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Methodology: Life After Service Studies 2013

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Methodology: Life After Service Studies 2013

Executive Summary

The Life After Service Studies (LASS) program of research is designed to further understand the transition from military to civilian life and ultimately improve the health of Veterans in Canada. LASS partners are Veterans Affairs Canada (VAC), the Department of National Defence/Canadian Armed Forces, and Statistics Canada. LASS 2013 builds on the earlier studies from 2010 by including Veterans of the Primary Reserves in two major studies: the survey of health and well-being, and the record linkage for pre- and post-release income trends.

LASS 2013 has the following objectives:

- Measure the well-being of released Reserve Force personnel after transition to civilian life (in terms of health, disability and determinants of health);
- Compare released Reserve and Regular Force personnel;
- Understand changes over time; and
- Examine program reach, potential needs not addressed by current programs, and program effectiveness.

LASS 2013 includes two studies:

- Life After Service Survey: data collected during Feb/March 2013; and
- Income Study: data linkage to Statistics Canada's longitudinal income data.

This methodology report provides the technical specification for data users of both LASS 2013 studies.

Méthodologie: Études sur la vie après le service militaire 2013

Sommaire

Le programme de recherche Études sur la vie après le service militaire (EVASM) vise à nous aider à mieux comprendre la transition de la vie militaire à la vie civile et en bout de ligne à améliorer la santé des vétérans au Canada. Les partenaires des EVASM sont Anciens Combattants Canada (ACC), le ministère de la Défense nationale/les Forces armées canadiennes et Statistique Canada. Les EVASM de 2013 s'appuient sur des études antérieures réalisées en 2010 et incluent les vétérans de la Première Réserve dans deux études importantes : l'enquête sur la santé et le bien-être et le couplage de données sur les tendances en matière de revenu avant et après la libération.

Les EVASM de 2013 poursuivent les objectifs suivants :

- mesurer les résultats en matière de santé des membres libérés de la Force de réserve après la transition à la vie civile (en fonction de la santé, de l'incapacité et des déterminants de la santé);
- examiner comment se comparent les résultats en matière de santé des membres libérés de la Force de réserve et ceux des membres libérés de la Force régulière;
- examiner comment les résultats en matière de santé évoluent au fil du temps; et
- examiner la portée des programmes, les besoins non comblés dont les programmes actuels ne tiennent pas compte et l'efficacité des programmes.

Les EVASM de 2013 regroupe deux études :

- Les données de sondage recueillies en février et mars 2013; et
- L'étude sur le revenu à l'aide d'un couplage des données avec le dossier annuel sur les revenus que possède Statistique Canada.

Le présent rapport de méthodologie énumère les spécifications techniques pour les utilisateurs des données tirées des deux études réalisées dans le cadre de l'Étude sur la vie après le service militaire 2013.

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1. Introduction

The Life After Service Studies (LASS) program of research is designed to enhance understanding of the transition from military to civilian life and ultimately improve the health of Veterans in Canada (VanTil 2011). LASS partners are Veterans Affairs Canada (VAC), the Department of National Defence (DND)/Canadian Armed Forces (CAF), and Statistics Canada.

LASS studies the health, well-being and income of former CAF personnel who released from service since 1998. Findings from LASS 2010 are described in more than 20 publications (VanTil 2014). Since LASS 2010, electronic data on releases from the Reserve Force have been examined. Reserve support to operations such as Afghanistan underscored the importance of including Reserve Force Veterans in LASS 2013.

LASS 2013 builds on the earlier work of LASS 2010 with the second cycle of studies: 1) income study using data linkage to Statistics Canada's annual income file; and 2) survey data collected during March 2013. In this cycle, the study populations expanded to include former CAF personnel, both Regular Force and Primary Reserve Force Veterans.

Study protocol was approved by the Statistics Canada's Policy Committee, the organization's most senior committee that reviews projects to ensure the project adheres to professional statistical standards, and that the project is in the best interests of Canadians. Statistics Canada also provided respected independent methodological expertise.

This methodology report provides the technical specification for data users of both LASS 2013 studies.

1.1 LASS Goal and Objectives

The goal of LASS is to understand the transition from military to civilian life and ultimately improve the well-being of Veterans in Canada.

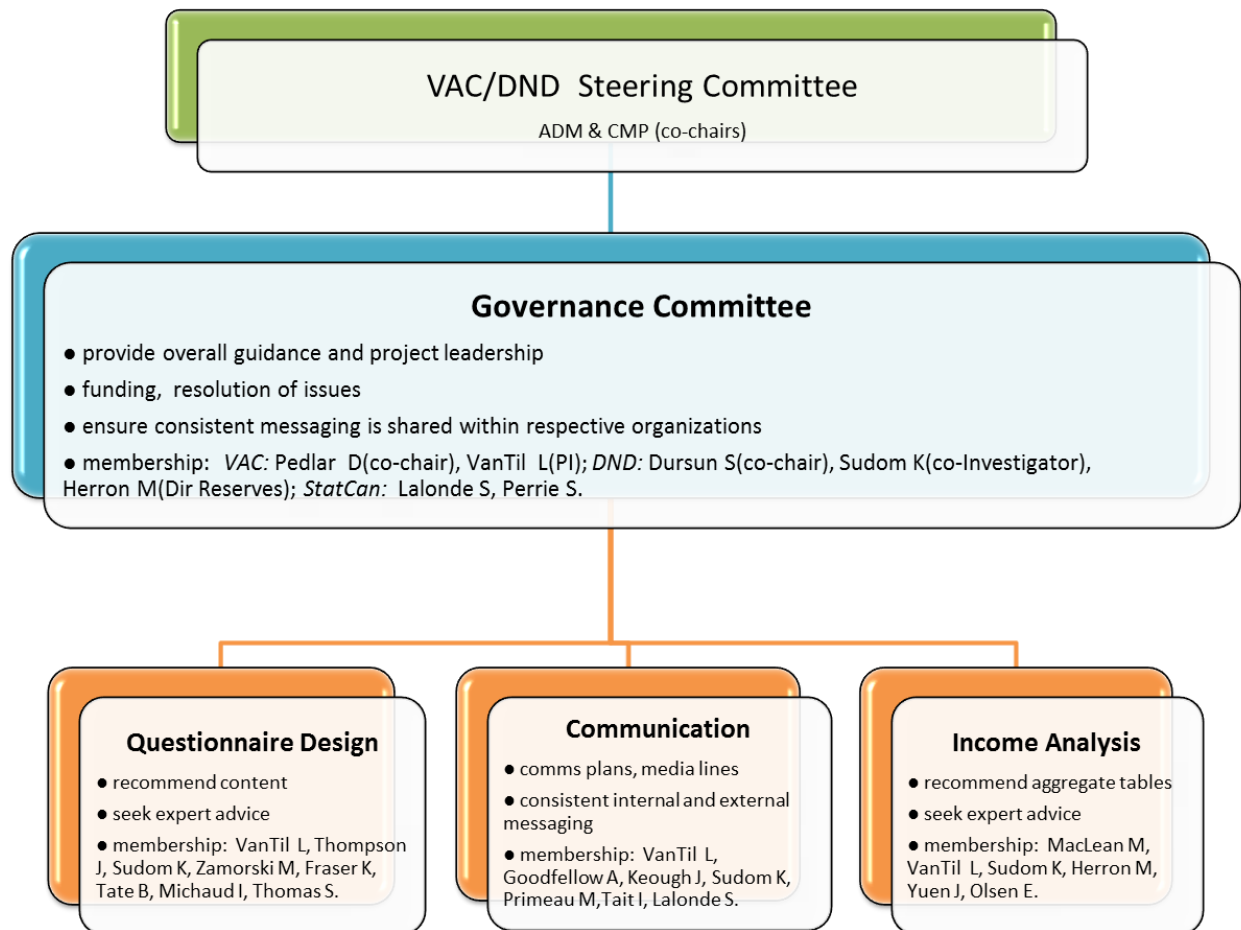
LASS 2013 has the following objectives:

- Measure the well-being of released Reserve Force personnel after transition to civilian life (in terms of health, disability and determinants of health);
- Compare released Reserve and Regular Force personnel;
- Understand changes over time; and
- Examine program reach, potential needs not addressed by current programs, and program effectiveness.

1.2 LASS Governance Structure

To meet the goals and objectives of LASS, and respect the processes of the three partnering departments, a governance structure (see Figure 1) was established in July 2012.

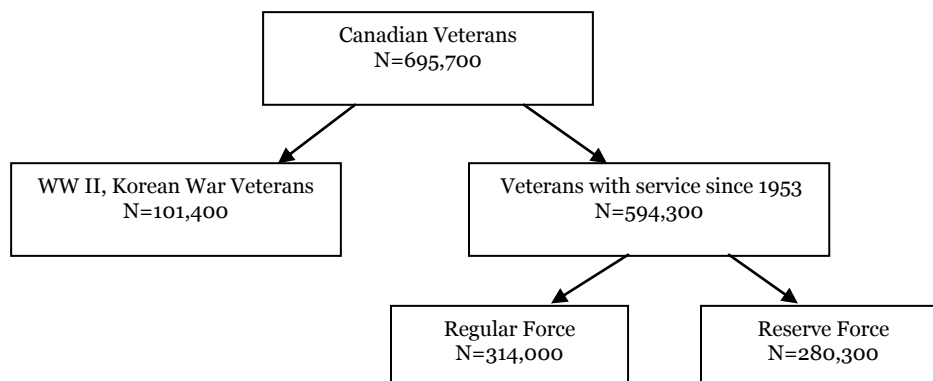
Figure 1. **Governance Structure**



2. Veteran Population in Canada

Veterans in Canada are former officers or non-commissioned members of the Canadian Armed Forces (Regular or Reserve)¹. As of March 2013, there were about 700,000 Veterans living among the general population in Canada, including those with service in the Second World War or the Korean War, and those who served since the 1950-53 Korean War (see Figure 2). Of the Canadian Veterans who served since the Korean War, about half had Regular Force service, and half had service in the Primary Reserve Force (MacLean 2013).

Figure 2. **Canadian Veteran Population², March 2013**



Regular Force Veterans had full-time service in at least one of the three service environments: Navy, Army, Air Force. The Primary Reserve Force augments the Regular Force with six elements: the Army, Naval and Air Reserves, the Canadian Special Operations Forces Command Reserve, the Health Services Reserve and the Judge Advocate General Reserve. Veterans of the Primary Reserve Force had three classes of service: Class A part-time service, Class B full-time service, and/or Class C service while on deployment (see Appendix A for definitions of Classes of Primary Reserves).

Veterans in Canada may apply to Veterans Affairs Canada (VAC) for benefits, with eligibility governed by 16 Acts and their regulations³. Eligibility generally requires the presence of a health condition related to service. As of March 2013, about 66,500² (11%) of the post-Korean War Veterans were in receipt of VAC benefits. Almost all of those were in receipt of a disability benefit.

¹ Canadian Forces Members and Veterans Re-establishment and Compensation Act, SC 2005, c21, s2(1).

² VAC Statistics Directorate, March 2013; excludes still-serving; methods for estimates in MacLean 2008.

³ www.veterans.gc.ca/eng/departement/Legislation/actsVAC

3. Population Frame

3.1 Construction

There is no listing of all Veterans in Canada.

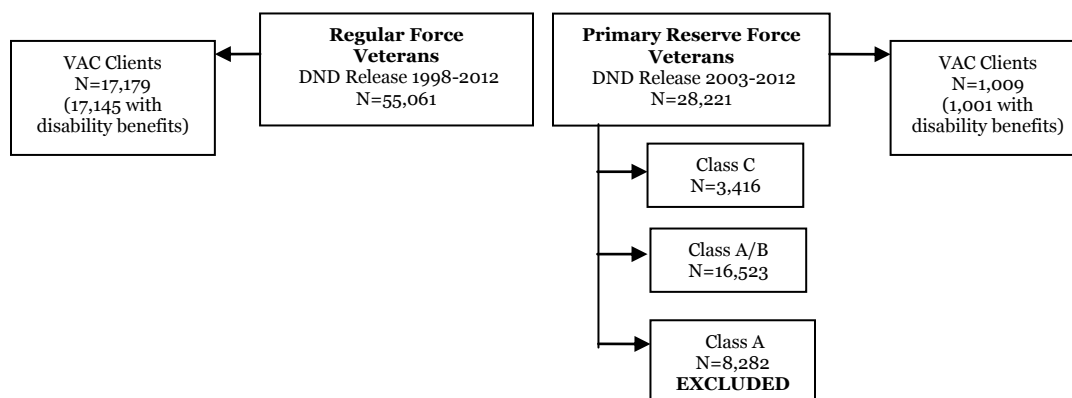
The most complete listing of persons with service in the Canadian military is DND's administrative data from its Human Resources Management System (HRMS) database. DND has used this database to manage information on serving personnel since 1998, in areas of personal information, occupation, postings, rank, and release. Data is not updated after release. While the database has included Regular Force members from its inception in 1998, Reserve units were incorporated over time, and consistently included since 2003 (Perrie 2011).

The population frame was constructed at Statistics Canada under the authority and protection of the *Statistics Act*, Section 13. The primary source was DND's administrative data (HRMS), that defined the two major groups of Veterans:

- Veterans of the Canadian Armed Forces, Regular Force; released from 1 Jan 1998 to 31 August 2012.
- Veterans of the Canadian Armed Forces, Primary Reserve Force; released from 1 Jan 2003 to 31 August 2012.

Additional sources from DND, VAC and Statistics Canada were also used, as detailed in Appendix B. Figure 3 summarizes the population frame of 75,000 records, using DND and VAC data sources.

Figure 3. **Life After Service Study Population, January 2013**



The population frame excluded some Primary Reserve Force Veterans; i.e., the group that had only Class A service (no Class B or Class C periods) since 2003 (n=8,282), since the administrative data contained no confirmation of the amount of time (eg. weekends?) they spent in part-time Class A service, and the feasibility study indicated they had a very low response rate as the result of out-of-date contact information. Other exclusions were those who did not live in the 10 Canadian provinces, lived in a long-term care institution, were still serving or re-enlisted in the Canadian Armed Forces, or were dead.

3.2 Stratification

The population frame of 75,000 records was stratified by Veteran group (definitions in Appendix A), and rank (definitions in Appendix C). The hierarchy of Veteran groups is based on qualitative results which show that Reserve Force Veterans identify with civilian life if they had part-time, short duration Class A/B service; but they identified with the Regular Force if they had service in both Reserve and Regular Forces (Statistics Canada, 2011). The military equivalent of socio-economic status is rank (groups described in Appendix C). To allow analysis by this major concept, rank was stratified in the Regular Force, but the Reserve Force population frame had too few officers for stratification. The five strata are described in Table 1.

Table 1. **Population Frame Stratification, LASS 2013**

Stratum	Population (N)
Veteran of Regular Force Officer	10,746
Veteran of Regular Force Senior NCM	13,794
Veteran of Regular Force Junior NCM	30,521
Total	55,061
Veteran of Reserve Force Class A/B	16,523
Veteran of Reserve Force Class C	3,416
Total	19,939
Total	75,000

3.3 Quality

The high quality population frame minimizes coverage error in the LASS 2013 results. This frame was updated (as described in Appendix B) to remove duplicates and provide additional information on re-enlistments, deaths, and moves to avoid erroneous inclusions. The linkage of DND release data with VAC client data (Figure 2) did not identify erroneous exclusions, since all releases identified by VAC clients were also identified by DND releases. The subset of releases that were VAC clients demonstrated the limitation of a population frame starting with VAC clients. Subsequent use of the population frame by interviewers in March 2013 determined that only 1% was out-of-scope (Appendix

B). The Veteran group classification for the strata were confirmed by 93% linkage with an independent pay data source in February 2014 (Appendix B).

3.4 Characteristics of Population Frame

The population frame data source at DND included variables on military characteristics (details in Appendix C). VAC administrative data linked with the population frame included variables on client characteristics (details in Appendix D). Characteristics of the population frame, using the variables available from DND and VAC, are highlighted in Table 2. Additional characteristics are found in Appendix E.

