Canadian Institutes of Health Research–Institute of Aging: Profile

Mining a Unique Canadian Resource: The Canadian Longitudinal Study on Aging*

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The Canadian Longitudinal Study on Aging (CLSA) is a major strategic initiative of the Canadian Institutes for Health Research (CIHR) that has been on the national research agenda since 2001. Launched in 2010, this landmark study of 50,000 Canadian residents provides a unique resource with vast potential to advance our understanding of adult development and aging. As a *study*, the CLSA was developed with three key objectives: (1) to examine aging as a dynamic life course process; (2) to investigate the inter-relationship among intrinsic and extrinsic factors from mid-life to older age; and (3) to capture the transitions, trajectories, and profiles of aging-related processes. As a *platform*, the CLSA was designed with the objective to provide the

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infrastructure and build capacity for state-of-the-art, interdisciplinary, population-based research and for evidence-based decision making needed to support the nation as it transitions into several decades of rapid population aging.

Over the next 20 years and beyond, the CLSA will generate a wealth of information that will contribute to the advancement of science and the development of programs and policy. Some of the CLSA research findings will be derived in the longer term; however, many others will be available in the short term. Indeed, we expect a steady flow of both basic and applied knowledge to be generated from the CLSA over the coming decades, creating the opportunity for continual productivity and the potential to make significant contributions to the study of aging in local, national, and international spheres.

With the first set of baseline data becoming available on the CLSA Tracking participants (i.e., those study participants being followed by telephone interview), we analysed selected characteristics of these participants at study entry, and in this article, we highlight the potential applications of these data as a platform for multilayered programs of research.

CLSA Study Design

The CLSA study design has been previously described in detail (Raina et al., 2009). Briefly, the CLSA will follow approximately 50,000 Canadian women and men, every three years, for at least 20 years. The study has two categories of participants: 21,241 Tracking participants (being followed by telephone interview only) were randomly selected within age/sex strata in each province, and the remainder (Comprehensive participants being followed via in-depth interviews and on-site data collection) were randomly selected within age/sex strata from within 25 km (and, in locales with lower population density, within 50 km) of 11 sites across the country (Victoria, Vancouver, Surrey, Calgary, Winnipeg, Ottawa, Hamilton, Montreal, Sherbrooke, Halifax, and St. John's). The Tracking cohort (our focus here) was portioned among the provinces to allow reasonably precise estimates of various parameters or associations to be made. The minimum target sample in any province was 1,100 (PEI), and the maximum was 4,388 (Ontario). Eight strata were formed within each province, based on age groups (45–54, 55–64, 65–74, 75–85) and sex. Table 1 shows the actual numbers of participants recruited in each stratum.

For CLSA Tracking participants, recruitment was accomplished in three ways: we recruited 3,923 participants via the Canadian Community Health Survey (CCHS) on Healthy Aging (CCHS Cycle 4.2); 3,810 participants, through mail-outs from provincial health ministries; and 13,508 participants by means of random-digit dialing. Tracking participants provided signed consent to participate in the study via an interviewer-administered computer-assisted telephone interview, and were given the option to provide their health card number for linkage to administrative health databases.

Details of the measures collected have been reported (Raina, Wolfson, Kirkland et al., 2009) and are available on the CLSA website (www.clsa-elcv.ca). Briefly, the CLSA Tracking questionnaire includes modules on (a) socio-demographic characteristics; (b) lifestyle and health behaviours; (c) health status and chronic conditions; (d) function and activities of daily living; (e) social networks, social support, and social participation; (f) care giving and receiving; and (g) labour force participation and retirement.

The baseline data for 21,241 CLSA Tracking participants became available for use by the research community in mid-2014. The final number of Tracking participants exceeded our initial estimate due to the need to approximate the Canadian population as closely as possible. As is characteristic of many population-based studies, CLSA respondents were of higher socioeconomic status than the general population. Therefore, as we approached the end of the recruitment period we chose to selectively target additional recruitment from participants living in postal codes identified as representing areas of low education by Statistics Canada (Statistics Canada, 2012).

Baseline Characteristics of CLSA Tracking Participants

Baseline characteristics of CLSA Tracking participants are presented in Table 1. Most participants were born in Canada (87.2%) and speak English as their primary language at home (80.2%). Although it was an eligibility requirement of the CLSA that participants were able to conduct the interview in either English or French, a small proportion of participants spoke neither English nor French at home (1.3%). The majority of participants lived in a detached or semi-detached house (83.7%) or apartment (14.1%), and more than 70 per cent of individuals in each age/sex group were married or living with a common-law partner, the exception being older women (46.0%). With respect to socioeconomic status, 2.5 per cent of participants had a Grade 8 education or lower; 13.6 per cent had completed secondary school or equivalent; 38.6 per cent had completed some post-secondary education including a technical diploma, college, or some university; and 38.5 per cent had completed a university degree. The greatest proportion of participants

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Table 1: Socio-demographic characteristics of CLSA Tracking participants, by age and sex, at baseline years 2010–2013 (*n* = 21,241)

