



Canadian Health Measures Survey (CHMS) Data User Guide: Cycle 1

April 2011

Acknowledgements

Statistics Canada relies heavily on the cooperation and good will of survey participants who donate their time. That is why the team of the Canadian Health Measures Survey (CHMS) is extremely grateful to participants for helping it collect key information relevant to the health of Canadians. This information will contribute to decision-making that will guide future health care policies and public health programs that will affect Canadians for years to come.

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1. Introduction

The Canadian Health Measures Survey (CHMS) is a new, comprehensive, direct health measures survey, developed to address important data gaps and limitations in existing health information. It is being conducted by Statistics Canada in partnership with Health Canada and the Public Health Agency of Canada. The results will provide comprehensive health information to advance health surveillance and research in Canada.

For cycle 1 of the CHMS directly measured indicators of health and wellness were collected on a representative sample of approximately 5,600 Canadians aged 6 to 79 years. The survey consisted of an in-home general health interview followed by a visit to a mobile examination centre (MEC). Reference laboratories and the MEC laboratory analyzed biological specimens for indicators of general health, chronic disease, infectious disease, nutritional status and environmental biomarkers.

This document will provide information to data users about the complexity of the data and any limitations that could affect their use. It will explain the methods and concepts used to collect the data at the household, as well as the MEC. Subsequent sections of the document contain information about data processing and the creation of derived variables. Content regarding sampling and weighting methodology, and guidelines for the creation of tabulations have also been included to assist the data user. Quality assurance and quality control information is provided to describe characteristics of the data which might limit their usefulness or interpretation. The document concludes with a series of appendices which provide supporting information that will be helpful to users of the CHMS data files.

All references and end notes will be found in section 13.

For additional information about the Canadian Health Measures Survey:

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1-888-253-1087

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Telecommunication device for the hearing impaired:

1-866-753-7083

Statistics Canada website:

www.statcan.gc.ca/chms

2. Canadian Health Measures Survey (CHMS) background and objectives

2.1 CHMS background

Policy makers, provincial health departments, researchers and health professionals from many fields have expressed a need for a national, comprehensive source of accurate health measures to assist them in addressing the health needs of all Canadians.

In 2003, Health Canada and the Public Health Agency of Canada supported Statistics Canada in obtaining funding for a ‘direct measures’ health survey to address longstanding limitations within Canada’s health information system. This support was announced in the 2003 federal budget as part of an extension of the Health Information Roadmap Initiative, and permanent funding was secured in the 2008 Federal Budget.

The information collected will create national baseline data on the extent of such major health concerns as obesity, hypertension, cardiovascular disease, exposure to infectious diseases, and exposure to environmental contaminants. In addition, the survey will provide clues about illness and the extent to which many diseases may be undiagnosed among Canadians. The CHMS will enable us to determine relationships between health status and disease risk factors, and to explore emerging public health issues.

2.2 CHMS objectives

Some of the objectives of the CHMS are to:

- estimate the numbers of people with selected health conditions, characteristics and environmental exposures based on direct health measures;
- ascertain relationships among risk factors, health promotion and protection behaviours, and health status; and
- establish a biobank of biospecimens (urine, blood, DNA (Deoxyribonucleic acid)) from a representative sample of Canadians to be used for future research and surveillance.

3. Survey approval

3.1 Authority

The 2003 federal budget funded a national ‘direct measures’ health survey to be conducted by Statistics Canada in partnership with Health Canada and the Public Health Agency of Canada.

The Canadian Health Measure Survey (CHMS) is a statistical research collection under the federal *Statistics Act*. Statistics Canada may only collect health information for this purpose and may not use or disclose individual participant information for any other purpose without the written consent of participants.

3.2 Ethical protocols and privacy standards

The cycle 1 of the CHMS was conducted in cooperation with provincial and municipal officials, with the support of health professional associations, and with the highest regard to Canadians’ health and safety.

All processes of cycle 1 of the CHMS were reviewed and approved by the Health Canada Research Ethics Board to ensure that internationally recognized ethical standards for human research were met and maintained. In addition, protocols were developed through extensive consultation with recognized experts and were performed in conformance with universal precautions by accredited health professionals.

Participation in this survey was voluntary. The voluntary nature of the survey was stated in the introductory letter, brochure, video, *Information and Consent Booklet*, and on the CHMS Questions & Answers section on the Statistics Canada website. The documents also emphasized the safety and standards used in all tests. CHMS staff answered any questions respondents may have had regarding the risks of participating in the tests and the use of their data in a nine-point interactive consent process throughout the household health interview and the visit to the mobile examination centre.

Several meetings were also held with the Office of the Privacy Commissioner of Canada and with provincial privacy commissioners regarding CHMS protocols to ensure that participants’ privacy rights were protected. A full Privacy Impact Assessment was completed for the CHMS and reviewed through the Office of the Privacy Commissioner of Canada—the authority that continues to provide oversight to the CHMS as well as a complaint route and redress mechanism to CHMS participants.

4. Survey content

Consultation has been an integral part of the planning of the Canadian Health Measures Survey (CHMS). Statistics Canada has undertaken extensive workshops and discussions with many programs, groups, individuals and agencies since March 2000 to gather input on proposed content, data requirements and operational considerations. Some of the groups that have been most instrumental in the content development include Health Canada, the Public Health Agency of Canada, National Health and Nutrition Examination Survey (NHANES), the CHMS Expert Advisory Committee, the CHMS Physician Advisory Committee, the CHMS Laboratory Advisory Committee, the CHMS Quality Assurance and Quality Control Advisory Committee, the CHMS Steering Committee and Statistics Canada's Policy Committee.

The cycle 1 of the CHMS was made up of a household interview and a visit to a mobile examination centre (MEC). The household interview included general demographic information and an in depth health questionnaire. The MEC visit included not only physical measure tests but also the collection of blood and urine samples from respondents. Some samples were analyzed in a laboratory at the MEC, such as the complete blood count (CBC), which includes platelets, red blood count and white blood count. The remaining samples were analyzed at three external reference laboratories. Finally, respondents were asked to wear an activity monitor for the seven days following their visit to the MEC.

The following tables provide detailed lists of household, clinic and laboratory content for the data releases for cycle 1 of the survey. The tables are organized alphabetically by similar themes and subjects to emphasize the relationships and analytical possibilities between the household, clinic and laboratory content. Further information regarding the staggered release of CHMS data can be found in Chapter 8 of this document.

Table 4.1 CHMS cycle 1 — Household questionnaire

Theme	Subject	CHMS Age	*Source (Statistics Canada surveys)
Alcohol	Alcohol use	12-79	CCHS 3.1 NPHS cycle 6
Anthropometry	Height and weight	6-79	CCHS 3.1 NPHS cycle 6
	Weight change	18-79	
Chronic conditions	Chronic conditions	6-79	CCHS 3.1
	Phlegm	6-79	
Drug/Medication use	Illicit drug use	14-79	CCHS 3.1
	Medication use	6-79	
Environmental exposure	Grooming product use	6-79	
	Hobbies	6-79	
	Housing characteristics	6-79	
Family medical history	Family medical history	6-79	
General health	General health	6-79	CCHS 3.1 NPHS cycle 6
	Health utility index	6-79	CCHS 3.1 NPHS cycle 6 NLSCY cycle 6
	Strengths and difficulties	6-17	
Infection markers	Hepatitis	6-79	
Nutrition	Dietary fat consumption	6-79	
	Grains, fruits and vegetables consumption	6-79	
	Meat and fish consumption	6-79	
	Milk and dairy product consumption	6-79	
	Salt consumption	6-79	
	Water and soft drink consumption	6-79	NPHS cycle 6
Oral health	Oral health	6-79	
Physical activity	Children's physical activity	6-11	CCHS 2.2
	Physical activities	12-79	CCHS 3.1 NPHS cycle 6
	Sedentary activities	12-79	CCHS 3.1

* Where no survey name is listed, the CHMS is the only survey at Statistics Canada to collect this information. Otherwise, the CHMS has used content directly from, or similar to, the surveys listed in the table.

CCHS = Canadian Community Health Survey

NPHS = National Population Health Survey

NLSCY = The National Longitudinal Survey of Children and Youth

CTUMS = Canadian Tobacco Use Monitoring Survey

Table 4.1 CHMS cycle 1 — Household questionnaire continued

Theme	Subject	CHMS Age	*Source (Statistics Canada Surveys)
Pregnancy/Birth	Birth information	6-11	NLSCY cycle 6
	Breastfeeding information	6-11	CCHS 3.1 NLSCY cycle 6
	Maternal breastfeeding	14-79 (F only)	CCHS 3.1
	Pregnancy	14-59 (F only)	NPHS cycle 6
	Pregnancy information	6-11	NLSCY cycle 6
Sexual health	Sexual behaviour	14-79	CCHS 3.1
Sleep	Sleep	6-79	CCHS 3.1 NPHS cycle 6
Smoking	Exposure to second-hand smoke	6-79	CCHS 3.1, CTUMS cycle 1
	Smoking	12-79	CCHS 2.2 CCHS 3.1 NPHS cycle 1, CTUMS cycle 1
Socio-demographic characteristics	Education	15-79	CCHS 3.1 NPHS cycle 6
	Income	6-79	CCHS 3.1 NPHS cycle 6
	Labour force activity	15-75	CCHS 3.1 NPHS cycle 6
	Socio-demographic characteristics	6-79	CCHS 3.1
Sun exposure	Sun exposure	6-79	CCHS 3.1

* Where no survey name is listed, the CHMS is the only survey at Statistics Canada to collect this information. Otherwise, the CHMS has used content directly from, or similar to, the surveys listed in the table.

CCHS = Canadian Community Health Survey

NPHS = National Population Health Survey

NLSCY = The National Longitudinal Survey of Children and Youth

CTUMS = Canadian Tobacco Use Monitoring Survey

Table 4.2 CHMS cycle 1 — Clinic measures

Theme	Subject	CHMS Age
Anthropometry	Hip circumference	6-79
	Sitting height	6-79
	Skinfolds	6-79
	Standing height	6-79
	Waist circumference	6-79
	Weight	6-79
Cardiovascular health and fitness	Blood pressure	6-79
	Heart rate (resting)	6-79
	Modified Canadian Aerobic Fitness Test (mCaft step test)	6-69
Lung function	Spirometry	6-79
Musculoskeletal fitness	Hand grip strength	6-79
	Partial curl-ups	6-69
	Sit and reach	6-69
Oral health	Oral health examination	6-79
Physical activity	Accelerometry (activity monitor)	6-79
Specimen collection	Blood collection	6-79
	Storage of blood and urine	6-79
	Urine collection	6-79

Table 4.3 CHMS cycle 1 — Clinic questionnaire

Theme	Subject	CHMS Age
General screening	Adherence to guidelines	6-79
	Physical and health conditions	6-79
	Physical activity readiness (PAR)	6-79
	Other substance confirmation	14-79
Lung function	Spirometry questions	6-79
	Spirometry restriction	6-79
Oral health	Oral Health questions	6-79
	Oral health restriction	6-79
Specimen collection	Blood collection questions	6-79

Table 4.4 CHMS cycle 1 — Laboratory tests

Theme	Subject	Blood/ Urine	CHMS Age	Reference Laboratory
Cardiovascular health	Apolipoprotein A1	B	6-79 (s) (fasting)	HC
	Apolipoprotein B	B	6-79 (s) (fasting)	HC
	C-reactive protein (high sensitivity)	B	6-79	HC
	Fibrinogen	B	12-79	HC
	High density lipoproteins (HDL)	B	6-79	HC
	Homocysteine	B	6-79	HC
	Low density lipoproteins (LDL)	B	6-79 (s) (fasting)	HC
	Total cholesterol	B	6-79	HC
	Total cholesterol/HDL ratio	B	6-79	HC
	Triglycerides	B	6-79 (s) (fasting)	HC
Chemistry panel	Alanine aminotransferase (ALT)	B	6-79	HC
	Albumin	B	6-79	HC
	Alkaline phosphatase (ALP)	B	6-79	HC
	Aspartate aminotransferase (AST)	B	6-79	HC
	Bicarbonate (HCO ₃)	B	6-79	HC
	Calcium	B	6-79	HC
	Chloride	B	6-79	HC
	Creatinine (see Kidney health theme)			
	Gamma glutamyltransaminase (GGT)	B	6-79	HC
	Glucose (see Diabetes theme)			
	Lactate dehydrogenase (LD)	B	6-79	HC
	Phosphorus	B	6-79	HC
	Potassium	B	6-79	HC
	Sodium	B	6-79	HC
	Total bilirubin	B	6-79	HC
	Total protein	B	6-79	HC
	Urea (see Kidney health theme)			
	Uric acid	B	6-79	HC
Diabetes	Glucose	B	6-79	HC
	Glycated hemoglobin (HbA _{1c})	B	6-79	HC
	Insulin	B	6-79 (s) (fasting)	HC

(s) = subgroup (some laboratory tests are only done on a random subgroup of the age range indicated)