Table 2. **Veteran Characteristics**

		Regular Force Veteran Released 1998–2012 (N=56129)		Reserve Class C Veteran Released 2003–2012 (N=3469)		Reserve Class A/B Veteran Released 2003–2012 (N=16698)	
		count	%	count	%	count	%
Rank	Officers	11019	20%	587	17%	1857	11%
	Senior NCM	14055	25%	685	20%	652	4%
	Junior NCM	31055	55%	2197	63%	14189	85%
Release year	1998 - 2002	16220	29%	0		0	
	2003 - 2007	19511	35%	1482	43%	7670	46%
	2008 - 2012	20398	36%	1987	57%	9028	54%
Gender	F	7024	13%	736	21%	2869	17%
	M	49104	88%	2731	79%	13818	83%
Age at Release	< 30	18617	33%	1403	40%	13207	79%
	30 – 50	29380	52%	1528	44%	2748	16%
	50+	8132	14%	538	16%	742	4%
Length of Service	< 2 yr	11608	21%	22	1%	4015	24%
	2 to 9 yr	11229	20%	1384	40%	10295	62%
	10 to 19 yr	6434	12%	1380	40%	1707	10%
	≥ 20 yr	26858	48%	683	20%	681	4%
Environment at Release	Air	16678	30%	223	6%	411	3%
	Land	29789	53%	2792	81%	13869	83%
	Sea	9662	17%	454	13%	2418	15%
Release Type	Involuntary	4394	8%	405	12%	3203	19%
	Medical	11725	21%	397	11%	436	3%
	Voluntary	39826	71%	2663	77%	13033	78%
Occupation at Release:							
Combat Arms		13484	27%	1050	45%	7680	59%
VAC client on Mar 31, 2012		18290	32%	521	15%	482	3%

4. 2013 Income Study

The primary objective of the Income Study was to use administrative records from DND and VAC linked to tax data to describe income trends pre and post release, for both Regular and Reserve Force Veterans.

4.1 Linkage Administration at Statistics Canada

The analysis plan for the LASS 2013 Income Study was developed under the leadership of VAC's health economist during 2012. The plan was finalized in late fall 2013 after staffing resources at Statistics Canada were identified. The analysis plan was included in the linkage request that required review by the Senior Policy Committee in consultation with the Data Access and Control Division to ensure the linkage complied with privacy and confidentiality laws under the *Statistics Act* and the *Privacy Act*. Approval of the linkage was granted by Statistics Canada on January 8, 2014. The population frame of administrative records from DND and VAC was sent to Statistics Canada under protection of the *Statistics Act* using secure electronic file transfer mechanism. The population frame and income files were finalized at Statistics Canada by February 14, 2014. Linkage of the files was completed February 28, 2014, with aggregate tables generated by March 31, 2014.

4.2 Data Sources

The population frame was developed from DND and VAC sources, as described in Chapter 3. The variables describing the population are found in Appendix C and Appendix D, and tabulated in Appendix E. Excluded from the population frame were releases in 2012, since they were too recent to link with the income file available up to 2011 at Statistics Canada. The population frame for the Income Study included 70,771 records of Veterans:

- 51,990 released from the Regular Force from 1998 to 2011, and
- 18,781 released from the Primary Reserve Force from 2003 to 2011.

The income file was the general family file (T1FF). The most recent year available was 2011, and the oldest year required was 1997, the pre-release year for the earliest year of release (1998) in the population frame. The T1FF data covers all persons who completed a T1 tax return, or received Canada Child Tax Benefits, as well as their spouses and children at the same address. The income variables used in the income study are described in Appendix F. The income file contained before-tax income reported by Veterans, as well as spousal income, family composition, province of residence, and Forward Sortation Area of postal code. This source of income excluded VAC Disability Award/Pension, other non-taxable/non-reportable benefits, and capital gains (as described in Appendix F).

4.3 Record Linkage

The population frame was prepared and organized by Social Insurance Number (SIN). An additional unique random identifier was added to each record by Statistics Canada, since SIN was not maintained on the final file.

The income file was prepared with an extraction from the 1997 to 2011 T1 Family File (T1FF), and sorted by SIN.

The two files were linked by SIN. Longitudinal consistency of personal identifiers was examined. All personal identifiers including SIN were excluded from the linked file, retaining only the unique random identifier for analysis. The first step to construct the linked file was to use all records linked for the year of their release. Then the longitudinal file was created by adding one-by-one the T1FF files containing the income information for the pre-release year, and all available post-release years. The linked file organized Veteran income information over the years from pre release to all available post-release years.

4.4 Linkage Rate

The overall linkage rate was 92% (Table 3); i.e., of all the records in the population frame, 92% were linked with the income file at the first step, in their year of release.

Table 3. **Income Linkage Rates**

	Number of Veterans		Linkage rate
	Population Frame	Linked with Income File (in Year of Release)	
Regular Force Veterans	51,990	47,950	92.2%
Primary Reserve Force Veterans	18,781	16,925	90.1%
Total	70,771	64,875	91.7%

Linkage rates were slightly higher for Regular Force Veterans (92%) than Reserve Force Veterans (90%). Linkage rates were consistent for all years of the study from 1998 to 2011 (MacLean, 2014b).

Not all the records in the population frame matched to the income file. Out-of-scope records were removed from the population frame if the Veteran was not in the country, died, or was in a long-term care institution (see Appendix B). Some remaining records may have been in these categories; an additional 1% of records were identified as out-of-scope by interviewers after initiation of LASS 2013 survey administration. There may also be other unknown reasons for a person not filing income tax.

The majority of linked records had income data for all the available years. Some persons had not filed in at least one year, creating differences between cross-sectional populations and longitudinal populations.

4.5 Time Frames

Regular Force Veterans were followed for at least two years (the pre-release year and the year of release), and up to 13 years post release. Only those released in 1998 could be linked with income data for the maximum 15-year period from 1997 to 2011.

Reserve Force Veterans were followed for at least two years (the pre-release year and the year of release), and up to 8 years post release. Only those released in 2003 could be linked with income data for the maximum 10-year-period from 2002 to 2011.

Five years of data are available for the longitudinal cohort. This cohort of Veterans were linked to tax files in the pre-release year and in all of the first three years post release up to 2008. The cohort included 32,540 Regular Force Veterans and 8,995 Primary Reserve Force Veterans. The cohort was used for the analysis comparing pre-release and post-release income for the same persons.

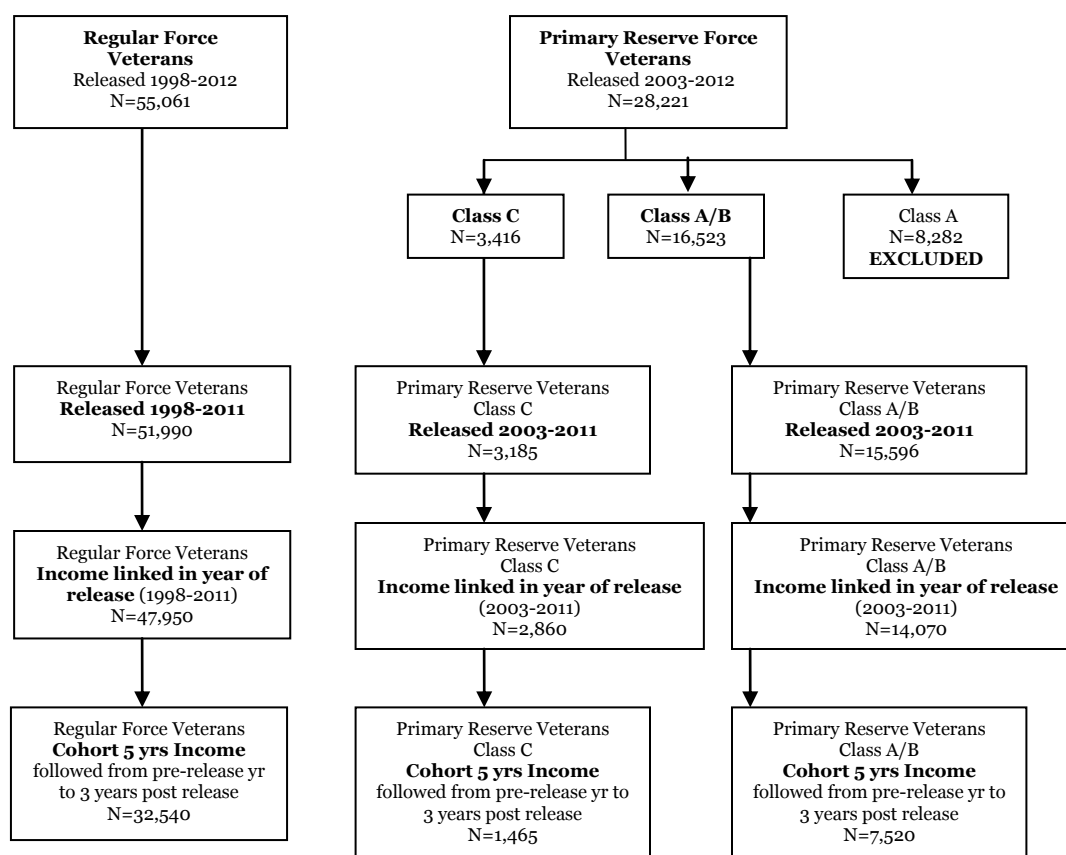
4.6 Income Study Population

The linked file is a census of the study population, and not subject to sampling error or variation. Its construction allows examination of both the cross-sectional and longitudinal economic situations of Veterans. Figure 3 shows the construction from the population frame to exclusion of releases in 2012 to the cross-sectional linked file to the longitudinal cohort file.

The longitudinal cohort included Veterans who were linked to tax files in the pre-release year and in all of the first three years post release. This cohort was used to analyze pre-release and post-release income for the same Veterans, and was a subset of the cross-sectional file, as shown in Figure 4.

The LASS 2013 Income Study cannot be linked with the LASS 2013 survey, since the rules around the use of tax data preclude linkage with other sources.

Figure 4. **Income Study Population, LASS 2013**



4.7 Low Income Measure

Low-Income Measure (LIM) is a relative measure of family income that takes into account family size (Zhang, 2014).

For analysis of the 2013 LASS Income Study, LIM thresholds were calculated by Statistics Canada. Both the derived LIM and its application to the study data used T1FF income. LIM threshold was derived using multiple steps:

- *Census family* was used to establish family size and income. Other family members or persons living in the household are not included in the census family.
- Median family income was tabulated using T1FF for family combinations of adults and children.
- LIM threshold was established at 50% of median family income.
- Process is repeated for each calendar year of the study (1997 to 2011), so the LIM threshold is specifically derived from reported income of that year.
- Counted Veterans with family income below the LIM.

For the 2013 LASS Income Study, an example of the before-tax LIM in 2011 for a census family of four (2 adults and 2 children under 16) was \$35,976 (Table 4). Below this threshold, a family of this size would be considered low income. Additional tables (not shown) were generated for each calendar year of the Income Study.

Table 4. **LIM (before-tax) by census family size, 2011**

Adults	Children (age 16 and under)					
	0	1	2	3	...	10
1	\$17,988	\$25,183	\$30,580	\$35,976	...	\$73,751
2	\$25,183	\$30,580	\$35,976	\$41,372	...	\$79,147
3	\$32,378	\$37,775	\$43,171	\$48,568	...	\$86,342
4	\$39,574	\$44,970	\$50,366	\$55,763	...	\$93,538

Source: Statistics Canada, Special Tabulation of T1FF data.

For analysis of the 2013 LASS survey, LIM thresholds were calculated using published data. Both the derived LIM and its application to the survey data used income reported on surveys. LIM threshold was derived as follows:

- *Household* was used to establish “family” size and income, for the 2012 year reported on in the survey.
- Statistics Canada published LIM for 2011 of \$45,440 before-tax income for household size of four persons, using Survey of Labour and Income Dynamics (Zhang 2014)
- LIM inflated to \$46,258 for 2012, the year of reported income
- Adjusted income for a one-person family in 2012 = $\$46,258 / \sqrt{4} = \$23,129$
- To convert to other household sizes, $\text{LIM} = \$23,129 * \sqrt{(\text{household size})}$.
- Calculated the proportion of Veterans with household income below the LIM.

Note that the LIM thresholds were matched to the LASS 2013 income and survey methodology, not to each other. They used different income sources, and different definitions of family. In 2013 LASS Income Study, the family concept under the T1FF is a *census family* consisting of married or common-law couples with or without children, lone parents with at least one child living in the same dwelling, and families of one person. The census family is also known as the “nuclear family” or “immediate family”. In 2013 LASS survey, *household* is a broader concept with higher income. A household is defined as a person or group of persons residing in a dwelling, whether they are related or not. Economies of scale in consumption are accounted less within a census family than within a household (Zhang, 2014).

4.8 Release of Information

Statistics Canada had the only access to the LASS 2013 Income Study linked file, and provided a set of analytical tables that were released to VAC and DND. The tables contained only aggregate data that conformed to the confidentiality provisions of the *Statistics Act*.

The LASS 2013 Income Study cannot be linked with the LASS 2013 survey, since the rules around the use of tax data preclude linkage with other sources.

The first LASS 2013 publications were released through a strategy coordinated by all three partner departments (VAC, DND, StatCan), through a communications working group. The partners brought the knowledge of communication procedures in each of their departments, and worked together to ensure consistent messaging was in place at the time of release.

5. 2013 Survey Administration at Statistics Canada

5.1 Pre-collection Procedures

Two rounds of qualitative testing were performed by the Questionnaire Design Resource Centre at Statistics Canada. In March 2011, focus groups were held with former Reserve Force members in Ottawa, Winnipeg, and Montreal (Statistics Canada, 2011). Discussions were structured to gain insight on Class of Reserve, and to determine the appropriateness of military specific content to Reserves, asked of former Regular Force members in LASS 2010. In March 2012, focus groups were held with former Regular and Reserve Force members in Edmonton, Halifax and Kingston (Statistics Canada, 2012). Discussions were structured to assess potential new content areas, and to determine if time-specific and recall-sensitive content modifications were required for longitudinal design elements.

The final questionnaire (see Section 6.2) was approved by the Questionnaire Review Committee, and signed off by the Chief Statistician.

Questionnaire review and qualitative testing were used by Statistics Canada to minimize measurement errors. Other techniques included the use of highly skilled interviewers, many of whom are familiar with CCHS content from which many of the questions are taken, extensive training of interviewers with respect to the survey procedures and content, observation and monitoring of interviewers to detect problems of questionnaire design or misunderstanding of instructions.

The questionnaire was developed on a Computer Assisted Telephone Interview (CATI) platform. The final survey specifications were programmed in individual survey blocks, then in an integrated CATI application. Operational testing of the survey blocks, as well as the integrated application and End-to-End testing, was completed prior to administration in order to ensure the survey instrument was functioning as intended. Installation of the CATI application was completed in January 2013.

5.2 Sample Size Calculations

Sample size options were explored in a feasibility study completed by Statistics Canada (Perrie, 2011). The study objectives required a minimum proportion estimated for the population of interest (min-p) of 10%, a coefficient of variation (CV) of 16.5% and a design effect (DEFF) of 1.1. This level of precision required a sample size of 350 in the final wave of data collection for each stratum.

Stratification of the sample was based on stratification of the population frame (see section 3.2). Consideration was given to stratification by many variables such

as Force component (Regular or Reserve), class of Reserve, sex, age, rank, VAC client status. To maximize future ability to follow the sample longitudinally, the number of strata was minimized. Five strata were defined as described in section 3.2, using Veteran groups (defined in Appendix A), and rank groups (defined in Appendix C).

The longitudinal survey was designed for five waves of data collection. Based on this design and response rates to the 2010 survey, the parameters in Table 5 were assumed.

Table 5. Parameters for the longitudinal sample (5 waves)

	Regular Force Veterans	Reserve Force Veterans
Out-of-scope rate	0.07	0.10
Response Rate, Wave 1	0.68	0.55
Response Rate, Wave 2	0.90	0.90
Response Rate, Waves 3-4-5	0.95	0.95
Unable to trace rate	0.10	0.10

The expected number of responses were calculated at each wave using the funnel approach. It means that once a Veteran is a non-respondent to a specific wave, the case is not sent for collection for subsequent waves. If there is a wave every second year, it means that wave 5 will happen 8 years after the sample selection. The expected number of respondents at a particular wave was calculated by applying the parameters from Table 5. This process resulted in calculation of the initial sample size of 6,017 that was necessary to be drawn from the population frame and sent to the interviewers for contact in wave 1. Table 6 describes the allocation of the sample.

Table 6. Allocation of sample by strata for 5 waves

Stratum	Population Frame (N)	Initial sample for interviewer contact	Expected Response wave 1	Expected Response wave 2	Expected Response wave 3	Expected Response wave 4	Expected Response wave 5
Regular Force, Officer	10,746	1,217	693	562	480	411	351
Regular Force, Sr NCM	13,794	1,225	697	565	483	413	353
Regular Force, Jr NCM	30,521	1,246	710	575	492	420	359
Reserve Force, Class A/B	16,523	875	498	403	345	295	252
Reserve Force, Class C	3,416	1454	648	525	449	384	328
Total	75,000	6,017	3,246	2,629	2,248	1,922	1,643

For Regular Force Veterans, a simple random sample was selected in each of the three stratum. For Reserve Force Veterans, the records were sorted by rank in each of the two stratum, and a systematic sample was selected. The systematic sample was used to ensure the proportion of units in each rank in the sample was the same as in the frame.

5.3 Longitudinal Design

Design of LASS 2013 survey included features to make future LASS cycles longitudinal. Longitudinal design was included in the Statistics Canada approval process.