Baseline Characteristic	Age 45–64 (*n* = 12,389)				Age 65–85 (*n* = 8,782)				Total (*n* = 21,171)[a]	
	Women *n* = 6,390 (*n* %)		Men *n* = 5,990 (*n* %)		Women *n* = 4,406 (*n* %)		Men *n* = 4,376 (*n* %)		Total *n* = 21,171 (*n* %)	
Province of residence										
Alberta	659	10.3	602	10.0	420	9.5	422	9.6	2,103	9.9
British Columbia	807	12.6	733	12.2	553	12.6	520	11.9	2,613	12.3
Manitoba	440	6.9	422	7.0	317	7.2	298	6.8	1,477	7.0
New Brunswick	403	6.3	377	6.3	285	6.5	290	6.6	1,355	6.4
Newfoundland and Labrador	367	5.7	354	5.9	259	5.9	271	6.2	1,251	5.9
Nova Scotia	461	7.2	440	7.3	312	7.1	333	7.6	1,546	7.3
Ontario	1,400	21.9	1,332	22.2	1,012	23.0	961	22.0	4,705	22.2
Prince Edward Island	313	4.9	297	5.0	262	6.0	266	6.1	1,138	5.4
Quebec	1,113	17.4	1,059	17.7	704	16.0	725	16.6	3,601	17.0
Saskatchewan	427	6.7	383	6.4	553	6.4	520	6.6	1,382	6.5
Country of birth										
Canada	5,757	90.1	5,331	88.9	3,784	85.9	3,583	81.9	18,455	87.2
Other North America	109	1.7	96	1.6	88	2.0	78	1.8	371	1.8
South, Central America and Caribbean	76	1.2	64	1.1	30	0.7	56	1.3	226	1.1
Europe	341	5.3	361	6.0	449	10.2	555	12.7	1,706	8.1
Africa	32	0.5	37	0.6	18	0.4	24	0.6	111	0.5
Asia, Oceania	75	1.2	109	1.9	36	0.9	78	1.8	298	1.5
Don't know/No answer/Refused	0		1		1		2		4	
Language spoken at home										
English only	5,058	79.2	4,718	78.7	3,641	82.7	3,559	81.4	16,976	80.2
French only	1,236	19.4	1,171	19.5	733	16.6	743	17.0	3,883	18.4
Neither English nor French	85	1.3	105	1.8	28	0.6	66	0.1	284	1.3
Other combination	10	0.2	3	0.1	3	0.1	5	1.5	21	0.1
Don't know/No answer/Refused	1		2		1		3		7	
Marital status										
Single, never married or lived with a partner	621	9.7	608	10.1	263	6.0	203	4.6	1,695	8.0
Married/Living with a common law partner	4,519	70.7	4,665	77.8	2,026	46.0	3,362	76.9	14,572	68.9
Widowed	307	4.8	94	1.6	1,463	33.2	461	10.5	2,325	11.0
Divorced, Separated	942	14.8	630	10.5	652	14.8	349	8.1	2,573	12.2
Don't know/No answer/Refused	1		2		2		1		6	
Type of dwelling										
House (single or semi-detached, duplex)	5,616	87.9	5,360	89.4	3,185	72.3	3,552	81.2	17,713	83.7
Apartment or condominium	696	10.9	561	9.4	1,015	23.0	720	16.5	2,992	14.1
Seniors' housing (retirement, assisted living)	14	0.2	11	0.2	128	2.9	54	1.2	207	1.0
Institution (nursing facility) and others	61	1.0	67	1.1	77	1.8	48	1.1	253	1.2
Don't know/No answer/Refused	3		0		1		2		6	
Annual household income										
Less than $20,000	358	5.9	263	4.5	515	13.3	202	4.9	1,338	6.8
$20,000 or more, but less than $50,000	1,357	22.5	966	16.7	1,938	50.1	1,559	37.7	5,820	29.4
$50,000 or more, but less than $100,000	2,212	36.7	2,153	37.2	1,136	29.4	1,707	41.3	7,208	36.4
$100,000 or more, but less than $150,000	1,257	20.9	1,314	22.7	195	5.0	444	10.7	3,210	16.2
$150,000 or more	838	13.9	1,091	18.9	83	2.2	225	5.4	2,237	11.3
Don't know/No answer/Refused	368		212		539		239		1,358	
Education										
<=Grade 8 (QC: <= Secondary II)	54	0.9	76	1.3	186	4.2	214	4.9	530	2.5
Grade 9-13 (QC: Secondary V)	270	4.2	286	4.8	479	10.9	405	9.3	1,440	6.8
Graduated secondary school, no post	900	14.1	770	12.9	654	14.9	544	12.5	2,868	13.6
Some post-secondary education	2,656	41.7	2,382	39.9	1,704	38.9	1,390	31.9	8,132	38.6
University degree	2,494	39.1	2,463	41.2	1,360	31.0	1,801	41.4	8,118	38.5
Don't know/No answer/Refused	16		22		23		22		83	

Note: **All percentages are calculated only within those participants who answered the given question, and exclude those who did not know or refused to answer, or those to whom the question is not applicable.**

[a] 70 participants age < 45 or > 85 at interview are excluded from the CLSA sample (met age eligibility at recruitment).

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fell in the $50,000–$100,000 annual household income bracket (36.4%); 6.8 per cent of participants fell in the lowest income bracket of less than $20,000, and 11.3 per cent were in the highest reported income bracket of greater than $150,000. Notably, women in the older age category occupied significantly higher proportions in the lower income categories than either older men or younger men and women, although similar differences in education were not seen.

In the following discussion, we expand on participant characteristics at baseline to provide a snapshot of the CLSA Tracking data available and to illustrate the ways in which CLSA data can be used to further the research agenda on health and aging in Canada.

