

Health Reports

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Transitions to long-term and residential care among older Canadians

by Rochelle Garner, Peter Tanuseputro, Douglas G. Manuel and Claudia Sanmartin

Abstract

Background: The aging of the Canadian population has increased attention on the future need for nursing home beds. Although current projections rely primarily on age and sex, other factors also contribute to the need for long-term care. This study seeks to identify additional factors to age and sex that contribute to Canadians transitioning from living at home to living in a seniors' residence or nursing home.

Data and methods: As part of a larger record linkage project, three cycles of the Canadian Community Health Survey (CCHS) were linked to the 2011 Census of Population: Cycle 3.1 (2005/2006), Cycle 4.1 (2007/2008), and CCHS-Healthy Aging (2008/2009). The sample was limited to successfully linked CCHS respondents who were aged 60 years or older as of Census Day 2011 (May 10, 2011; n=81,411). Sex-specific generalized multinomial logistic regression models were conducted to examine the association between each respondent's characteristics and dwelling location (private dwelling, private dwelling with additional family, nursing home, or seniors' residence) on Census Day.

Results: On Census Day, 1.4% of the study sample were living in a nursing home, 1.2% in a seniors' residence, 7.1% in a private dwelling with additional family, and 90.3% in a private dwelling. Women were more likely than men to be living in a nursing home (1.8% of women vs. 0.9% of men) or seniors' residence (1.7% of women vs. 0.7% of men). Regression models showed that, aside from age, there were increased odds of living in a nursing home or seniors' residence among individuals who lost their spouse or who were not married, who did not own their dwelling, who had poor self-rated health, or who had been diagnosed with dementia. The association of other factors with dwelling place differed according to sex and type of dwelling.

Interpretation: Although age is strongly associated with living in a nursing home or seniors' residence, other demographic and health factors affect the likelihood of an individual transitioning to an institutional dwelling. Such factors could be considered when planning for the future housing and care needs of the Canadian population.

Keywords: Nursing home, seniors' residence, dwelling place, transition

In 2016, 16.9% of Canadians were aged 65 years or older, and 2.2% were aged 85 years or older, representing a 20.0% increase in these age groups since 2011.¹ The proportion of the Canadian population aged 65 years and older is expected to increase to 20.0% by 2024.² These demographic shifts raise concerns about the future need for nursing home (NH) care,³⁻⁵ because age is a strong predictor of admission to an NH.⁶⁻⁸ According to the 2016 Census, 6.8% of Canadians aged 65 years and older were living in an NH or residence for senior citizens (hereafter referred to as a seniors' residence, SR): this proportion jumps to 30.0% among Canadians aged 85 years and older.^{9,10}

Published estimates of the future need for NH care in Canada typically rely on population projections of age and sex.^{11,12} However, ratio-based approaches to the capacity planning of long-term care often over- or underestimate the number of beds (or units) needed to meet demand.¹³ Furthermore, transitions to long-term care are associated with other factors, such as physical and cognitive limitations, acute health events, social support, household composition, and income—yet these factors are often not considered in projections.¹⁴⁻¹⁸ While some Canadian studies have been conducted on population-based predictors for NH care,^{7,19,20} few have considered a broad range of potential predictors, chiefly because of a lack of data on the range of factors reflected in the Canadian population. Furthermore, few studies have considered other competing outcomes, such as

transitions to retirement homes, transitions to supportive living or mortality. Evidence suggests that controlling for mortality is important when estimating the potential for NH entry.²¹

In Canada, NHs typically offer the highest level of support, and some are subsidized by publicly funded health care. The number of NH beds are limited and waitlists are often long. SRs typically provide less intensive services than NHs and are generally paid for out-of-pocket. Individuals with health care needs and their families base long-term care decisions on their preferences, level of need, ability to pay, and the availability of a bed or unit. Individuals who do not qualify for, who cannot afford, or who opt not to access NH or SR care may rely on community supports and/or care from family and friends to remain at home.

Population health surveys, such as Statistics Canada's Canadian Community Health Survey (CCHS), include a range of questions on the health and health-related behaviours of Canadians. However, population health surveys typically exclude individuals living in facilities such as NHs and SRs, and are usually cross-sectional in nature. Other data sources, such as the Canadian Census of Population, capture less detailed health information than surveys, but provide a broader representation of the whole population. The 2011 Census enumerated individuals living in NHs and SRs among residents of collective dwellings. According to the 2011 Census, an NH was defined as a facility that provides 24/7 professional health monitoring and skilled nursing care to residents, often individuals

who are elderly and not independent in most activities of daily living.²² Assisted or supportive living, rest homes, retirement residences, and other facilities that provided personal support services but did not provide continuing health care services were classified in the 2011 Census as SRs.²³

By linking CCHS respondents to the 2011 Census, it was possible to identify individuals who moved from their private residence at the time of the CCHS interview to an NH or SR by Census Day. The purpose of this study is to estimate how a range of demographic, health and socioeconomic factors among older Canadians are associated with their transition from living in a private dwelling to living in an NH or SR.