Sample size calculations were designed for five waves of longitudinal data collection (see section 5.2). This option is available for all strata except Veterans of Reserve Class A/B.

The initial contact with potential respondents, the introductory letter, included the potential for future follow-up. As part of the data collection process, Statistics Canada collected the email addresses of all respondents willing to share their contact information. With a longitudinal survey in mind, the benefit of this will be future electronic contact, and building a more comprehensive contact file for future collection cycles. Future cycles of LASS may explore the administration of electronic questionnaires - a mode of collection that was not used for LASS 2013.

As part of the survey exit process, contact information was updated and supplementary contact information requested. Statistics Canada has the authority (under provisions of the Statistics Act) to link the existing sample file to tax records and other sources of contact information that are more timely (for instance, administrative records from Public Works). The mechanisms that were explored in the past to update contact information and to facilitate the clean-up of the sample file have laid the groundwork for best practices in future cycles of collection. This work on improved contact information reduces the risk of low rates of contact that can be problematic for longitudinal surveys.

5.4 Data collection

The survey collection period was February 4 to March 15, 2013, and administered in three regional offices of Statistics Canada: Sherbrooke, Halifax and Edmonton. The mode of collection was Computer Assisted Telephone Interview (CATI). Initial contact and interview termination modules, based on a standard template used for CATI surveys conducted at Statistics Canada, were adapted for LASS. The application included a standard set of response codes to identify all possible outcomes. The application was tested prior to use to ensure that only valid question responses could be entered and that all question flows would be correctly followed. The application included edits to check the consistency of responses. These measures ensured that the response data were already “clean” at the end of the collection process.

A training package was designed during November and December 2013. This package included development of mock interviews, preparation of training manuals and documentation, translation of manuals, and printing of manuals.

During the week of January 28 to February 1, 2013, interviewer training sessions were conducted at the three regional offices with existing staff of experienced interviewers. Training for LASS introduced some of the pertinent issues covered in the questionnaire, and familiarized the interviewers with the questions using examples of entire interviews. Help screens were provided to the interviewers to assist them in answering respondents' questions.

Two weeks prior to collection, Statistics Canada sent an introductory letter to each person for whom sufficient mailing address information was available. During collection, interviewers followed a standard approach used for many Statistics Canada surveys in order to introduce the agency, the name and purpose of the survey, the collaboration with the Department of National Defence and Veterans Affairs Canada, how the survey results would be used and when the results were expected to become available. Those contacted were told that their participation in the survey was voluntary, and that their information would remain strictly confidential.

The workload at each regional office was managed by an on-site project manager. The CATI system featured an automated scheduler to assign cases randomly to interviewers and to ensure that cases were called at different times of the day and on different days of the week to maximize the probability of contact.

Proxy responses on behalf of persons selected into the sample were not accepted. Partial interviews were not accepted as complete. A complete interview lasted approximately 30 minutes. Respondents were considered in-scope if their age provided on the survey was within ± 5 years from the one recorded on the sample file and they had returned to civilian life after being a member of the Regular Force and/or the Primary Reserve Force. Respondents were considered to be out-of-scope if they indicated on the survey that they had rejoined the Canadian Armed Forces (Regular or Reserve).

5.5 Data processing

Processing transforms survey responses into a form suitable for tabulation and data analysis. It includes all data handling activities – automated and manual – after collection and prior to estimation.

Data capture of responses to survey questions was done directly by the interviewer at the time of the interview using the computerized questionnaire. The computerized questionnaire reduces processing time and costs associated with data entry, transcription errors and data transmission. The response data were encrypted to ensure confidentiality and transferred over a secure network for further processing.

Some editing was done directly at the time of the interview. Where the information entered is out of range (too large or small) of expected values, or inconsistent with the previous entries, the interviewer is prompted, through message screens on the computer, to modify the information. However, for some questions, interviewers have the option of bypassing the edits, and of skipping questions if the respondent does not know the answer or refuses to answer.

Electronic text files containing the daily transmissions of completed cases are combined to create the “raw” survey file. At the end of collection, this file should contain one record for each sampled individual. Before further processing, verification was performed to identify and eliminate potential duplicate records and to drop non-response and out-of-scope records. Problems were encountered at this stage with share question responses stripped from the end of some files.

Further edit processes occur once they arrive in head office. Data variables used in the survey process but not kept on the survey master file are deleted and the remaining variables are formatted appropriately. Text fields are stripped off the main files and written to a separate file.

Edits were applied to variables without answers, where questions which did not apply to the respondent were skipped by the questionnaire flow and assigned “Valid skip”. Skips based on “Don’t know” or “Refusal” were set to “Not stated.” No imputation methods were employed to complete missing survey data. No open-ended questions were administered in this survey.

Derived variables were created by combining items on the questionnaire, based on previous analyses of Canadian Community Health Survey (CCHS) files. Short-Form 12 (SF12) questions used scoring software copyrighted by QualityMetric to generate Physical Component Score (PCS) and Mental Component Score (MCS) scores.

A preliminary processed data file was shared with VAC and DND on October 10, 2013. Subsequent corrections were made to the file to include weights for all shared responses and data labels; this revised file was available on January 17, 2014. The final processed data file (with addition of a previously deleted variable INC1_03) was available in July 2014.

5.6 Response Rate

The initial sample size of 6,017 was drawn from the population frame (see Section 5.2) and sent to the interviewers for contact. Of these, 55 were found to be out-of-scope (moved out of Canada, death, in long-term care, rejoined). Of the remaining 5,962 in-scope Veterans in the sample, 4,149 completed a full

interview. The majority of non-respondents were not available for an interview during the data collection period. A small number were non-contacts with no answer to repeated telephone attempts and eligibility could not be resolved.

The overall response rate was 70%. Table 7 provides details of response rates by stratum. Response rates were similar for men and women, but were lowest among the younger Veterans, and improved with increasing age (see Table 8).

Table 7. Response rate by stratum

Stratum	Number of in-scope Veterans	Number of Respondents	Response rate (%)
Veteran of Regular Force, Officer	1,205	872	72.37
Veteran of Regular Force, Sr NCM	1,216	950	78.13
Veteran of Regular Force, Jr NCM	1,237	800	64.67
Veteran of Reserve Force, Class A/B	863	514	59.56
Veteran of Reserve Force, Class C	1,441	1,013	70.30
Total	5,962	4,149	69.59

Table 8. Response rate by age and sex

	Males			Females			Total		
Age Group	Number in-scope	Number of respondent	Response rate (%)	Number in-scope	Number of respondent	Response rate (%)	Number in-scope	Number of respondent	Response rate (%)
<30	1,043	576	55.23	166	94	56.63	1,209	670	55.42
30-49	2,167	1,498	69.13	502	368	73.31	2,669	1,866	69.91
≥50	1,819	1,408	77.41	265	205	77.36	2,084	1,613	77.40
Total	5,029	3,482	69.24	933	667	71.49	5,962	4,149	69.59

5.7 Share Rate

The following share question was asked at the end of the LASS 2013 survey:

“To reduce the number of questions and to avoid duplication, Veterans Affairs Canada and the Department of National Defence intend to supplement the information collected during this survey with administrative data. Statistics Canada has entered into agreements with these organizations to share the information collected during your interview. This information will be kept confidential and used only for statistical purposes. Do we have your permission to share your survey information?”

A share file for VAC and DND was created for respondents who gave a positive response to the share question in LASS 2013. Future cycles of LASS will use the protocol developed for the National Population Health Survey, where the question is only asked of those who did not agree to share in a prior cycle. Once a respondent agrees to share, all cycles are released for the share file.

Data processing at Statistics Canada of the LASS 2013 survey lost the final byte of 243 records that contained the share question at the end of the survey making it impossible to confirm their response to the share question. This appeared to have been sheared off the record at the closure of the file in the field; the lost share response along with their long-term contacts was not retrievable from any of the audit systems. Attempts were made to re-ask this question during a two-week period from December 1 to 13, 2013. At the end of this period, 136 responses remained missing since the Veteran was not reached.

Of the 4,149 survey respondents, 136 were missing a share response, 286 did not agree to share, and 3,727 agreed to share. The overall share rate was 90% (see Table 9). This share rate was consistent across the five strata (Table 9), and across age and sex (see Table 10).

Table 9. **Share rate by stratum**

Stratum	Number of respondents	Number of Sharers	Share rate (%)
Regular Force, Officer	872	775	88.88
Regular Force, Senior NCM	950	844	88.84
Regular Force, Junior NCM	800	710	88.75
Reservists, Class A/B	514	476	92.61
Reservists, Class C	1,013	922	91.02
Total	4,149	3,727	89.83

Table 10. **Share rate by age and sex**

	Males			Females			Total		
Age Group	Number of respondent	Number of sharers	Share rate (%)	Number of respondent	Number of sharers	Share rate (%)	Number of respondent	Number of sharers	Share rate (%)
<30	576	534	92.71	94	84	89.36	670	618	92.24
30-49	1,498	1,353	90.32	368	327	88.86	1,866	1,680	90.03
≥50	1,408	1,243	88.28	205	186	90.73	1,613	1,429	88.59
Total	3,482	3,130	89.89	667	597	89.51	4,149	3,727	89.83

5.8 Weighting Procedures

The LASS 2013 survey used complex survey design that incorporated stratification and oversampling. This design requires the application of survey weights to generate findings that are representative of the sampled Veteran population. The sum of the survey weights approximates the population frame (see Chapter 3).

i) Sample weight

Sample weights were calculated by Statistics Canada for each record of survey respondents. This sample weight accounts for the unequal probabilities of selection, eligibility, and non-response.

Probability of selection was the first step in the initial design of weights. This probability corresponds to the ratio of the number of sampled units to population size, based on random selection among those assigned to the specific stratum. The inverse of this probability was used as the initial weight. Calculations are provided in Table 11.

Table 11. **Probability of selection, by stratum**

Stratum	Population Size (N)	Initial sample for interviewer contact (n)	Probability of selection (n/N)	Initial Weight (1 / Probability of selection)
Veteran of Regular Force, Officer	10,746	1,217	1,217 / 10,746	8.83
Veteran of Regular Force, Sr NCM	13,794	1,225	1,225 / 13,794	11.26
Veteran of Regular Force, Jr NCM	30,521	1,246	1,246 / 30,521	24.50
Veteran of Reserve Force, Class A/B	16,523	875	875 / 16,523	18.88
Veteran of Reserve Force, Class C	3,416	1454	1,454 / 3,416	2.35

Eligibility was incorporated during the construction of the population frame (see Chapter 3), with removal of out-of-scope units. During collection, an additional 1% of the initial sampled units were also identified as out-of-scope. These were Veterans who were deceased, lived outside the 10 Canadian provinces, were in

institutions, or had reenlisted into the Canadian Armed Forces. They were removed from the process, leaving only in-scope units in the sample. These in-scope units kept their initial probability weight.

Non-response was incorporated in the sample weight. During collection, there were Veterans who could not be reached for an interview, and a few refused to participate or provided unusable data. Weights of the non-responding units were redistributed to responding units with similar characteristics within response homogeneity groups (RHGs). RHGs were created based on logistic regression models for the propensity to respond, by characteristics available on the population frame. Stepwise selection kept these variables in the model: age, province of residence, number of years of service, client of VAC or not, reason of release. RHGs were formed within strata to better control for strata totals. Within each RHG, weights were adjusted by a factor created by the sum of weights for all in-scope units, divided by the sum of weights for all responding units.

At this point in the process, non-responding units were dropped, and the master file contained all respondents (n=4,149). This file had 1,457 different sample weights attached to each record. Therefore all estimates and analyses using the master file need to apply the sample weights.

ii) Share weight

Share weights were calculated by Statistics Canada for each record of survey respondent who agreed to share with VAC and DND. This share weight accounts for the unequal probabilities of selection, eligibility, non-response, and sharing. Although no obvious patterns were seen for sharing (Section 5.7), any differences between share and non-share responses is accounted for in the share weights.

To compensate for the loss of some respondents from the file, the weights of these non-sharers were redistributed to sharers with similar characteristics within response homogeneity groups (RHGs). RHGs were created based on logistic regression models for the propensity to share, by characteristics available on the population frame. Stepwise selection kept these variables in the model: age, client of VAC or not, gender, province of residence, reason of release. RHGs were formed within strata to better control for strata totals. Within each RHG, weights were adjusted by a factor created by the sum of weights for all responding units, divided by the sum of weights for all sharing units.

At this point in the process, non-sharing units were dropped, and the share file contained all respondents who agreed to share (n=3727). This file had 1,457 different share weights ranging from 2.4 to 61.4 attached to each record. Therefore all estimates and analyses using the share file applied the share weights.

5.9 Release of information

Release of LASS data in publications adheres to Statistics Canada Disclosure Guidelines (Appendix G). Statistical analysis must use the survey weights to ensure the LASS complex survey design and selection probabilities are correctly accounted for to generate accurate survey estimates and variances. Bootstrap weights are provided and can be used by Stata 9 or 10, SUDAAN and WesVar. SAS or SPSS require the BOOTVAR macro program that may be downloaded from Statistics Canada's Research Data Centre (RDC) website.

Statistics Canada's institutional review is intended to ensure that information products disseminated to the public are free of material which would compromise the Agency's reputation for nonpartisanship, objectivity and neutrality.

The first LASS 2013 publications were released through a coordinated strategy that all three departments (VAC, DND, StatCan) participated in, through a communications working group. The partners brought the knowledge of communication procedures in each of their departments, and worked together to ensure consistent messaging was in place at the time of release.

6. 2013 Survey Content and Analysis

6.1 Questionnaire Content Development

Development of the questionnaire used the conceptual framework for Veterans' well-being (Thompson 2013). The broad definition of health and well-being was used to identify 116 potential content areas (see Appendix H). A working group comprised of experts from VAC, DND, and several Canadian universities discussed potential content areas, and assigned priority to the content areas using criteria of:

- Comparison with 2010 LASS survey to evaluate changes over time;
- Baseline measures on longitudinal survey for future cycles of LASS;
- Comparison with Canadian population (CCHS, 2012);
- Comparison with military population (HLIS, 2009; CFMHS, 2012);
- Public health significance, avoid very low prevalence;
- Assessment methods, availability of validated measures.

Discussion of the potential content areas culminated in selection of high priority modules (see Appendix H).

6.2 LASS 2013 Survey Questionnaire

The final survey included 193 questions (see Appendix I), to fit within the allotted 45-minute average interview time. Content modules included in the questionnaire were:

CCHS Module		#Q	LASS Module		#Q
GEN	General health	8	GEN1	transition	1
HWT	Height/Weight	4			
MAS	Mastery	7			
CCC	Chronic conditions	29	CCC1	Chronic anxiety, PTSD, military service	5
HUI1	Hearing loss	5			
HUP	Pain	3			
RAC	Restriction of activities	6			
ADL	Activities of daily living	6	SF2	SF-12v2 Health Measure	11
DIS	Distress	14	PTSD	PTSD Screen	5
SPS	Social provisions/support	10			
SMK	Smoking	12			
ALC	Alcohol consumption	3			
SUI	Suicide	6			
HCU	Health care utilization	4			
CHP	Contact with health professionals	15	CP2	Contact with other health care providers.	10
HCU1	Alternative health care provider	1			
UCN	Unmet Care Needs	4			
INS	Insurance	3			
EHG1	Education, highest level	1			
LF2	Labour force	4	EMH1	Main Activity, skills transfer	3
INC	Income	11	INC1	Satisfaction with income	1
PS	Permission to Share	1			

6.3 Item Non-Response

For most questionnaire items, 10 or fewer of the 3,727 respondents selected non-response categories: refusal, don't know, not stated¹. The list below provides details on the questionnaire items with higher non-response rates.

Seventeen percent (17%) of respondents had non-response to household income (n=640, INC_04), but had less difficulty providing some household income categories (n=117, INC_05). Non-response was lower (4%) for personal income (n=148, INC_08), and less difficult for personal income categories (n=109, INC_09).

Four percent (4%) of respondents had difficulty answering the relationship between military skills and their job (n=154, EMH1_01). Two percent (2%) of respondents had non-response to relate military service and chronic conditions (n=80, CCC1_5); or PTSD (n=66, PTSD_5). Other PTSD questions were less difficult (n=46, PTSD_2); (n=40, PTSD_3); (n=37, PTSD_4); and diagnosis of PTSD (n=34, CCC1_4).

Less than 3% of respondents had difficulty with answering questions about insurance for eye glasses (n=101, INS_03); for medication (n=28, INS_01); for dental (n=19, INS_02).

Less than 1% of respondents had difficulty providing responses to questions about social support: for admiration (n=39, SPS_09); for social activity (n=28, SPS_02); for shared attitudes (n=15, SPS_07); sense of belonging (n=23, GEN_10). K10 Distress scale frequency had some non-response (n=19, DIS_01L/M/N).