Health, Chronic Diseases, and Function in the CLSA

It is well documented that the prevalence of chronic diseases increases with age (Broemeling, Watson, Prebtani, & Health Outcomes Steering Committee of Health Council of Canada, 2008; Elmslie, 2012; Ramage-Morin, Shields, & Martel, 2010) and that many older adults have multiple chronic diseases (Marengoni et al., 2011). Moreover, functionality – involving, for instance, loss of vision, hearing, or mobility – that affects the ability to engage in activities of daily living typically declines with age. Preventing or delaying the onset of chronic diseases, reducing the impacts of disease and disability, and slowing functional decline to maintain independence for as long as possible are, therefore, important research foci and avenues for further work. With the increasing population of older adults, these issues have also come to the forefront for policy makers. While it has been clearly demonstrated that higher utilization, not the elderly population per se, is driving health care spending (Denton & Spencer, 2010; Evidence Network of Canadian Health Policy, 2011), the need for effective and efficient provision of services and an appropriate system of care tailored to the needs of older adults remain pressing policy issues (Hollander, Chappell, Prince, & Shapiro, 2007).

The ability to examine health and functional transitions is a key aspect of the CLSA. Numerous questionnaire-based, clinical, and physiological measures are included in the CLSA to allow for the assessment of various aspects of health, disability, and function. For example, self-report measures of general health, mental health, and successful aging are included in the interviewer-administered questionnaire, as are self-reported chronic conditions. A measure of self-rated general health whereby participants are asked to rate their health on a scale ranging from poor to excellent is commonly used in research and has been shown to be highly predictive of a range of outcomes, such as mortality (Idler & Benyamini, 1997). Among the 21,241 CLSA Tracking participants, over half rated their health as very good or excellent (57.1%) and 29.5 per cent as good, with only 13.5 per cent indicating that they perceived their health as fair or poor (see Table 2). These proportions were remarkably consistent across age and sex groups.

Similar patterns were seen for self-rated mental health, satisfaction with life, and self-rated healthy aging. Subjective, positive ratings of health, however, do not necessarily reflect an absence of health problems. When asked whether they had any long-term health conditions that had been diagnosed by a health professional, CLSA participants most frequently reported the following chronic conditions: hypertension (38.2%), allergies (37.1%), cataracts (24.8%), back problems (24.5%), diabetes (16.7%), osteoarthritis in the knee (16.1%), and mood disorder (14.7%) (see Table 3). Many health conditions were substantially higher in a specific age and/or sex category, such as heart-related conditions in older men, migraine in women, and cataracts in older age groups. An understanding of the relationship between subjective and more objective measures of health, of how these measures change over time and age, as well as of the factors that precipitate change are important to the aging process.

Function can be examined from a variety of perspectives, such as in terms of mobility and sensory function. Among the CLSA Tracking participants, 10.9 per cent indicated that they had difficulty walking alone up and down a flight of stairs; and 8.9 per cent reported having difficulty walking two to three neighbourhood blocks (see Table 3). In terms of hearing function, over a third of participants (37.6%) indicated that they found it difficult to follow a conversation if there is background noise, such as TV, radio, or children playing, even if using a hearing aid as usual. As for vision, although the vast majority of participants rated their vision as good, very good, or excellent, 8.9 per cent rated it as fair, poor, or non-existent.

When examined together with socio-demographic characteristics, lifestyle factors, social engagement and social supports, and other factors, the CLSA provides a rich source of data to address a wide range of clinically and policy-relevant questions, such as: What factors (e.g., in the social or physical environment) predict functional decline? How do major life events (e.g., the onset of disease, loss of a spouse) impact health and functional trajectories? What factors (e.g., medical, social) protect against functional decline or the onset of specific chronic conditions, and how does this vary across different subpopulations (e.g., different income levels, gender, ethnic groups)? How do health and functional trajectories impact engagement and participation, such as social participation and labour force participation?

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Table 2: Self-reported health characteristics of CLSA Tracking participants, by age and sex, at baseline years 2010–2013 (*n* = 21,241)

Baseline Characteristic	Age 45–64 (*n* = 12,389)				Age 65–85 (*n* = 8,782)				Total (*n* = 21,171)[a]	
	Women *n* = 6390 (*n* %)		Men *n* = 5990 (*n* %)		Women *n* = 4406 (*n* %)		Men *n* = 4376 (*n* %)		Total 21,171 (*n* %)	
Self-rated general health										
Excellent	1,309	20.5	1,111	18.5	766	17.4	783	17.9	3,969	18.8
Very good	2,507	39.3	2,306	38.5	1,693	38.5	1,597	36.6	8,103	38.3
Good	1,746	27.3	1,822	30.4	1,319	30.0	1,350	30.9	6,237	29.5
Fair	617	9.7	590	9.8	499	11.3	512	11.7	2,218	10.5
Poor	209	3.3	166	2.8	122	2.8	126	2.9	623	3.0
Don't know/No answer/Refused	2		4		7		8		21	
Self-rated mental health										
Excellent	1,779	27.9	1,848	30.8	1,288	29.3	1,424	32.6	6,339	30.0
Very good	2,547	39.9	2,263	37.8	1,764	40.1	1,627	37.2	8,201	38.8
Good	1,629	25.5	1,522	25.4	1,177	26.7	1,162	26.6	5,490	26.0
Fair	366	5.7	309	5.2	162	3.7	141	3.2	978	4.6
Poor	65	1.0	52	0.9	10	0.2	18	0.4	145	0.7
Don't know/No answer/Refused	4		5		5		4		18	
Satisfaction with life										
Disagree	759	11.9	694	11.6	361	8.2	254	5.8	2,068	9.8
Neither agree or disagree	302	4.7	229	3.8	191	4.4	127	2.9	849	4.0
Agree	5,328	83.4	5,069	84.6	3,842	87.4	3,990	91.3	18,229	86.2
Don't know/No answer/Refused	1		7		12		5		25	
Self-rated healthy aging										
Excellent	1,191	18.7	1,019	17.0	870	19.8	892	20.4	3,972	18.8
Very good	2,599	40.8	2,360	39.4	1,859	42.3	1,765	40.4	8,583	40.7
Good	1,884	29.6	1,920	32.1	1,277	29.1	1,286	29.5	6,367	30.2
Fair	551	8.7	542	9.1	321	7.3	350	8.0	1,764	8.4
Poor	146	2.3	144	2.4	66	1.5	73	1.7	429	2.0
Don't know/No answer/Refused	19		14		13		10		56	
Self-rated weight status										
Overweight	3,791	59.8	3,145	52.5	2,252	51.5	1,996	45.7	11,184	53.1
Underweight	72	1.1	137	2.3	116	2.7	103	2.3	428	2.0
Just about right	2,475	39.1	2,709	45.2	2,008	45.9	2,272	52.0	9,464	44.9
Don't know/No answer/Refused	52		8		30		5		95	