Methods

Record linkage data sources

This study is part of a larger record linkage project that combined information from three different data sources: (1) the CCHS, (2) the Canadian Mortality Database (CMDDB), and (3) the 2011 Census. The Executive Management Board of Statistics Canada approved this linkage project²³ and the Directive on Record Linkage governs the use of the linked data.²⁴

The CCHS is a national, cross-sectional, population-based survey. It measures the health, behaviour, health care use and sociodemographic characteristics of the non-institutionalized household population aged 12 years or older. The survey excludes people living on reserves and other Aboriginal settlements in the provinces, full-time members of the Canadian Forces, the institutionalized population, and people living in selected Quebec health regions. Altogether, these exclusions represent less than 3% of the target population. The CCHS was conducted biennially between 2000 and 2006, then annually starting in 2007. Additional details regarding the CCHS sampling strategy and survey content are available on the Statistics Canada website.²⁵ Individuals

who responded to the CCHS between 2000 and 2011 and agreed to share and link their data (n=701,877) were eligible for linkage with the other data sources.

The CMDDB is a census of all deaths registered in Canada. It includes information such as cause and date of death, as well as the name, date of birth, and postal code of the deceased at the time of death. Deaths recorded in the CMDDB between January 1, 2000, and December 31, 2011, among individuals aged 12 years or older (n=2.77 million) were eligible for record linkage in this study.

The 2011 Census of Population is an enumeration of the Canadian population on Census Day (May 10, 2011; n=33.5 million). The census provides individual, family and household-level information. In this study, it was used primarily to determine an individual's place of residence.

Record linkage methodology

Record linkage was conducted in two steps. First, respondents to CCHS cycles from 2000 through 2011 (n=701,877) were linked to the CMDDB using G-Link, a SAS-based record linkage software developed at Statistics Canada, and a probabilistic linkage methodology based on the Fellegi-Sunter theory of record linkage.^{26,27} CCHS respondents were linked to death records based on given name, last name, date of birth, postal code and sex. Additional information from tax files was used to enhance the linkage with alternative postal codes and names (e.g., maiden name, father's name).²⁸ Overall, 5.3% of CCHS respondents were linked to a mortality record. More information on this linkage is available elsewhere.²⁹

In the second step, the same CCHS respondents were linked to the 2011 Census. This linkage followed a hierarchical, deterministic, exact-match approach that compared the following linkage keys across the files: social insurance number (SIN), name (first and last), date of birth, postal code, and telephone number. This approach maximizes the discriminatory power of the

linking variables and minimizes the influence of errors and missing values.³⁰ Separate linkages of the CCHS and the census to the tax data provided the SIN as a linking variable. Overall, 80.9% of CCHS respondents were linked to a unique individual in the census. Most links (82.6%) were created using the SIN. Among individuals who were not linked, 26.5% were known to have died. More information is available in an internal report.³¹

Respecting respondent privacy

Statistics Canada ensures respondent privacy during the linkage process and subsequent use of linked files. Only employees directly involved in the linkage process had access to the unique identifying information required for linkage, such as names. Health-related information was not accessible to these individuals. Once the data linkage process was completed, all identifying information was removed from the analytical file.

Study sample

The sample for this study includes respondents from three CCHS survey cycles (Cycle 3.1, 2005/2006; Cycle 4.1, 2007/2008; and CCHS-Healthy Aging, 2008/2009) who agreed to share and link their data, who were believed to be alive and aged 60 years or older on Census Day 2011, and who were successfully linked to a unique census individual living in a private dwelling, NH or SR (see "Outcome Measure"). The final analytic sample included 81,411 individuals.

Outcome measure

The outcome measure is the dwelling place of an individual on Census Day. The census classifies dwellings as either private or collective. This study is interested in collective dwellings classified as an NH or SR. A key difference between an NH and an SR is the level of care provided, which is reflected in the collective dwelling classification used by the census.

Among individuals living in a private dwelling on Census Day, the majority (78.0%) were in the same living arrangement as at the time of the CCHS interview. Living arrangement at the time of the CCHS interview was based on the household relationship matrix, whereas living arrangement at Census Day was based on census family status. Respondents who changed living arrangements were classified as living in a private dwelling with additional family (PDAF) if they experienced the following changes: (1) lived alone at the time of the CCHS interview, but were living with other individuals at the time of the census; (2) did not live with a spouse/partner or children at the time of the CCHS interview, but were doing so at the time of the census; or (3) lived with their spouse/partner and no children at the time of the CCHS interview, but were living with their children (with or without their spouse present) at the time of the census. While family members are often the primary source of informal care,³² the classification used in this study is only a proxy measure since the reason for changing living arrangements cannot be determined.

Covariate measures

Marital status and change in status

Marital status at the time of the CCHS interview and at the census were each dichotomized as married (including common-law) and not married (including separated, divorced, widowed and never married). Changes in marital status between the CCHS interview and Census Day were classified as: (1) remained married (i.e., married at the time of the CCHS interview and on Census Day), (2) lost spouse (i.e., married at the time of the CCHS interview but not married on Census Day), and (3) not married at the time of the CCHS interview (regardless of marital status on Census Day). Most individuals who lost a spouse were widowed by Census Day (78.1% of women compared with 60.5% of men) rather than divorced or separated. Among individ-

uals who were not married at the time of the CCHS interview, a small proportion of women (3.2%) and men (9.0%) were married or living common-law on Census Day. Unfortunately, because of small cell counts, individuals who lost a spouse or were not married at the time of the CCHS interview could not be further disaggregated in analyses.