Small numbers did not answer the weight (n=17) so that BMI could not be calculated. Chronic conditions were not answered by a few for diagnosis of arthritis (n=17, CCC_051) and high blood pressure (n=17, CCC_071). Among those with diabetes, 75% did not respond to the question on insulin use (n=159, CCC_105).

¹ Statistics Canada, LASS 2013 Data Dictionary.

6.4 Survey Content for Analysis

The survey questions are detailed in Appendix I, with their variable names as found on the share data file (see StatCan LASS 2013 data dictionary). Since the questions were selected as modules, most of the analysis is based on their scales, universe, and subsequent derived variables. The variables for analysis are described in this section, and listed with additional file details in Appendix J.

Statistical analysis must use the survey weights to ensure the LASS complex survey design and selection probabilities are correctly accounted for to generate accurate survey estimates and variances. Bootstrap weights are provided, as described in Appendix G.

i) Survey Weights

Share weight must be used with the share data file. This share weight accounts for the unequal probabilities of selection, eligibility, non-response, and sharing. Strata used in the survey design are described in section 3.2 and incorporated in the weights (see section 5.7).

Veteran groups were drawn as separate samples, and should be described separately. Definitions of the three groups are found in Appendix A; their characteristics are described in Appendix E.

ii) General Module

Self-rated health is a single-item ordinal measure with five levels. It is a widely used indicator of general health status in epidemiologic and population health research. Self-rated health was associated with subsequent mortality and functional limitation, especially for males (Idler 2000). It is used in CCHS.

Life Satisfaction is a single-item ordinal measure with 10 levels. It is a measure of subjective well-being, and considered as a stable phenomenon, not simply a momentary judgment based on fleeting influences (Pavot 1991). It is used in CCHS.

Community Belonging is a single-item ordinal measure with four levels. It is a widely used indicator of social capital in population health research. Sense of community belonging is associated positively with neighborhood network-based social capital measures and health measures, but results differed by urban and rural settings (Carpiano 2011). It is used in CCHS.

Adjustment to Civilian Life is a single-item ordinal measure with five levels. A similar question was used in a study of retired US Navy officers (Spiegel 2003). Based on pre-testing conducted prior to LASS 2010, it was adapted to use

wording compatible with the other single item measures in the general module. It was used in LASS 2010 (MacLean 2014) & 2013.

iii) Height and Weight Module

BMI (body mass index) was calculated using self-report weight in kilograms divided by height in meters squared. BMI was categorized (WHO, 2000) into: underweight (<18.5), normal weight (18.5-24.9), overweight (25-29.9), grade 1 obesity (30-34.9), grade 2 obesity (35-39.9), grade 3 obesity (40+). Self-report weight is typically underestimated, and height is overestimated (Tjepkema 2005). Since the correlation between self-reported and measured BMI was 90% (Spenser 2002), self-reported measures are considered valid for identifying relationships in epidemiological studies. This module is used in CCHS.

iv) Mastery Module

Mastery is a seven-item measure answered with a five-point Likert scale. It is a widely used indicator of the extent to which people see themselves as being in control of forces that affect their lives (Perlin 1981). Face validity is suggested by its wide use, but there is minimal psychometric information in the literature. Mastery is conceived as a personality characteristic that serves as a psychological resource individuals use to help them withstand stressors in their environment. Mastery can be bolstered by social support, and is related to the concept of resilience. The scores are transformed to a 0-4 scale, the two positive items are reverse scored, then all seven are summed for a total score from 0 to 28, with higher scores for superior mastery. This module was used in the CF Recruit Health Questionnaire (Lee 2010), and CCHS.

v) Chronic Condition Module

This CCHS module contains a series of questions on self-report of the following conditions with a duration of at least six months and diagnosed by a health professional.

Asthma is a single-item dichotomous measure. Asthma is a chronic inflammatory disorder characterized by symptoms of shortness of breath, chest tightness, wheezing, sputum production and cough associated with airflow limitation and airway hyperresponsiveness to a variety of stimuli (Becker 2005). The diagnosis of asthma may include spirometry measurement of airway function (National Asthma Control Task Force, 2000). Prevalence rates in Ontario vary with different methodologies; 9% using CCHS self-report, 10% using administrative physician data (Kappa=.55, Muggah 2013).

COPD is a single-item dichotomous measure asked of persons 35 or older.

Chronic obstructive pulmonary disease is a group of chronic lung conditions that restrict airflow and make breathing difficult. Two of the most common are emphysema and chronic bronchitis. The diagnosis may include spirometry measurement of airway function (O'Donnell 2007). Underutilization of spirometry and confusion with asthma result in underestimations of COPD. Prevalence rates in Ontario vary with different methodologies; 6% using CCHS self-report, 11% using administrative physician data (Kappa=.29, Muggah 2013).

Diabetes is a single-item dichotomous measure. Diabetes mellitus is a group of chronic metabolic diseases leading to high blood sugar levels. Diabetes is diagnosed by detection of hyperglycemia (Canadian Diabetes Association, 2013). Prevalence rates in Canada have high levels of agreement with different methodologies; 7% using CCHS self-report, 9% using Canadian Chronic Disease Surveillance System (CCDSS) administrative physician and hospital data (Kappa=.80, Muggah 2013). An additional 20% of cases are undiagnosed, based on Canadian Health Measures Survey (CHMS) blood samples (PHAC 2011).

Arthritis is a single-item dichotomous measure. Arthritis is a group of more than 100 chronic inflammatory disorders of the joints. The most common are osteoarthritis (degenerative major joints), followed by gout (hyperuricemia) and rheumatoid arthritis (synovitis of multiple joints). The diagnosis may include serology and radiography. There are wide variations in the accuracy by diagnosis within the arthritis group. Overall prevalence in Canada has poor agreement with different methodologies; 16% using CCHS self-report, 14% using CCDSS administrative data (Kappa=.35; Lix 2006, PHAC 2010).

Back problems is a single-item dichotomous measure. Back problems include the constructs of pain, disability, and social roles. The diagnosis is often non-specific chronic low backpain, radiography is not recommended, and patients are often frustrated with limited treatment options. Self-reported back problems have poor correlation with clinical measures, similar to chronic pain (Froud 2014).

Heart disease is a single-item dichotomous measure. Heart disease refers to multiple diseases most commonly including: ischemic heart disease (partial blockage of blood to the heart muscle); myocardial infarction (complete blockage of an artery causing acute tissue damage); congestive heart failure (reduced pumping action of the heart); arrhythmia (abnormal or irregular heart beat). There are wide variations in the accuracy by diagnosis within the group of conditions. Low agreement between self-report and physician data is indicated by a range of kappas from 0.3 to 0.5 (PHAC 2014; Muggah 2013).

Stroke is a single-item dichotomous measure. Effects of stroke following damage to brain tissue caused by insufficient blood flow are captured. Hospitalization

data do not include emergency visits and likely reflect a more severe stroke, and underestimate prevalence by 50% compared to CCDSS (Tu 2013). Prevalence rates in Ontario have poor agreement with different methodologies; 2% using CCHS self-report, 1% using administrative data (Kappa=.36, Muggah 2013).

Hypertension is a single-item dichotomous measure. High blood pressure is a chronic condition diagnosed by testing systolic pressure and resting diastolic pressure (PHAC 2010b). Prevalence rates in Ontario have moderate agreement with different methodologies; 21% using CCHS self-report, 28% using administrative data (Kappa=.66, Muggah 2013).

Cancer is a two-item dichotomous measure, asked as current or ever diagnosed; consideration should be given to deriving a variable that uses both CCC_131 and CCC_132. There are many different types of cancers; all are characterized by uncontrolled abnormal growth of cells. Cancer incidence that follows diagnostic protocols are maintained in Canada by provincial cancer registries that include tissue-specific characteristics and full descriptions of cancer site, morphology, and behavior. The accuracy of the self-report varies by type of cancer and has high agreement with physician data when cancer is considered as a group (Kappa=.71, Lyons 2014). Specificity of self-report is high (>98%) for most sites, indicating that few false positives are reported. Low sensitivity is reported for cervical, endometrial, and melanoma, with *in situ* cancer less likely to be reported. Under-reporting also exists for lung, colorectal, ovary, leukemia and lymphoma (sensitivity ≈80%). Highest sensitivities (>90%) are reported for breast and thyroid cancers (Parikh-Patel 2003).

Bowel disorder is a single-item dichotomous measure. Bowel disorder refers to multiple chronic conditions including: Crohn's disease, ulcerative colitis, irritable bowel syndrome, or incontinence. There is poor agreement between survey and administrative data, and evidence of under-reporting in both sources. Prevalence rates in Manitoba have poor agreement with different methodologies; 3% using CCHS self-report, 4% using administrative physician data (Kappa=.22, Lix 2010).

Depression is a single-item dichotomous measure. This item captures multiple mood disorders including: depression, mania, dysthymia, or bipolar disorder. Under-reporting may result from mild cases, stigma, a diagnosis under consideration but does not meet standard criteria, or symptom co-occurrence for other mental disorders such as anxiety. There is fair agreement between medical charts and administrative data (Kappa=0.54, West 2000).

Anxiety is a single-item dichotomous measure. This item captures multiple anxiety disorders including: phobias, obsessive-compulsive disorder, or panic disorder. Diagnosis requires assessment of symptoms and functional impairment. There is fair agreement between methods when anxiety and depression were

combined (Kappa=0.54, West 2000). Combined prevalence rates in Quebec vary with different methodologies: 11% using CCHS self-report, 22% using administrative physician data (Tannenbaum 2013).

PTSD is a single-item dichotomous measure that includes a variety of symptoms following exposure to trauma (Asmundson 2000). It was used in CCHS MH 2012.

TBI is a single-item dichotomous measure. Effects of traumatic brain injury are captured, and range from mild concussion to severe psychological states. The effects may be nonspecific, and many who suffer from mild TBI do not seek medical help (Thompson 2008). Self-reported diagnosis has not been compared with other data sources. It was used LASS 2013.

Military attribution is a single-item dichotomous measure. It measured self perceived relationship of the prior group of chronic conditions (excludes hearing and pain) to their military service, in LASS 2013. Prior use in LASS 2010 asked a series of questions after each chronic condition and established that self-reported attribution was highest for those with PTSD, hearing problems, pain, arthritis, back problems, depression or anxiety; lower attribution rates were assigned for cancer, stroke, diabetes, and heart disease (Thompson 2011).

Hearing was measured using a scale that is a component of the Health Utility Index developed at McMaster University's Centre for Health Economics and Policy Analysis (Horsman 2003). Ability to hear was captured in a variety of circumstances; utility was not assigned.

Chronic pain was measured using a scale that is a component of the Health Utility Index developed at McMaster University's Centre for Health Economics and Policy Analysis (Horsman 2003). Pain or discomfort related to activity limitation was captured. Self-reported pain intensity was also available.

vi) Restriction of Activity (RAC) Module

Restriction of activity questions originate from the Participation and Activity Limitation Survey (PALS). PALS adopted the International Classification of Functioning (ICF) concept of functional disability, but not the 1,400 different dimensions the ICF uses to describe possible forms of disability. The RAC module in CCHS are the filter questions from PALS that were designed to be followed by a series of additional questions to determine the nature of the respondent's disability (Statistics Canada, 2015).

Activity limitation is derived from the RAC questions assessing health-related restriction of activity. This measure of disability captured function in life domains

at home, work/school, or leisure (Thompson 2014). CCHS classified the impact of health problems into three levels: often, sometimes or never.

ADL is derived from the six questions on need for help with activities of daily living. Basic ADLs (personal care, moving inside house) indicate self care ability to avoid long-term care services. Basic ADL correlates with the SF-36 scale. Instrumental ADLs (meals, housework, groceries, finances) include a broader range of activities needed for independent living in the community (Fillenbaum 1988). CCHS dichotomized the need for help for any ADL in the module.

vii) Quality of Life Module

Self-perceived health related quality of life was measured using a scale of 12 items (Short Form SF-12, v2). Quality of life measures represent personal perception of an individual's ability to function compared with his or her own internalized standards of what is possible or ideal; including concepts of resilience, health worries, functioning, and impairment. SF-12 is a reduced item scale based on the SF-36 short form of the Medical Outcomes Study by RAND. Correlation between scores on the SF-12 and SF-36 was over 94% (Ware 1996). The scale covers physical and mental health concepts of physical functioning, role physical, bodily pain, general health, vitality, social functioning, role emotional, and mental health, that can be scored separately using SF-12, v2. Two broader component summaries were computed using QualityMetric's software: **PCS** (physical health composite score), and **MCS** (mental health composite score). Both PCS and MCS scores were transformed by the software to a mean of 50 and a standard deviation of 10, based on US norms. Canadian norms are a little higher with means of 51 to 52, indicating better quality of life (Thompson 2013b). LASS 2010 used SF-12, v1.

viii) Distress Module

Psychological distress was measured using the **K10** Distress Scale of 10 items. This scale was developed to assist in assessing the severity of psychiatric illness by detecting symptoms of depression and anxiety (Kessler 2002). K10 validation demonstrated equivalent identification of cases of severe mental illness as CIDI (Furukawa 2003). Using CCHS 1.2, agreement between K10 and CIDI was 93% (Cairney 2007). The overall K10 score (higher scores indicate more distress) had 0.75 correlation with MCS, and weak correlation with PCS. Factor analysis derived two major subsets of K10 items; one related to a diagnosis of depression (items A, D, G, H, I, J) and one related to a diagnosis of anxiety (items B, C, E, F) (Brooks 2006). Also available is the K6 score that demonstrated an optimal cut point of 13+ to assess prevalence of serious mental illness in population studies (Kessler 2003). A measure of chronicity demonstrated that for the majority (71%) their distress score was their usual state. K10 was used in CCHS MH 2012.

ix) PTSD Screen Module

Posttraumatic stress disorder is an anxiety disorder with characteristic symptoms following exposure to trauma. The symptoms correspond to four dimensions: re-experiencing, avoidance, emotional numbing, and hyperarousal (Asmundson 2000). The four dimensions are part of the DSM-IV diagnostic criteria, and were used in the development of the four-item Primary Care PTSD Screen. Using a cut-off score of 3 and comparison with a structured clinical interview (CAPS), the **PTSD screen** has a sensitivity of 0.78 and specificity of 0.87 (Prins 2003; Bliese 2008). A question on attribution to military service was added to the module. This module was used in CCHS MH 2012.

x) Social Support Module

The availability of social support was measured using a scale of 10 items. The **SPS** (social provision scale) is a reduced version of the original 24-item scale (0.93 correlation). The 10-item scale used in LASS 2013 incorporates the dimensions of emotional attachment, social integration, reassurance of worth, material assistance, and advice/guidance. Other measures of support received or adequacy of support are less predictive of health. The total SPS score indicates more social support, with correlation between SPS and K10 of -0.34 (Caron 2013). This module was used in CCHS. LASS 2010 used the longer 24-item scale.

xi) Smoking, Alcohol Modules

Smoking behaviour was measured using a series of 12 questions. From these, variables were derived to indicate **daily smoking**, years of daily smoking, and years since stopped smoking. The smoking module was used in CCHS.

Alcohol consumption behaviour was measured using a series of 3 questions. From these, a variable was derived to indicate **heavy drinking**. In March 2013, the definition was the same for both men and women: five or more drinks per occasion, at least once a month. The alcohol module was used in CCHS.

xii) Suicidality Module

Suicidal behavior was measured using a series of six questions. From these, past-year suicide ideation was derived. Suicide ideation was associated with socioeconomic factors and both mental health and physical health (Thompson 2014b). The suicide module was used in CCHS MH 2012; past year suicide attempts were only available for those with past year suicide ideation.

xiii) Health Care Utilization Modules

Use of the provincial health care systems was measured using several CCHS modules (HCU, CHP, UCN) that contain a series of questions on self-report of past-year utilization. Utilization is measured as 1) contact – a dichotomous measure of use, or 2) intensity – volume of use. Contact is primarily initiated by individual patients, especially contact with the family doctor. Contact with specialists is a more complex negotiation between the patient, referring doctor, and specialist. Hospital contact is largely driven by specialists, with a limited patient role. Intensity of utilization is primarily determined by health care providers and need indicators (Asada 2007).

Note that analysis of intensity (frequency of use), required 0 count assigned to # visits for those with a valid skip, for all measures in this section. These modules were used in LASS 2013.

Regular doctor is a single-item dichotomous measure of current availability.

Home care is measured using two questions to differentiate use of care subsidized by government from care paid for by private sources.

Hospitalization is measured using two questions: a single-item dichotomous measure, and frequency of # nights used. Self-report underestimates hospital visits by 8% (Rotermann 2009).

