite régulièrement; un médecin de garde 24 heures par jour, 7 jours par semaine; et des règlements et protocoles permanents. Le programme comprend aussi un outil d'évaluation gériatrique complet, un travail en équipe multidisciplinaire, l'accès à soins paramédicaux complets en cas d'urgence, et une mesure constante du rendement.

**Conclusion** Le but de *Care by Design* est d'améliorer de diverses façons les soins donnés sur place aux résidents des ESP ainsi que l'expérience de travail des médecins de famille qui y prodiguent des soins, par exemple en améliorant l'efficacité clinique, les communications et la continuité, et en offrant un soutien approprié au sein d'une équipe interdisciplinaire.

### POINTS DE REPÈRE DU RÉDACTEUR

- Le programme *Care by design* est une nouvelle façon de donner des soins primaires et d'urgence aux personnes hébergées dans les établissements de soins prolongés (ESP) d'Halifax, en Nouvelle-Écosse, qui vise à fournir en temps opportun des soins complets et de grande qualité, centrés sur le patient, tout en utilisant au mieux les ressources spécialisées du système de santé.
- Le programme *Care by Design* a amélioré l'accès des résidents des ESP à des soins primaires d'urgence de meilleure qualité, tout en diminuant le nombre de transports aux services d'urgence. Ce modèle est avantageux pour les résidents, leurs familles, le personnel des ESP et les médecins de famille, mais aussi pour les services d'urgence du système de santé et les départements d'urgence, avec une meilleure communication et des soins plus efficaces, à la satisfaction des résidents.

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A new model of care in long-term care facilities (LTCFs) called *Care by Design* (CBD) recently implemented within the Capital District Health Authority (CDHA) in Halifax, NS, addresses concerns of a previously uncoordinated care system in LTCFs, reduction of family physician services and on-call coverage for LTCF residents, and high rates of ambulance transports to emergency departments (EDs). The core of CBD is dedicated family physician coverage for each LTCF floor, with regular on-site visits; on-call coverage, 24 hours a day, 7 days a week; and standing orders and protocols. Other key aspects of CBD include an extended care paramedic (ECP) program, providing on-site acute care and facilitating coordinated transfers to the ED; a new comprehensive geriatric assessment (CGA) tool; performance measurements; and interdisciplinary education. This paper considers some of the problems with primary care delivery in LTCFs, outlines the objectives of CBD, and describes CBD and its implications in detail.

## Background

Between 1999 and 2005, Nova Scotia experienced a 32% reduction in LTCF physician services, and fewer physicians were willing to provide on-call coverage for LTCFs.<sup>1</sup> Before CBD, physician involvement in LTCF resident care was uncoordinated, and residents were responsible for finding their own physicians. Uncoordinated primary care in LTCFs often resulted in transports to the ED for problems that could have been addressed effectively within LTCFs with a coordinated care team. Avoidance of unnecessary ED transports reduces strain on stretched acute care resources, and respects residents with no-transfer wishes. In 2006, the CDHA sponsored the Primary Care of the Elderly (PCOE) Project to review primary care in LTCFs.<sup>1</sup> Retrospective analyses of 2002 to 2005 emergency health services (EHS), hospital, and LTCF charts revealed an annual transport rate from LTCFs to EDs of 75 residents per 100 beds.<sup>1</sup>

To study implications of transports to the ED, chart audit data were collected on all LTCF-to-ED transports between November 2004 and April 2005 from 7 LTCFs. Of the 240 transports, 80% of residents were transported for breathing problems or falls. Overall, 35% of residents transported to hospital had advanced care directives stipulating they should not be hospitalized. While comfort care orders can change, it was found that in 50% of all transfer cases the LTCF could not reach the patient's physician for consultation before transfer. Only 15% of cases had on-site assessment by a family physician before transfer. In 60% of cases there was no family physician contact in the week before transfer, and 33% of transferred patients had no family physician contact in the 4 weeks before transfer. Among

transported residents, 60% returned to the LTCF, 39% were admitted to the hospital, and 1% died.<sup>1</sup>

One reason transfer rates are high in CDHA LTCFs is that Nova Scotia legislation prohibits LTCFs from providing bloodwork more than 3 times a week, retention sutures, extensive dressings, continuous bladder irrigation, gastrostomy, intermittent oxygen, intravenous antibiotics, or nutrition other than by mouth, gastrostomy, or jejunostomy.<sup>2</sup> As a result, before CBD, LTCFs called 911 for ambulance transfer to the ED for these services.