HC = Health Canada

INSPQ = Institut national de santé publique du Québec

MEC = Mobile examination centre

NML = National Microbiology Laboratory, Public Health Agency of Canada

Table 4.4 - Laboratory Tests – CHMS Cycle 01 Continued

Theme	Subject	Blood/ Urine	CHMS Age	Reference Laboratory
Environmental Exposure	Bisphenol A	U	6-79 (s)	INSPQ
	Cotinine - Free	U	6-79	INSPQ
	Metals:			
	Antimony	U	6-79	INSPQ
	Arsenic (total)	B&U	6-79	INSPQ
	Cadmium	B&U	6-79	INSPQ
	Copper	B&U	6-79	INSPQ
	Lead	B&U	6-79	INSPQ
	Manganese	B&U	6-79	INSPQ
	Mercury (total)	B	6-79	INSPQ
	Mercury Inorganic	B	6-79 (s)	INSPQ
	Mercury Inorganic	U	6-79	INSPQ
	Molybdenum	B&U	6-79	INSPQ
	Nickel	B&U	6-79	INSPQ
	Selenium	B&U	6-79	INSPQ
	Uranium	B&U	6-79	INSPQ
	Vanadium	U	6-79	INSPQ
	Zinc	B&U	6-79	INSPQ
	Organochlorine pesticides	B	20-79 (s) (fasting)	INSPQ
	Organophosphate pesticides	U	6-79 (s)	INSPQ
	Perfluorinated compounds (PFHxS, PFOS, PFOA)	B	20-79 (s)	INSPQ
	Phenoxy herbicides (2,4-D, 2,4-DCP)	U	6-79 (s)	INSPQ
	Polychlorinated biphenyls (PCBs)	B	20-79 (s) (fasting)	INSPQ
	Polybrominated biphenyls (PBBs)	B	20-79 (s) (fasting)	INSPQ
	Polybrominated diphenyl ethers (PBDEs)	B	20-79 (s) (fasting)	INSPQ
	Phthalate metabolites	U	6-49	INSPQ
	Pyrethroid pesticides	U	6-79	INSPQ

(s) = subgroup (some laboratory tests are only done on a random subgroup of the age range indicated)

HC = Health Canada

INSPQ = Institut national de santé publique du Québec

MEC = Mobile examination centre

NML = National Microbiology Laboratory, Public Health Agency of Canada

Table 4.4 CHMS cycle 1 — Laboratory tests concluded

Theme	Subject	Blood/ Urine	CHMS Age	*Reference Laboratory
General	Complete blood count (CBC):			
	Platelets	B	6-79	MEC
	Red blood count:	B	6-79	MEC
	Haematocrit	B	6-79	MEC
	Haemoglobin	B	6-79	MEC
	Mean corpuscular haemoglobin (MCH)	B	6-79	MEC
	Mean corpuscular haemoglobin concentration (MCHC)	B	6-79	MEC
	Mean corpuscular volume (MCV)	B	6-79	MEC
	Red cell distribution width (RDW)	B	6-79	MEC
	White blood count:	B	6-79	MEC
	Basophils	B	6-79	MEC
	Eosinophils	B	6-79	MEC
	Lymphocytes	B	6-79	MEC
	Monocytes	B	6-79	MEC
	Neutrophils	B	6-79	MEC
Infection markers	Hepatitis A (anti HAV)	B	14-79	NML
	Hepatitis B (anti HBs and anti HBc)	B	14-79	NML
	Hepatitis B (HBsAg; positive anti HBc only)	B	14-79 (s)	NML
	Hepatitis C (anti HCV)	B	14-79	NML
Kidney health	Creatinine	B&U	6-79	HC
	Microalbumin	U	6-79	HC
	Microalbumin/creatinine ratio	U	6-79	HC
	Urea	B	6-79	HC
Nutritional status	Folic acid:	B	6-79	HC
	Red blood cell folate	B	6-79	HC
	Iodine	U	6-79	HC
	Iodine/creatinine ratio	U	6-79	HC
	Vitamin B12	B	6-79	HC
	Vitamin D	B	6-79	HC

(s) = subgroup (some laboratory tests are only done on a random subgroup of the age range indicated)

HC = Health Canada

INSPQ = Institut national de santé publique du Québec

MEC = Mobile examination centre

NML = National Microbiology Laboratory, Public Health Agency of Canada

5. Sample design

5.1 Target population

The Canadian Health Measures Survey (CHMS) targets the population aged 6 to 79 living at home and residing in the 10 provinces and three territories. Excluded from the scope of the survey are persons living on reserves or in other Aboriginal settlements in the provinces, institutional residents, and full-time members of the Canadian Forces. Persons living in certain remote areas and persons living in areas with a low population density are also excluded. The CHMS covers approximately 96.3% of the Canadian population aged 6 to 79.

5.2 Sample size and allocation

To produce reliable estimates at the national level by age group and sex, it was determined that this survey must be carried out on a sample of at least 5,000 persons over a two-year period: a minimum size of 500 is necessary for each sex from the following five age groups: ages 6 to 11, 12 to 19, 20 to 39, 40 to 59 and 60 to 79.

5.3 Sampling frames and sampling strategy

To meet the requirements of the CHMS, a multistage sampling strategy was used.

5.3.1 Sampling of collection sites

Because the CHMS requires that participants report to a mobile examination centre (MEC), they should be able to travel to that clinic within a reasonable period of time. To accommodate these requirements, the Labour Force Survey (LFS) sampling frame was used to create the collection sites and control their size. Using the LFS frame clusters, 257 collection sites were created. The clusters are small geographic units that contain approximately 200 dwellings. A collection site is a geographic area with a population of at least 10,000 and a maximum respondent travel distance of 50 kilometres in urban areas and 100 kilometres in rural areas. Areas not meeting these criteria were excluded. The sites cover 96.3% of the Canadian population aged 6 to 79.

Although only national estimates were required, the collection sites were stratified into five regions to ensure that the allocation of the sample was representative of the national population. The regions identified, based on Statistics Canada's standard regional boundaries, were British Columbia, the Prairies (Alberta, Manitoba and Saskatchewan), Ontario, Quebec and the Atlantic provinces (Newfoundland and Labrador, Prince Edward Island, Nova Scotia and New Brunswick).

A large number of collection sites with few respondents is recommended because it helps optimize the precision of the estimates. However, the logistical and cost constraints associated with the use of MEC restricted the number of collection sites to 15. The 15 collection sites were allocated to the regions in proportion to the size of the population (Table 5.1).

Table 5.1 Selection of collection sites for the CHMS, by region – cycle 1

Region	Estimated target population, ages 6 to 79, 2001 Census	Number of sites in region	Number of sites allocated
Atlantic	2,061,425	36	1
Quebec	6,560,375	50	4
Ontario	10,248,545	61	6
Prairies (including Yellowknife)	4,538,970	77	2
British Columbia (including Whitehorse)	3,540,000	33	2
Total	26,949,315	257	15

Within each region, the collection sites were sorted according to whether they belonged to a census metropolitan area (CMA), and then by the size of the population before the selection took place. A CMA is an area consisting of one or more adjacent municipalities centering on a large urban area (known as an urban core). The urban core must have a population of at least 100,000 to form a CMA. The collection sites were then sampled systematically with a probability of selection proportional to the size of their population. This selection method, combined with the sorting of sites by CMA and non-CMA and by population size, ensured that the sites selected would be allocated among CMA and non-CMA areas and among areas with larger and smaller populations. While not every province/territory would have a collection site, the CHMS sites were chosen to represent the Canadian population, east to west, with larger and smaller population densities.

Data collection at the 15 sites was carried out sequentially over two years. The sites were classified to take account of seasonality and the temporal effect, subject to operational and logistical constraints. The temporal effect was corrected by distributing uniformly the number of sites per region between the first year and the second (except for the Atlantic region, where there is only one site).

5.3.2 Dwelling sampling

Several options were examined to determine how best to obtain the required number of participants by age group. The option chosen uses the 2006 Census as a sampling frame. The household composition of dwellings as of May 2006 was available and could be used to develop a design to meet the sample requirements in each age group.

Within each collection site, dwellings with known household composition at the time of the 2006 Census were stratified by the occupants' age at the time of the survey. Five age-group strata were created, corresponding to the five CHMS age groups (6 to 11, 12 to 19, 20 to 39, 40 to 59 and 60 to 79 years). Age was determined based on the starting date of data collection at each site.

- 6 to 11 stratum: dwellings where at least one 6-to-11-year-old is present, else,
- 12 to 19 stratum: dwellings where at least one 12-to-19-year-old is present, else,
- 60 to 79 stratum: dwellings where at least one 60-to-79-year-old is present, else,
- 20 to 39 stratum: dwellings where at least one 20-to-39-year-old is present, else,
- 40 to 59 stratum: dwellings where at least one 40-to-59-year-old is present, else,
- "Other" stratum: dwellings not included in the above-mentioned strata, such as vacant dwellings at the time of the 2006 Census or dwellings with people outside the CHMS age range based on household composition at the time of the 2006 Census.

Each stratum had a high probability of having dwellings inhabited by persons in the desired age groups, whether they were the same occupants or were replaced by a similar household. Within each site, a simple random sample of dwellings was selected in each stratum. The sample size was allocated in each stratum so that, combined with the strategy for sampling participants in the survey, an equal number of respondents by age group was obtained. Each selected dwelling was contacted to draw up a current list of the members of the household, and this list was then used to select survey respondents. To cover new dwellings constructed since the 2006 Census or dwellings missed in the 2006 Census and to reduce undercoverage, dwellings from the Address Register were sampled as well.

Table 5.2 shows the distribution of the number of dwellings selected per site. In all, 9,349 dwellings were selected, with an average of 623 dwellings per site.

Table 5.2 CHMS cycle 1 — Number of dwellings selected per site

Site	Number of dwellings
1	590
2	610
3	611
4	536
5	580
6	626
7	655
8	664
9	656
10	659
11	659
12	654
13	611
14	616
15	622
TOTAL	9,349

5.3.2.1 Fasted sub-sampling

Each sampled dwelling was randomly flagged to indicate whether a respondent should be offered a clinic appointment in the morning or in the afternoon. A morning appointment required that respondents fast overnight, whereas shorter eating restrictions were imposed on those with afternoon appointments. This random allocation reduced the potential for bias, which could occur if respondents were permitted to choose their appointment times. During collection, the sampling fractions were adjusted to obtain approximately half of the sample where respondents were selected to be fasted and were actually fasted.

5.3.2.2 Polybrominated diphenyl ether (PBDE) / Polychlorinated biphenyls (PCB) sub-sampling

This sub-sample was actually a subset of the fasted sub-sample. Only respondents aged 20 to 79 (at the time of the household interview) had this measure performed.

5.3.2.3 Inorganic mercury sub-sampling

Each sampled dwelling was randomly flagged to indicate whether a respondent should have the inorganic mercury measure performed. During collection, the sampling fractions were adjusted to be able to obtain 500 males and 500 females aged 6 to 79 (at the time of the household interview). In households where two persons were selected, that is one aged 6 to 11 and one aged 12 to 79, the algorithm was designed to select only one person per household.

5.3.2.4 Perfluorinated compounds sub-sampling

Each sampled dwelling was randomly flagged to indicate whether a respondent should have the perfluorinated compounds measure performed. The original goal was to obtain 250 respondents by sex for the three older age groups (20 to 39, 40 to 59 and 60 to 79) for a total of 1,500 respondents. Starting with site six, the requirements were changed to include all respondents aged 20 to 79 (at the time of the household interview). It was not possible however to go back and to have this component analyzed on leftover blood for the rest of the persons not selected for the first five sites. Therefore, weighting was necessary to take into account the sub-sample of the first five sites.

5.3.2.5 Phthalates sub-sampling

Each sampled dwelling was randomly flagged to indicate whether a respondent would have the phthalates sub-sample performed. All youths 6 to 19 (at the time of the household interview) were to be selected for this measure. Adults 20 to 49 years old were to be selected if they were in households with only one person selected (no 6 to 11 year old in the household). The total number of respondents desired was around 3,000. Note that adults 50 years old and older were excluded for this measure.

5.3.3 Respondent sampling

Different selection probabilities by age group within each stratum were used to ensure that the sampling targets were attained (see Table 5.3). The dwellings selected were contacted to obtain a list of current household members. In each dwelling, one or two people were selected, depending on the household composition. Because children have to be accompanied to the mobile examination centre, two people were selected from households with children aged 6 to 11: one child randomly selected among those aged 6 to 11, and a second person aged 12 to 79. If no 6-to-11-year-olds were living in the household, only one person was selected among the household members aged 12 to 79. The weight vector for the selection of people aged 12 to 79 was designed to avoid large person sampling weights. Since some age groups have a weight that is up to five times higher than that of other age groups, it is possible that a selected person would have a very high sampling weight when there are many household members in a dwelling. Hence, when a specified minimum number of people aged 12 to 79 are living in a household, the weight for each person is reset to 1. In such cases, each household member has an equal chance of being selected. A careful balance of the parameters required for each of the measures put in place was obtained through studies and simulations.