Family doctor contact was measured using two questions: a single-item dichotomous measure of past-year use, and frequency of # visits. Self-report appears to underestimate physician office visits. MD visits: admin adjusted: *.87 women, *.75 men compared to CCHS (Tannenbaum 2013).

Specialist doctor contact was measured using four questions. Any specialist visit (other than family doctor) can be derived, or eye doctor visits can be excluded. Both dichotomous use and frequency of # visits were measured.

Nurse contact was measured using two questions: a single-item dichotomous measure of past-year use, and frequency of # visits. Location of visit was also available; nurse visits may overlap with physician and hospital visits.

Dentist contact was measured using two questions: a single-item dichotomous measure of past-year use, and frequency of # visits.

Other health care provider contacts were less frequent. They include physiotherapist, psychologist, social worker, counsellor, audiologist, speech therapist, occupational therapist. Analysis will require a new derived variable.

Chiropractor contact was measured using two questions: a single-item dichotomous measure of past-year use, and frequency of # visits.

Alternative care provider contact was measured using two questions: a single-item dichotomous measure of past-year use, and frequency of # visits. These providers included acupuncturist, homeopath, massage therapist.

xiv) Unmet Need Module

Self-perceived **unmet need** for healthcare was measured using the CCHS module of four questions. The wording does not distinguish situations in which people did not receive services at all from those situations in which they did not receive them in a timely manner. Reasons for unmet need can be broadly categorized into system-related and personal; others have used additional categories (Chen 2002; Ronksley 2013). This module was used in LASS 2013.

xv) Insurance Module

Insurance coverage of health was measured using the CCHS module of three questions. Prescription medication coverage is under-reported by 30 to 50%, with some evidence of deductibles confused with lack of coverage (Grootendorst 2003). This module was used in LASS 2010 & 2013.

xvi) Education Module

Education was measured using one item from the CCHS module that asks the highest level completed. This module was used in LASS 2010 & 2013.

xvii) Labour Force Module

Labour force participation was measured using a portion of the CCHS module; the source of these questions are the Labour Force Survey.

Labour Force Status is derived from three of these questions, and allow calculation of current employment and unemployment rates that match Canadian definitions by categorizing those in the labour force as employed/unemployed, and those not in the labour force as no job and not looking/not able to work.

Full-time and part-time employment status is also derived.

Additional questions specific to military service were added to LASS 2010 & 2013.

Knowledge and skills were part of a series (Spiegel 2003) of 8 questions used in LASS 2010. Analysis of 2010 data demonstrated overlapping concepts comparing military and civilian work experience; focus groups described the 1st question as double-barreled, and questions 4, 6, 8 as difficult to interpret (Statistics Canada, 2012). LASS 2013 kept only the 3rd question with its limited overlap with the concept of adjustment to civilian life ($\kappa=0.15$).

Comparability of military and civilian tasks can be assessed using administrative data (MacLean 2015).

Main activity in the past 12 months was developed for LASS 2010, inspired by a lengthy series of questions designed to evaluation employment status for those with addiction issues, and adjusted following pretest in 2009. It was not validated. Satisfaction with main activity was used in LASS 2010 & 2013.

xviii) Income Module

Income was measured using the CCHS module of 11 questions. This module included family information on **marital status, household size, personal income, and household income**. They were used to derive the **Low Income Measure** (details in section 4.7).

An additional question was added on **satisfaction with finances**; it was used in LASS 2010 & 2013.

7. Strengths and Limitations

The primary strength of LASS is the ability to generalize the LASS results to Veterans released since 1998. The basis for this ability is the high quality population frame and large representative sample. Since there is no listing of Veterans in Canada, the LASS population frame was carefully constructed from multiple files of administrative data available from DND and VAC sources. Statistics Canada assembled the data files with additional Canadian data sources. The frame was tested by Statistics Canada interviewers in March 2013, who found only 1% of records were out-of-scope. The result of these efforts was an accurate population frame.

The LASS Income Study used the high quality population frame for linkage with income data only available at Statistics Canada. The 92% linkage rate was evidence of the high quality of both files. The strength of this design was the census approach that avoided sampling error, and avoided estimation errors of self-reported income.

The Life After Service Survey 2013 used the high quality population frame as the sample frame. The 70% response rate exceeded the design assumptions used to calculate sample size. The survey's $n=4149$ exceed the expected 3246 responses. The 90% share rate was consistently high across groups with different characteristics. Validated questions were used within the survey, and the majority of the content was selected from CCHS modules, which allowed comparisons with Canadians. The self-report nature of the survey can lead to measurement bias that was minimized by Statistics Canada procedures. The use of Statistics Canada, the most respected independent third party in Canada, was a deliberate choice to avoid potential bias introduced by VAC or DND collection. The cross-sectional design is not appropriate for analysis of incidence or causation. Conditions measured may pre-exist prior to the survey, and point-in-time reference does not elucidate the course of these conditions. When weighting procedures provided by Statistics Canada are used, the cross-sectional design is optimal for analysis of prevalence and associations.

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Appendix A. Definitions of Veteran Groups

Classes of Primary Reserves⁵:

- Class “A” Reserve Service is when the member is performing part-time training or duty in circumstances other than Class B or Class C Reserve Service.
- Class “B” Reserve Service is when the member is on full-time service and is serving on a training course, or as a temporary instructor conducting training, or on other approved duties of a temporary nature.
- Class “C” Reserve Service is when the member is on full-time service and is serving in a Regular Force established or supernumerary position, or is deployed on an operation, domestically or internationally.

Groups used in LASS 2013 data analysis:

Personnel move between the Regular Force and Primary Reserve; and within the Primary Reserve there is frequent movement between Class A, B, and C. This movement was addressed in the study by assigning each Veteran to one of the following mutually exclusive categories:

- Regular Force Veterans had full-time service in the Canadian Armed Forces between 1998 and 2012. They may also have served in the Primary Reserve Force, but this was not consistently captured for the study period.
- Reserve Class A/B Veterans had part-time Class A service in the Primary Reserve Force between 2003 and 2012, and also had some Class B temporary full-time service. They had no Regular Force service.
- Reserve Class C Veterans had some full-time Class C service in the Primary Reserve Force between 2003 and 2012, and also had Class A service and Class B service. Class C service is full-time service in support of deployed operations, domestically or internationally. They had no Regular Force service.

5 Queen's Regulations & Orders, Chapter 9; excludes other types of Reserves: Supplemental, COATS, Rangers.

Appendix B. Population Frame Construction

- Sept 14, 2012 **Request** – for DRIM data from HRMS (Human Resources Management System) summary Personal Info table to extract all releases.
[Variables: SN, Name, DOB, gender, original hire date, last environment, last component (Reg/Res), last subcomponent (Ranger/COAT/Sup/Prim), last rank, release code, release date]
- Oct 5, 2012 **Data File**
149,578 records: 33,153 Reg F, 116,425 Reserve F
Problem with 90,139 releases from Supplementary Reserve, unknown number with another Reg release or Primary Res release.
- Oct 8, 2012 **Request** – for DRIM data from HRMS employment history file to extract all postings.
- Oct 16, 2012 **Data File** not available
Problem with relational database computations overwhelming and crashing the system
- Oct 17, 2012 **Request** – for DRIM data from HRMS employment history file to extract all releases and transfers (to capture movement between Reg, Primary Reserve and Supp Reserve).
- Oct 30, 2012 **Request** – for pay data to extract Service Number and Social Service Number (to enable linkage for contact information)
- Nov 5, 2012 **Request** – for data from HRMS to extract all still-serving
[Variable: SN]
- Nov 14, 2012 **Request** – for data from Public Works to extract all with a pension from DND, requested by StatCan [variables: contact info]
Requested data not received by January 2013.
- Nov 20, 2012 **Data File**
Still-serving for removal from population frame of releases
- Nov 26, 2012 **Request** – Director Military Personnel Operational Research and Analysis, DGMPRA expedited Oct 17 & 30 requests
- Dec 12, 2012 **Data File**
150,171 records: 513 duplicates
154 missing key variables [35 SN, 17 component, 102 date of release]
15,176 old rec not in pay system since 1997, nor LASS 2010
529 still serving as of Nov 20, 2012
- 133,799 records of releases on population frame
- Dec 13, 2012 **Population Frame**
133,799 records assigned a pattern of up to 6 hires by comp & sub-components
Excluded: 27,502 Supp Res service only
18,349 Reg F release date prior to 1998
1,892 Reserve only service prior to 2003
559 Release after Aug 31, 2012
- 85,497 records of releases on population frame

- Dec 14, 2012 **Population Frame** to Statistics Canada
85,497 records: 29,117 Reserve releases (unknown distribution of Class A, B, C)
56,380 RegF releases (may also have Reserve release)
[Variables created: sum_sub_comp to capture up to 6 changes between comp/subcomp,new_release_dte]
Variables used to stratify sample: Unique component (Reg/Res/both), last rank.
- Dec 14, 2012 **Request** – for DRIM data from HRMS Class assignment file
to extract all periods of Class B and C service
[Variables: SN, start date, end date, Class]
- Dec 14, 2012 **Contact Information** to Statistics Canada
100% records had most recent address from DND files (esp from their Supp
Reserve release)
48% records had most recent address from VAC files (if contacted VAC)
0% records had most recent address from PWGSC (file not available)
- Dec 17, 2012 **Population Frame** linkage at Statistics Canada
Death clearance
Contact information from tax files, child benefit, driver's license used to remove
out-of-scope (address outside Canada, address of long-term institution).
- Dec 18, 2012 **Data File** on Class Assignments
Of the 29,117 Reserves, each person had up to 107 periods of service:
16,702 Class A and at least one period of Class B
3,469 at least one period of Class C
8,946 Class A only, no periods of Class B or Class C
[Variables created: LOS, round_sum_length (#yr B service), Csum (#days C service)]
- Dec 19, 2012 **Data File** on VAC clients
18,290 records
- Dec 20, 2012 **Population Frame** to Statistics Canada
85,497 records: 56,380 RegF releases (may also have Reserve release)
16,702 Class A and at least one period of Class B
3,469 at least one period of Class C
8,946 Class A only
76,596 records of releases on population frame; exclude Class A only
- Jan 10, 2013 **Population Frame** updated at Statistics Canada
76,596 records, exclude 1,596 out-of-scope:
803 contact info not in 10 Canadian provinces
6 contact info long-term care
720 deaths
67 still serving from updated DND file
75,000 records on population frame prior to sampling:
1,673 contact info not updated since release
5,305 phone not updated since release
68,022 phone and address updated by a linkage file

- Jan 16, 2013 **Population Frame** used to draw survey sample, survey selection excluded 1,673 with no update of either phone or address; 75,000 full population frame used for weighting
- March 18, 2013 **Population Frame** sample contacted for interviews; 6,017 selected for an interview:
 - 55 identified as out-of-scope (1%)
 - (moved out of Canada, death, long term care, still serving)
 - 5,962 in-scope Veterans (eligible for data collection or non-response)
- July 24, 2013 **Request** – for Revised Pay System for Reserves data to extract all Reserve compensation since 2002
Variables: annual total pay by calendar year
- July 24, 2013 **Request** for DRIM data from HRMS on all releases
Variables at release: Occupation, marital status, education, province
- Feb 4, 2014 **Data File** on Reserve pay
29,117 records on frame for Reserve Force
27,063 records on Reserve compensation (93% linkage rate)
[Variables created: pay per year, length of service, sum of all pay]
[pay per year: 2% of records had negative pay, recoded to zero pay]
- Feb 14, 2014 **Data File** on military characteristics at release
Variables at release added to population frame
 - province at release: 41% missing; no documentation for the 200 codes used
 - education at release: 100% missing for Reserve F; 37% missing for RegF
 - occupation at release: 8% missing
- Feb 28, 2014 **Population Frame** linkage to Income 1997 to 2011
70,771 records on frame after excluded releases after Dec 31, 2011
64,875 records on T1FF (92% linkage rate)

Appendix C. Population Frame Variables, DND Sources

1. Service Number
2. DOB – matched to T1FF for all but 5 persons
3. Sex (Male/Female)
4. Original hire date - enrollment
5. Release date
5. Last environment (Navy/Army/Air)
6. Last component (Regular Force/Reserve Force)
7. Last subcomponent (Ranger/COAT/Supplementary/Primary)
8. Release type codes⁶:
 - **Voluntary:** 4a immediate annuity, 4b fixed service; 4c other voluntary; 5a Retirement Age; 5c Service Complete.
 - **Medical:** 3a medical; 3b medical military occupation.
 - **Involuntary:** 1a sentenced to dismissal; 1b service misconduct; 1c illegally absent; 1d fraudulent enrolment; 2a unsatisfactory service; 2b unsatisfactory performance; 5b reduction in strength; 5d not advantageously employed; 5e irregular enrolment; 5f unsuitable for further service.
9. Last rank⁷:
 - **Senior Officer**
Navy: Admiral(Adm, VAdm, RAdm), Commodore, Captain, Commander(Cdr, LCdr)
Army/Air Force: General(Gen, LGen, MGen, BGen), Colonel(Col, LCol), Major
 - **Junior Officer**
Navy: Lieutenant(Lt(N), SLt, A/SLt), Naval Cadet
Army/Air Force: Captain, Lieutenant(Lt, 2Lt), Officer Cadet
 - **Senior NCM** (Non-Commissioned Member)
Navy: Petty Officer(CPO1, CPO2, PO1, PO2)
Army/Air Force: Warrant Officer(CWO, MWO, WO), Sergeant
 - **Junior NCM** (Non-Commissioned Member)
Navy: Seaman (MS, LS, AS, OS)
Army/Air Force: Corporal(MCpl, Cpl), Private(Pte, Pte Recruit)
10. Military Occupation at Release
There are over 100 MOCs; these were assigned to 8 groups⁸:
 - Combat Arms, Communications, Maritime, Aviation, Administrative, Engineering, Medical, Specialist.
11. Length of Service – derived using days between dates 4 & 5.
 - Regular Force: any Reserve Force service was not included in length of service.
 - Reserve Force: all of the period between dates was included, and not pro-rated for part-time service.
 - For those with multiple enrollment and release dates, the time between periods of service was not counted in length of service.
12. Age at Release – derived using date 2 and most recent date 5.

6 Source: Queen's Regulations and Orders for the Canadian Forces (QR&Os)

Available: www.admfincs.forces.gc.ca/qro-orf/vol-01/doc/chapter-chapitre-015.pdf

7 Source: www.forces.gc.ca/en/honours-history-badges-insignia/rank.page

8 Source: MacLean et al. Military Occupation and Post-Military Employment and Income Outcomes. VAC Report Jan 16, 2015.

Appendix D. Population Frame Variables, VAC Sources

1. Client ID [clnt_id]
2. Service Number
3. DOB [dte_brth] - confirmed DND source
4. Date of Death [dte_dth]
5. Province at time of VAC contact [addr_prvn2_2]

AB=	5006	ON=	10525
BC=	3842	PE=	265
MB=	1315	QC=	7630
NB=	1847	SK=	521
NF=	894	YU=	26
NWT=	48	USA=	168
NS=	4418	Missing=	39,786
NU=	5	Total=	76,296
6. Client as of March 31, 2012 (avail Dec 2012 to build Population Frame)
7. Client as of March 31, 2013 (see Figure 5)
8. Client status [VAC_Client] (created for Income Study using VAC expenditure data)

0= VAC client in any program on Mar 31, 2013	(N=18,135)
1= non-client on Mar 31, 2013, no DA/DP expenditures	(N=52,383)
2= longitudinal expenditure: DA 2006-2012 DP2004-2012	(N=253)
9. Disability Benefits client type [COG_DB]

1= DA only	(N=4276)
2= DP only	(N=9991)
3= DA & DP	(N=3802)
4= Entitlement only	(N=26)
5= not DB client	(N=52676)
Total=	70,771
10. Disability Benefit clients by disability percentage [COG_DBgroups]

1= <5%	(N=1320)
2= 5 – 17%	(N=7112)
3= 18 – 27%	(N=2529)
4= 28 – 47%	(N=2828)
5= 48%+	(N=4306)
Total=	18,095
11. Disability Benefit condition [COG_condition]

1= hearing loss	(N=2025)
2= musculoskeletal condition	(N=9564)
3= psychiatric condition	(N=1773)
4= MSK & psych conditions	(N=3539)
5= other conditions	(N=1234)
6= not DB client	(N=52636)
Total=	70,771
12. Rehabilitation program client

[COG_Rehab] 1= Rehab client on Mar 31, 2013	(N=3371)
[Rehab_ever] 4 digits= year of first entry into Rehab based on Rehab Record of Decision range: 2006 to Feb 11, 2014	(N=5488)
[RROD_year] 4 digits= year of first entry into Rehab based on Rehab Record of Decision within range 2006 to 2011	(N=4508)
[Rehab_completed] 4 digits= year of last entry into Rehab and completed based on Rehab Record of Decision within range 2006 to 2011	(N=852)

13. Vocational Rehabilitation program client

[VOC_Ind] 1= Rehab client with a VAC case manager to initiate a new career/vocation during the period 2006 to Feb 7, 2014 (N=2188)

[IVRP_Ind] 1= Rehab client with a completed Individual Vocational Rehabilitation Plan during the period 2006 to Feb 5, 2014; (N=681)
Completion of the IVRP is a proxy for “employable”.