## Objectives of program

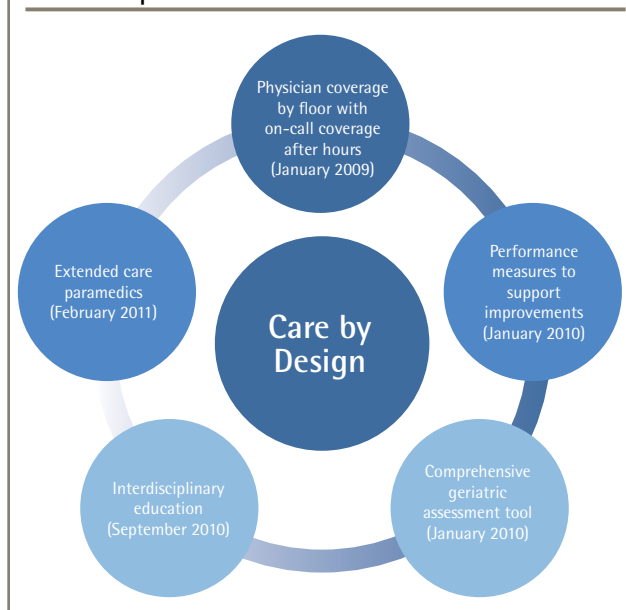
The objectives of CBD include providing comprehensive, skilled, timely, resident-centred care and making appropriate use of specialized health care resources in serving LTCF residents. Care by Design should

- provide better coordinated care;
- provide increased continuity of care;
- reduce ambulance transport rates to the ED;
- reduce rates of polypharmacy; and
- reduce health care costs.

## Program description

Recognizing the need for a more coordinated and interdisciplinary model of care based on the findings of the PCOE Project, the CDHA implemented the CBD model, which has 5 components (**Figure 1**). Under CBD, all residents of an LTCF floor are cared for by the same dedicated family physician, with on-call physician coverage after hours. The 55 CBD physicians are organized into 5 networks across the CDHA,

**Figure 1. Implementation of the Care by Design model components**



representing a total of 2600 beds. Each physician attends interprofessional team meetings and provides regular, anticipated care on their designated floors once per week. Practice standards include 30-minute physician on-call response time to calls from LTCFs, on-call sign-out communications, on-call telephone support, and standing orders and protocols. This consistent interaction between LTCF residents and dedicated family physicians is designed to improve continuity of care, facilitate communication, and allow for timely, best-practice care on site. Communication is improved with the reduced number of physicians caring for residents, creating greater familiarity for staff and residents. For example, CBD has reduced the number of family physicians providing care in 7 of the CDHA facilities (representing 1312 beds) from 230 to 41 physicians (**Table 1**). Care by Design physicians were self-selected, leading to a team with interest in geriatric care. Additionally, a comprehensive program of interdisciplinary education and training improves team coordination, communication, and end-of-life care.

Another component of CBD is a new EHS ECP program, initiated in February 2011. The ECPs are experienced advanced care paramedics, trained and equipped to deliver acute care on site at LTCFs at the request of the CBD physician. The ECP care plan is developed in consultation by telephone or in person with the CBD physician and the EHS oversight physician. The ECPs work alone (rather than the typical paramedic crew of 2) in a non-transport-capable vehicle. The ECPs can administer oxygen; provide suturing, slab splinting, steroid therapy, urinalysis, and 12-lead electrocardiograms; and take blood samples. When ECPs are involved with 911 calls from LTCFs, approximately

70% of patients remain on site.<sup>3</sup> When it is deemed that an LTCF resident should be seen in the ED, the ECP and the EHS oversight physician coordinate to ensure timely transport to the ED. This occurs about 24% of the time. Facilitated transfers by ambulance minimize stress for residents and strains on resources. Rarely, it is necessary for the ECP to request an emergency ambulance for immediate transport to the ED (about 6% of the time). The ECP program was established to provide geriatric-appropriate care in several ways. First, ECPs were selected through an application, screening, and interview process designed to find experienced, mature advanced care paramedics well suited for this role. Next, they received specific interdisciplinary classroom and on-site LTCF training. In addition, ECP-specific processes were developed and implemented for care in LTCFs, moving away from a rapid assessment, stabilization, and transport model to a “slow medicine” approach of evaluation, consultation, and providing care on site.