Table 5.3 CHMS cycle 1 – Selection weight multiplicative factors for the person-level sampling strategy, by stratum and age group

	Age Group				
Stratum ¹	6 to 11	12 to 19 ²	20 to 39	40 to 59	60 to 79
6 to 11 stratum	1	5	1	1	1
12 to 19 stratum	1	5	1	1	1
60 to 79 stratum	1	1	1	1	2
20 to 39 stratum	1	1	2	1	1
40 to 59 stratum	1	1	1	2	1
“Other” stratum	1	5	1	1	1

5.3.3.1 Activity monitor sub-sampling

A sub-sample of respondents aged 6 to 79 who had valid data on their activity monitor for 4 days or more was created.

5.3.3.2 Tobacco sub-sampling

A sub-sample of 2,500 clinic participants aged 12 to 79 was randomly selected for the nicotine and metabolites, and NNAL (4-(methylnitrosoamino)-1-(3-pyridyl)-1-butanol) sub-sample. The sample was allocated by age group (12 to 19, 20 to 39, 40 to 59 and 60 to 79) and by smoker status derived from the respondents' answers to the household questionnaire (smoker, non-smoker exposed to smoke and non-smoker non-exposed to smoke). The sample was selected among persons who provided urine and consented to storage of their urine sample for future health studies.

6. Data collection

6.1 Preparation for collection

6.1.1 The Canadian Health Measures Survey (CHMS) team

The CHMS team is a diverse well-trained, experienced group of individuals. The group can be subdivided into three sub-teams: field team, mobile examination centre (MEC) team, and head office staff. Each of these three sub-teams was responsible for specific portions of the survey.

6.1.1.1 Field team

The CHMS field team was comprised of Statistics Canada household interviewers and an interviewer manager. The household interviewers were primarily responsible for contacting selected households, conducting the household interview, explaining the clinic portion of the survey to respondents and attempting to secure their participation at the MEC. The CHMS interviewers were supervised by an interviewer manager who was responsible for conducting data quality assurance activities for the household component, overseeing the non-response follow-up and monitoring the household collection rates.

6.1.1.2 Mobile examination centre (MEC) team

The CHMS MEC team consisted of health professionals responsible for various components of the physical measures testing and a site manager who oversaw the day-to-day operation of the MEC. The health measures specialists were responsible for performing the majority of physical measures tests on respondents (e.g., blood pressure, anthropometry, fitness testing, spirometry). The laboratory technologists/phlebotomists conducted the specimen collection (blood and urine), performed the complete blood count analysis and processed the biological samples for storage and shipment to the reference labs. A licensed dentist conducted the oral health component. In addition to the health professionals, the MEC team also consisted of administrative staff who worked at the reception desk, the appointment booking desk and as dental recorders during the oral health component, as well as a site logistics officer who took care of the maintenance of the trailers.

6.1.1.3 Head office staff

The CHMS staff at head office monitored data collection response rates and data quality, and through periodic site visits, staff performance. These staff members provided human resource support, processed data, and assessed the output from the reference labs. In addition, head office staff prepared and mailed the respondent's report of selected laboratory tests, and provided information about the survey to respondents, the public and the media. Finally, a medical advisor followed-up with respondents about critical or sensitive results.

6.1.2 The mobile examination centre (MEC)

Two sets of trailers were acquired in order to conduct the physical measures and laboratory components of the CHMS. Each MEC was comprised of two trailers, the administrative trailer and the clinic trailer. The trailers had several different rooms, including a reception area, restrooms, an administrative office, fitness testing area, a screening area, an oral health room, anthropometry and phlebotomy areas and a laboratory.

Using MECs provided several benefits over a fixed clinic site (e.g., a clinic set up in an office building or hospital). They provided a standardized collection environment (equipment set up, room size, etc.) that was designed to meet Statistics Canada security and confidentiality policies and the flexibility of locating the MEC near the selected respondents' homes. The MEC also allowed for comparability with the National Health and Nutrition Examination Survey (NHANES) in the United States which also uses MECs.

6.1.3 Informatics environment

Computer assisted interviewing (CAI) was used to capture the responses for the household, physical measure and laboratory components of the CHMS. CAI allowed for custom interviews for every respondent based on their individual characteristics and survey responses. This included:

- Questions that were not applicable to the respondent were skipped automatically.
- Edits to check for inconsistent answers or out-of-range responses were applied automatically and on-screen prompts were shown when an invalid entry was recorded. Immediate feedback was given to the respondent and the interviewer was able to correct any inconsistencies.
- Question text, including reference periods and pronouns, was customised automatically based on factors such as the age and sex of the respondent, the date of the interview and answers to previous questions.

In order to perform computerized data capture within the MEC, a unique data capture architecture had to be developed as there was a requirement for multiple users in different MEC rooms to access a single respondent's case file. This required the development of a complex, fully customized data capture application that used components of the computer assisted telephone interview (CATI) environment.

To reduce data entry errors, increase efficiency of data collection and reduce the need for double entry and data entry verification, the CHMS MEC data capture system was developed to accept direct input from other electronic testing equipment. This included communication (both one and two-way) between the application and the measurement devices (e.g., automated blood pressure cuff, weigh scale). In cases where the direct input was not functioning and manual entry was required, the data were entered in twice.

In order to support the electronic capture of physical measures data and to support the operational and administrative needs, the MEC was equipped with its own computer server. After each session at the MEC, encrypted data were transmitted from the trailer server via a dedicated out-going phone line to Statistics Canada headquarters. Encryption software was used to ensure the confidentiality of the data during transmissions between the MEC and headquarters.

6.1.4 Questionnaire design

6.1.4.1 Household questionnaire

The household questionnaire content was developed with input from stakeholders (Health Canada and the Public Health Agency) and from external experts, who participated as members of various advisory committees. In addition to new questions, existing health questions were taken from other surveys (e.g., Canadian Community Health Survey (CCHS)) to build the CHMS questionnaire. Focus groups and one-on-one interviews were conducted to look at specific questionnaire content under consideration. Improvements were made to questionnaire wording and instructions and to the flow of questions as a result of this testing. Throughout the questionnaire testing process, internal and external experts and stakeholders were consulted before content changes were finalized.

6.1.4.2 Clinic questionnaire

Development of the MEC component of the survey proceeded in much the same way as that of the household questionnaire. A determination was made as to the content and multiple iterations of the collection application were generated. Each iteration was assessed to determine the best flow within the MEC for the respondent and the MEC staff, and the quality and quantity of data collected. As with the household questionnaire, experts were frequently consulted to ensure that the clinic component achieved the goal of collecting high quality results.

6.1.4.3 Pre-test

The final test was a large scale pre-test, which tested modules on general health, sleep, height and weight, chronic conditions, nutrition and physical and sedentary activity. The testing provided the first opportunity to examine the potential household and clinic questionnaire content in conjunction with physical measure tests. The flow of physical measures tests in the mobile examination centre, as well as accompanying screening and administration questions, were also tested.

6.2 Collection

Data for cycle 1 of the CHMS were collected between March 19, 2007 and February 25, 2009 from 15 collection sites spread across Canada from Moncton to Vancouver. While one set of trailers was being used for collection, the second set would be moved to the next location and began the rigorous set of procedures required in order to prepare for collection.

6.2.1 Collection – Household interview

One to two weeks prior to the start of household interviews at each collection site, a letter and brochure were mailed to the dwellings selected for the survey, informing them that they would be contacted to participate in the survey. Interviewers called or drove to each dwelling to book an interview. Once contact was made with the household, the interviewer introduced the survey by outlining the basic steps of the survey and informing the person that participation was voluntary and that any information provided would be kept confidential under the authority of the *Statistics Act*.

Based on the demographic information collected, one or two persons in the household were selected to participate in the survey using different probabilities of selection by age group. The selection algorithm was designed to try and reach an equal distribution of people among the different age groups. If two persons were selected in a household, one person was always 6 to 11 years old and the other 12 to 79 years old.

Prior to commencing the interview, the respondent was informed about the survey and was shown a brief (four-minute) introductory video. For respondents between the ages of 6 and 11, an adult was present during the interview to answer questions with assistance from the child. All respondents aged 12 to 79 years who were able to answer questions on their own were asked to do so.

At the end of the interview, the interviewer provided the respondent with an information package, explaining the clinic portion of the survey, information about the tests performed at the mobile examination centre (MEC) and general information about the survey. The interviewer briefly reviewed the material in the information package and answered any questions. At that time the interviewer informed the respondent that he/she had been assigned to a morning or afternoon/evening appointment at the MEC. The morning session required the respondent to fast for 12 hours for measurement of fasting glucose, blood lipids and insulin levels, among other tests. See appendix 1 for a list of the pre-testing guidelines provided to respondents during the household interview.

If the respondent was 14 years or older, the interviewer then asked the respondent to set up an appointment at the MEC. Parents were asked to set up the appointment for their 6- to 13-year-old child. At the end of each day, the interviewers transmitted all completed cases back to Statistics Canada using encryption software to ensure the confidentiality of the data during the transmission.

6.2.2 Collection – Mobile examination centre (MEC)

Upon arrival at the MEC, the respondent's information was logged into the database at the reception desk. The MEC staff verified that the respondent's name, sex, date of birth and official language (collected during the household interview) were correct. Adherence to the pre-testing guidelines was verified and documented within the clinic capture application.

Prior to beginning the physical measures tests, the respondent must have given consent to participate in the clinic portion of the survey. Parents or guardians gave consent on behalf of children aged 6-13 while the child provided his/her assent to participate.

After the consent module, the respondent (or parent/guardian of younger respondents) was asked some screening questions using the PAR-Q (appendix 3). Although the PAR-Q was intended for people aged 15-69, it was used on all respondents. Parents or guardians completed the screening questions on behalf of children aged 6-13. Depending on the fasting status, the age of the respondent and the responses to the screening questions some respondents were excluded from certain measures or laboratory tests (see appendix 2 – Exclusion Criteria and appendix 3 – PAR-Q).

The respondent then proceeded with the visit at the MEC, performing all measures or laboratory tests for which he/she was eligible. The respondent could, at any time, refuse to participate in any measure or test. The order of the measures and blood tests was set in such a way that the effects of a certain measure (e.g., increased blood pressure from mCAFT) did not affect the results of another measure (e.g., resting blood pressure). For detailed information describing the protocols followed for all measures see appendix 4.

The blood and urine samples collected from survey respondents were processed, analyzed for the complete blood count (CBC) and temporarily stored in fridges and freezers within the MEC laboratory. Stored samples were sent weekly to reference laboratories in Ottawa, Quebec City and Winnipeg for additional analyses related to general health, diabetes, kidney disease, cardiovascular disease, environmental contaminants and infectious diseases and for storage in the CHMS biobank. Deoxyribonucleic acid (DNA) samples were sent twice weekly to Winnipeg for processing since DNA integrity is time sensitive.

Prior to leaving the MEC, the respondent received a report of their measurements, and possibly one or more letters for their health care provider if required (some blood pressure, and oral health results may have been deemed as requiring follow-up). A few months after the visit to the MEC, a report of laboratory tests containing most of the respondent's blood and urine test results was sent out. At the end of cycle 1 a spirometry report was also sent out to respondents. Respondents 14 years of age or older received their laboratory and spirometry reports, while parents of respondents 6 to 13 years old received their child's reports.

6.2.3 Collection – Home visit

In order to maximize response rates to the CHMS, respondents who were unwilling or unable to attend the mobile examination centre (MEC), but were willing to have a selected number of measures done in their home were offered the option of a home visit. There were 22 home visits during the entire cycle 1 collection period.

The home visit was conducted by a minimum of two CHMS staff members (most often a health measures specialist and laboratory technologist) using paper questionnaires for data recording. There were no differences in the procedures used to conduct the measurements in the home, however, there were minor differences in the equipment used (e.g., scale, stadiometer) because all home visit equipment needed to be portable. As with the visit to the MEC, the respondent could, at any time, refuse to participate in any measure or laboratory test. The home visit took less time because the mCAFT, sit and reach and partial curl-up components were not performed at the home. The oral health component was performed only if a dentist was available at the time of the home visit. Once back at the MEC, the health measures specialist entered the data from the home visit into the application and coded it as a home visit. The senior health measures specialist then verified the data entry. A report of measurements was mailed to the respondent within a few days of completion of the home visit. Respondents received a report of laboratory tests a few months later and a report of their spirometry results at the end of cycle 1.

6.3 Minimizing non-response

6.3.1 Minimizing non-response – Household interview

To ensure the best possible response rate at the household, many practices were used to minimize non-response.

6.3.1.1 Introductory letters and brochures

Before the start of each collection period, introductory letters and brochures were sent to the sampled households, explaining the different steps of the survey and emphasizing the importance of the survey by providing examples of how CHMS data would be used.

6.3.1.2 Initiating contact

Interviewers were instructed to make all reasonable attempts to obtain interviews. When the timing of the interviewer's visit was inconvenient, an appointment was made to come back at a more convenient time. If no one was home on first visit, a notice that a CHMS interviewer had stopped by their home was left at the door. Numerous personal visits were made at different times on different days until potential respondents were home and available to do the interview. If interviewers were unable to make contact with anyone at the household, they tried to obtain a name and telephone number for the dwelling using directory listings, neighbours, superintendents, and management/rental offices in order to call the dwelling later to arrange for a personal visit.

6.3.1.3 Refusal procedures – Household interview

The interviewer tried to convince the respondent of the importance and potential benefits of participating in the survey. If the individual refused to participate in the survey, they were then contacted a second time by another interviewer who, again, stressed the importance of the survey and the household's participation.