Sociodemographic and economic measures

To provide a common metric for the three cycles of the CCHS, age was calculated as of Census Day 2011 based on the date of birth provided at the CCHS interview. All other characteristics refer to respondents' statuses at the time of the CCHS interview. Household income was divided by Statistics Canada's low income cut-off (LICO) corresponding to the respondent's household and community size.³³ These adjusted household income ratios were subsequently divided into quintiles at the provincial level, with a missing category included to retain residents of the territories (which have no LICO), as well as respondents who did not report household income (14.9%). Home ownership was a dichotomous variable that distinguished respondents living in a home owned by a member of the household from respondents living in a home that was rented. Living arrangements were dichotomized as respondents living alone and respondents not living alone. For province of residence, individuals living in the Atlantic provinces (i.e., Nova Scotia, New Brunswick, Prince Edward Island, and Newfoundland and Labrador) were grouped because of small sample sizes in these regions. Place of residence was also classified as either urban or rural based on postal code and census geography. Lastly, individuals were characterized as either immigrant or Canadian-born.

Health measures

Several measures of health status were considered. Each individual rated their general and mental health on five-point scales ranging from "excellent" to "poor."

Respondents also rated their health at the time of the interview compared with their health a year prior on a five-point scale ranging from "much better than a year ago" to "much worse than a year ago." Furthermore, respondents were asked whether they had ever been diagnosed by a doctor with any of the following chronic conditions lasting more than six months: asthma, arthritis, back problems (not arthritis), high blood pressure, emphysema, chronic obstructive pulmonary disorder, diabetes, heart disease, cancer, ulcers, the effects of a stroke, urinary incontinence, bowel disease, Alzheimer's disease or other dementia (referred to henceforth as dementia), a mood disorder, or an anxiety disorder.

Smoking status classified respondents as never smokers, former smokers or current smokers. The self-reported height and weight of individuals were used to derive their body mass index (BMI), which was subsequently categorized as underweight ($BMI < 18$), acceptable weight ($18 \leq BMI < 25$), overweight ($25 \leq BMI < 30$) and obese ($BMI \geq 30$). Respondents were also asked if they had been a patient overnight in a hospital, an NH or a convalescent home in the year prior to the interview.

Analysis

The association between the characteristics of CCHS respondents and their place of residence on Census Day was examined crudely and after adjusting for age, separately for men and women. Sex-specific generalized multinomial logistic regression models were conducted to examine the association between the characteristics and dwelling location (private dwelling [reference group], PDAF, NH, or SR) of respondents. Because of the large number of potential covariates, only factors that were significantly associated ($p < 0.05$) with dwelling location after age adjustment (results not shown) were considered as potential covariates in final models. Only covariates that were statistically significant ($p < 0.05$) for one of the non-reference outcomes were retained in final sex-specific regression models.

Table 1
Distribution of characteristics of residents of private dwelling, nursing homes, seniors' residences, and private dwellings with additional family, separately for women and men