Performance measures are being collected in a systemized way to measure outcomes. For example, an on-call tracking system has been implemented to monitor the number and types of calls being handled by on-call physicians, and collect clinical event and outcome data for residents. These forms are reviewed by the medical director and reports are evaluated by CDHA. In addition, EHS data on ambulance transfers and ECP calls are monitored monthly at the district level and within EHS.

Care by Design includes a standardized CGA of the health status of each resident, completed by the interdisciplinary team and signed off on by the CBD physician. The CGA is a 1-page form, modified and validated for use in LTCFs,<sup>4</sup> documenting an older patient’s frailty status, including cognition (eg, dementia, delirium), mood, mobility, function, appetite, weight, bowel and bladder function, medical conditions, goals of care, care directives, and medications. This form is sent with residents who are transferred and has been a provincial standard since late 2010.

Costs of the CBD dedicated-physician model are revenue neutral, with the exception of on-call coverage, which costs \$875 per day for all 5 networks and is paid by the CDHA. A before-and-after cost analysis of the full program including the ECP is planned.

## Discussion

While advocates of a “social model” of care in LTCFs have moved away from physician involvement to avoid overmedicalization and a focus on illness, disease treatment, and cure,<sup>1</sup> there are many reasons why team care with increased primary care involvement of family physicians and nurse practitioners in LTCFs is beneficial. With an aging population there are increased demands

**Table 1. Comparison of the number of LTCF physicians before and after implementation of the Care by Design model**

LTCF	NO. OF BEDS	NO. OF PHYSICIANS BEFORE CARE BY DESIGN (2008)	NO. OF PHYSICIANS AFTER CARE BY DESIGN (2010)	LTCF PAYMENT SOURCE
A	446	76	12	Not for profit
B	149	24	6	Not for profit
C	87	18	4	Private
D	190	26	5	Private
E	192	32	6	Private
F	124	24	4	Private
G	124	30	4	Private
Total	1312	230	41	NA

LTCF—long-term care facility, NA—not applicable.

for health care services, a proportion of which will be provided to LTCF residents. We see within the LTCF population increased acuity levels,<sup>5</sup> multiple chronic conditions, and comorbidities commonly requiring increasing primary and acute care.<sup>6</sup> Additionally, shortened hospital stays have increased demand for coordination of postdischarge care in LTCFs.<sup>6</sup> These trends suggest increased primary care involvement in LTCFs is warranted.<sup>6</sup>

While providing care within LTCFs is a goal of CBD, in addressing the health care needs of LTCF residents there are instances when residents will need more acute care services than their LTCFs can provide, leading to appropriate and necessary transfers to hospitals. What is less agreed upon is whether the current rates of transfer from LTCFs are appropriate in relation to other solutions. Saliba et al<sup>7</sup> determined appropriateness of transfers by examining the reason for the transfer, finding 36% of transfers to EDs and 40% of admissions to hospital inappropriate. *Inappropriateness* meant trained physician reviewers believed the resident could have been cared for at a lower level of care within the LTCFs. A related American study on hospitalization rates following LTCF-to-ED transfer suggested hospitalizations could not be predicted easily but could be reduced if more acute services were offered in LTCFs.<sup>8</sup> The PCOE Project reported high rates of ambulance transports to EDs in our jurisdiction, now being addressed through the CBD physician and ECP care.

The cornerstone to providing the best possible health care to meet the acute needs of LTCF residents is good clinical information.<sup>9,10</sup> An examination of patient transfer outcomes from LTCFs to 6 EDs in Australia determined that those cases that were transferred were largely high acuity and had high hospitalization and death rates.<sup>9</sup> The essential information for providing ED patient care was significantly increased with the use of a transfer form ( $P < .001$ ).<sup>11</sup> Accurate transfer forms are one step on the spectrum of communication strategies required among health care professionals to ensure appropriate care of LTCF residents. In addition to communication issues<sup>12,13</sup> and clinical data collection, various pressures complicate transport decisions, including lack of LTCF family physicians providing on-site care; inadequate staff-to-resident ratios; and the need to deliver end-of-life care that meets the wishes of residents and families.<sup>11</sup> These interconnected issues should be addressed when designing new models of care, and have been accounted for with the new CBD CGA form.