6.3.1.4 Language barriers – Household interview

The introductory letter and the CHMS brochure were available in English, French, Punjabi and Chinese. Respondents were interviewed in the official language of their choice (English or French). To remove language as a barrier to conducting interviews, where possible, the CHMS team recruited interviewers with some language competencies other than the two official languages. When necessary, cases were transferred to an interviewer or external interpreter with the language competency so that questions/instructions could be translated for the respondent in order to complete the interview. If no one with a certain language competency could be found, it was also acceptable for a household member who was willing and able to translate for the respondent to do so. Note that this was not considered a proxy interview. The household member was simply translating the questions and the respondent's answers directly to the interviewer, not answering for the respondent.

6.3.1.5 Youth respondents – Household interview

Interviewers were obliged to obtain verbal permission from parents/guardians to interview youths between the ages of 12 and 17 who were selected for the survey. Several measures were taken to alleviate potential parental concerns and to ensure a completed interview. Interviewers provided the parent or guardian with a copy of the "Note to parents / guardians about interviewing youths for the Canadian Health Measures Survey". This document explained the purpose of collecting information from youth, listed the subjects to be covered in the survey and explained the need to respect a child's right to privacy and confidentiality.

When interviewing respondents 12 to 17 years of age, interviewers ensured that the parent was in the home but that the interview took place outside of parents/siblings earshot, unless permission was obtained from the youth for a parent to be present. If the interviewer was not able to obtain privacy to interview the selected youth the interviewer read the questions out loud with the parent in the room and had the youth enter his/her answers directly on the computer. If privacy and confidentiality could not be respected, the case was coded as a refusal with a permanent note indicating that privacy/confidentiality could not be respected.

If parents asked to know more about the type of questions asked in the survey, interviewers first directed them to the topics listed in the Note to Parents. If they asked to see the actual questions interviewers showed them the content section of the Interviewer's Manual. For those parents who requested a copy of the questions, a copy was available through the Data Collection Manager, as well as at Statistics Canada's head office in Ottawa.

6.3.1.6 Proxy interviews

In the CHMS, parents/guardians answered questions about their children aged 6 to 11. This included all household modules that were applicable to children. Children assisted in responding to some questions for which the parents may not have known the answers (e.g., participation in activity during school hours).

In cases where the selected respondent 12 years of age or over was, for reasons of physical or mental limitations, incapable of completing an interview at the household, another knowledgeable member of the household supplied information about the selected respondent. While these proxy respondents were able to provide accurate answers to most of the survey questions, the more sensitive or personal questions were beyond their scope of knowledge. This resulted in some questions from the proxy interview being unanswered. Every effort was taken to keep proxy interviews to a minimum. The variable “PROXY” on the data set indicates whether a household interview was completed by proxy.

In cycle 1, 20% of the interviews were proxy. Of the proxy interviews, 97% of the respondents were under 12 years of age and 3% of the respondents were 12 years of age or older.

6.3.2 Minimizing non-response – Mobile examination centre (MEC)

Approximately 85% of respondents who completed a household interview in cycle 1 agreed to go to the MEC. Many practices were used to obtain this high level of participation, including:

6.3.2.1 Non-response follow-up

MEC staff were responsible for following up with any respondents who did not book an appointment at the end of their household interview and did not call the MEC booking desk to set up an appointment within a few days after their household interview. The staff members followed similar refusal procedures as household interviewers.

6.3.2.2 Flexible MEC hours

Strategies specific to the MEC included the creation of MEC opening hours and appointment times that provided maximum flexibility to the respondent. The MEC staff tried to accommodate as many respondents as possible at each site. In addition, home visits were offered to respondents unwilling or unable to go to the MEC.

6.3.2.3 Refusal procedures - MEC

To minimize the non-response to the CHMS, the MEC staff were instructed to make all reasonable attempts to convince respondents who participated in the household interview to attend the MEC. The appointment booking desk staff, who had received specific training in handling refusal conversions, followed-up with respondents who refused to participate in the clinic portion of the survey. If they were unsuccessful in booking an appointment, the MEC site manager would call one final time to attempt to book an appointment. Respondents who could not be contacted (e.g., no answer at the home phone number) were sent a “No-contact Letter” asking them to phone the MEC to book an appointment.

6.3.2.4 Language barriers - MEC

Mobile examination centre (MEC) staff handled language barriers in the same way as household interviewers. CHMS staff, external interpreters or family members with knowledge of the third language were used to help the respondent understand instructions and forms in order to complete the visit at the MEC. The consent forms and screening questions were available in Punjabi and Chinese to try to accommodate respondents from these ethnic minority groups since a high percentage of these groups were known to be living within some of the cycle 1 sample collection areas.

6.3.2.5 Youth respondents - MEC

As with the household interview, parents/guardians answered all questions about their children aged 6 to 11. The questions asked at the MEC pertained to screening, lung health and oral health. Since the age of consent for the clinic portion of the CHMS was 14 years of age, parents/guardians also answered these questions for their 12 and 13 year old youths, though the youths usually assisted. Youths aged 14 and over were responsible for signing their own consent form and answering all questions, though parents/guardians were in some cases present during their visit at the MEC and able to assist on difficult questions as required. To maximize efficiency at the MEC, the selected child or youth usually did the physical measure tests with one CHMS staff member while their selected parent was doing tests with another CHMS staff member.

In cases where the selected respondent 14 years of age or over was, for reasons of physical or mental limitations, incapable of answering questions and completing the consent form at the MEC, the parent/guardian assisted.

6.4 Clinic measures protocols

For detailed information describing the protocols see appendix 4. For detailed information on test exclusion criteria see appendix 2.

6.4.1 Anthropometry

The Anthropometric Component consisted of height (which included standing and sitting height) and weight measurement, measurement of circumferences (including waist and hip circumferences) and skinfold measurement. The six anthropometric measures were taken on all eligible respondents aged 6 to 79 years old. Acute or chronic conditions specifically affecting one or more of the anthropometry measures were reasons why a respondent would not have been eligible for any of the following measures.

6.4.1.1 Standing height

Standing height is an assessment of maximum vertical size. This measure was taken of all the respondents who were able to stand unassisted. Standing height was measured with a fixed stadiometer with a vertical backboard and a moveable headboard using a procedure based on the 3rd edition of the *Canadian Physical Activity, Fitness and Lifestyle Approach* (CPAFLA) 3rd Edition.³ A self-reported height was captured for respondents who were not eligible because of an acute or chronic condition (e.g., in a wheelchair) or who refused to have their height measured.

6.4.1.2 Sitting height

Sitting height is an assessment of maximum vertical size when the respondent is sitting. It was measured on respondents who were able to sit unassisted. Sitting height was measured with a fixed stadiometer with a vertical backboard and a moveable headboard. The respondent's sitting height was measured, following the International Society for the Advancement of Kinanthropometry (ISAK) protocol⁴.

6.4.1.3 Weight

The respondent's weight was taken on a Mettler Toledo digital scale. The respondent's weight was measured, following the CPAFLA protocol (3rd Edition).³

6.4.1.4 Waist circumference

Waist circumference provides an indicator of abdominal fat distribution. The respondent's waist circumference was measured, following the CPAFLA protocol (3rd Edition)³. This protocol was modified by the Canadian Society for Exercise Physiology in the fall of 2008. Note that the CHMS continued using the previous protocol throughout cycle 1 and a cross over study is being performed to allow the comparison between cycle 1 and cycle 2 data.

6.4.1.5 Hip circumference

Hip circumference is the maximal circumference measured at the hips or buttocks region (whichever is larger). It is used to calculate the waist-to-hip ratio (waist circumference divided by hip circumference) and is a simple method of determining body fat pattern. The protocol for hip circumference was based on the *Canadian Standard Test of Fitness* (3rd Edition)⁵.

6.4.1.6 Skinfolts

Skinfold measurement is used to estimate the amount of body fat and the distribution of subcutaneous adipose tissue. The principle behind this technique is that the amount of subcutaneous fat (fat that lies directly beneath the skin) is proportional to the total amount of body fat. The respondent's skinfolts were measured following the five site method of the CPAFLA (3rd Edition) protocol.³ Skinfold measurements were not done on respondents with a body mass index (BMI) equal to or greater than 30 kg/m².

6.4.2 Heart rate and blood pressure

The respondent's resting heart rate and blood pressure (BP) were measured, following a new protocol created by the CHMS and inspired by the report entitled "Hypertension Surveillance in Canada: Minimum Standards For Assessing Blood Pressure In Surveys" report⁶. This report was published by an expert committee consisting of members of the Canadian Hypertension Society, the Canadian Coalition for High Blood Pressure Prevention and Control and the Heart and Stroke Foundation of Canada.

Heart rate and blood pressure measurements were taken on all eligible respondents aged 6 to 79 years old using an oscillometric blood pressure measurement device. A series of BP and heart rate measurements were taken at one minutes intervals following a five minute rest period and the last five measurements were used in the determination of average resting heart rate and blood pressure.

6.4.3 Spirometry

Spirometry measurements were taken on all eligible respondents aged 6 to 79 years old, following the 1994 Update of the Standardization of Spirometry article, published by the American Thoracic Society⁷. Heart attacks, chest or abdomen surgeries within 3 months, eye surgery within 6 weeks, tuberculosis medication, pregnancy >27 weeks and acute or chronic conditions were some reasons for exclusion.

6.4.4 Musculoskeletal fitness

Fitness tests were done on all eligible respondents aged 6 to 69 years old, except for the grip strength component which was done on all eligible respondents aged 6 to 79 years old. Medication use, acute and chronic conditions, pregnancy, and failure to adhere to pre-testing guidelines (appendix 1) were reasons why a respondent would not have been eligible for any of the measures. Respondents aged 70-79 were excluded from the sit and reach, partial curl-ups and aerobic fitness tests.

6.4.4.1 Grip strength component

Muscular strength refers to the maximum force that can be generated by a specific muscle or muscle group. The most common method of measuring muscular strength in the field is isometric grip strength. Isometric grip strength is measured using a handgrip dynamometer. The protocol for the Grip Strength Component was based on the *Canadian Physical Activity, Fitness and Lifestyle Approach* (CPAFLA) 3rd Edition³.

6.4.4.2 Sit and reach component

The sit and reach test is a commonly used field test to assess low back and hip-joint flexibility. The protocol for the Sit and Reach Component was based on the CPAFLA (3rd Edition)³.

6.4.4.3 Partial curl-up component

The partial curl-up test evaluates the endurance of the abdominal muscles. The protocol for the Partial Curl-up Component is based on the CPAFLA (3rd Edition)³.

6.4.5 Modified Canadian Aerobic Fitness Test (mCAFT) component

Aerobic fitness is a measure of the combined efficiency of the lungs, heart, vasculature, and exercising muscles. The eligible age group for the mCAFT was 6 to 69 years of age. The protocol for the modified Canadian Aerobic Fitness Test (mCAFT) Component is based on the Canadian Physical Activity, Fitness and Lifestyle Approach (CPAFLA) 3rd Edition for adults 15-69 years of age³, but was applied to all age groups.

6.4.6 Oral health component

For the oral health component a dentist assessed the oral health status of respondents based on criteria from the World Health Organization and was done on all eligible respondents aged 6 to 69 years old. The results of the oral exam were directly entered into a computer, with the help of a dental recorder. The World Dental Federation (FDI) numbering system was used.

6.4.7 Activity Monitor

An Actical physical activity monitor was given to all eligible respondents aged 6 to 79 years old, along with an adjustable belt, an XPRESSPOST envelope, and an information sheet. Respondents in wheelchairs were excluded.

6.5 Laboratory measures protocols

6.5.1 Sample collection

Blood and urine were collected to obtain laboratory results that provided prevalence estimates of disease, risk factors for certain diseases, and baseline information on health, nutritional status of the population and environmental contaminants.

6.5.1.1 Blood collection

The blood was collected by the phlebotomist using a standardized venipuncture technique. The amount of blood taken from respondents depended on their age:

- 6-11 years: < 28 ml
- 12-13 years: < 38 ml
- 14-19 years: < 50 ml
- 20-79 years: <80 ml

An increasing amount of blood was taken by age because more tests were done for older respondents. For example, 6 to 11 year olds had less than half the number of tests done as compared to 20 to 79 year olds.

The blood tests selected for the CHMS were ranked in order of priority and so it should be noted that a deviation from the standard order of blood draw was made to accommodate the priority of the test(s) being measured. The order of vacutainer collected was dependent upon the priority of the test versus the anticoagulant used.

6.5.1.2 Urine collection

The urine was collected using mid stream collection and the respondent was asked to provide approximately 60 ml of urine. This collection was done for all respondents.

6.5.2 Analysis of CBC performed at the mobile examination centre (MEC)

The complete blood count (CBC) was analyzed in the MEC laboratory by the technologist and performed for all respondents from whom a sample was collected. Results from any unsuitable samples (ie:severe lipemia or clot in tube) were not reported.