***Note:* all percentages are calculated only within those participants who answered the given question, and exclude those who did not know or refused to answer, or those to whom the question is not applicable.**

[a] 70 participants age <45 or >85 at interview are excluded from the CLSA sample (met age eligibility at recruitment).

Work, Aging, Retirement, and Health in the CLSA

In Canada, the employment rate for individuals age 55 and older has increased significantly in recent years. Between 1997 and 2010, the rate increased by 9 per cent for men and 13 per cent for women (Carrière & Galarneau, 2011). In fact, in 2012 it was estimated that one in four persons aged 65 to 70 was still working, compared to about 11 per cent a decade before (MacEwen, 2012). The increased participation of older aged groups and the relative decrease in younger workers are two factors contributing to the aging workforce. In 2010, more than one in six workers was age 55 or older (Carrière & Galarneau, 2011).

The nature of the older workforce is also changing. Many older workers who leave long-term jobs do not fully retire. Over half of workers aged 55 to 64 who left long-term jobs between 1994 and 2000 were re-employed within a decade (Bonikowska & Schellenberg, 2014). Many of these new jobs are part-time, such that the proportion of part-time workers who are 55 and older has nearly doubled since the mid-1990s to 20 per cent.

Using data from the CLSA, we can study how these changes in work life and retirement, interacting with other factors, such as social support and caregiving expectations, affect healthy aging. Of the 21,241 Tracking participants, 9,839 (46.7%) reported that they were completely retired, the majority of these being in the 55 and older age group. A further 2,250 (10.7%) reported

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Table 3: Chronic disease and functional status of CLSA Tracking participants, by age and sex, at baseline years 2010–2013 (*n* = 21,241)

Baseline Characteristic	Age 45–64 (*n* = 12,389)				Age 65–85 (*n* = 8,782)				Total (*n* = 21,171)[a]	
	Women *n* = 6,390 (*n* %)		Men *n* = 5,990 (*n* %)		Women *n* = 4,406 (*n* %)		Men *n* = 4,376 (*n* %)		Total 21,171 (*n* %)	
Condition diagnosed by a physician										
Osteoarthritis knee	881	13.8	595	10.0	1,138	25.9	792	18.2	3,406	16.1
Osteoarthritis hip	533	8.4	305	5.1	806	18.4	431	9.9	2,075	9.8
Osteoarthritis hand	824	12.9	380	6.4	1,164	26.5	598	13.7	2,966	14.1
Rheumatoid arthritis	293	4.6	254	4.3	325	7.5	218	5.0	1,090	5.2
Asthma	863	13.5	620	10.4	516	11.7	341	7.8	2,340	11.1
COPD	358	5.6	304	5.1	387	8.8	381	8.7	1,430	6.8
Hypertension	1,628	25.5	1,831	30.6	2,340	53.2	2,266	51.9	8,065	38.2
Diabetes	784	12.3	886	14.8	792	18.0	1,074	24.6	3,536	16.7
Heart disease	272	4.3	439	7.3	547	12.5	912	20.9	2,170	10.3
Angina	117	1.8	213	3.6	316	7.2	490	11.2	1,136	5.4
Heart attack	115	1.8	287	4.8	257	5.8	644	14.8	1,303	6.2
Peripheral vascular disease	342	5.4	303	5.1	443	10.1	417	9.6	1,505	7.1
Stroke	59	0.9	72	1.2	93	2.1	164	3.8	388	1.8
Transient Ischemic Attack	94	1.5	99	1.7	250	5.7	295	6.8	738	3.5
Memory problem	147	2.3	134	2.2	74	1.7	93	2.1	448	2.1
Parkinsonism, Parkinson's disease	7	0.1	11	0.2	20	0.5	40	0.9	78	0.4
Multiple sclerosis	78	1.2	32	0.5	20	0.5	11	0.3	141	0.7
Epilepsy	58	0.9	47	0.8	24	0.5	36	0.8	165	0.8
Migraine	1,395	21.9	538	9.0	730	16.6	249	5.7	2,912	13.8
Stomach ulcers	393	6.2	405	6.8	399	9.1	434	9.9	1,631	7.7
Bowel disorder	727	11.4	316	5.3	553	12.6	237	5.4	1,833	8.7
Bowel incontinence	143	2.2	82	1.4	162	3.7	97	2.2	484	2.3
Urinary incontinence	619	9.7	138	2.3	698	15.9	403	9.2	1,858	8.8
Cataracts	588	9.2	440	7.3	2374	54.0	1,834	42.0	5,236	24.8
Glaucoma	143	2.2	126	2.1	365	8.3	316	7.2	950	4.5
Macular degeneration	102	1.6	93	1.6	373	8.5	292	6.7	860	4.1
Cancer	738	11.6	477	8.0	972	22.1	1,063	24.3	3,250	15.4
Breast Cancer	223	3.5	0	0.0	383	8.7	—	—	606	2.9
Colorectal cancer	36	0.6	42	0.7	91	2.1	140	3.2	309	1.5
Melanoma	73	1.1	73	1.2	84	1.9	120	2.7	350	1.7
Kidney cancer	13	0.2	14	0.2	18	0.4	29	0.7	74	0.3
Lung cancer	13	0.2	14	0.2	37	0.8	26	0.6	90	0.4
Prostate cancer (men only)	—	—	104	1.7	—	—	436	10.0	540	5.2
Ovarian cancer (women only)	39	0.6	—	—	44	1.0	—	—	83	0.8
Leukemia	9	0.1	13	0.2	13	0.3	19	0.4	54	0.3
Non-Hodgkins Lymphoma	16	0.3	22	0.4	21	0.5	26	0.6	85	0.4
Mood disorder	1,361	21.3	808	13.5	593	13.5	338	7.7	3,100	14.7
Anxiety disorder	672	10.5	400	6.7	333	7.6	151	3.5	1,556	7.4
Allergies	2,945	46.2	1,956	32.7	1,785	40.6	1,142	26.2	7,828	37.1
Osteoporosis	578	9.1	113	1.9	1,110	25.3	197	4.5	1,998	9.5
Back problems	1,482	23.2	1,541	25.7	1,101	25.0	1,065	24.4	5,189	24.5
Underactive thyroid	918	14.5	241	4.0	963	22.2	316	7.3	2,438	11.6
Overactive thyroid	183	2.9	55	0.9	159	3.7	67	1.5	464	2.2
Kidney disease	108	1.7	133	2.2	155	3.5	190	4.4	586	2.8
Difficulty walking a flight of stairs										
Yes	606	9.5	409	6.8	781	17.7	501	11.5	2,297	10.9
No	5,728	89.7	5,563	92.8	3,558	80.8	3,835	87.7	18,684	88.3
Unable to do/Don't do on doctor's orders	55	0.9	23	0.4	67	1.6	36	0.8	181	0.9
Don't know/No answer/Refused	1		4		0		4		9	