14. Financial Benefits client

[COG_FB] 1= client of EEL, CFIS, or PIA (N=2308)

15. Totally and Permanently Incapacitated client

[COG_TPI] 1= TPI client (N=988)

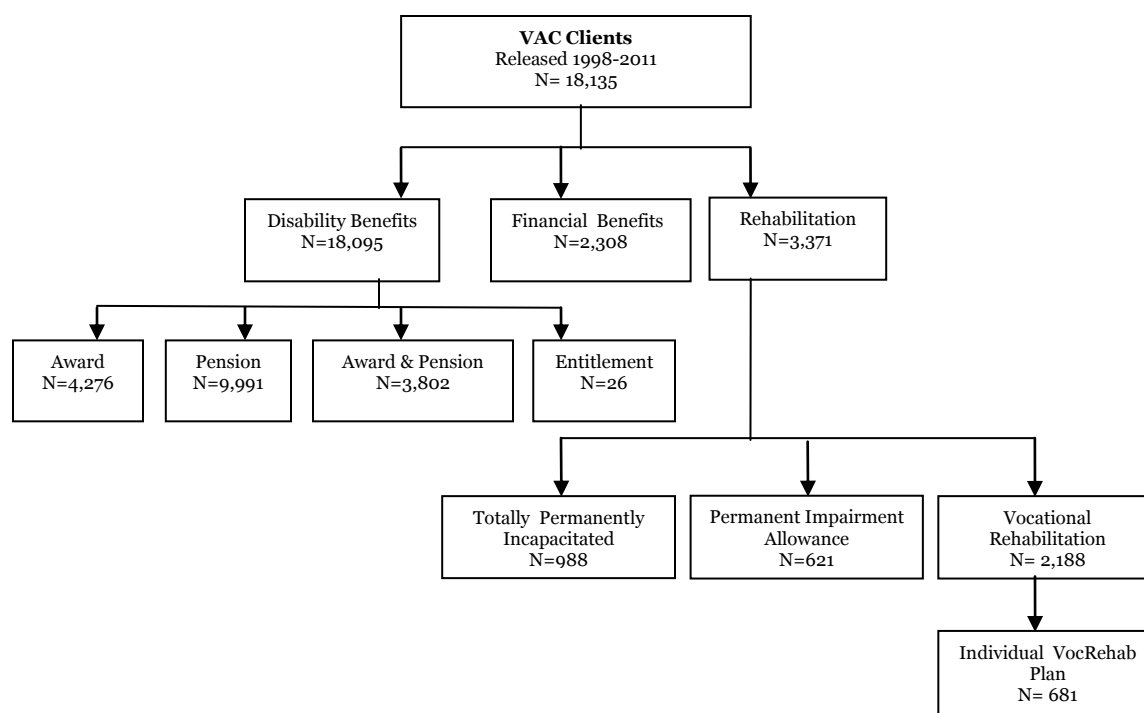
16. Permanent Impairment Allowance client

[COG_PIA] 1= PIA client (N=621)

17. Veterans Independence Program client

[vipclient] 1= VIP client (N=6431)

Figure 5. **Veterans in Receipt of VAC Benefits**



N: VAC clients as of March 2013, Income Study Population Frame

Appendix E. Population Frame Characteristics, By Veteran Group

		Regular Force Veteran Released 1998 – 2012 (N=56129)		Reserve Class C Veteran Released 2003 – 2012 (N=3469)		Reserve Class A/B Veteran Released 2003 – 2012 (N=16698)	
		count	%	count	%	count	%
Release year	1998	3408	6%	0		0	
	1999	3273	6%	0		0	
	2000	3314	6%	0		0	
	2001	3052	5%	0		0	
	2002	3173	6%	0		0	
	2003	3229	6%	200	6%	1198	7%
	2004	3693	7%	300	9%	1468	9%
	2005	3622	7%	338	10%	1684	10%
	2006	4243	8%	324	9%	1824	11%
	2007	4724	8%	320	9%	1496	9%
	2008	5263	9%	394	11%	2145	13%
	2009	4537	8%	384	11%	1958	12%
	2010	4025	7%	389	11%	1907	11%
	2011	3845	7%	536	16%	1916	12%
	2012	2728	5%	284	8%	1102	7%
Gender	F	7024	13%	736	21%	2869	17%
	M	49104	88%	2731	79%	13818	83%
Age at Release	< 20	3144	6%	29	1%	3409	20%
	20 – 29	15473	28%	1374	40%	9798	59%
	30 – 39	11967	21%	1044	30%	1915	12%
	40 – 49	17413	31%	484	14%	833	5%
	50 – 59	7397	13%	412	12%	549	3%
	60+	735	1%	126	4%	193	1%
Age on Feb 01, 2013	< 20	32	0%	0	0%	107	1%
	20 - 29	8466	15%	528	15%	9067	54%
	30 - 39	11595	21%	1468	42%	5051	30%
	40 - 49	13652	24%	727	21%	1310	8%
	50 - 59	16416	29%	447	13%	686	4%
	60+	5968	11%	299	9%	476	3%
Length of Service	< 2 yr	11608	21%	22	1%	4015	24%
	2 to 9 yr	11229	20%	1384	40%	10295	62%
	10 to 19 yr	6434	12%	1380	40%	1707	10%
	≥ 20 yr	26858	48%	683	20%	681	4%
Environment at Release	Air	16678	30%	223	6%	411	3%
	Land	29789	53%	2792	81%	13869	83%
	Sea	9662	17%	454	13%	2418	15%
Release Type ⁹	Involuntary	4394	8%	405	12%	3203	19%
	Medical	11725	21%	397	12%	436	3%
	Vol -Service comp	9056	16%	224	7%	670	4%
	Vol - Retirement	2749	5%	180	5%	290	2%
	Voluntary - other	28021	50%	2259	65%	12073	72%
Enrollment Year	1950s	133	0%	0	0%	0	0%
	1960s	3000	5%	49	1%	64	0%
	1970s	11252	20%	213	6%	219	1%
	1980s	15831	28%	545	16%	537	3%
	1990s	7644	14%	1712	49%	2701	16%
	2000s	16810	30%	939	27%	12677	76%
	2010s	1459	3%	11	0%	500	3%
VAC client on Mar 31, 2012		18290	32%	521	15%	482	3%

9 Release type described in Appendix C.

		Regular Force Veteran Released 1998 – 2012 (N=56129)		Reserve Class C Veteran Released 2003 – 2012 (N=3469)		Reserve Class A/B Veteran Released 2003 – 2012 (N=16698)	
		count	%	count	%	count	%
Rank ¹⁰	General / Admiral	147	2%	11	2%	5	
	Lieut General / VAdm						
	Mj General / Rear Adm						
	Brig Gen / Commodore						
(Sr Off)	Colonel / Captain (N)	389	4%	18	3%	13	1%
	Lieut Col / Commander	1081	11%	84	15%	84	5%
	Major / Lieut Commander	2306	23%	116	22%	97	6%
(Jr Off)	Captain / Lieutenant (N)	3092	31%	210	39%	359	21%
	Lieutenant / Sub-Lieut	239	2%	67	12%	218	13%
	2nd Lieut / A Sub-Lieut	705	7%	29	5%	571	33%
(Subord)	Officer Cadet / N Cadet	2157	22%	3		380	22%
	Total Officers	10116	100%	538	100%	1727	100%
(Sr NCM)	Chief WO / Chief PO1	985	8%	47	7%	43	7%
	Master WO / Chief PO2	2336	19%	50	8%	66	11%
	Warrant Off / Petty Off 1st	3376	26%	116	18%	119	19%
	Sergeant / Petty Officer 2 nd	6140	48%	417	66%	372	61%
	Total Sr NCM	12837	100%	630	100%	610	100%
(Jr NCM)	Master Corp / M Seaman	5248	19%	417	20%	495	4%
	Corporal / Leading Sea	9943	34%	1445	72%	4579	35%
	Private / Able Seaman	3981	14%	44	2%	2041	15%
	Pte(Recruit) / Ordinary Sea	6562	22%	32	2%	3544	26%
	Pte(Training) / OS (Recruit)	3303	10%	79	3%	2600	21%
	Total Jr NCM	29037	100.0%	2017	100.0%	13259	100.0%
Military Occup Group ¹¹	Combat Arms	13484	27%	1050	45%	7680	59%
	Communications	4113	8%	241	10%	754	6%
	Maritime	6009	12%	212	9%	1358	10%
	Aviation	6757	14%	44	2%	85	1%
	Admin/Logistics/Secu/Int	11276	23%	577	25%	1971	15%
	Engineering/Technical	5184	10%	82	4%	374	3%
	Medical	2286	5%	90	4%	579	4%
	General Officer Specialist	655	1%	39	2%	322	2%
	Total	49764	100%	2335	100%	13123	100%
Marital Status ¹²	Married/common-law	21086	40%	772	24%	1313	9%
	Single	14988	29%	1503	47%	10481	67%
	Missing	15916	31%	910	29%	3802	24%
	Total	51990	100%	3185	100%	15596	100%

10 Ranks described in Appendix C; table based on n=70,771 Income Study pop'n.

11 MOC Groups described in MacLean et al, 2015; table based on n=65222 (92%) of 70,771 Income Study pop'n.

12 Marital Status at release table based on n=70,771 Income Study pop'n.

Appendix F. Income Variables

1. Total income is the sum of all sources of taxable income filed with the Canada Revenue Agency, as described on this page.

2. Earnings

- Wages and salaries
 - Earnings from T4 slips
 - Other employment income (VAC's Earnings Loss, Permanent Impairment Allowance; DND's SISIP long-term disability for medically released)
- Self-employment (business, professional, commissions, farming, fishing)

3. Pensions

- Pension and superannuation income
- Foreign pensions converted into Canadian funds
- RRSP income if age 65+
- Excludes: Old Age Security, Canada/Quebec Pension Plan (gov't transfers)
- **Excludes** non-taxable pensions not on tax file: VAC's Disability Pension, Disability Award, War Veterans Allowance.

4. Government transfers

- Old Age Security pension
- Canada/Quebec Pension Plan
- Employment insurance
- Tax credits (GST credit, provincial refundable tax credits)
- **Includes** non-taxable sources on tax file: Social Assistance, Workers' Compensation, Child Tax Benefits, Family Benefits

5. Investment

- Interest and dividends (excludes capital gains)
- Partnership income
- Rental income

6. Other income

- Alimony or separation allowances
- Scholarships, research grants, amateur athlete trust, project grants
- Retiring allowances
- Registered education savings plan income
- Training allowances
- Annuity payments (e.g., Guaranteed Annual Income)

Sources: Statistics Canada, Longitudinal Administrative Data Dictionary: 2004, Catalogue no. 12-585-XIE

Appendix G. Statistics Canada Disclosure Guidelines

Statistics Canada is prohibited by law from releasing any data which would divulge information obtained under the Statistics Act that relates to any identifiable person, business or organization without the prior knowledge or the consent in writing of that person, business or organization. Various confidentiality rules are applied to all data that are released or published to prevent the publication or disclosure of any information deemed confidential. If necessary, data are suppressed to prevent direct or residual disclosure of identifiable data.

Disclosure control measures may include data reduction methods (removing names and addresses, sampling or sub-sampling, reducing the level of detail, grouping categories, recoding of some variables, top and bottom coding, removing variables or critical survey respondents, suppressing data values on specific records) or data perturbation methods (random perturbation or noise addition and data swapping).

Release of LASS data in publications adheres to the following Statistics Canada guidelines:

1. Rounding

- population estimates are rounded to the nearest 100 units;
- marginal sub-totals are derived from their corresponding unrounded components and then rounded
- rates and percentages are rounded to one decimal
- proportions and ratios are rounded to three decimals
- sums and differences are derived from their corresponding unrounded components and then rounded
- unrounded estimates are not to be published since they imply greater precision than actually exists.

2. Sample weighting

All estimates, rates, and percentages must apply the proper survey sample weights to be representative of the survey population.

3. Data suppression

- all sample sizes less than 5 must be suppressed for confidentiality
- population estimates based on sample size less than 30 should be suppressed for data quality
- population estimates based on sample sizes of 30 or more, suppression is recommended if the coefficient of variation is unacceptable (category 3).

4. Coefficient of variation (CV)

One measure of data quality is the sampling error as reflected by the coefficient of variation. CV is a relative measure of sampling error, calculated as the ratio of the standard error of the survey estimate to the estimate itself. Precision of the estimates are then described as:

- Category 1: Acceptable CV from 0.0% to 16.5%. No release restrictions are required.
- Category 2 : Marginal CV from 16.6% to 33.3%. Release with caveat regarding accuracy such as “Interpret with caution.”
- Category 3: Unacceptable CV in excess of 33.3%. Not recommended for release since estimates are so potentially misleading, and estimate should be replaced with an F indicating “Too unreliable to be published.” If released in a non-standard product, estimates must be flagged with an F and the disclaimer: “Does not meet Statistics Canada’s quality standards. Conclusions based on these data will be unreliable, and most likely invalid.”

5. Statistical analysis

The LASS complex survey design and selection probabilities affect the estimation and variance calculation procedures that must use the survey weights. Many statistical packages allow weights to be used, and will generate estimates correctly. Procedures using the weight often underestimate variances, if the calculations do not appropriately use the sample survey framework.

For other analysis techniques (e.g., linear regression, logistic regression and analysis of variance), there is a method which can make the variances calculated by the standard packages more meaningful, by incorporating the unequal probabilities of selection. The method rescales the weights so that there is an average weight of 1. However, the statistical package must also take into account the stratification and clustering of the sample’s design to avoid under-estimation of variance. Variances that use detailed knowledge (not available on the microdata file) of the complete sample design can be precisely calculated by Statistics Canada on a cost-recovery basis.

6. Variance estimation

Variance estimation requires calculation of standard deviation, coefficient of variation, and confidence intervals that take into account the complex survey design. Statistics Canada recommends the bootstrap method for variance estimation when using the master and share files.

Bootstrap weights are provided and can be used by commercial software packages that can carry out some design-based analysis for variance estimation: Stata 9 or

10, SUDAAN and WesVar. Stata's SVY commands account for stratified and clustered design, and BRR commands use the bootstrap weights to provide appropriately skewed confidence intervals. SAS or SPSS cannot use the pre-calculated bootstrap weights, so they require the BOOTVAR macro program that may be downloaded from Statistics Canada's Research Data Centre (RDC) website:

- SAS: http://www.statcan.gc.ca/rdc-cdr/bootvar_sas-eng.htm
- SPSS: http://www.statcan.gc.ca/rdc-cdr/bootvar_spss-eng.htm

Independently, in each stratum, a simple random sample of $(n-1)$ of the n units in the sample is selected with replacement. Note that since the selection is with replacement, a unit may be chosen more than once. An initial bootstrap weight is calculated for each sample unit in the stratum which ensures that the $n-1$ units are representative of the population. The process is repeated 500 times, yielding 500 different initial bootstrap weights. These weights are then adjusted according to the same weighting process as the regular weights. The end result is 500 final bootstrap weights for each unit in the sample. These weights are then adjusted according to the same weighting process as the regular weights: non-response adjustment, calibration and so on. The end result is final mean bootstrap weights for each unit in the sample. The variation among the possible estimates based on the bootstrap weights are related to the variance of the estimator based on the regular weights and can be used to estimate it.