6.5.3 Processing and storage of the blood and urine samples

It was important to process the specimens as soon as possible because the quality and integrity of the blood and urine specimens would deteriorate over time. Whole blood was centrifuged to separate plasma from cells and serum from a clot, to allow for the aliquoting into smaller tubes. The urine was also aliquoted into smaller tubes. These tubes were placed in shipping trays and stored in the MEC laboratory in either the refrigerator or the freezer depending on the test. All specimens were stored as soon as processing was complete to ensure the samples viability.

6.5.4 Shipping

With the exception of the DNA samples which were sent twice a week, the shipping of the blood and urine aliquots was done once a week to the reference laboratory on pre-assigned shipping days. All packages were sent to one of the 3 reference labs: Health Canada in Ottawa for chronic disease, general health (chemistry panel) and nutritional lab results, Institut National de Santé Publique du Québec (INSPQ) in Quebec City for environmental lab tests plus urine creatinine (environmental adjustments and kidney health) and the NML in Winnipeg for infectious disease lab results and the CHMS biobank. Shipments were packaged according to the International Air Transport Association (IATA) and transport of dangerous goods regulations.(biological specimens). All shipments were sent by overnight delivery using a courier company certified to handle dangerous goods and were scheduled to arrive at the reference laboratory only on weekdays. A specimen tracking system was also developed so that staff could determine the status of every tube shipped to the reference laboratory. In addition, the temperature of refrigerated shipments was monitored using pre programmed devices that took the temperature every 15-30 minutes during shipping. This allowed assurance that the samples received by the reference labs were maintained at an adequate temperature to preserve the sample integrity during shipping.

There were some occurrences where shipments were delayed and once received it was noted that the shipment conditions had been compromised. Any results from compromised samples were removed to ensure that only the highest quality of data was reported to the CHMS by the reference laboratory.

7. Data processing

7.1 Verification

One of the unique features of Canadian Health Measures Survey (CHMS) is that three different sets of data were collected for the same respondent: household interview data, clinic measurement data, and laboratory result data. Each set of data had to be processed on its own, yet they could not be completely separated from each other because at various points during processing the three sets of data had to be used together.

The processing of the household interview data was performed in a manner similar to that of other health surveys at Statistics Canada. The data were validated first at the record level and then at the individual variable level, followed by detailed top-down editing. During data collection processing took place on a daily basis (including weekends). The household interview responses had to be processed quickly in order for the data to be available at the mobile examination centre (MEC) in time for the respondent's visit to the MEC.

Similarly, the processing of the clinic measurement data began with the data being validated first at the record level and then at the individual variable level, followed by detailed top-down editing. Also, because the laboratory tests were determined based on responses during the clinic portion at the MEC, the clinic data were used to generate a file containing a list of the tests for which results were expected to be received. This laboratory "control" file was used in processing the laboratory result data.

The processing of the laboratory result data involved significant file manipulation due to the fact that several different file types were received from the MEC and the three reference laboratories. Then the data were validated at the record level and at the individual variable level, and several new variables were derived. The laboratory data were processed as quickly as possible so that any critical results that had been identified at the reference laboratories and the MEC were immediately available for reporting to respondents.

7.2 Mark-all-that-apply questions

During the initial phase of data processing, mark-all-that-apply questions are expanded with each response category in the original question becoming a series of separate questions with a yes or no response. In the example below, the respondent selected both 2 and 3 as answers to the original question. The answers to the new questions are based on answers from the original question.

Original question:

CCC_Q96 **What type of hepatitis do you have?**

INTERVIEWER: Read categories to respondent. Mark all that apply.

1 **Hepatitis A**

☒ 2 **Hepatitis B**

☒ 3 **Hepatitis C**

Final questions / responses:

CCC_96A **What type of hepatitis do you have? - Hepatitis A**

1 Yes

☒ 2 No
Don't Know, Refused

CCC_96B **What type of hepatitis do you have? - Hepatitis B**

☒ 1 Yes

2 No
Don't Know, Refused

CCC_96C **What type of hepatitis do you have? - Hepatitis C**

☒ 1 Yes

2 No
Don't Know, Refused

7.3 Coding

Pre-coded answer categories were supplied for all suitable variables, and the interviewers and health measures specialists were trained to assign a respondent's answers to the appropriate category. In the event that a respondent's answer could not be easily assigned to an existing category, several questions also allowed the interviewer to enter a long-answer text in the "Other-specify" category. All such questions were closely examined at head office during processing. For some household questions, the long answers were coded into one of the existing listed categories if the long answer duplicated a listed category. If not, the response was coded as 'Other'. For the clinic responses, at the end of processing, long answers were reviewed and some responses were coded to existing categories. For the remaining 'Other-Specify' answers, some new categories were created where there were sufficient numbers of responses. The remaining responses were coded as 'Other'. For all questions, the "Other-specify" responses will be taken into account when refining the answer categories for future cycles.

Statistics Canada is not permitted to release specific drug names and cigarette brands. As a result, this information, while collected, is not available on the master files. Instead, coded variables representing information about these responses (ATC, AHFS and tar values (see section 12.6)) are placed on the master files.

Certain data were collected as long answers and had codes assigned, specifically medication and other health product names and dosages, cigarette brand names, and job description information. For medications and cigarette brand names, databases of standard descriptions were available in the computer-assisted interviewing (CAI) applications, and a code could be assigned at the time of collection based on a search of the appropriate database. Any description without a code was extracted during processing and coded manually. Over the course of the full survey, there were 1,832 medications and other health products that were manually assigned a Drug Identification Number (DIN), and 154 cigarette brand names that were manually assigned a brand code. For the assignment of North American Industry Classification System (NAICS) 2002 and National Occupational Classification - Statistics (NOC-S) 2001 codes, all 3,485 records with data in the job description fields were extracted and sent for manual industry and occupation coding. A preliminary step of matching to a database of previously coded descriptions was performed to provide starting points for the manual coding.

7.4 Editing

Most editing of the data was performed at the time of the interview by the CAI application. It was not possible for interviewers to enter out-of-range values, and flow errors were controlled through programmed skip patterns. For example, CAI ensured that questions that did not apply to the respondent were not asked. Edits requiring corrective action were incorporated in the CAI application to deal with inconsistent responses, and warnings not requiring corrective action were also included to identify unusual (i.e., improbable rather than impossible) values as a means of catching potential errors and allowing correction at source.

At head-office the data underwent a series of processing steps that may have resulted in some of the data being adjusted. As a final validation step, the CAI edits were re-applied to the processed data. As a result, the final data were complete and contained reserve codes for responses of “less than limit of detection”, “not applicable”, “don’t know”, “refused” and “not stated”.

Table 7.1 Reserve code of responses

Reserve Code label	Reserve code
Less than limit of detection	9.5, 99.5 etc.
Not Applicable	6, 96, 99.6 etc.
Don’t Know	7, 97, 99.7 etc.
Refusal	8, 98, 99.8 etc.
Not Stated	9, 99, 99.9 etc.

7.5 Creation of derived variables

Derived variables (DV) for cycle 1 of the Canadian Health Measures Survey (CHMS) were created to facilitate data analysis and to minimize the risk of errors. The three most common types of derived variables were created by: collapsing data from one variable into groups; combining the data from one or more survey questions for a single respondent; or combining data from more than one respondent. Derived variables generally have a "D" or "G" in the fourth character of the variable name.

Three other types of derived variables can be found on the cycle 1 CHMS data file: converting responses given in various time units (days, weeks, months or a year) into one type of units such as yearly; calculation of body mass index (BMI); and the creation of the Health Utility Index which is based on the responses from a series of questions.

Specifications were received which provided details as to how to proceed with the creation of each derived variable. Cycle 1 of the CHMS has 599 derived variables. Half were created within the capture application in order to be able to provide initial results to the respondents at the end of their visit to the mobile examination centre and the remaining derived variables were created after the completion of data processing.

All derived variables underwent a validation process after creation in order to ensure that the output provided the requested data. Modifications to the specifications may have been necessary if, during validation by subject matter experts, the output from the derived variables was determined to be flawed. Complete documentation for all cycle 1 derived variables can be found in the DV documentation (see appendix 5).

7.6 Limit of detection

The data released for waves 2 and 3 had never been collected or released by Statistics Canada in the past. This data differed from the typical survey data collected through interviews or the data collected through actual physical measurements. The vast majority of the data for waves 2 and 3 came from the blood and urine samples collected at the Mobile Examination Centres.

Once collected, the samples were sent to the reference laboratories for analysis. The instruments and methods used to perform the analysis have limits as to what they can actually detect in the blood and urine samples. For that reason, from time to time, results were returned from the laboratories with a code that indicated that the results for a particular sample were above or below a level of concentration that could be measured by the instrument for that test.

During processing this information was translated into a reserve code.

7.7 Reference ranges

Commonly referred to as the *normal range* a reference range is an interval into which 95% of the population falls. The ranges are established over time by testing a large number of people. They provide guidelines as to what are usual values in the population being measured but are not *optimal health ranges*.

Reference ranges may vary depending on factors such as age, sex, and race. The instruments used in the laboratory may also affect these ranges. For that reason, reference ranges are provided by each laboratory for each type of test they perform for a specific time period. The ranges may change over time as characteristics of the population being measured change.

For tests performed on samples collected by the CHMS, a document is available upon request that lists the reference ranges for each test. As these ranges are provided by the various laboratories performing the tests, Statistics Canada provides them to data users for informational purposes only.

8. Data file structure

8.1 Description of data files

The dissemination files only contain data from respondents who attended the mobile examination centre (MEC) and agreed to share their responses with Health Canada and the Public Health Agency of Canada. For cycle 1 of the CHMS, after the completion of processing, and with the removal of non-share records, 5,604 records remain on the main master file.

By the end of cycle 1 dissemination, nine files containing CHMS data will have been released. One file will contain the complete household, MEC visit, full sample laboratory, and activity monitor derived variables. Six files will contain sub-sampled laboratory data. There will also be one file that contains the activity monitor derived variables for people who wore their activity monitor for four or more days, and one file with all the medication data. An additional file containing Environment Canada weather and air quality data was also released.

Wave 1	Household & MEC data	January 2010
Wave 2	Laboratory data (excluding environmental measures) + selected fasted sub-sample file	March 2010
Wave 3	Laboratory data (including environmental measures) + three sub-sample files: <ul style="list-style-type: none"> • Polybrominated diphenyl ether (PBDE) / Polychlorinated biphenyls (PCB) sub-sample • Inorganic mercury sub-sample • Perfluorinated sub-sample 	
Wave 4	Activity monitoring data + sub-sample file for people who wore their activity monitor for 4 or more days	November 2010
Supplementary Data release	Master file with updated 2,4,D data Tobacco sub-sample data: <ul style="list-style-type: none"> • Nicotine • Nicotine metabolites • NNAL (4-(methylnitrosoamino)-1-(3-pyridyl)-1-butanol) Phthalate sub-sample data Medication data	April 2011

The basic sample for the survey covers respondents 6 – 79 years of age. However, some of the measures or tests were only done for one sex, on fasting respondents or on a random subgroup of ages. Refer to chapter 4 for detailed content information.

8.1.1 Wave 1: Master file

This data file contains the responses collected during the household interview, the MEC visit, derived variables created by the collection applications and some created after data processing. The 5,604 records represent one record for each respondent who went to the MEC and participated in at least some of the measures and then agreed to share those results with Health Canada and the Public Health Agency of Canada.

The data contained in this file covers the following topics:

- Alcohol use
- Anthropometry
- Cardiovascular health and fitness
- Chronic conditions
- General health
- Lung function
- Medication use
- Musculoskeletal fitness
- Nutrition
- Oral Health
- Physical activity
- Pregnancy
- Sexual health
- Sleep
- Smoking
- Sun exposure

8.1.2 Wave 2: Master file

This file contains all of the data from wave 1 master file as well as the first group of laboratory variables. These variables contain laboratory data on cardiovascular health, chemistry panel, diabetes, general health, infection markers, kidney health and nutritional status.

8.1.3 Wave 2: Fasted sub-sample file

This was the first of the sub-sample files to be released for the CHMS. This file contains data for a subset of the CHMS respondents; those who had fasted for a minimum than 10 hours. The file contains the following variables:

- Apolipoprotein A1
- Apolipoprotein B
- Low density lipoproteins (LDL)
- Triglycerides
- Insulin

Note that this file also contains a weight specific to this sub-population.

8.1.4 Wave 3: Master file

This file contains all of the data from the wave 1 and wave 2 master files, as well as the laboratory variables concerning environmental contaminants and chemical substances. These variables contain laboratory data on bisphenol A, cotinine, metals, organophosphate pesticides, phenoxy herbicides (2,4-D, 2,4-DCP) and pyrethroid pesticides.

8.1.5 Wave 3: Sub-sample files

Three sub-sample files were released in wave 3. These files contained data for a subset of the CHMS respondents.

Sub-sample File	Sample
1) PFCS:	
- Perfluorinated compounds (PFHxS, PFOS, PFOA)	20-79 (s)
2) PBDE:	
- Organochloride pesticides	20-79 (s) (fasting)
- Polychlorinated biphenyls (PCBs)	
- Polybrominated biphenyls (PBBs)	
- Polybrominated diphenyl ethers (PBDEs)	
3) BIHG	
- Inorganic mercury - Blood	6-79 (s)

(s) = some laboratory tests are only done on a random subgroup of the age range indicated

Note that each of these files contain a weight specific to the sub-population of the file.