Continued

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Table 3. Continued

Baseline Characteristic	Age 45–64 (*n* = 12,389)				Age 65–85 (*n* = 8,782)				Total (*n* = 21,171)[a]	
	Women *n* = 6,390 (*n* %)		Men *n* = 5,990 (*n* %)		Women *n* = 4,406 (*n* %)		Men *n* = 4,376 (*n* %)		Total 21,171 (*n* %)	
Difficulty walking 2–3 blocks										
Yes	481	7.5	330	5.5	614	14.0	454	10.4	1,879	8.9
No	5,809	91.0	5,611	93.6	3,614	82.3	3,817	87.4	18,851	89.2
Unable to do/Don't do on doctor's orders	94	1.5	56	0.9	163	3.7	98	2.2	411	1.9
Don't know/No answer/Refused	6		2		15		7		30	
Difficulty following a conversation with background noise										
Yes	1950	30.6	2,333	38.9	1,514	34.6	2,148	49.2	7,945	37.6
No	4,429	69.4	3,657	61.1	2,879	65.5	2,218	50.8	13,183	62.4
Don't know/No answer/Refused	11		9		13		10		43	
Self–rated vision										
Excellent	1,459	22.9	1,393	23.2	760	17.3	910	20.8	4,522	21.4
Very good	2,396	37.5	2,191	36.6	1,600	36.4	1,624	37.2	7,811	36.9
Good	1,981	31.0	1,933	32.2	1,573	38.5	1,440	32.9	6,927	32.8
Fair	432	6.8	394	6.6	377	8.6	323	7.4	1,526	7.2
Poor or non-existent (blind)	118	1.9	84	1.4	90	2.1	74	1.7	366	1.7
Don't know/No answer/Refused	4		4		6		5		19	

***Note:* all percentages are calculated only within those participants who answered the given question, and exclude those who did not know or refused to answer, or those to whom the question is not applicable.**

[a] 70 participants age < 45 or > 85 at interview are excluded from the CLSA sample (met age eligibility at recruitment).

that they were partly retired (see Table 4). Of those retired, the majority indicated that their retirement was voluntary, but nearly one quarter reported that health, disability, or stress contributed to their decision to retire (over 30% of those aged 45–64 and almost 20% of those aged 65–85). Of those aged 65–85, 26.7 per cent of men and 16.6 per cent of women who were retired reported returning to work. Of those not retired, about 90 per cent of both men and women aged 45–64 reported that they were currently working, and about one in six indicated that they had more than one paid job. Among participants aged 65–85, 94.7 per cent of men and 75.5 per cent of women who were not retired reported currently working, and 21.5 per cent of men and 12.8 per cent of women reported having more than one paid job.

The CLSA has an extensive retirement module which includes the age of retirement, spouse's retirement status, reasons for retirement, preparation for retirement, return to work after retirement, reasons for return to work, and type of work. For all participants, the labour force module includes characteristics of the current or most recent job (for those retired) and characteristics of the longest held job. For those not retired, information is also collected on current working status and, if applicable, the reason for not working (if currently not working or if never worked). The CLSA also contains a retirement planning module administered to those not yet retired.