Characteristics at CCHS interview (except where indicated)		Women					Men				
		N	Private dwelling	Nursing home	Seniors' residence	PDAF	N	Private dwelling	Nursing home	Seniors' residence	PDAF
Sample	N	46,399	40,180	1,272	1,009	3,938	35,012	31,408	512	346	2,746
	%	100.0	89.7 [†]	1.8 [†]	1.7 [†]	6.8 [†]	100	92.2	0.9	0.7	6.3
Age group at Census Day	60 to 69, %	20,258	51.3 [†]	4.5 ^{E*}	5.0 ^{E*}	55.0 ^{**†}	17,264	55.1	12.4 ^{E*}	7.4 ^{E*}	61.4 [*]
	70 to 74, %	7,456	17.0	4.1 ^{E*}	7.3 ^{E*}	16.3	6,267	17.4	5.7 ^{E*}	12.0 ^{E*}	14.6 [*]
	75 to 79, %	6,627	13.7	12.5 [†]	12.8	11.2 [*]	4,932	13.2	18.7 [*]	9.3 ^E	12.4
	80 to 84, %	5,614	10.0 [†]	23.0 [*]	24.6 [*]	9.1	3,568	8.8	19.4 [*]	22.9 [*]	7.3 [*]
	85 to 89, %	4,097	5.8 [†]	29.1 [*]	30.7 [*]	6.0 [†]	2,044	4.2	25.4 [*]	30.3 [*]	2.9 [*]
	90 and older, %	2,347	2.2 [†]	26.8 ^{**†}	19.7 [*]	2.5 [†]	937	1.3	18.4 [*]	18.1 [*]	1.5 ^E
Marital status, CCHS & Census	Remained married, %	19,229	57.5 [†]	12.8 ^{**†}	12.1 ^{**†}	39.2 ^{**†}	23,654	80.2	40.4 [*]	42.4 [*]	60.0 [*]
	Loss of spouse, %	2,881	6.2 [†]	14.8 [*]	14.5 [*]	5.7 [†]	1,579	4.2	16.5 [*]	19.3 ^{E*}	2.6 ^{E*}
	Not married at CCHS, %	24,269	36.3 [†]	72.4 ^{**†}	73.5 ^{**†}	55.1 ^{**†}	9,758	15.6	43.1 [*]	38.3 [*]	37.4 [*]
Living alone	Living with others, %	24,726	74.2 [†]	44.5 ^{**†}	33.4 ^{**†}	43.9 ^{**†}	25,916	88.1	63.4 [*]	68.1 [*]	57.0 [*]
	Living alone, %	21,673	25.8 [†]	55.5 ^{**†}	66.6 ^{**†}	56.1 ^{**†}	9,096	11.9	36.6 [*]	31.9 [*]	43.0 [*]
Dwelling owned by a household member	No, %	11,299	20.1 [†]	46.3 ^{**†}	57.5 ^{**†}	24.8 ^{**†}	5,536	13.8	35.2 [*]	47.6 [*]	19.1 [*]
	Yes, %	35,006	79.9 [†]	53.7 ^{**†}	42.5 ^{**†}	75.2 ^{**†}	29,376	86.2	64.8 [*]	52.4 [*]	80.9 [*]
Immigrant status	Canadian-born, %	38,761	75.1 [†]	79.6 ^{**†}	84.7 ^{**†}	74.3 ^{**†}	28,716	73.0	79.7 [*]	90.5 [*]	70.9 [*]
	Immigrant, %	7,570	24.9 [†]	20.4 [*]	15.3 ^{**†}	25.7	6,227	27.0	20.3 ^E	9.5 ^{E*}	29.1
Province [†]	Atlantic provinces, %	7,901	8.0 [†]	10.3 [*]	4.0 ^{**†}	8.3 [†]	5,807	8.3	9.4 ^E	3.3 ^{E*}	6.8 [*]
	Quebec, %	9,603	25.5	19.5 [*]	43.5 ^{**†}	23.2	7,367	25.4	23.2	52.2 [*]	23.0
	Ontario, %	14,065	38.4	37.7	24.4 [*]	39.6	10,480	38.4	40.4	20.9 [*]	36.4
	Manitoba, %	2,778	3.6	3.8 ^E	2.8 ^E	3.1	2,136	3.4	3.1 ^E	F	2.8
	Saskatchewan, %	3,054	3.0	5.0 [*]	1.6 ^{**†}	2.8	2,229	3.0	5.4 ^{E*}	F	3.3
	Alberta, %	3,390	8.2	9.7	13.8 [*]	7.2	2,629	8.4	7.8 ^E	13.1 ^E	8.7
	British Columbia, %	5,278	13.3	14.0	9.9 [*]	15.7 ^{**†}	4,051	13.1	10.7 ^E	7.8 ^{E*}	19.1 [*]
Self-perceived general health	Excellent	6,834	16.6	8.9 [*]	7.3 [*]	18.6	5,218	17.0	8.8 ^{E*}	12.9 ^E	18.2
	Very good	15,369	33.4 [†]	17.5 [*]	25.2 [*]	31.1	10,989	32.1	17.0 [*]	21.0 [*]	31.6
	Good	15,017	32.1	33.3	34.6	32.2	11,741	33.2	35.0	32.9	31.8
	Fair	6,988	13.7	26.4 [*]	27.9 [*]	13.5	5,405	13.7	24.4 [*]	27.2 [*]	13.9
	Poor	2,131	4.3	13.9 [*]	4.9	4.6	1,612	4.0	14.8 [*]	6.0 ^E	4.5
Year of interview	2005/2006, %	18,015	31.9	47.7 [*]	41.1 [*]	32.5	13,417	32.6	44.6 [*]	40.5 [*]	32.0
	2007, %	9,610	16.6	17.0	18.3	16.4	7,198	16.4	15.4	13.4 ^E	15.2
	2008, %	10,308	19.3	15.2 [*]	24.4 [*]	18.5	7,838	18.9	16.3	18.6	20.0
	2009, %	8,466	32.2	20.1 [*]	16.2 ^{**†}	32.6	6,559	32.1	23.7 [*]	27.5	32.8

^E use with caution

F too unreliable to be published

* significantly different from those living in a private dwelling ($p < 0.05$)

[†] residents of the territories were included in the study sample, but due to small cell counts were not included in deriving the distribution of province by dwelling type

[‡] estimate is significantly different from that of men living in the same dwelling type

PDAF = private dwelling with additional family

Source: CCHS respondents from Cycles 3.1 (2005/2006), Cycle 4.1 (2007/2008), and CCHS-Healthy Aging (2008/2009) linked to 2011 Census respondents, limited to respondents who were age 60 years or older on Census Day (May 10, 2011)

All analyses were weighted using CCHS survey weights adjusted for respondents' consent to link and share their information. Variation estimation was conducted using the bootstrap technique. Analyses were run in SAS-callable SUDAAN (version 11.0).

Results

In the analytic sample of CCHS respondents linked to the census, 1.4% of respondents were living in an NH at the time of the census, 1.2% of respondents were living in an SR, and 6.6% of respondents were living in a PDAF. Women were more likely than men to be

living in an NH (1.8% of women vs. 0.9% of men), an SR (1.7% of women vs. 0.7% of men) or a PDAF (6.8% of women vs. 6.3% of men; Table 1). The proportion of respondents living in an NH or SR was relatively insignificant until respondents were aged 75 or older, after which living in an NH or SR became more prevalent (Figure 1).

Table 2
Adjusted odds ratios for the association between respondent characteristics and place of residence on Census Day 2011, women aged 60 years or older, Canada