8.1.6 Wave 4: Master file

This file contains all of the data from the wave 1, wave 2 and wave 3 master files, as well as 98 activity monitor derived variables.

8.1.7 Wave 4: Sub-sample file

This file contains data for a subset of the CHMS respondents; those who wore their activity monitor for a minimum of 4 days. The file contains the 98 activity monitor derived variables. The file also contains a weight specific to this sub-population.

8.1.8 Supplementary data release: Master file

The file created for this release contains all of the data from the wave 1, wave 2 and wave 3 master files with the following changes:

- The medication data has been removed and placed on a separate file.
- The 2,4,D data has been updated.

8.1.9 Supplementary release: Medication File

In an effort to make the medication data collected during the CHMS household interview and clinic visit easier to work with, a separate database containing all medication responses was created. This database contains information for all respondents and so uses the same weight as the Wave 1 master file – WGT_FULL.

During the household interview, respondents were asked to report any prescription medication, over-the-counter medication and health products or herbal remedies that they took during the previous month. The interviewer was able to capture information for up to 15 prescription medications, 15 over-the-counter medications, and 15 health products or herbal remedies, for a total of 45 possible entries.

During the clinic visit the continued use of each medication, over-the-counter product and health product or herbal remedy reported at the household was confirmed. Respondents then had an opportunity to add up to five new prescription medications, five new over-the-counter products, and five new health products or herbal remedies that they started to take after the household interview had been completed.

Using this information a series of derived variables was created to indicate where the products were reported, how many total products were reported, and when the products were last taken by product type (prescription medications, over-the-counter products or health products or herbal remedies). In addition, both ATC and AHFS codes were assigned for each reported medication; a second AHFS code was added when applicable.

Variable naming convention

As per the general rules for the CHMS variable naming convention, the medication database variable names are limited to 8 characters and each character of the variable name contains information about the data contained in the variable.

Positions 1-3:

- “MED” or “MHR”: collected or derived variables from the household and/or clinic interviews
- “ATC”: Anatomical Therapeutic Chemical (ATC) classification variables
- “AHF”: American Hospital Formulary Service (AHFS) classification variables

Position 4: Identifies whether the variable was collected during the household or clinic interview (“_”) or was later derived (“D”).

Position 5: Identifies the medication category:

- “1”: prescription medication
- “2”: over-the-counter medication
- “3”: health product or herbal remedy

Positions 6-7: Identifies the list number of the medication:

- “01” to “15”: Medications collected during the household interview which were then confirmed during the clinic visit
- “31” to “35”: Additional medications collected during the clinic visit

Description of key variables

NOTE: The variables are described below, using an “X” in position 5 of the variable name as the same logic applies for each medication category (prescription medication, over-the-counter medication, and health products or herbal remedy).

The variable MEDDX00A indicates whether or not the respondent took any medication within a given category in the past month. The variable MEDDX00B is the sum of the medications within a given category taken by the respondent during the past month. Both MEDDX00A and MEDDX00B are derived from information collected during both the household interview and the clinic visit. For more information, refer the *Derived Variable Documentation*.

It should be noted that although a maximum of 20 medications were captured (15 from the household and 5 from the clinic) for each medication category, the value for MEDDX00B represents the actual number of medications being taken by the respondent within a given category, and therefore may exceed a value of 20. Due to the limitations of the data capture application, details are only available for the first 20 medications reported. For example, if a respondent indicated taking 17 different prescription medications in the last month at the time of the household interview then MEDDX00B will equal 17, although details would only have been captured for the first 15 of the 17 prescription medications.

Six additional variables are associated with each of the medications reported within a given category at the household and five additional variables are associated with each new medication reported at the clinic.

MEDDX01A to MEDDX15A and MEDDX31A to MEDDX35A	This variable is derived from the information collected at the clinic during the confirmation of medication-use reported during the household interview. It provides information about whether the respondent was still taking the medication, had stopped taking the medication since the household interview, or had never taken the medication.
ATC_X01A to ATC_X15A and ATC_X31A to ATC_X35A	The ATC code derived from the drug identification number (DIN) collected during the household and/or clinic interview.
AHF_X01A to AHF_X15A and	The first AHFS code derived from the DIN collected during the household and/or clinic interview.

AHF_X31A to AHF_X35A	Note: If the DIN was not available for a given medication, the AHF code will appear as “Not Stated” in the database.
AHF_X01B to AHF_X15B and AHF_X31B to AHF_X35B	The second AHFS code derived from the DIN collected during the household and/or clinic interview (if applicable). Note: If the DIN was not available for a given medication, the AHF code will appear as “Not Stated” in the database.
MED_X01B to MED_X15B	This information was collected at the household and indicates the time the respondent last took each medication from the time of the household interview. Note: This variable is suggested for use during analysis if attempting to relate medication use to one or more other variables from the household interview.
MHR_X01B to MHR_X15B and MHRDX31B to MHRDX35B	These variables are collected at the clinic and indicate the last time the respondent took each medication from the time of the clinic interview. Note: This variable is suggested for use during analysis if attempting to relate medication use to one or more other variables from the clinic visit.

8.1.10 Supplementary data release: Sub-sample files

Two more sub-sample files were released. These files contained data for a subset of the CHMS respondents.

Supplementary release: Sub-sample files	
Sub-sample File	Sample
1) Pthalates:	
- Pthalates	6 to 49
2) Tobacco:	
- Nicotine	12 to 79 (s)
- Nicotine metabolites	
- NNAL (4-(methylnitrosoamino)-1-(3-pyridyl)-1-butanol)	
(s) = some laboratory tests are only done on a random subgroup of the age range indicated	

Note that each these files contain a weight specific to the sub-population of the file.

8.2 Key variables for linking data files

As a result of the large number of files disseminated for cycle 1, there is a requirement to be able to link these files in order to have access to a larger pool of information. This also applies to the sub-sample files.

In order to facilitate the linking of two or more files, a variable that uniquely identifies each respondent on each file is required. For the CHMS, the variable to be used is called CLINICID. With this variable, data users are able to join the data from any sub-sample file to the master file for a particular respondent.

8.3 Key variables and definitions

Other variables which may be particularly useful for data users are listed below:

CLC_AGE	Respondent's age at the time of the mobile examination centre visit
CLC_SEX	Gender of Respondent
DHH_MS	Marital Status of Respondent
EDUDR04	Highest level of education - respondent, 4 levels
EDUDR10	Highest level of education - respondent, 10 levels
PROXY	Proxy or non-proxy interview
WGT_FULL	Weight for the full sample file and the medication file
WGT_FAST	Weight for the fasted sub-sample file
WGT_PFCS	Weight for the PFCS sub-sample file
WGT_PBDE	Weight for the PBDE sub-sample file
WGT_BIHG	Weight for the BIHG sub-sample file
WGT_ACMO	Weight for the Activity Monitor sub-sample file
WGT_PHTH	Weight for the Phthalate sub-sample file
WGT_NICO	Weight for the Tobacco sub-sample file

For information regarding the actual questions asked of the respondents, the household and clinic questionnaires are attached to this document (appendix 6). A record layout of all of the variables on the files is also attached to this document (appendix 7). Data dictionaries containing descriptions and characteristics of all of the released variables are available upon request. Each file released will have a separate dictionary.

9. Weighting

In order for estimates produced from survey data to be representative of the population covered and not merely of the sample itself, users must incorporate weighting factors (survey weights) into their calculations. A survey weight is assigned to each person included in the final sample, that is, in the sample of persons who responded to the entire survey. This weight corresponds to the number of people represented by the respondent in the population as a whole.

As described in chapter 5 (Sample Design), the Canadian Health Measures Survey (CHMS) uses two sampling frames for selecting its sample: an area frame of geographic units (clusters) for constructing and selecting collection sites, and an area frame of dwellings within each site.

In accordance with the weighting strategy, the selection weights for collection sites are multiplied by the selection weights for dwellings (households), adjusted for non-response. Following the conversion of household weights into person weights, the latter are adjusted for non-response at the interview stage and the mobile examination centre (MEC) stage, and with several other adjustments, this weight becomes the final person weight.

9.1 Selection weights for collection sites

The first step is to calculate the selection weight for each collection site. For each site, this weight is calculated as follows within each of the standard regional boundaries⁸ (SRB):

Selection weight of a collection site within a given SRB⁹ =

$$\frac{\text{Sum of persons in all sites contained within the SRB}}{(\text{Number of persons in the site}) \times (\text{Number of the sites selected within the SRB})}$$

There is no adjustment for non-response at the level of the collection sites, since all sites participated in the survey.

9.2 Selection weights for dwellings

For each collection site selected, a list of all dwellings was obtained from the 2006 Census. These dwellings were stratified into six groups corresponding to the five age group strata and one other strata, using household composition as specified in the section 5.3.2 (Dwelling sampling). The sample of dwellings was allocated among these strata.

For a given dwelling, the selection weight is equal to the inverse of the probability of selection of the dwelling within the stratum to which it belongs.

This weight is then multiplied by the collection site selection weight.

9.3 Removal of out-of-scope units

Among all the dwellings sampled, a proportion is identified during collection as being outside the scope of the survey. Examples of out-of-scope cases for the CHMS are demolished dwellings; dwellings under construction; vacant, seasonal or secondary dwellings; institutions; and dwellings in which all household members are under 6 or over 79 years of age or are full-time members of the Canadian Forces. These dwellings are simply removed from the sample, leaving only dwellings in the scope of the survey. The dwellings that remain in the sample retain the same weight as at the previous stage.

9.4 Household non-response

During collection, a proportion of the households sampled inevitably resulted in a non-response. This usually occurs when the household refuses to participate in the survey, provides unusable data or cannot be reached to conduct the interview. The weight of non-respondent households is redistributed to respondents within homogeneous response groups (HRGs). In order to create these HRGs, the score method based on logistic regression is used to determine the response probability, and then these probabilities are used to divide the sample into groups with similar response properties. Since the information available for non-respondent dwellings (households) is limited, the regression model includes a few variables from the 2006 Census such as dwelling type, as well as geographic information and paradata, which includes the number of weeks between the first and last contact. An adjustment factor was therefore calculated within each HRG as follows:

$$\frac{\text{Sum of weights for all dwellings (households)}}{\text{Sum of weights for all respondent households}}$$

The weight of respondent households is multiplied by this adjustment factor to produce the adjusted household weight. Non-respondent households are eliminated from the weighting process starting at this point.

9.5 Creation of the person weight

Since the final sampling unit for the CHMS is the person, the adjusted household weight up to this point must be converted into a person weight. This is obtained by multiplying the adjusted household weight by the inverse of the probability of selection of the person selected in the household. It should be kept in mind that the probability of a person being selected changes depending on the number of persons in the household and their ages (see section 5.3, Sample Design for more details).

9.6 Non-response at the questionnaire level

The CHMS has a three-stage collection process. First, the interviewer obtains the complete list of persons living in the household, then he or she interviews the person(s) selected in the household, and finally, the selected person or persons report to the CHMS mobile examination centre.

In some cases, interviewers succeed in completing only the first step, either because they cannot contact the person(s) selected, or because the person or persons selected refuse to be interviewed. Such cases are defined as non-responses at the questionnaire level, and an adjustment factor must be applied to the weights of respondent persons to compensate for this non-response. Just as for non-response at the dwelling (household) level, the adjustment is applied within classes defined according to the characteristics available for respondents and non-respondents. All the characteristics collected when the members of the household are listed, such as the number of persons in the household, in addition to geographic information and paradata, were in fact available to create these classes. The “score” method is used to define the classes. An adjustment factor is calculated within each class, as follows:

$$\frac{\text{Sum of weights for all selected persons}}{\text{Sum of weights for all selected persons responding to the questionnaire}}$$

Thus, the weight of respondent persons is multiplied by this adjustment factor. Persons not responding to the questionnaires are eliminated from weighting starting at this point.

9.7 Non-response at the MEC level

Respondents to the questionnaire are then invited to go to the CHMS mobile examination centre for physical measurements. In some cases, people refuse to participate or do not keep their appointment at the mobile examination centre. Such cases are defined as non-responses at the MEC level, and to compensate for this non-response, an adjustment factor must be applied to the weights of the clinic participants. Just as for non-response at the dwelling (household) and questionnaire levels, the adjustment is applied within classes defined on the basis of characteristics available for respondents and non-respondents. All the characteristics collected on the questionnaire during the interview (such as income class and whether or not the respondent is employed), in addition to geographic information and paradata, were made available to create these classes. The “score” method is used to define the classes. An adjustment factor is calculated within each class as follows:

$$\frac{\text{Sum of weights for all persons responding to the questionnaire}}{\text{Sum of weights for all persons participating in the clinic}}$$

The weights of the persons participating in the clinic were accordingly multiplied by this adjustment factor. Persons who did not report to the MEC are eliminated.

9.8 Winsorization

Note that following a series of adjustments applied to the weights, it is possible that some units will have weights that stand out from the other weights to the point of being aberrant. Some respondents may actually represent an abnormally high proportion in their group and therefore strongly influence both the estimates and the variance. To avoid this situation, a respondent weight that contributes aberrantly to the age-sex group is adjusted downward using a method known as “winsorization.”