The CLSA offers rich data on socio-demographic and psychological characteristics, social environment, physical health and physical functioning, and injuries. Within this context, researchers will be able to examine areas such as disability in retirees and occupational history, correlates of health-related job loss, cognitive function in retirement in relation to occupational history, health status and return to work after retirement, and information caregiving and work, among many other concerns.

Social Isolation and Aging in the CLSA

Social isolation has been identified as a widespread phenomenon that is increasingly affecting the lives of older adults in Canada (Hall, 2004; MacCourt, 2007). It is a multifaceted concept that is commonly defined as a low quantity and quality of contact with others, and one that considers the number and types of social network contacts, feelings of belonging, a sense of engagement with others, and related attributes (National Seniors Council, 2014a; Nicholson, 2008). Social isolation overlaps with other concepts such as loneliness and social engagement. It has been estimated that approximately 24 per cent of older Canadians aged 65 and older desire more informal contact, and at least 10 per cent report being directly affected by a sense of loneliness (Kobus et al., 2010; National Seniors Council, 2014b).

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Table 4: Work and retirement characteristics of CLSA Tracking participants, by age and sex, at baseline years 2010–2013 (*n* = 21,241)

Baseline Characteristic	Age 45–64 (*n* = 12,389)				Age 65–85 (*n* = 8,782)				Total (*n* = 21,241)[a]	
	Women *n* = 6,390 (*n* %)		Men *n* = 5,990 (*n* %)		Women *n* = 4,406 (*n* %)		Men *n* = 4,376 (*n* %)		Total 21,171 (*n* %)	
Retirement status										
Completely retired	1,607	25.3	1,176	19.6	3,700	84.5	3,356	76.8	9,839	46.7
Partly retired	598	9.4	627	10.5	365	8.3	660	15.1	2,250	10.7
Not retired	4,143	65.3	4,187	69.9	314	7.2	355	8.2	8,999	42.7
Don't know/No answer/Refused	42		9		27		5		83	
Reasons for retirement										
Qualify for pension	540	23.5	803	41.2	938	22.9	1,535	37.6	3,816	30.7
Financial possibility	933	40.5	948	48.7	1,483	36.2	1,960	48.0	5,324	42.8
Health/disability/stress	801	34.8	608	31.2	797	19.5	716	17.5	2,922	23.5
Employer incentives	118	5.1	202	10.4	295	7.2	654	16.0	1,269	10.2
Organizational restructuring	237	10.3	251	12.9	462	11.3	592	14.5	1,542	12.4
Providing care	308	13.4	88	4.5	576	14.1	155	3.8	1,127	9.1
Mandatory employer retirement policy	14	0.6	39	2.0	174	4.3	272	6.7	499	4.0
Desire to pursue hobbies, activities	596	25.9	532	27.3	848	20.7	1,009	24.7	2,985	24.0
Desire to stop working	948	41.2	836	42.9	1,818	44.4	1,965	48.1	5,567	44.8
An agreement with spouse/partner	517	22.5	373	19.2	782	19.1	809	19.8	2,481	20.0
Other	2	0.1	5	0.3	18	0.4	8	0.2	33	0.3
[a] Limited to completely retired/partly retired sample (*n* = 12,431)										
Retirement was voluntary										
Yes	1,679	74.1	1,397	72.2	3,237	81.3	3,320	81.8	9,633	78.7
No	586	25.9	539	27.8	744	18.7	741	18.3	2,610	21.3
Don't know/No answer/Refused	37		11		116		24		188	
[a] Limited to completely retired/partly retired sample (*n* = 12,431)										
Returned to work after retirement										
Yes	516	8.1	574	9.6	728	16.6	1,165	26.7	2,983	14.1
No	5,857	91.9	5,414	90.4	3,655	83.4	3,203	73.3	18,129	85.9
Don't know/No answer/Refused	17		11		23		8		59	
Currently employed										
Yes	3,694	89.0	3,844	91.7	203	75.5	339	94.7	8,080	90.1
No	458	11.0	348	8.3	66	24.5	19	5.3	891	9.9
Don't know/No answer/Refused	0		1		2		2		5	
[a] Limited to those not retired and ever worked (*n* = 8,976)										
Employed at more than one job										
Yes	627	17.0	619	16.1	26	12.8	73	21.5	1,345	16.7
No	3,067	83.0	3,225	83.9	177	87.2	266	78.5	6,735	83.4
[a] Limited to those not retired and currently employed (*n* = 8,080)										

Note: **all percentages are calculated only within those participants who answered the given question, and exclude those who did not know or refused to answer, or those to whom the question is not applicable.**

[a] 70 participants age < 45 or > 85 at interview are excluded from the CLSA sample (met age eligibility at recruitment).

Research to date has only begun to disentangle the risk and protective factors associated with social isolation and related concepts such as loneliness, as well as the underlying processes and trajectories. Some of the ascribed characteristics and risk factors (both mutable and immutable) include (a) advanced age; (b) widowhood; (c) living alone; (d) low income; (e) childlessness; (f) episodic or lifelong health problems (mental and/or physical), or late onset or age-related conditions such as incontinence, and especially multi-morbidity; (g) lacking access to transportation, community services, and programs; (h) fear, stigma, or ageist attitudes; (i) lack of affordable housing and care options; (j) loss of sense of community; and (k) challenges relating to technology (costs, literacy,

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comfort) including telephone systems, computers, and social media (Hall, 2004; MacCourt, 2007; Nicholson, 2008).