		Nursing home			Seniors' residence			Private dwelling with additional family		
		Odds ratio	95% confidence interval		Odds ratio	95% confidence interval		Odds ratio	95% confidence interval	
			from	to		from	to		from	to
Age group at Census Day	60 to 69	0.1*	0.1	0.2	0.1*	0.1	0.3	1.6*	1.4	1.9
	70 to 74	0.3*	0.2	0.5	0.5*	0.3	0.9	1.3*	1.1	1.6
	75 to 79	1.0			1.0			1.0		
	80 to 84	1.9*	1.3	2.8	2.2*	1.5	3.1	1.0	0.8	1.2
	85 to 89	4.0*	2.9	5.7	4.7*	3.3	6.7	1.0	0.8	1.3
	90 and older	8.0*	5.5	11.5	7.1*	4.8	10.4	1.0	0.7	1.3
Marital status, CCHS & Census	Remained married	1.0			1.0			1.0		
	Loss of spouse	4.3*	2.8	6.5	4.2*	2.8	6.3	1.2	0.9	1.6
	Not married at CCHS	2.0*	1.3	3.1	1.2	0.8	2.1	0.5*	0.3	0.7
Living alone	Living with others	1.0			1.0			1.0		
	Living alone	1.5*	1.1	2.0	2.6*	1.7	3.8	8.3*	5.6	12.1
Dwelling owned by a household member	Yes	1.0			1.0			1.0		
	No	2.1*	1.7	2.5	2.6*	2.1	3.2	0.9	0.8	1.0
Self-perceived general health	Excellent	1.0			1.0			1.0		
	Very good	0.7*	0.5	1.0	1.4	1.0	2.0	0.8*	0.7	1.0
	Good	1.0	0.7	1.4	1.4	0.9	2.0	0.9	0.7	1.1
	Fair	1.2	0.9	1.8	2.0*	1.3	3.0	0.9	0.7	1.1
	Poor	2.0*	1.3	3.3	1.4	0.8	2.4	0.9	0.6	1.4
Self-perceived mental health	Excellent	1.0			1.0			1.0		
	Very good	1.4*	1.1	1.8	1.0	0.8	1.3	1.0	0.9	1.2
	Good	1.5*	1.1	2.0	1.1	0.8	1.4	1.2*	1.0	1.4
	Fair	2.0*	1.2	3.4	1.2	0.7	1.9	1.3	0.9	1.9
	Poor	2.7	0.9	8.6	0.6	0.2	2.1	1.4	0.7	2.6
	Missing (proxy respondent)	2.3	1.0	5.3	1.0	0.3	3.5	0.7	0.2	2.0
Province [†]	Atlantic provinces	1.1	0.9	1.5	0.7	0.5	1.1	1.0	0.9	1.2
	Quebec	0.7*	0.5	0.9	2.3*	1.7	3.1	0.9	0.7	1.0
	Ontario	1.0			1.0			1.0		
	Manitoba	0.8	0.5	1.2	0.8	0.5	1.4	0.8	0.6	1.1
	Saskatchewan	1.0	0.8	1.4	0.5*	0.3	0.9	0.8	0.7	1.0
	Alberta	1.4	0.9	2.2	3.0*	2.1	4.4	0.9	0.7	1.1
	British Columbia	1.2	0.9	1.6	1.2	0.9	1.7	1.1	0.9	1.3
Immigrant status	Canadian-born	1.0			1.0			1.0		
	Immigrant	0.7*	0.5	0.9	0.7*	0.5	0.9	1.1	1.0	1.3
Chronic conditions	Diabetes	1.5*	1.1	2.1	1.4*	1.1	1.9	1.1	0.9	1.4
	High blood pressure	0.8*	0.6	1.0	1.1	0.9	1.3	1.1	0.9	1.2
	Urinary incontinence	1.3*	1.1	1.7	1.3*	1.0	1.7	0.9	0.8	1.1
	Dementia	6.7*	3.6	12.4	4.4*	1.2	15.5	1.4	0.7	2.8
	Mood disorder	1.7*	1.1	2.5	1.8*	1.2	2.7	1.0	0.8	1.3
Overnight patient in a hospital, nursing home, or convalescent home in past year	No	1.0			1.0			1.0		
	Yes	1.8*	1.4	2.3	1.2	0.9	1.6	0.9	0.8	1.1
BMI group	Underweight	1.4	0.9	2.1	1.7*	1.0	2.8	1.2	0.8	1.6
	Acceptable weight	1.0			1.0			1.0		
	Overweight	0.7*	0.6	0.9	0.9	0.7	1.1	1.0	0.9	1.1
	Obese	0.6*	0.4	0.8	0.9	0.7	1.3	0.9	0.8	1.1
	Missing	1.2	0.7	2.1	0.9	0.4	1.9	0.6*	0.4	0.9
Year of interview	2005/2006	1.6*	1.2	2.1	1.0	0.9	1.5	1.1	1.0	1.3
	2007	1.0			1.0			1.0		
	2008	0.7*	0.5	1.0	1.1	0.8	1.5	1.0	0.8	1.2
	2009	0.5*	0.4	0.7	0.4*	0.3	0.6	1.0	0.8	1.2

* significantly different from odds ratio (p<0.05)

[†] residents of the territories were included in the study sample but, due to small cell counts, odds ratios for the territories are not presented

Note: Reference category for outcome is living in a private residence on Census Day 2011.

Source: CCHS respondents from Cycle 3.1 (2005/2006), Cycle 4.1 (2007/2008), and CCHS-Healthy Aging (2008/2009) linked to 2011 Census respondents, limited to respondents who were age 60 years or older on Census Day (May 10, 2011).

Compared with individuals still living in a private dwelling on Census Day 2011, individuals living in an NH were older, were more likely to be unmarried at the time of the CCHS interview or to have lost their partner between the CCHS interview and the census, were in poorer health, and were more likely to have been born in Canada (Table 1). A similar pattern was also seen for individuals living in SRs. Fewer differences were found between individuals living in a PDAF and those in private dwellings. Individuals living in PDAFs were more likely to be unmarried and living alone at the time of the CCHS interview than those living in other private dwellings: the latter difference may result from the definition of PDAF.