A qualitative study examining transfers from LTCFs to the ED<sup>14</sup> found a need for integrated models of care that fostered role clarity and an understanding of the responsibilities of practitioners working along the care continuum. An integrated model of care could lead to

fewer ED visits and admissions. Codde and colleagues<sup>15</sup> found that the most common reason for avoidable admission was nonemergent symptoms suitable for assessment and management in LTCFs. Services most frequently identified as being potentially preventive of transport if they had been available in LTCFs were a general practitioner or assessment team, radiology services, and acute wound care. At present, CBD improves access to family physicians, team assessment, and wound care. Further, ECP-facilitated transfers for diagnostic imaging are designed to minimize wait times and transfer stress.

Several models of transitional care for LTCF residents are available in other jurisdictions. For example, the American Medical Directors Association practice guideline for transitions of care along the long-term care continuum<sup>16</sup> includes goals of reducing avoidable transitions. The INTERACT (Interventions to Reduce Acute Care Transfers) program provides a variety of online information and tools for communication, care paths, and advance care planning<sup>17</sup> and has been shown to have positive outcomes for avoiding transfers<sup>18</sup> and reducing hospital stays.<sup>19</sup> The BOOST (Better Outcomes for Older Adults through Safe Transitions) tool kit provides resources for expediting hospital discharge (including screening and assessment tools, a discharge checklist, a transition record, a teach-back process, and risk-specific interventions with a goal of reducing 30-day readmissions), and improves patient satisfaction and information flow between hospital and outpatient physicians.<sup>20</sup> In Canada, a randomized controlled trial found that treating residents of LTCFs who had pneumonia and other lower respiratory tract infections using a clinical pathway resulted in comparable outcomes to hospitalization while reducing hospitalization and health care costs.<sup>21</sup>

Care by Design is structured to improve on-site care for LTCF residents and improve family physicians' experiences of providing care in several ways including improved clinical efficiency and appropriate support from the interdisciplinary team model (**Box 1**). Care by Design itself does not rely on any new funding, but rather a reorganization of current existing funding that supports LTCF health care services.

## Conclusion

Care by Design is a new model of LTCF primary and emergency care delivery that has been implemented to provide comprehensive, skilled, timely, resident-centred care and make appropriate use of specialized health care resources in serving residents of LTCFs. Factors important to the success of CBD include dedicated family physicians, access to ECPs, interdisciplinary education, and a standardized CGA tool. Care by Design has improved the quality of and access to primary



## Box 1. Advantages of the Care by Design model

Care by Design improves on-site care for long-term care facility residents and improves family physicians' experiences of providing care in several ways:

- The model improves clinical efficiency by reducing travel time to visit residents in multiple long-term care facilities
- The Care by Design physician team provides peer support when addressing clinical challenges
- The Care by Design physician team shares on-call time, reducing individual burden
- Regular visits within one long-term care facility floor or wing promote better communication among care teams, residents, and family members
- The coordinated interdisciplinary team improves continuity and quality of care for residents

and emergency care for residents in LTCFs, leading to a reduction in transports to the ED. The model has benefits for LTCF residents, their families, LTCF staff, and family physicians, as well as for the EHS system and EDs, including improved communication and more efficient care delivery meeting the wishes of residents.

We are currently conducting a mixed-methods study of CBD including qualitative focus groups, individual interviews, and quantitative chart reviews from EHS, hospital, and LTCF charts over 3 time periods (before CBD, after physicians-per-floor introduction, and after CBD was fully implemented). The study's objective is to assess whether there are improved outcomes with CBD and where further improvements are warranted.

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### Contributors

All authors contributed to the concept and design of the study; data gathering, analysis, and interpretation; and preparing the manuscript for submission.