Research has also identified several important target groups who are particularly susceptible to social isolation and loneliness, including older adults with physical and mental health issues (including seniors with Alzheimer's disease or other related dementias, or multiple chronic illnesses); ethnic older adults – Aboriginal elders or immigrant groups (language proficiency issues, separation from family, financial dependence, discrimination); lesbian, gay, bisexual, or transgendered seniors; low-income older adults; and caregivers. However, numerous research gaps remain that CLSA data will assist in filling in order that researchers better understand the ways in which social isolation shapes health and social processes of aging, and how we can mitigate these problems when they occur.

Table 5 provides selective descriptive data pertaining to several key dimensions of social network and support characteristics derived from the baseline CLSA Tracking participants. These data include useful indicators of social isolation and social contact, such as (a) household composition; (b) number of confidents; (c) community participation; (d) perceived happiness, depression, loneliness, and love and affection; (e) someone with whom one can do enjoyable things; and (f) desire to do more activities. Overall, CLSA Tracking participants reported being in relatively strong and rewarding support networks with relatively high levels of social engagement and low levels of social isolation and loneliness, although there were some variations across age and sex groups. For instance, the average number of additional people in the household declined with age and was lower for older women than for their male counterparts – 1.5 and 1.7 for women and men aged 45–64, respectively, compared to 0.7 and 1.0 for women and men aged 65–85, respectively.

Additionally, while most participants in the sample reported being happy and content with relationship quality, and reported low levels of loneliness and depression, there appear to be unmet needs pertaining to social participation, especially among the pre-seniors. Table 5 shows that 46.6 per cent of females aged 45–64 and 43.8 per cent of males in that age category reported that they desired to participate in more activities; whereas 32.3 per cent of women aged 65–85, and 28 per cent of men aged 65–85, reported unmet social participation needs. However, having others with whom to engage in enjoyable activities indicates a reversal in this age-related pattern. Indeed, 16.1 per cent of women and men aged 45–64, compared to 18.3 per cent of women aged 65–85 and 17.2 per cent of men aged 65–85, reported having someone with whom to do something enjoyable only some of the time, a little of the time, or never. While the presentation of these CLSA data only scratch the surface of social isolation and loneliness and their connections to health trajectories, they are indicative of tremendous research potential.

One way to conceptualize the causes and consequences of social isolation (including loneliness) is to position these within a resilience framework. Resilience can be broadly defined as a dynamic adaptive process through which individual traits, characteristics of an individual's environment, and an individual's internal and external resources are utilized in the face of adversity (Ungar, 2011). In this sense, social isolation among older adults needs to be understood as a multilevel, life course process that is experienced by individuals but embedded within communities, neighbourhoods, and households.

Several potential research questions that can advance our understanding of social isolation can be addressed using the CLSA Tracking baseline data, including these: What are the risk factors/correlates of social isolation among older adults (e.g., mental/physical health, care giving, and isolation)? What are the primary risk/protective factors for the most isolated seniors (i.e., most vulnerable groups)? What are the most mutable risk/protective factors to social isolation? and, What are the structural dynamics of a social isolation-loneliness model?

At the longitudinal level, CLSA data can be used to answer several additional questions, including the following: What are the pathways into and out of a socially isolated state? What are the reciprocal (cyclical) associations between mental/physical health, other roles/transitions (i.e., care giving, widowhood), and social isolation/loneliness? How does resilience protect against social isolation? and, What are the most important mutable factors in reducing the likelihood of social isolation/loneliness and maintaining social engagement?

Conclusions

As the age of the population continues to increase in the majority of countries worldwide, attention is now turning to understanding the aging process, and how individuals and populations can age successfully. Canada is undergoing rapid population aging due to the position of the large baby boom cohorts in the upper levels of the age structure, coupled with increasing life expectancy. Concurrently, the older population is becoming increasingly diverse in terms of immigration status, ethno-cultural composition, family history, economic security, support networks, sexual orientation and gender identity, and other important determinants of health. In order to advance our understanding of the causal pathways leading to adverse events or favourable outcomes and meet the

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Table 5: Social network and social support characteristics of CLSA Tracking participants, by age and sex, at baseline years 2010–2013 (*n* = 21,241)