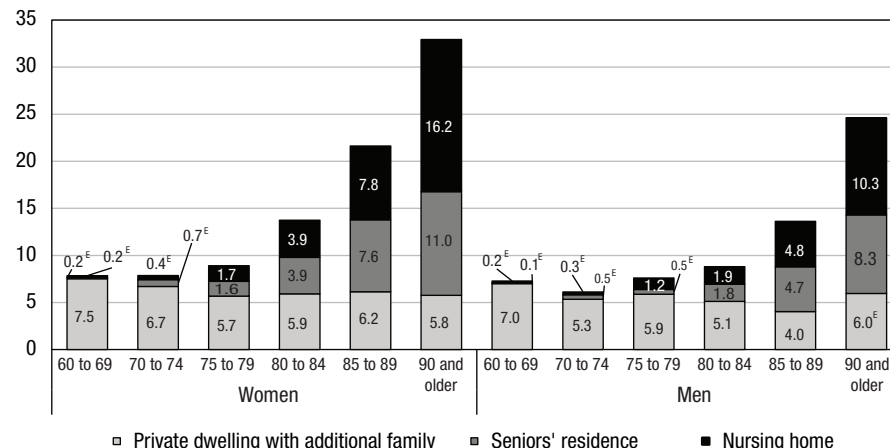
Regression results

Final regression models for women and men are shown in Tables 2 and 3, respectively. On Census Day, individuals were significantly more likely to live in an NH than a private dwelling if they: had lost their spouse by Census Day (OR=4.3 for women, OR=3.7 for men) or were not married at their CCHS interview (OR=2.0 for women, OR=2.4 for men), compared with those who remained married; did not own their dwelling (OR=2.1 for women, OR=2.3 for men), compared with those who did; reported spending time in a hospital or a convalescent home in the year prior to the CCHS interview (OR=1.8 for women, OR=1.9 for men); or had been diagnosed with dementia (OR=6.7 for women, OR=6.2 for men).

Decreased self-perceived general health and mental health also significantly increased the likelihood of an individual living in an NH, showing a gradient in the effect across levels of each measure (Tables 2 and 3). In addition, living alone significantly increased the odds of women living in an NH (OR=1.5), as did having diabetes (OR=1.5), urinary incontinence (OR=1.3) or a diagnosed mood disorder (OR=1.7, Table 2). For men, these factors were not significantly associated with living in an NH (Table 3). Furthermore, immigrant

Figure 1
Proportion of CCHS respondents linked to the Census who were living in private dwellings with additional family, seniors' residences, and nursing homes on Census day 2011, by sex and age group at Census

proportion of linked respondents living in dwelling category



[£] use with caution

Source: CCHS respondents from Cycle 3.1 (2005/2006), Cycle 4.1 (2007/2008), and CCHS-Healthy Aging (2008/2009) linked to 2011 Census respondents, limited to respondents who were age 60 years or older on Census Day (May 10, 2011)

women (OR=0.7) were significantly less likely to live in an NH compared with Canadian-born women (Table 2).

An individual was significantly more likely to live in an SR on Census Day if they: lost their spouse between the CCHS interview and Census Day (OR=4.2 for women, OR=3.5 for men), compared with those who remained married; did not own their home (OR=2.6 for women, OR=2.9 for men), compared with those who did; had diabetes (OR=1.4 for women, OR=1.8 for men); or lived in Quebec (OR=2.3 for women, OR=3.1 for men) or Alberta (OR=3.0 for women, OR=2.6 for men), compared with respondents from Ontario (Tables 2 and 3).

Men who were not married at the time of the CCHS were also significantly more likely to live in an SR on Census Day (OR=2.7, Table 3); this association was not significant for women (Table 2). Among women, a diagnosed mood disorder (OR=1.8) or urinary incontinence (OR=1.3) was associated with higher odds of living in an SR (Table 2). Being hospitalized or in a convalescent home in the year prior to the CCHS interview was associated with higher odds of living in an SR among men (OR=1.8,

Table 3); this association was not significant among women (Table 2).

Compared with living in a private dwelling, few characteristics were significantly associated with living in a PDAF on Census Day. Although individuals who were living alone at the time of the CCHS interview were significantly more likely to live in a PDAF on Census Day compared with individuals who lived with others (OR=8.3 for women, Table 2; OR=16.4 for men, Table 3), this is an association by definition, since individuals who lived alone at the time of the CCHS interview had a greater chance of gaining family members than individuals who lived with others. Beyond living arrangement, individuals who were not married at the time of the interview were significantly less likely to live in a PDAF (OR=0.5 for women, Table 2; OR=0.3 for men, Table 3), compared with those who remained married. Among men, losing a spouse also significantly decreased the likelihood of living in a PDAF (OR=0.6, Table 3). Women with very good self-perceived health were significantly less likely (OR=0.8, Table 2) than women with excellent self-perceived health to live

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Table 3
Adjusted odds ratios for the association between respondent characteristics and place of residence on Census Day 2011, men aged 60 years or older, Canada