9.9 Calibration

The last step required to obtain the final CHMS weight is calibration. This procedure is applied to ensure that the sum of the final weights corresponds to the estimates of populations defined at the scale of the five Canadian geographic regions, for each of the 10 age-sex groups of interest, namely the five age groups 6 to 11, 12 to 19, 20 to 39, 40 to 59 and 60 to 79 for each sex.

The population estimates are based on the most recent census counts, as well as on counts of births, deaths, immigration and emigration since then. The calibration was carried out using the mean of the monthly estimates (covering the survey period) for each cross-tabulation of standard regional boundaries and age-sex groups. After calibration, the weight adjustment was obtained. The resulting weight is the final CHMS weight found in the data file bearing the variable name WGT_FULL.

9.10 Fasted sub-sample

The steps described in sections 9.1 to 9.4 were carried out on the fasted sub-sample. At the person weight creation step (section 9.5) the fasted sub-sample flag assigned to the dwellings (see section 5.3.2.1) was attributed to the selected person(s). Before adjusting for non-response at the questionnaire level (section 9.6), the person weights of those selected to be fasted were adjusted to incorporate the fasted sub-sample sampling weights. An adjustment factor was derived by collection site and stratum as follows:

$$\frac{\text{Sum of weights for all selected persons}}{\text{Sum of weights for all persons selected to be fasted}}$$

The weights of the persons selected to be fasted were accordingly multiplied by this adjustment factor. Persons who were not selected to be fasted are eliminated.

Adjustment for non-response at the questionnaire level and the MEC level (sections 9.6 and 9.7) were carried out on the fasted sub-sample.

An additional step was required to adjust for persons who were selected to be fasted, but had not fasted or did not provide blood. Such cases are defined as non-responses to the fasted sub-sample, and to compensate for this non-response, an adjustment factor was applied to the weights of the persons who fasted and gave blood. Just as for non-response at the dwelling (household), questionnaire and clinic levels, the adjustment is applied within classes defined on the basis of

characteristics available for respondents and non-respondents. All the characteristics collected on the questionnaire during the household interview and measures taken at the clinic, in addition to geographic information and paradata, were made available to create these classes. The “score” method is used to define the classes. An adjustment factor is calculated within each class as follows:

$$\frac{\textit{Sum of weights for all persons participating at the clinic}}{\textit{Sum of weights for all persons who were fasted and provided blood}}$$

The weights of the persons who were fasted and provided blood were accordingly multiplied by this adjustment factor. Persons who were not fasted or did not provide blood were eliminated.

The final two steps, winsorization and calibration (see sections 9.8 and 9.9) were then applied to the fasted sub-sample. After calibration, the weight adjustment was obtained. The resulting weight is the final CHMS weight found in the fasted sub-sample data file bearing the variable name WGT_FAST.

9.11 Polybrominated diphenyl ether (PBDE) / Polychlorinated biphenyls (PCB) sub-sample

The steps described in section 9.10 (fasted sub-sample) were carried out. Only respondents aged 20 year old and over (at the time of the household interview) from the fasted sub-sample were kept. The resulting weight is the final CHMS weight found in the PBDE/PCB sub-sample data file bearing the variable name WGT_PBDE.

9.12 Inorganic mercury sub-sample

The steps described in sections 9.1 to 9.4 were carried out on the inorganic mercury sub-sample. At the person weight creation step (section 9.5) the inorganic mercury flag assigned to the dwellings (see section 5.3.2.3) was attributed to the selected person(s). Before adjusting for non-response at the questionnaire level (section 9.6), the person weights of those selected for the inorganic mercury sub-sample were adjusted to incorporate the inorganic mercury sub-sample sampling weights. An adjustment factor was derived by collection site and stratum as follows:

$$\frac{\textit{Sum of weights of selected persons}}{\textit{Sum of weights of persons selected for inorganic mercury}}$$

The weights of the persons selected for inorganic mercury were accordingly multiplied by this adjustment factor. Persons who were not selected for inorganic mercury are eliminated.

Adjustment for non-response at the questionnaire level and the MEC level (section 9.6 and 9.7) were carried out on the inorganic mercury sub-sample.

An additional step was required to adjust for persons who were selected for inorganic mercury but for whom the measure could not be performed. Such cases are defined as non-responses to the inorganic mercury sub-sample, and to compensate for this non-response, an adjustment factor was applied to the weights of the persons with a valid inorganic mercury measure. Just as for non-response at the collection site and dwelling (household) levels and clinic, the adjustment is applied

within classes defined on the basis of characteristics available for respondents and non-respondents. All the characteristics collected on the questionnaire during the interview and measures taken at the clinic, in addition to geographic information and paradata, were made available to create these classes. The “score” method is used to define the classes. An adjustment factor is calculated within each class as follows:

$$\frac{\text{Sum of weights of persons selected for inorganic mercury and participating at the clinic}}{\text{Sum of weights of persons selected for inorganic mercury who had a valid measure}}$$

The weights of the persons who were selected for inorganic mercury who had a valid measure were accordingly multiplied by this adjustment factor. Persons who did not have a valid measure were eliminated.

The final two steps, winsorization and calibration (see sections 9.8 and 9.9) were then applied to the inorganic mercury sub-sample. After calibration, the weight adjustment was obtained. The resulting weight is the final CHMS weight found in the inorganic mercury sub-sample data file bearing the variable name WGT_BIHG.

9.13 Perfluorinated compounds sub-sample

The steps described in sections 9.1 to 9.4 were carried out on the perfluorinated compounds sub-sample. At the person weight creation step (section 9.5) the perfluorinated compounds flag assigned to the dwellings (see section 5.3.2.4) was attributed to the selected person(s). Before adjusting for non-response at the questionnaire level (section 9.6), the person weights of those selected for the perfluorinated compounds sub-sample were adjusted to incorporate the perfluorinated compounds sub-sample sampling weights. An adjustment factor was derived by collection site and stratum as follows:

$$\frac{\text{Sum of weights of selected persons}}{\text{Sum of weights of persons selected for perfluorinated compounds}}$$

The weights of the persons selected for perfluorinated compounds were accordingly multiplied by this adjustment factor. Persons who were not selected for perfluorinated compounds are eliminated.

Adjustment for non-response at the questionnaire level and the MEC level (section 9.6 and 9.7) were carried out on the perfluorinated compounds sub-sample.

An additional step was required to adjust for persons who were selected for perfluorinated compounds for whom the measures could not be performed. Such cases are defined as non-responses to the perfluorinated compounds sub-sample, and to compensate for this non-response, an adjustment factor was applied to the weights of the persons with a valid perfluorinated compounds measure. Just as for non-response at the collection site and dwelling (household) levels and clinic, the adjustment is applied within classes defined on the basis of characteristics available for respondents and non-respondents. All the characteristics collected on the questionnaire during the interview and measures taken at the clinic, in addition to geographic information and paradata, were

made available to create these classes. The “score” method is used to define the classes. An adjustment factor is calculated within each class as follows:

$$\frac{\text{Sum of weights of persons selected for Perfluorinated compounds and participating at the clinic}}{\text{Sum of weights of persons selected for perfluorinated compounds who had a valid measure}}$$

The weights of the persons who were selected for perfluorinated compounds who had a valid measure were accordingly multiplied by this adjustment factor. Persons who did not have a valid measure were eliminated.

The final two steps, winsorization and calibration (see sections 9.8 and 9.9) were then applied to the perfluorinated compounds sub-sample. After calibration, the weight adjustment was obtained. The resulting weight is the final CHMS weight found in the perfluorinated compounds sub-sample data file bearing the variable name WGT_PFCs.

9.14 Activity monitor weighting

The steps described in sections 9.1 to 9.7 were carried out. Activity monitors were to be offered to all the clinic participants once their visits at the clinic was completed. However, due to technical problems, not all of them were offered the device. It is therefore necessary to take into account the clinic participants who were not offered to participate in this component of the survey. The weights of the respondents for whom an activity monitor was offered were inflated to take into account the weights of the clinic respondents who were not offered one. An adjustment factor was derived by collection site and stratum as follows:

$$\frac{\text{Sum of weights for all clinic participants}}{\text{Sum of weights for persons offered an activity monitor}}$$

The weights of the persons offered an activity monitor were accordingly multiplied by this adjustment factor. Persons who were not offered an activity monitor are eliminated.

An additional step was required to adjust for persons who were offered an activity monitor but did not have four days of valid entries. Such cases are defined as non-responses to the activity monitor component, and to compensate for this non-response, an adjustment factor was applied to the weights of the persons who had four days or more of valid entries. Just as for non-response at the collection site and dwelling (household) levels and clinic, the adjustment is applied within classes defined on the basis of characteristics available for respondents and non-respondents. All the characteristics collected on the questionnaire during the interview and measures taken at the clinic, in addition to geographic information and paradata, were made available to create these classes. The “score” method is used to define the classes. An adjustment factor is calculated within each class as follows:

$$\frac{\text{Sum of weights of persons offered an activity monitor}}{\text{Sum of weights of persons with four days or more with valid entries}}$$

The weights of the persons who have valid entries for four days or more on their activity monitor were accordingly multiplied by this adjustment factor. Persons who had less than four days of valid entries were eliminated.

The final two steps, winsorization and calibration (see sections 9.8 and 9.9) were then applied to the respondents. After calibration, the weight adjustment was obtained. The resulting weight is the final CHMS weight found in the activity monitor data file bearing the variable name WGT_ACMO.

9.15 Phthalates sub-sample

The steps described in sections 9.1 to 9.4 were carried out on the phthalates sub-sample. At the person weight creation step (section 9.5) the phthalates flag assigned to the dwellings (see section 5.3.2.5) was attributed to the selected person(s). Before adjusting for non-response at the questionnaire level (section 9.6), the person weights of those selected for the phthalates sub-sample were adjusted to incorporate the phthalates sub-sample sampling weights. An adjustment factor was derived by collection site and stratum as follows:

$$\frac{\textit{Sum of weights of selected persons}}{\textit{Sum of weights of persons selected for phthalates}}$$

The weights of the persons selected for phthalates were accordingly multiplied by this adjustment factor. Persons who were not selected for phthalates are eliminated.

Adjustment for non-response at the questionnaire level and the MEC level (section 9.6 and 9.7) were carried out on the phthalates sub-sample.

An additional step was required to adjust for persons who were selected for phthalates for whom the measures could not be performed. Such cases are defined as non-responses to the phthalates sub-sample, and to compensate for this non-response, an adjustment factor was applied to the weights of the persons with a valid phthalates measure. Just as for non-response at the collection site and dwelling (household) levels and clinic, the adjustment is applied within classes defined on the basis of characteristics available for respondents and non-respondents. All the characteristics collected on the questionnaire during the interview and measures taken at the clinic, in addition to geographic information and paradata, were made available to create these classes. The “score” method is used to define the classes. An adjustment factor is calculated within each class as follows:

$$\frac{\textit{Sum of weights of persons selected for phthalates and participating at the clinic}}{\textit{Sum of weights of persons selected for phthalates who had a valid measure}}$$

The weights of the persons who were selected for phthalates who had a valid measure were accordingly multiplied by this adjustment factor. Persons who did not have a valid measure were eliminated.

The final two steps, winsorization and calibration (see sections 9.8 and 9.9) were then applied to the phthalates sub-sample. After calibration, the weight adjustment was obtained. The resulting weight is the final CHMS weight found in the phthalates sub-sample data file bearing the variable name WGT_PHTH.

9.16 Tobacco sub-sample

The steps described in sections 9.1 to 9.7 were carried out. For the components that were being measured on clinic participants who provided urine and consented to storage of their urine sample for future health studies, an adjustment factor was necessary to compensate for those who did not provide urine or did not consent. Just as for non-response at the collection site and dwelling (household) levels and clinic, the adjustment is applied within classes defined on the basis of characteristics available for respondents and non-respondents. All characteristics collected on the questionnaire during the interview and measures taken at the clinic, in addition to geographic information and paradata, were made available to create these classes. The “score” method is used to define the classes. An adjustment factor is calculated within each class as follows:

$$\frac{\text{Sum of weights of clinic participants aged 12 to 79}}{\text{Sum of weights of participants aged 12 to 79 who provided urine and consented to future studies}}$$

The weights of persons who provided urine and consented to future studies were accordingly multiplied by this adjustment factor. Persons who did not provide urine or did not consent to storage of their urine for future studies were eliminated.

Each clinic participant aged 12 to 79 was assigned to a stratum defined by an age group (12 to 19, 20 to 39, 40 to 59 and 60 to 79) and a smoker status (smoker, non-smoker exposed to smoke and non-smoker non-exposed to smoke). To achieve the sample size of approximately 2,500 for the nicotine subsample, a sample has been selected among these participants. Some respondents were excluded because there was not enough urine left for analysis, mostly because their urine was used to perform other studies. These exclusions are considered random. To compensate for these exclusions and to factor in the nicotine sub-sample weights, an adjustment factor must be applied to the weights of the participants whose urine was analysed for the nicotine study. An adjustment factor is calculated within each of the age group by smoker status stratum as follow:

$$\frac{\text{Sum of weights of participants 12 to 79 who provided urine and consented to future studies}}{\text{Sum of weights of persons 12 to 79 on whom nicotine analysis was performed}}$$

The weights of the persons 12 to 79 on whom nicotine analysis was performed were accordingly multiplied by this adjustment factor. Persons on whom nicotine analysis was not performed are eliminated.