Appendix H. Survey Content Selection

Question Module		LASS 2010	CCHS 2012	CCHS 2008	HLIS 2009	MH 2012	CF 2013	Priority 2013	Comment
Demographics									
date of birth, sex	ANC	y	C	C	y	y	Admin	H	admin
marital status	INC	y	C	C	y	y	y	H	
immigrant status, ethnic	SDC		C	C				L	
languages spoken	SDC		C	C	y			M	
# persons in household	INC	y		C				H	
Geography		prov						H	FSA
permission to share		y						H	admin linkage; prov # in future cycle? (S 5.7)
Health Status									
General Health	GEN	y	C	C	Y	y	y	H	use full CCHS module
Positive Mental Health	PMH		C			y	y	M -> L	14Q, overlap with GEN, Sat, K10, MAS
Satisfaction with Life	SWL	y	O	O				M	keep sat with finances
Chronic conditions	CCC	y	C	C	Y	y	y	H	use full CCHS module
PTSD dx		y				y	y	H	
TBI dx							y	H	
Height and Weight (BMI)	HWT	y	C	C	y	y		H	
Injuries, repetitive strain, work	INJ		O	C/O	y			L	
Neurological conditions	NEU		C					M -> L	Low prevalence, but incr with age
Oral health	OH1,2		O	O	y			L	
Hearing		1Q						M -> H	severity in 5Q HUI hearing module
Tinnitus								L	
Pain and discomfort	HUP	PALS	C	C		y	y	H	severity in HUP, not PALS
Chronic widespread pain								M -> L	4Q on subset of pain
PTSD					screen		y	H	screen 4Q, not CIDI 17Q
Distress (K10)	DIS		O	O	y	y	y	M -> H	trajectory of anx/dep symptoms
Depression	DEP		O+	O	y	y	y	M -> L	9Q for probability of MDD
Depression screen (PHQ2)								M -> L	2Q screener – overlap with K10
Suicidal thoughts and attempts	SUI	y	O	O	y	y	y	H	
General Anxiety Disorder	GAD					y	y	L	
Two-week disability days	TWD			C	1	y	y	L	
Restriction of activities	RAC	y	O	C	1 Q			H	
Activities of Daily Living	ADL	y	O					H	changes over time; able ≠ actual
WHO Disability Schedule	DAS					y	y	M -> L	psych dominated
Health Utility Index								M -> L	ec analysis
SF-12		y						H	v2 in 2013; v1 in 2010
Determinants of health									
Smoking	SMK	y	C	C	y	y		M	need start/stop
smoking cessation, counsel,	S*		O	O	y			L	
Alcohol use (Heavy drinking)	ALC	y	C	C	y			M -> H	
Alcohol use, past week	ALW		O+	O	y			L	knowl gap, low prev
alcohol use and dependence	AUD			O	y	y	y	M -> L	CIDI; poor focus test 2012
Illicit drug use	IDG		O	O	y	y		M -> L	knowl gap, low prev
Substance use and dependence	SUD					y		M -> L	knowl gap, low prev
Problem gambling				O	y			M -> L	knowl gap, low prev
Use of protective equipment	UPE		O	O				L	
Sun safety behaviours	SSB		O	O				L	
Driving and safety	DRV		O+	O				L	
Sexual behaviours	SXB		O	O	y			L	
Risk Behaviours					y			L	small effect sizes
Physical activity during leisure	PAC		C	C	y			L	knowl gap
Physical activity - short	PHS					y		L	knowl gap
Sedentary activities	SAC		C	O				L	knowl gap
Maternal -Breastfeeding,	MEX		C	C/O				L	
Fruit and vegetable	FVC		C	C	y			L	
Food choices	FDC		O+	O	y			L	
Dietary supplement use –	DSU		O	O	y			L	
Sleep	SLP		O	O				M -> L	
Changes made to Improve	CIH		O+	O	y			L	
Labour force	LBS	y	C	C		y	y	H	
Loss of Productivity	LOP		O					M -> L	
Main activity		y						M -> H	
income - household, personal	INC	y	C	C		y	y	H	
Food security	FSC		C	O				L	
education	EDU	y	C	C		y		H	
Stress – Sources	STS		O	O		y	y	L	
Stress – Recent life events	RLE		O	O				L	knowl gap
Stress – Childhood/adult	CST		O	O				M -> L	knowl gap; future cycle?
Stress – Work stress	WST			O		y	y	L	
Self-esteem	SFE		O	O				L	

Question Module		LASS 2010	CCHS 2012	CCHS 2008	HLIS 2009	MH 2012	CF 2013	Priority 2013	Comment
Mastery	MAS	y	O	O		y		H	
Family violence					y			L	
Spiritual values	SPR		O	O		y		L	
social support - availability	SSA	y	O	O				M -> L	21Q, ceiling effect
social provisions scale	SPS		O	O		y	y	M -> H	10Q
Sense of community belonging	GEN		C	C				M -> H	
Voluntary organization	ORG		O	O				L	
negative social interactions	NSI					y		L	long module
contact with police	CWP					y		L	
Exposure to second-hand	ETS		C	C				L	
Neighbourhood environment	NBE		C					L	
Home safety	HMS			O				L	
Dwelling characteristics	SDC	y	C	C				L	
Health system performance									
Patient satisfaction (and quality)	PAS		O	O	y			L	
Health care satisfaction	HCS		O					L	
Mental Health experiences	MHE					y		L	attitudes to MH access from CF2012
Family mental health impact	FMI					y		L	knowl gap; impact on respondent
Influenza immunization	FLU		C	C				L	
Mammography	MAM		C	C				L	
Cervical cancer screening	PAP		C	C	y			L	
Colorectal cancer screening	CCS		C	C	y			L	
Prostate cancer screening	PSA		O					L	
Blood pressure check	BPC			O				L	
Physical Check-up	PCU		C					L	
Regular medical doctor	HCU	y	C	C	y			H	access to prov health system
Access to health care services,	ACC		C	O	y?			L	prov system eval
Insurance coverage	INS	y	O	O				H	
Diabetes care	DIA		O	O				L	
Medication use	MED		O		y	y		M -> L	DIN specific info
Community and health system characteristics									
Population estimates				census					
Home care services	HMC		O	O				M -> H	utilization for ec analysis
Eye examination	EYX		O	O				M -> L	
Contact with a medical doctor	CHP	y	C	C				M -> H	utilization for ec analysis; tx intensity
Contact with health profession	CHP2		C	C	y			M -> H	utilization for ec analysis
Contact with alternate care	HCU1		O					M -> H	utilization for ec analysis
Consultations on mental health	CMH		C		y			M -> L	Short version of SR1 (see notes)
Mental Health Services	SR1				y	y	y	M -> L	Uses booklet for prof contacted & frequ
Dental visits	DEN		O	C				L	
Unmet need	UCN		O		y			M -> H	analysis for MH services
Perceived need for care	PNC					y	y	M -> L	overlap UCN; personal interview only
Help Needed	PN1					y	y	M -> L	overlap UCN
Military characteristics									
MOC		y						M -> H	admin
Employment history		y						M -> H	admin; future development of Reserve hx
Skills transfer		y						M	reduce #Q; not validated
Deployment		y			y		y	H -> L	admin; 2010 not validated; future development
Use of health promotion programs					y			L	
Battle Fitness Test					y			L	
Rank, years of service	admin				y			H	admin
CC related to military service	y							M	reduce #Q
Adjustment to civilian life	y							H	
traumatic military experiences							DEX	M -> L	combat exposure scale for personal int, not phone; Future development

Source Notes:

LASS 2010: see STCL Methods in MacLean et al, 2010.

CCHS 2012: www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=3226

CCHS MH 2012: www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=5015

CF MH 2013: www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SurvId=135885&InstaId=135886&SDDS=5084

CMH: kappa=0.29 compared to admin data, reflecting different consumer and provider perspectives on definition of mental health services. Drapeau et al, Discrepancies between survey and admin data in Quebec. BMC Public Health 2011; 11:837.

Appendix I. Survey Questions

Variable	Question	Universe
GEN_01	In general, would you say your health is...? 1 Excellent, 2 Very good, 3 Good, 4 Fair, 5 Poor	All
GEN_02A	Compared to one year ago, how would you say your health is now? Is it...? 1 Much better, 2 Somewhat better, 3 Same, 4 Somewhat worse, 5 Much worse	All
GEN_02B	How do you feel about your life as a whole right now? (Scale from 00 Very dissatisfied to 10 Very satisfied)	All
GEN_02C	In general, would you say your mental health is...? 1 Excellent, 2 Very good, 3 Good, 4 Fair, 5 Poor	All
GEN_07	Thinking about the amount of stress in your life, would you say that most days are...? 1 Not at all stressful, 2 Not very, 3 A bit, 4 Quite a bit, 5 Extremely stressful	All
GEN_08	Have you worked at a job or business at any time in the past 12 months? 1 Yes, 2 No (n=776)	<75 yr
GEN_09	Would you say that most days at work were...? 1 Not at all stressful, 2 Not very, 3 A bit, 4 Quite a bit, 5 Extremely stressful	GEN_08=1
GEN_10	How would you describe your sense of belonging to your local community? 1 Very strong, 2 Somewhat strong, 3 Somewhat weak, 4 Very weak	All
GEN1_1	In general, how has the adjustment to civilian life been since you were released from the Canadian Forces? 1 Very difficult, 2 Moderately difficult, 3 Neither, 4 Moderately easy, 5 Very easy	All
HWT_1	Are you pregnant? 1 Yes (n=18), 2 No	<50 yr F
HWTDHMT	How tall are you without shoes on? (meters)	HWT_1≠1
HWTDO3	How much do you weigh? (kg)	HWT_1≠1
HWT_Q4	Do you consider yourself...? 1 Overweight, 2 Underweight, 3 Just about right	All
MAS_601	You have little control over the things that happen to you. 1 Strongly agree, 2 Agree, 3 Neither, 4 Disagree, 5 Strongly disagree RF(n=2)	All Skip if RF
MAS_602	There is really no way you can solve some of the problems you have.	
MAS_603	There is little you can do to change many of the important things in your life.	
MAS_604	You often feel helpless in dealing with problems of life.	
MAS_605	Sometimes you feel that you are being pushed around in life.	
MAS_606	What happens to you in the future mostly depends on you.	
MAS_607	You can do just about anything you really set your mind to.	
	Chronic conditions lasting 6 months or more (have lasted or expected to last) and diagnosed by a health professional:	All
CCC_031	Do you have asthma? 1 Yes, 2 No RF(n=1)	Skip if RF
CCC_035	Have you had any asthma symptoms or attacks in the past 12 months?	Asthma=1
CCC_036	In the past 12 months, have you taken any medicine for asthma such as inhalers, nebulizers, pills, liquids or injections?	Asthma=1
CCC_051	Do you have arthritis, excluding fibromyalgia?	
CCC_061	Do you have back problems, excluding fibromyalgia and arthritis?	
CCC_071	Do you have high blood pressure?	
CCC_072	Have you ever been diagnosed with high blood pressure?	BP=2
CCC_073	In the past month, have you taken any medicine for high blood pressure?	BP=1
CCC_075	Were you pregnant when first diagnosed with high blood pressure?	BP=1, F
CCC_077	Other than during pregnancy, were you ever told you have high blood pressure?	BP_75=1
CCC_081	Do you have migraine headaches?	

Variable	Question	Universe
CCC_091	Do you have chronic bronchitis, emphysema or COPD?	≥35 yr
CCC_101	Do you have diabetes?	
CCC_102	How old were you when this was first diagnosed? (years)	DM=1
CCC_10A	Were you pregnant when you were first diagnosed with diabetes?	DM=1, F
CCC_10B	Other than during pregnancy, were you ever told you have diabetes?	DM=1, 10A=1
CCC_10C	When you were first diagnosed with diabetes, how long before you started insulin? 1 <1 mo, 2 1-2 mo, 3 2-6 mo, 4 6-12 mo, 5 1 yr+, 6 Never	DM=1
CCC_105	Do you currently take insulin for your diabetes?	DM=1, 10C≠6
CCC_106	In the past month, did you take pills to control your blood sugar?	DM=1
CCC_121	Do you have heart disease?	
CCC_131	Do you have cancer?	
CCC_132	Have you ever been diagnosed with cancer?	Cancer=2
CCC_141	Do you have intestinal or stomach ulcers?	
CCC_151	Do you suffer from the effects of a stroke?	
CCC_161	Do you have urinary incontinence?	>25 yr
CCC_171	Do you suffer from a bowel disorder such as (1, 2, 3, 4 below)?	
CCC_172	What kind...? 1 Crohn, 2 Ulcerative colitis, 3 Irritable Bowel, 4 Incontinence	BD=1
CCC_181	Do you have Alzheimer's Disease or any other dementia?	>35 yr
CCC_280	Do you have a mood disorder such as depression, bipolar disorder, mania or dysthymia?	
CCC1_1	Do you suffer from the effects of TBI or concussion? 1 Yes, 2 No, 3 Maybe	All
CCC1_2	Do you have an anxiety disorder such as (A,B,C below)?	All
CCC1_3	What kind..? A. Phobia, B. OCD, C. Panic (all that apply)	AX=1
CCC1_4	Do you have post-traumatic stress disorder (PTSD)?	All
CCC1_5	Do you think any of the previously mentioned conditions you identified are related to your military service?	All
HUI1_06	Are you usually able to hear what is said in a group conversation with at least three other people without a hearing aid? 1 Yes, 2 No	All
HUI1_07A	Are you usually able to hear what is said in a group conversation with at least three other people with a hearing aid?	HUI_6=2
HUI1_07B	Are you able to hear at all?	HUI_7a≠1
HUI1_08	Are you usually able to hear what is said in a conversation with one other person in a quiet room without a hearing aid?	HUI_7b=1
HUI1_09	Are you usually able to hear what is said in a conversation with one other person in a quiet room with a hearing aid?	HUI_8=2
HUP_28	Are you usually free of pain or discomfort? 1 Yes, 2 No	All
HUP_29	How would you describe the usual intensity of your pain or discomfort? 1 Mild, 2 Moderate, 3 Severe	HUP=2
HUP_30	How many activities does your pain or discomfort prevent? 1 None, 2 Few, 3 Some, 4 Most	HUP=2
RAC_1	Current limitations in your daily activities caused by a health condition lasting six months or more. Do you have any difficulty hearing, seeing, communicating, walking, climbing stairs, bending, learning or doing any similar activities? 1 Sometimes, 2 Often, 3 Never RF(n=1)	All Skip if RF
RAC_2A	Does a health problem reduce the amount or the kind of activity you can do: ... at home? 1 Sometimes, 2 Often, 3 Never	

Variable	Question	Universe
RAC_2B_1	... at school? 1 Sometimes, 2 Often, 3 Never, 4 do not attend school	
RAC_2B_2	... at work? 1 Sometimes, 2 Often, 3 Never, 4 do not work	
RAC_2C	... in other activities, for example, transportation or leisure?	
RAC_5	What is the best description of the cause of this condition? 1 Accident at home, 2 MVA, 3 Accident at work, 4 Other accident, 5 Genetic, 6 Work conditions, 7 Disease, 8 Ageing, 9 Mental health, 10 Alcohol or drugs	RAC≠3
ADL_01	Because of any health problem, do you need the help of another person: ...with preparing meals? 1 Yes, 2 No	All
ADL_02	... with getting to appointments and errands such as grocery shopping?	All
ADL_03	... with doing everyday housework?	All
ADL_04	... with personal care such as washing, dressing, eating or medication?	All
ADL_05	... with moving about inside the house?	All
ADL_06	... with looking after your personal finances such as paying bills?	All
SF2_02	Does your health now limit you for these activities? ... moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf? 1 Limited a lot, 2 Limited a little, 3 Not limited	All
SF2_03	... climbing several flights of stairs?	All
SF2_04	During the past four weeks, as a result of your health, how much of the time ... have you accomplished less than you would like? 1 All the time, 2 Most, 3 Some, 4 Little, 5 None	All
SF2_05	... were you limited in the kind of work or regular daily activities you do?	All
SF2_06	... have you accomplished less than you would like as result of depressed or anxious?	All
SF2_07	... were you less careful at work or regular daily activities as a result of depressed or anxious?	All
SF2_08	... did pain interfere with your normal work? 1 Not at all, 2 A little bit, 3 Moderately, 4 Quite a bit, 5 Extremely	All
SF2_09	... have you felt calm and peaceful? 1 All the time, 2 Most, 3 Some, 4 Little, 5 None	All
SF2_10	... did you have a lot of energy?	All
SF2_11	... have you felt downhearted and depressed?	All
SF2_12	... has your health problems interfered with your social activities like visiting with friends or relatives?	All
DIS_01A	During the past month, how often did you feel: ... tired out for no good reason? 1 All the time, 2 Most, 3 Some, 4 Little, 5 None of the time RF(n=9)	All Skip if RF
DIS_01B	... nervous?	
DIS_01C	... so nervous that nothing could calm you down?	
DIS_01D	... hopeless?	
DIS_01E	... restless or fidgety?	
DIS_01F	... so restless you could not sit still?	
DIS_01G	... sad or depressed?	
DIS_01H	... so depressed that nothing could cheer you up?	
DIS_01I	... that everything was an effort?	
DIS_01J	... worthless?	
DIS_01K	Altogether, how often did these feelings occur in the past month compared to usual? 1 More often, 2 Less often, 3 About the same, 4 Never have had any	
DIS_01L	How much more compared to usual? 1 A lot, 2 Somewhat, 3 A little	DIS_K=1