	Age 45-64 (*n* = 12,389)				Age 65-85 (*n* = 8,782)				Total (*n* = 21,241)	
Baseline Characteristic	**Women** *n* = 6,390 (*n* %)		**Men** *n* = 5,990 (*n* %)		**Women** *n* = 4,406 (*n* %)		**Men** *n* = 4,376 (*n* %)		**Total** 21,171 (*n* %)	
Number of people in household										
Mean (SD)	1.5	(1.1)	1.7	(1.3)	0.7	(0.8)	1.0	(0.7)	1.2	(1.1)
Number of close friends										
Mean (SD)	5.8	(6.2)	5.9	(8.0)	5.8	(6.9)	6.3	(9.0)	6.0	(7.6)
Number of neighbours know										
Mean (SD)	10.7	(13.7)	10.7	(13.7)	11.6	(14.6)	12.3	(15.4)	12.7	(16.7)
Participation in activity in the past 12 months (At least once/week)										
Sports or physical activities with others	3,326	52.1	2,848	47.5	2,045	46.5	1,932	44.2	10,151	48.0
Family/ friends activities out of household	3,403	53.3	2,838	47.4	2,352	53.5	2,020	46.3	10,613	50.2
Religious activities	1,442	22.6	1,060	17.7	1,845	41.9	1,448	33.1	5,795	27.4
Volunteer or charity work	1,030	16.1	886	14.8	1,157	26.3	845	19.3	3,918	18.5
Educational or cultural activities	639	10.0	504	8.4	523	11.9	411	9.4	2077	9.8
Neighbourhood, community activities	469	7.4	461	7.7	569	13.0	394	9.0	1893	9.0
Service clubs or organization activities	261	4.1	340	5.7	305	6.9	361	8.3	1267	6.0
Happy in last week										
All of the time (5–7 days)	4142	64.8	3,769	63.0	3,078	70.2	3,076	70.7	14,047	66.6
Occasionally (3–4 days)	1,532	24.1	1,500	25.1	846	19.3	866	19.9	4,744	22.5
Some of the time (1–2 days)	543	8.5	567	9.5	381	8.7	320	7.4	1,811	8.6
Rarely or never (less than 1 day)	164	2.6	146	2.4	80	1.8	92	2.1	482	2.3
Don't know/No answer/Refused	27		17		21		22		87	
Depressed in last week										
All of the time (5–7 days)	172	2.7	119	2.0	98	2.2	64	1.5	453	2.1
Occasionally (3–4 days)	474	7.4	381	6.4	335	7.6	242	5.5	1,432	6.8
Some of the time (1–2 days)	879	13.8	694	11.6	573	13.0	432	9.9	2,578	12.2
Rarely or never (less than 1 day)	4,856	76.1	4,803	80.1	3,389	77.1	3,630	83.1	16,678	78.9
Don't know/No answer/Refused	9		2		11		8		20	
Lonely in last week										
All of the time (5–7 days)	200	3.1	193	3.2	164	3.7	124	2.8	681	3.2
Occasionally (3–4 days)	506	7.9	408	6.8	461	10.5	304	7.0	1,679	7.9
Some of the time (1–2 days)	778	12.2	629	10.5	630	14.3	405	9.3	2,442	11.6
Rarely or never (less than 1 day)	4,896	76.7	4,762	79.5	3,144	71.5	3,534	80.9	16,336	77.3
Don't know/No answer/Refused	10		7		7		9		33	
Someone to confide in										
None of the time	74	1.2	147	2.5	90	2.1	176	4.1	487	2.3
A little of the time	130	2.0	208	3.5	129	3.0	203	4.7	670	3.2
Some of the time	586	9.2	733	12.3	464	10.6	501	11.6	2,284	10.8
Most of the time	1,727	27.1	1,559	26.1	1,118	25.6	953	22.0	5,357	25.4
All of the time	3,861	60.5	3,335	55.8	2,574	58.8	2,506	57.8	12,276	58.3
Don't know/No answer/Refused	12		17		31		37		97	
Someone who shows you love and affection										
None of the time	50	0.8	110	1.8	74	1.7	107	2.5	341	1.6
A little of the time	86	1.4	113	1.9	85	1.9	87	2.0	371	1.8
Some of the time	352	5.5	377	6.3	320	7.3	252	5.8	1,301	6.2
Most of the time	1,023	16.0	1,006	16.8	775	17.6	684	15.7	3,488	16.5
All of the time	4,870	76.3	4,372	73.1	3,145	71.5	3,225	74.1	15,612	73.9
Don't know/No answer/Refused	9		21		7		21		58	

Continued

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Table 5. Continued

Baseline Characteristic	Age 45-64 (*n* = 12,389)				Age 65-85 (*n* = 8,782)				Total (*n* = 21,241)	
	Women *n* = 6,390 (*n* %)		Men *n* = 5,990 (*n* %)		Women *n* = 4,406 (*n* %)		Men *n* = 4,376 (*n* %)		Total 21,171 (*n* %)	
Someone to do something enjoyable with										
None of the time	57	1.3	80	1.3	58	1.3	92	2.1	287	1.4
A little of the time	139	2.0	120	2.0	105	2.4	98	2.3	462	2.2
Some of the time	856	12.8	768	12.8	641	14.6	558	12.8	2,823	13.4
Most of the time	2,048	31.4	1,877	31.4	1,285	29.3	1,070	24.6	6,280	29.8
All of the time	3,280	52.4	3,135	52.4	2,300	52.4	2,532	58.2	11,247	53.3
Don't know/No answer/Refused	10		19		17		26		72	
Desire to participate in more activities										
Yes	2,976	46.6	2,623	43.8	1,419	32.3	1,223	28.0	8,241	39.0
No	3,410	53.4	3,368	56.2	2,980	67.7	3,145	72.0	12,903	61.0
Don't know/No answer/Refused	4		8		7		8		27	

***Note:* all percentages are calculated only within those participants who answered the given question, and exclude those who did not know or refused to answer, or those to whom the question is not applicable.**

[a] 70 participants age < 45 or > 85 at interview are excluded from the CLSA sample (met age eligibility at recruitment).

needs of the older population of today and tomorrow, there is an urgent need for high-quality, longitudinal, population-based information. The Canadian Longitudinal Study on Aging is a rich resource that allows us to move beyond merely describing change over time to actually studying the dynamic determinants of change within and between individuals over time. The CLSA will become increasingly valuable to scientists and policy makers alike as the baseline data from the CLSA Comprehensive study participants (which includes physical assessment data and biological samples) becomes available to the research community in the near future, and as repeated, longitudinal data from both Tracking and Comprehensive study participants become available over the coming decades.

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