		Nursing home			Seniors' residence			Private dwelling with additional family		
		Odds ratio	95% confidence interval		Odds ratio	95% confidence interval		Odds ratio	95% confidence interval	
			from	to		from	to		from	to
Age group at Census Day	60 to 69	0.2*	0.1	0.4	0.2*	0.1	0.5	1.3*	1.0	1.6
	70 to 74	0.3*	0.1	0.5	1.0	0.5	2.0	0.9	0.7	1.2
	75 to 79	1.0			1.0			1.0		
	80 to 84	1.2	0.8	1.9	3.5*	1.9	6.5	0.8	0.6	1.1
	85 to 89	3.0*	2.0	4.7	9.8*	5.2	18.6	0.6*	0.4	0.9
	90 and older	6.3*	4.0	9.9	19.4*	10.0	37.8	0.9	0.6	1.4
Marital status, CCHS & Census	Remained married	1.0			1.0			1.0		
	Loss of spouse	3.7*	2.4	5.7	3.5*	2.0	6.0	0.6*	0.4	0.9
	Not married at CCHS	2.4*	1.2	4.8	2.7*	1.3	5.8	0.3*	0.2	0.6
Living alone	Living with others	1.0			1.0			1.0		
	Living alone	1.8	1.0	3.2	1.0	0.5	2.0	16.4*	9.4	28.5
Dwelling owned by a household member	Yes	1.0			1.0			1.0		
	No	2.3*	1.6	3.3	2.9*	2.0	4.4	0.8	0.7	1.0
Self-perceived general health	Excellent	1.0			1.0			1.0		
	Very good	0.8	0.5	1.5	0.6	0.3	1.4	1.0	0.8	1.2
	Good	1.3	0.7	2.4	0.8	0.4	1.6	0.9	0.7	1.1
	Fair	1.4	0.7	2.6	1.3	0.6	2.7	1.0	0.8	1.3
	Poor	2.3*	1.1	4.9	1.1	0.4	3.0	1.1	0.6	1.8
Self-perceived mental health	Excellent	1.0			1.0			1.0		
	Very good	1.6*	1.1	2.3	1.5	0.9	2.5	1.1	0.9	1.3
	Good	1.6*	1.0	2.4	1.1	0.7	1.8	1.0	0.8	1.2
	Fair	2.7*	1.6	4.6	1.5	0.7	3.3	1.0	0.7	1.5
	Poor	6.0*	2.2	16.3	1.3	0.0	55.5	0.8	0.3	2.0
	Missing (proxy respondent)	5.0*	2.0	12.2	1.2	0.5	3.2	1.2	0.7	1.9
Province [†]	Atlantic provinces	0.9	0.5	1.5	0.6	0.3	1.2	0.9	0.8	1.1
	Quebec	0.8	0.5	1.2	3.1*	1.9	4.9	0.9	0.7	1.0
	Ontario	1.0			1.0			1.0		
	Manitoba	0.6	0.3	1.2	0.6	0.2	1.5	0.8	0.6	1.0
	Saskatchewan	1.1	0.7	1.8	0.5	0.2	1.3	1.1	0.8	1.5
	Alberta	0.9	0.5	1.4	2.6*	1.4	4.6	1.1	0.8	1.4
	British Columbia	0.7	0.4	1.1	1.0	0.5	1.9	1.4*	1.1	1.7
Immigrant status	Canadian-born	1.0			1.0			1.0		
	Immigrant	0.7	0.4	1.1	0.3*	0.2	0.5	1.2	1.0	1.4
Chronic conditions	Diabetes	1.1	0.8	1.7	1.8*	1.2	2.8	1.2	0.9	1.5
	Heart disease	0.9	0.6	1.2	0.7*	0.4	1.0	0.9	0.8	1.1
	Dementia	6.2*	2.7	14.0	1.9	0.6	5.8	0.6	0.2	1.8
Overnight patient in a hospital, nursing home or convalescent home in past year	No	1.0			1.0			1.0		
	Yes	1.9*	1.2	2.9	1.8*	1.1	2.7	1.2	1.0	1.5
Smoking status	Never smoker	1.0			1.0			1.0		
	Former smoker	0.7*	0.5	0.9	1.3	0.8	2.3	1.0	0.8	1.2
	Current smoker	0.6	0.3	1.2	1.4	0.7	2.6	1.0	0.8	1.3
Year of interview	2005/2006	1.6*	1.2	2.3	1.5	1.0	2.5	1.2*	1.0	1.4
	2007	1.0			1.0			1.0		
	2008	0.8	0.5	1.3	1.1	0.6	1.9	1.1	0.9	1.4
	2009	0.7	0.4	1.1	0.9	0.5	1.6	1.1	0.9	1.4

* significantly different from odds ratio (p<0.05)

[†] residents of the territories were included in the study sample but, due to small cell counts, odds ratios for the territories are not presented

Note: Reference category for outcome is living in a private residence on Census Day 2011.

Source: CCHS respondents from Cycle 3.1 (2005/2006), Cycle 4.1 (2007/2008), and CCHS-Healthy Aging (2008/2009) linked to 2011 Census respondents, limited to respondents who were age 60 years or older on Census Day (May 10, 2011).

What is already known on this subject?

- In Canada, adults older than 65 currently outnumber children younger than 18.
- The proportion of individuals living in a nursing home or seniors' residence increases with age. According to the 2016 Census, 6.8% of Canadians older than 65 lived in a nursing home or seniors' residence; this proportion was 30.0% among individuals aged 85 years and older.
- Published projections of the need for long-term nursing home beds are often based solely on age and sex, despite other factors also influencing the likelihood of an individual moving into a nursing home or seniors' residence.

What does this study add?

- In addition to age, factors associated with an increased likelihood of living in a nursing home or seniors' residence included loss of a spouse or not being married, not owning one's dwelling, poor self-rated health, and a diagnosis of dementia.
- The likelihood of living in a nursing home or seniors' residence was lower for individuals who were not born in Canada.
- The specific factors associated with living in a nursing home or seniors' residence differed for men and women.
- Future projections and studies may wish to include other factors in addition to age when planning for the housing and care needs of seniors in Canada.

in a PDAF, whereas women with good self-perceived mental health relative to women with excellent self-perceived mental health had increased odds (OR=1.2, Table 2). Men living in British Columbia (OR=1.4, Table 3) were more

likely to live in a PDAF compared with men living in Ontario.