Variable	Question	Universe
DIS_01M	How much less compared to usual? 1 A lot, 2 Somewhat, 3 A little	DIS_K=2
DIS_01N	During the past month, how much did these feelings usually interfere with your life or activities? 1 A lot, 2 Somewhat, 3 A little, 4 Not at all	DIS_K=1,3
PTSD_1	Have you ever had any experience that was so frightening, horrible, or upsetting that, in the past month, you: ... had nightmares about it or thought about it when you did not want to? 1 Yes, 2 No	All
PTSD_2	... tried hard not to think about it or went out of your way to avoid situations that reminded you of it?	All
PTSD_3	... were constantly on guard, watchful, or easily startled?	All
PTSD_4	... felt numb or detached from others, activities, or your surroundings?	All
PTSD_5	Were you thinking about an experience related to your military service?	All
SPS_01	There are people I can depend on to help me if I really need it. 1 Strongly agree, 2 Agree, 3 Disagree, 4 Strongly disagree RF(n=1)	All Skip if RF
SPS_02	There are people who enjoy the same social activities I do.	
SPS_03	I have close relationships that provide me with a sense of emotional security and wellbeing.	
SPS_04	There is someone I could talk to about important decisions in my life.	
SPS_05	I have relationships where my competence and skill are recognized.	
SPS_06	There is a trustworthy person I could turn to for advice if I were having problems.	
SPS_07	I feel part of a group of people who share my attitudes and beliefs.	
SPS_08	I feel a strong emotional bond with at least one other person.	
SPS_09	There are people who admire my talents and abilities.	
SPS_10	There are people I can count on in an emergency.	
SMK_201A	In your lifetime, have you smoked a total of 100 or more cigarettes (4 packs)?	All
SMK_201B	Have you ever smoked a whole cigarette?	
SMK_201C	At what age did you smoke your first whole cigarette?	
SMK_202	At the present time, do you smoke cigarettes? 1 Daily, 2 Occasionally, 3 Not at all	
SMK_203	At what age did you begin to smoke cigarettes daily?	SMK=daily
SMK_204	How many cigarettes do you smoke each day now?	SMK=daily
SMK_205	How many cigarettes do you usually smoke?	SMK=occ
SMK_206	When did you stop smoking?	SMK=non
SMK_207	At what age did you begin to smoke (cigarettes) daily?	SMK=occ,non
SMK_208	How many cigarettes did you usually smoke each day?	SMK=occ,non
SMK_209	When did you stop smoking daily?	SMK=occ,non
SMK_210	When did you completely quit smoking?	SMK=non
ALC_1	'drink' means: 1 bottle beer/ 1 glass wine/ 1 ½ ounce liquor During the past 12 months, have you had a drink?	All
ALC_2	During the past 12 months, how often did you drink alcoholic beverages?	ALC_1=1
ALC_3	How often in the past 12 months have you had five or more drinks on one occasion?	ALC_1=1
SUI_1	Have you ever seriously considered committing suicide or taking your own life? 1 Yes, 2 No	All
SUI_2	Has this happened in the past 12 months?	SUI_1=1
SUI_3	Have you ever attempted to commit suicide or tried taking your own life?	SUI_2=1
SUI_4	Did this happen in the past 12 months?	SUI_3=1
SUI_5	Did you see or talk to a health professional following your attempt or consideration to commit suicide?	SUI_1to4=1

Variable	Question	Universe
SUI_6	Whom did you see or talk to?	
HCU_01	Do you have a regular medical doctor? 1 Yes, 2 No	All
HCU_02	Why do you not have a regular medical doctor? (multiple responses allowed)	HCU_1=2
HCU_03	Have you received any home care services in the past 12 months, with the cost being entirely or partially covered by government?	All
HCU_04	Have you received any other home care services in the past 12 months, with the cost not covered by government?	All
CHP_01	In the past 12 months, have you been a patient overnight in a hospital, nursing home or convalescent home? 1 Yes, 2 No	All RF _(n=0) Skip if RF
CHP_02	How many nights in the past 12 months?	
CHP_03	In the past 12 months, have you seen, or talked to any of the following health professionals about your health:	All
CHP_04	... a family doctor, or general practitioner?	
CHP_05	How many times?	
CHP_06	Where did the most recent contact take place?	
CHP_07	... an eye specialist, such as an ophthalmologist or optometrist?	All
CHP_08	How many times?	
CHP_09	... any other medical doctor or specialist such as a surgeon, allergist, orthopaedist, [gynaecologist/urologist], or psychiatrist?	All
CHP_10	How many times?	
CHP_11	Where did the most recent contact take place?	
CHP_12	... a nurse for care or advice ?	
CHP_13	How many times?	
CHP_14	Where did the most recent contact take place?	
CHP_15	... a dentist, dental hygienist or orthodontist?	All
CP2_16	How many times?	
CP2_17	... a chiropractor?	All
CP2_18	How many times?	
CP2_19	... a physiotherapist?	All
CP2_20	How many times?	
CP2_21	... a psychologist?	All
CP2_22	How many times?	
CP2_23	... a social worker or counselor?	All
CP2_24	How many times?	
CP2_25	... an audiologist, a speech or occupational therapist?	All
HCU1_1	How many times?	
UCN_010	... an acupuncturist, homeopath or massage therapist? (alternative health care provider)	All
UCN_020	During the past 12 months, was there ever a time when you felt that you needed health care but you didn't receive it? 1 Yes, 2 No	All
UCN_030	Thinking of the most recent time, why didn't you get care? A. not avail in area, B. not avail at time required, C. wait time too long, D. inadequate care, E. cost, F. too busy, G. didn't bother, H. decided not to seek care, I. Dr didn't think necessary (all that apply)	UNC=1
UCN_040	Again, thinking of the most recent time, what type of care was needed? A. tx physical health problem, B. tx emotional or mental health problem, C. regular check-up, D. care of injury (all that apply)	UNC=1
UCN_050	Where did you try to get the service you were seeking?	UNC=1

Variable	Question	Universe
INS_01	Do you have insurance that covers all or part of: ... the cost of your prescription medications?	All
INS_02	... your dental expenses?	All
INS_03	... the costs of eye glasses or contact lenses?	All
EHG1_01	What is the highest certificate, diploma or degree that you have completed? 1. Less than high school, 2. High school or equivalent, 3. Trade certificate, 4. College, CEGEP, non-university certificate/diploma (non-trades), 5. University certificate below bachelor, 6. Bachelor degree, 7. University degree above bachelor	All
LF2_01	Last week, did you work at a job or a business? Please include part-time jobs, seasonal work, contract work, self-employment, baby-sitting and any other paid work, regardless of the number of hours worked. 1 Yes, 2 No, 3 Permanently unable to work	All
LF2_02	Last week, did you have a job or business from which you were absent? 1 Yes (n=158), 2 No	LF_1=2
LF2_04	In the past four weeks, did you do anything to find work?	LF_2=2
LF2_08	About how many hours a week do you usually work at your job or business? Include extra hours, paid or unpaid.	LF_1=1 (missing LF_2=1)
EMH1_01	The knowledge and skills I use at my current or most recent job are the same as the knowledge and skills used in my military service. Do you...? 1 Strongly agree, 2 Agree, 3 Neither, 4 Disagree, 5 Strongly disagree	All
EMH1_04	What has been your main activity in the past 12 months? 1. Worked at a job or ran a business 2. Worked in the reserve forces 3. Retired and not looking for work 4. Attended school or training 5. Looked for work 6. Cared for family member 7. Was disabled or on disability	All
EMH1_05	Thinking about this activity in the past 12 months, how satisfied are you? 1 very satisfied, 2 satisfied, 3 neither, 4 dissatisfied, 5 very dissatisfied	All
INC_01	Are you...? 1 Married, 2 common-law, 3 widowed, 4 separated, 5 divorced, 6 single never married	All
INC_02	Including yourself, how many persons usually live in your household?	All
INC_03	How many of these persons are 18 years or younger?	HH>1
INC_04	Total household income, before tax	HH>1
INC_05	1. under \$50,000 2. \$50,000 +	INC_4=DK,RF
INC_06	\$10K groups under \$50,000	INC_5=1
INC_07	\$10K groups over \$50,000	INC_5=2
INC_08	Total personal income, before tax	All
INC_09	1. under \$30,000 2. \$30,000 +	INC_8=DK,RF
INC_10	\$10K groups under \$30,000	INC_9=1
INC_11	\$10K groups over \$30,000	INC_9=2
INC1_03	How satisfied are you with your financial situation? 1 very satisfied, 2 satisfied, 3 neither, 4 dissatisfied, 5 very dissatisfied	All
PS_Q01	Do we have your permission to share your survey information?	All

Full text available at the Statistics Canada website:

www23.statcan.gc.ca/imdb/p3Instr.pl?Function=assembleInstr&lang=en&Item_Id=137193

Appendix J. Survey Variables for Analysis

Name	Variable	Categories	Distribution for n=3727
Weight	WPTS	Share weight ranges from 2.439 to 61.452	
Veteran Groups	NEWCLASS	1 Regular Force 2 Reserve Class C 3 Reserve Class A/B	1 (n=2329) 2 (n=922) 3 (n=476)
Self-rated health	GEND01	0 poor 1 fair 2 good 3 very good 4 excellent	0 (n=157) 1 (n=406) 2 (n=1039) 3 (n=1334) 4 (n=791)
Life Satisfaction	GEN_02B	00 very dissatisfied -> 10 very satisfied	20%ile = 6 65%ile = 8 85%ile = 9
Community Belonging	GEN_10	1 Very strong 2 Somewhat strong 3 Somewhat weak 4 Very weak	1 (n=437) 2 (n=1759) 3 (n=1102) 4 (n=406)
Adjustment to Civilian Life	GEN1_1	1 Very difficult 2 Moderately difficult 3 Neither 4 Moderately easy 5 Very easy	1 (n=255) 2 (n=596) 3 (n=566) 4 (n=931) 5 (n=1376)
BMI	HWTDBMI1	Score ranges from 10 to 53	25%ile = 25 50%ile = 27 75%ile = 30
BMI Class	HWTDBMI2	01 underweight 02 normal weight 03 overweight 04 obese - class 1 05 obese - class 2 06 obese - class 3	01 (n=18) 02 (n=1106) 03 (n=1672) 04 (n=656) 05 (n=176) 06 (n=64)
Mastery	MASDCON	5 pt scale for each item recoded 0 to 4, then summed: Score ranges from 0 - 28	25%ile = 18 50%ile = 21 75%ile = 24
Asthma	CCC_031	1 yes, 2 no	1 (n=214)
COPD	CCCDCOPD	1 yes, 2 no	1 (n=76)
Diabetes	CCC_101	1 yes, 2 no	1 (n=207)
Arthritis	CCC_051	1 yes, 2 no	1 (n=783)
Back problems	CCC_061	1 yes, 2 no	1 (n=1229)
Heart disease	CCC_121	1 yes, 2 no	1 (n=131)
Stroke	CCC_151	1 yes, 2 no	1 (n=21)
Hypertension	CCC_071	1 yes, 2 no	1 (n=638)
Cancer	CCC_131 CCC_132	1 yes, 2 no (current) 1 yes, 2 no (prior)	1 (n=64) 1 (n=132)
Bowel disorder	CCC_171	1 yes, 2 no	1 (n=213)
Depression	CCC_280	1 yes, 2 no	1 (n=507)
Anxiety	CCC1_2	1 yes, 2 no	1 (n=332)
PTSD	CCC1_4	1 yes, 2 no	1 (n=360)
TBI	CCC1_1	1 yes, 2 no	1 (n=101)
Military attribution	CCC1_5	1 yes, 2 no	1 (n=1396)
Hearing	HUIGHER	1 Able to hear well 2 Problem hearing in group and/or individual - corrected 3 Problem hearing – not corrected	1 (n=3324) 2 (n=188) 3 (n=101)

Name	Variable	Categories	Distribution for n=3727
Pain	HUPDPAD	1 No pain or discomfort 2 Pain - does not prevent activity 3 Pain prevents a few activities 4 Pain prevents some activities 5 Pain prevents most activities	1 (n=2581) 2 (n=157) 3 (n=293) 4 (n=345) 5 (n=344)
Pain intensity	HUP_29	1 Mild 2 Moderate 3 Severe 6 No pain	1 (n=275) 2 (n=678) 3 (n=185) 6 (n=2581)
Activity Limitation	RACDIMP	Role impairment 1 Sometimes 2 Often 3 Never	1 (n=898) 2 (n=802) 3 (n=2026)
ADL	ADLF6R	1 Needs help with at least one task; 2 Does not need help	1 (n=620)
PCS	PCS	SF-12 physical component items transformed: Score ranges from 6 to 72.	25%ile = 43 50%ile = 53 75%ile = 57
MCS	MCS	SF-12 mental component items transformed: Score ranges from 3 to 75.	25%ile = 48 50%ile = 55 75%ile = 58
K10	DISDK10	Distress 5 pt scale transformed: each item reverse coded 0 to 4, then summed; Score ranges from 0 to 40.	25%ile = 0 50%ile = 2 75%ile = 6
K6	DISDK6	Score ranges from 0 to 24.	
Chronicity of Distress	DISDCHR	1-3 more distress than usual 4 same 5-7 less 8 never distressed	1-3 (n=403) 4 (n=2636) 5-7 (n=204) 8 (n=464)
PTSD Screen	PCPTSD	1 - positive on 3 or 4 items	1 (n=442)
SPS	SPSDCON	Answers to 10 items summed; range from 10 to 40.	25%ile = 30 50%ile = 36 75%ile = 39
Daily smoker	SMKDSTY	1 - daily smoker	1 (n=493)
Years smoked	SMKDYCS	Daily smoker (n=493) duration ranges from 0 to 50 yr	
Years since smoke	SMKDSTP	Former smoker (n=1187) stopped ranges from 1 to 56 yr ago	25%ile = 5 yr 50%ile = 13 yr 75%ile = 25 yr
Heavy Drinker	ALC_3	3-6 drank 5+ drinks per occasion, 12+ times per year (sum of categories 3, 4, 5, 6)	n= 948
Suicide Ideation	SUI_2	1- suicide ideation in past year	1 (n=197)
Regular doctor	HCU_01	1- yes	1 (n=3061)
Home care	HCU_03 HCU_04	1- home care funded by government 1- home care not funded by government	1 (n=228) 1 (n=304)
Hospitalization	CHP_01	1- hospitalized in past year	1 (n=256)
Family doctor	CHP_03	1- visit in past year	1 (n=2760)
Eye doctor	CHP_06	1- visit in past year	1 (n=1385)
Specialist doctor	CHP_08	1- visit in past year	1 (n=1200)
Dentist	CHP_14	1- visit in past year	1 (n= 2700)
Chiropractor	CHP_16	1- visit in past year	1 (n=567)
Alternative care provider	HCU1_1	1- visit in past year	1 (n=256)
Unmet need	UCN_010	1 yes, 2 no	1 (n=538)
Unmet need – care type	UCN_030A UCN_030B UCN_030C UCN_030D	1 need tx physical health problem 1 need tx emotional or mental health problem, 1 need regular check-up 1 need care of injury	1 (n=299) 1 (n=100) 1 (n=59) 1 (n=83)
Insurance	INS_01	1= insurance covers prescription medications	1 (n=3399)

Name	Variable	Categories	Distribution for n=3727
Education	EHG1_01	1 less than high school 2 high school 3-5 certificate or diploma 6-7 university degree	1 (n=148) 2 (n=1266) 3-5 (n=944) 6-7 (n=1041)
Labour force status (current)	LFSDWS	1 - Worked at a job or business 2 - Had a job but did not work (absent) 3 - Did not have a job 4 - Permanently unable to work	1 (n=2,575) 2 (n=157) 3 (n=886) 4 (n=106)
Hours of work	LFSDFPT	1 - Full-time (≥ 30 hr per week) 2 - Part-time (< 30 hr per week)	1 (n=2,313) 2 (n=253)
Skills Transfer	EMH1_01	1,2 Agree 3 Neither 4,5 disagree	1,2 (n=1703) 3 (n=496) 4,5 (n=1374)
Marital status	INC_01	1,2 Married or common law 3+ single	1,2 (n=2784) 3+ (n=942)
Household size	INC_02	Range from 1 to 13(max allowed)	1 (n=446) 2 (n=1492) 3 (n=753) 4 (n=712) 5+ (n=320)
Children	INC_03	Range from 0 to 6	0 (n=2360) 1 (n=568) 2 (n=587) 3+ (n=212)
Personal Income	INCDPER	Total before tax \$ from all sources, for Veteran (missing for n=148)	25%ile = \$35K 50%ile = \$50K 75%ile = \$80K
Household Income ¹³	INCDHH	Total before tax \$ from all sources, for household (missing for n=640)	25%ile = \$60K 50%ile = \$90K 75%ile = \$125K
Satisfaction with income	INC1_03	1,2 Satisfied 3 Neither 4,5 dissatisfied	1,2 (n=2691) 3 (n=401) 4,5 (n=629)

13 HH Income used to calculate LIM; for HH missing (n=640) derived LIM by assigning \$50K/\$85K/\$150K from HH categories, or use Personal Income, or \$30K/\$85K/\$100K from personal categories, resulted in LIM missing (n=97).