### Competing interests

None declared

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### References

1. Clarke B, Pyra K. *From care by default to Care by Design: improving primary care of the elderly in Capital Health. Report of Capital Health's Primary Care of the Elderly Project*. Halifax, NS: Capital Health District Authority; 2006. Available from: [http://medicine.dal.ca/content/dam/dalhousie/images/faculty/medicine/departments/departments-sites/family/DFM\\_research\\_carebydesign\\_cdhaproject.pdf](http://medicine.dal.ca/content/dam/dalhousie/images/faculty/medicine/departments/departments-sites/family/DFM_research_carebydesign_cdhaproject.pdf). Accessed 2013 Jan 4.
2. Government of Nova Scotia. *Homes for Special Care Regulations made under section 19 of the Homes for Special Care Act*. RSNS; 1989, c. 203.
3. Jensen JL, Travers AH, Bardua DJ, Dobson T, Cox B, McVey J, et al. Transport outcomes and dispatch determinants in a paramedic long-term care program: a pilot study. *CJEM* 2013;15(4):206-13.
4. Rockwood K, Abeysondera MJ, Mitnitski A. How should we grade frailty in nursing home patients? *J Am Med Dir Assoc* 2007;8(9):595-603.
5. Spillman BC, Lubitz J. New estimates for lifetime nursing home use: have patterns of use changed? *Med Care* 2002;40(10):965-75.
6. Stone RI. Physician involvement in long-term care: bridging the medical and social models. *J Am Med Dir Assoc* 2006;7(7):460-6.
7. Saliba D, Kingston R, Buchanan J, Bell R, Wang M, Lee M, et al. Appropriateness of the decision to transfer nursing facility residents to the hospital. *J Am Geriatr Soc* 2000;48(2):154-63.
8. Barker WH, Zimmer JG, Hall JW, Ruff BC, Freundlich CB, Eggert GM. Rates, patterns, causes, and costs of hospitalization of nursing home residents: a population-based study. *Am J Public Health* 1994;84(10):1615-20.
9. Arendts G, Dickson C, Howard K, Quine S. Transfer from residential aged care to emergency departments: an analysis of patient outcomes. *Intern Med J* 2012;42(1):75-82.
10. Ouslander JG, Lamb G, Perloe M, Givens JH, Kluge L, Rutland T, et al. Potentially avoidable hospitalizations of nursing home residents: frequency, causes, and costs. *J Am Geriatr Soc* 2010;58(4):627-35.
11. Dalawari P, Duggan J, Vangimalla V, Paniaqua M, Armbricht ES. Patient transfer forms enhance key information between nursing homes and emergency department. *Geriatr Nurs* 2011;32(4):270-5.
12. Arendts G, Reibel T, Codde J, Frankel J. Can transfers from residential aged care facilities to the emergency department be avoided through improved primary care services? Data from qualitative interviews. *Australas J Ageing* 2010;29(2):61-5.
13. Terrell KM, Miller KM. Challenges in transitional care between nursing homes and emergency departments. *J Am Med Dir Assoc* 2006;7(8):499-505.
14. McCloskey RM. A qualitative study on the transfer of residents between a nursing home and an emergency department. *J Am Geriatr Soc* 2011;59(4):717-24.
15. Codde J, Frankel J, Arendts G, Babich P. Quantification of the proportion of transfers from residential aged care facilities to the emergency department that could be avoided through improved primary care services. *Australas J Ageing* 2010;29(4):167-71.
16. American Medical Directors Association. *Transitions of care in the long-term care continuum: practice guideline*. Columbia, MD: American Medical Directors Association; 2010.
17. INTERACT: *Interventions to Reduce Acute Care Transfers* [website]. Boca Raton, FL: Florida Atlantic University; 2011. Available from: <http://interact2.net>. Accessed 2012 Aug 10.
18. Lamb G, Tappen R, Diaz S, Herndon L, Ouslander JG. Avoidability of hospital transfers of nursing home residents: perspectives of frontline staff. *J Am Geriatr Soc* 2011;59(9):1665-72.
19. Ouslander JG, Lamb G, Tappen R, Herndon L, Diaz S, Roos BA, et al. Interventions to reduce hospitalizations from nursing homes: evaluation of the INTERACT II Collaboration Quality Improvement project. *J Am Geriatr Soc* 2011;59(4):745-53.
20. Society of Hospital Medicine [website]. *Overview. Project BOOST Implementation Toolkit*. Philadelphia, PA: Society of Hospital Medicine; 2014. Available from: [www.hospitalmedicine.org/Web/Quality\\_Innovation/Implementation\\_Toolkits/Project\\_BOOST/Web/Quality\\_Innovation/Implementation\\_Toolkit/Boost/Overview.aspx](http://www.hospitalmedicine.org/Web/Quality_Innovation/Implementation_Toolkits/Project_BOOST/Web/Quality_Innovation/Implementation_Toolkit/Boost/Overview.aspx). Accessed 2015 Feb 9.
21. Loeb M, Carusone SC, Goeree R, Walter SD, Brazil K, Krueger P, et al. Effect of a clinical pathway to reduce hospitalizations in nursing home residents with pneumonia: a randomized controlled trial. *JAMA* 2006;295(21):2503-10.

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