Discussion

The availability of uniquely linked, population-based health survey and census data enabled a comprehensive, national look at factors associated with older Canadians' transitions from living in a private dwelling to living in an NH or SR. This study simultaneously examined multiple settings that provide support, including SRs and PDAFs, while also accounting for mortality.

As expected, a diagnosis of dementia was strongly associated with transitions to NHs. Among women, it also significantly increased the odds of living in an SR. These findings are supported by existing evidence, both Canadian and international.^{16,19,21} Current estimates suggest that over 66% of NH residents in Canada have a diagnosis of dementia.³⁴ Findings from this study contribute to our understanding of the role of dementia in the transitions of individuals to NHs and other supportive settings. Consistent with the literature, findings from this study show that other chronic conditions, namely diabetes, urinary incontinence and mood disorders among women, were also significantly associated with transitions to NHs.^{20,35} Sub-optimal mental health also significantly increased the odds of both men and women living in an NH.

This study also found that losing a spouse was a significant predictor of an individual transitioning to either an NH or an SR. Compared with respondents who remained married, respondents who lost their spouse had more than four times the odds of living in an NH or SR on Census Day. Similar findings have been observed in international studies.^{36,37}

The strength of this study also lies in the ability to identify individuals living in PDAFs. In the study, approximately 7% of individuals were living in a PDAF, more than the proportion of individuals living in NHs and SRs combined. With the current focus on "aging in

place," alternate living arrangements are becoming more common. According to the 2016 Census, 11.6% of Canadians aged 65 years and older were living in private dwellings with people other than a spouse or child.³⁸ The high cost of SRs and NHs, along with the limited number of available beds, limited funding for residential care and rising out-of-pocket costs for individuals, may mean that alternate living arrangements will become necessary or preferable in the future, particularly given the progressive aging of the Canadian population.

This study also shows the protective effect of immigration status: immigrant respondents were much less likely to transition to an NH or SR by Census Day than Canadian-born respondents. According to the 2011 National Household Survey, immigrant seniors who had been in Canada for a relatively short time were both less likely to live alone and more likely to live in multigenerational households than Canadian-born seniors or immigrant seniors who had lived in the country for a longer period of time.³⁹ Furthermore, it is traditional among certain immigrant groups for elderly people to live with their children or other relatives.⁴⁰ This may explain why immigrant CCHS respondents were less likely to move into an SR or NH by the study follow-up. Given that future cohorts of Canadian seniors are likely to be more ethno-culturally diverse than current seniors,⁴¹ the effect of ethnicity and immigrant status may significantly influence residential preferences in the future.

Certain interprovincial differences related to the likelihood of individuals transitioning to an SR were also highlighted in this study. Respondents from Alberta and Quebec were more likely than those from Ontario to have moved to an SR by Census Day 2011; however, there were few interprovincial differences related to NH entry. According to the Seniors' Housing Survey conducted by the Canada Mortgage and Housing Corporation, Quebec has the largest pool of SR spaces in Canada, the lowest

average rents for such spaces, and a high degree of targeted marketing in the seniors' housing market.⁴² The number of retirement spaces in Alberta has grown over time, increasing 5.9% from 2009 to 2010.⁴³ This number has continued to rise: in Alberta, the increase in the number of retirement spaces in 2015 outpaced the increase in the number of seniors aged 75 years and older.⁴⁴ The high availability of retirement spaces in Alberta and Quebec may contribute to the interprovincial differences seen in this study.

Limitations

Although there was a high overall linkage rate (90.2%), linkage rates were significantly lower among older respondents, who are most likely to reside in NHs or SRs. According to the 2011 Census, 3.1% of Canadians aged 60 years and older lived in an NH and 1.9% lived in an SR. In this study, the proportion of individuals living in an SR (1.2%) is comparable with census findings. In contrast, the proportion of the analytic sample residing in NHs is notably smaller in this study than in

census findings. One reason for this may be that the study sample used individuals known to be living in private dwellings, thereby excluding individuals who were already living in an SR or NH.

This study was only able to examine place of residence at a single point in time, Census Day 2011. It is likely that some CCHS respondents who died before Census Day may have been living in an NH or SR at the time of their death. However, because these transitions could not be identified, they are missing from the analysis. Future studies may wish to examine data with a finer degree of precision in terms of entry dates into long-term and residential care.

Similarly, changes in respondent characteristics (apart from marital status) are also not included in this study. The effect of changes in health status after the interview, or of acute events occurring between the CCHS interview and the census, cannot be discerned from this analysis. Furthermore, characteristics were limited to self-reported measures. Use of direct measurements and other sources of information may have yielded different estimates.

Finally, although including PDAF as a dwelling variable was a strength and unique trait of this study, its measurement is imperfect. It is unknown whether individuals living in PDAFs were receiving additional support from family members or whether, in the case of adult children moving back into the family home, the respondent was the one offering additional assistance, financially or otherwise. Further examination of alternate private dwelling living arrangements should use other data sources to better understand this growing, and potentially important, residential transition.

Conclusion

Although age is a strong predictor of an individual transitioning from a private dwelling to an SR or NH, other factors such as loss of a marital partner or diagnosis of a chronic condition are also predictive of such residential transitions. Future projections of the demand and need for assisted living and institutional care could consider the influence of these other factors in their calculations. ■

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