The final two steps, winsorization and calibration (see sections 9.8 and 9.9) were then applied to the tobacco sub-sample. After calibration, the weight adjustment was obtained. The resulting weight is the final CHMS weight found in the nicotine sub-sample data file bearing the variable name WGT_SMOK.

10. Data quality

10.1 Response rate

In all, 8,772 of the dwellings selected in the Canadian Health Measures Survey (CHMS) were within the scope of the survey¹⁰. Of these dwellings, 6,106 agreed to give the composition of the household, for a household response rate of 69.6%. From these respondent households, 7,483 persons were selected (one or two persons per household) to participate in the survey, of whom 6,604 agreed to respond to the questionnaire, for a response rate of 88.3%. Of these persons, 5,604 then reported to the CHMS mobile examination centre for physical measurements, for a response rate of 84.9%. At the Canadian scale, a combined response rate of 51.7% was observed for cycle 1 of the CHMS. It is important to note that the combined response rate is not obtained by multiplying the response rates by the person and household scales (at the questionnaire level and the clinic level), since two persons were selected in some households. Appendix 9a shows the combined response rates and the relevant information for calculating them for each site.

Below is a description of how the different components of the equation must be manipulated to calculate combined response rates correctly.

Response rate at the household scale

$$\text{HR} = \frac{\text{R}}{\text{S}} = \frac{\text{\# of respondent households}}{\text{\# of households within the scope of the survey}}$$

Response rate at the person scale among households where one person was selected (questionnaire)

$$\text{PQ1} = \frac{\text{Q1}}{\text{PS1}} = \frac{\text{\# of respondents to the questionnaire among households where one person was selected}}{\text{\# of persons within the scope of the survey among households where one person was selected}}$$

Response rate at the person scale among households where two persons were selected (questionnaire)

$$\text{PQ2} = \frac{\text{Q2}}{\text{PS2}} = \frac{\text{\# of respondents to the questionnaire among households where two persons were selected}}{\text{\# of persons within the scope of the survey among households where two persons were selected}}$$

Response rate at the person scale among households where one person was selected (clinic)

$$PC1 = \frac{C1}{Q1} = \frac{\text{\# of participants in the clinic among households where one person was selected}}{\text{\# of respondents to the questionnaire among households where one person was selected}}$$

Response rate at the person scale among households where two persons were selected (clinic)

$$PC2 = \frac{C2}{Q2} = \frac{\text{\# of participants in the clinic among households where two persons were selected}}{\text{\# of respondents to the questionnaire among households where two persons were selected}}$$

Ratio for households where one person was selected

$$RR1 = \frac{R1}{R} = \frac{\text{\# of respondent households among those where one person was selected}}{\text{\# of respondent households}}$$

Note: The “# of respondent households among those where one person was selected” is neither more nor less than the number of persons selected among households where one person was selected in appendix 9a.

Ratio for households where two persons were selected (area frame)

$$RR2 = \frac{R2}{R} = \frac{\text{\# of respondent households among those where two persons were selected}}{\text{\# of respondent households}}$$

Note: It is important to note that the “# of respondent households among those where two persons were selected” is obtained by dividing by 2 the number of persons selected among household where two persons were selected in appendix 9a.

Once all the above components have been calculated, a user can calculate the combined response rate using the following formula.

Combined response rate

$$COMBRR = HR * [(RR1 * PQ1 * PC1) + (RR2 * PQ2 * PC2)]$$

Below is an example of calculating the response rate at the household scale for Canada using the information provided in the appendix 9a.

$$\text{HR} = \frac{R}{S} = \frac{\text{\# of respondent households}}{\text{\# of households within the scope of the survey}}$$
$$\text{HR} = \frac{6,106}{8,772} = 0.696$$
$$= \mathbf{69.6\%}$$

Now here is an example of calculating the combined response rate for Canada using the information provided in appendix 9a.

$$\text{HR} = \frac{6,106}{8,772} = 0.696$$
$$\text{PQ1} = \frac{4,158}{4,734} = 0.878$$
$$\text{PC1} = \frac{3,463}{4,158} = 0.833$$
$$\text{PQ2} = \frac{2,446}{2,744} = 0.891$$
$$\text{PC2} = \frac{2,141}{2,446} = 0.875$$
$$\text{RR1} = \frac{4,734}{6,106} = 0.775$$
$$\text{RR2} = \frac{2,744 \div 2}{6,106} = 0.225$$

$$\begin{aligned}\text{Combined response rate} &= 0.696 * [(0.775 * 0.878 * 0.833) + (0.225 * 0.891 * 0.875)] \\ &= 0.517 \\ &= \mathbf{51.7\%}\end{aligned}$$

10.1.1 Blood draw and Urine response rate

Although the file with the laboratory data includes all clinic participants, some laboratory analysis could not be performed because the respondents did not or could not provide blood or urine. Of the 5,604 participants who reported to the CHMS mobile examination centre for physical measurements, 5,373 participants provided blood and 5,540 provided urine. The combined response rate for blood draw was 50.0% whereas the combined response rate for urine was 51.2%. It is important to note that the combined response rate is not obtained by multiplying the response rates by the person and household scales, since two persons were selected in some households. Appendix 9b shows the combined response rates and the relevant information for calculating them for each site.

Below is a description of how the different components of the equation must be manipulated to calculate combined response rates correctly. Four additional response rates are required to derive the blood draw and the urine combined response rates:

Response rate at the person scale among households where one person was selected (blood draw)

$$BC1 = \frac{B1}{C1} = \frac{\text{\# of participants who provided blood among clinic participants where one person was selected}}{\text{\# of participants in the clinic among households where one person was selected}}$$

Response rate at the person scale among households where two persons were selected (blood draw)

$$BC2 = \frac{B2}{C2} = \frac{\text{\# of participants who provided blood among clinic participants where two persons were selected}}{\text{\# of participants in the clinic among households where two persons were selected}}$$

Response rate at the person scale among households where one person was selected (urine)

$$UC1 = \frac{U1}{C1} = \frac{\text{\# of participants who provided urine among clinic participants where one person was selected}}{\text{\# of participants in the clinic among households where one person was selected}}$$

Response rate at the person scale among households where two persons were selected (urine)

$$UC2 = \frac{U2}{C2} = \frac{\text{\# of participants who provided urine among clinic participants where two persons were selected}}{\text{\# of participants in the clinic among households where two persons were selected}}$$

Blood draw combined response rate

$$BCOMBRR = HR * [(RR1 * PQ1 * PC1 * BC1) + (RR2 * PQ2 * PC2 * BC2)]$$

Urine combined response rate

$$UCOMBRR = HR * [(RR1 * PQ1 * PC1 * UC1) + (RR2 * PQ2 * PC2 * UC2)]$$

where HR, RR1, PQ1, PC1, RR2, PQ2 and PC2 are described in section 10.1.

Now here is an example of calculating the Blood draw combined response rate for Canada using the information provided in Appendixes 9 and 9b.

$$HR = \frac{6,106}{8,772} = 0.696$$

$$PQ1 = \frac{4,158}{4,734} = 0.878$$

$$PC1 = \frac{3,463}{4,158} = 0.833$$

$$PQ2 = \frac{2,446}{2,744} = 0.891$$

$$PC2 = \frac{2,141}{2,446} = 0.875$$

$$RR1 = \frac{4,734}{6,106} = 0.775$$

$$RR2 = \frac{2,744 \div 2}{6,106} = 0.225$$

$$BC1 = \frac{3,397}{3,463} = 0.981$$

$$BC2 = \frac{1,976}{2,141} = 0.923$$

Blood draw combined response rate =

$$\begin{aligned} & 0.696 * [(0.775 * 0.878 * 0.833 * 0.981) + (0.225 * 0.891 * 0.875 * 0.923)] \\ & = 0.500 \\ & = \mathbf{50.0\%} \end{aligned}$$

10.1.2 Fasted sub-sample response rate

From the 6,106 respondent households, 3,948 persons were selected (one or two persons per household) to participate in the fasted sub-sample, of whom 3,483 responded to the questionnaire, for a response rate of 88.2%. Of these persons, 2,969 then reported to the CHMS mobile examination centre for physical measurements, for a response rate of 85.2%. Of these persons, 2,634 were actually fasted and provided blood. At the Canadian scale, a combined response rate of 46.3% was observed. It is important to note that the combined response rate is not obtained by multiplying the response rates by the person and household scales, since two persons were selected in some households. Appendix 9c shows the fasted sub-sample combined response rates and the relevant information for calculating them for each site.

Below is a description of how the different components of the equation must be manipulated to calculate the combined response rate correctly.

Response rate at the person scale among households where one person was selected for the fasted sub-sample (questionnaire)

$$\text{FSQ1} = \frac{\text{FQ1}}{\text{FPS1}} = \frac{\text{\# of respondents to the questionnaire among households where one person was selected for the fasted sub-sample}}{\text{\# of persons within the scope of the survey among households where one person was selected for the fasted sub-sample}}$$

Response rate at the person scale among households where two persons were selected for the fasted sub-sample (questionnaire)

$$\text{FSQ2} = \frac{\text{FQ2}}{\text{FPS2}} = \frac{\text{\# of respondents to the questionnaire among households where two persons were selected for the fasted sub-sample}}{\text{\# of persons within the scope of the survey among households where two persons were selected for the fasted sub-sample}}$$

Response rate at the person scale among households where one person was selected for the fasted sub-sample (clinic)

$$\text{FSC1} = \frac{\text{FC1}}{\text{FQ1}} = \frac{\text{\# of participants in the clinic among households where one person was selected for the fasted sub-sample}}{\text{\# of respondents to the questionnaire among households where one person was selected for the fasted sub-sample}}$$

Response rate at the person scale among households where two persons were selected for the fasted sub-sample (clinic)

$$\text{FSC2} = \frac{\text{FC2}}{\text{FQ2}} = \frac{\text{\# of participants in the clinic among households where two persons were selected for the fasted sub-sample}}{\text{\# of respondents to the questionnaire among households where two persons were selected for the fasted sub-sample}}$$

Response rate at the person scale among households where one person was selected for the fasted sub-sample (actually fasted and provided blood)

$$\text{FSB1} = \frac{\text{FB1}}{\text{FC1}} = \frac{\text{\# of participants who were fasted and provided blood among clinic participants where one person was selected for the fasted sub-sample}}{\text{\# of participants in the clinic among households where one person was selected for the fasted sub-sample}}$$

Response rate at the person scale among households where two persons were selected for the fasted sub-sample (actually fasted and provided blood)

$$\text{FSB2} = \frac{\text{FB2}}{\text{FC2}} = \frac{\text{\# of participants who were fasted and provided blood among clinic participants where two persons were selected for the fasted sub-sample}}{\text{\# of participants in the clinic among households where two persons were selected for the fasted sub-sample}}$$

Fasted sub-sample combined response rate

$$\text{FSCOMBRR} = \text{HR} * [(\text{RR1} * \text{FSQ1} * \text{FSC1} * \text{FSB1}) + (\text{RR2} * \text{FSQ2} * \text{FSC2} * \text{FSB2})]$$

where HR, RR1 and RR2 are described in section 10.1.

Now here is an example of calculating the Fasted sub-sample combined response rate for Canada using the information provided in Appendixes 9a and 9c.

$$\text{HR} = \frac{6,106}{8,772} = 0.696$$

$$\text{FSQ1} = \frac{2,206}{2,522} = 0.875$$

$$\text{FSC1} = \frac{1,840}{2,206} = 0.834$$

$$\text{FSQ2} = \frac{1,277}{1,426} = 0.896$$

$$\text{FSC2} = \frac{1,129}{1,277} = 0.884$$

$$\text{RR1} = \frac{4,734}{6,106} = 0.775$$

$$\text{RR2} = \frac{2,744 \div 2}{6,106} = 0.225$$

$$\text{FSB1} = \frac{1,672}{1,840} = 0.909$$

$$\text{FSB2} = \frac{962}{1,129} = 0.852$$

Fasted sub-sample combined response rate =

$$0.696 * [(0.775 * 0.875 * 0.834 * 0.909) + (0.225 * 0.896 * 0.884 * 0.852)]$$

$$= 0.463$$

$$= \mathbf{46.3\%}$$

10.1.3 Polybrominated diphenyl ether (PBDE) / Polychlorinated biphenyls (PCB) sub-sample response rates

From the 6,106 respondent households, 2,513 persons were select to participate in the PBDE/PCB sub-sample, of whom 2,203 responded to the questionnaire, for a response rate of 87.7%. Of these persons, 1,841 then reported to the CHMS mobile examination centre for physical measurements, for a response rate of 83.6%. Of these persons, 1,696 were actually fasted and provided blood. At the Canadian scale, a combined response rate of 47.0% was observed. It is important to note that the combined response rate is not necessarily obtained by multiplying the response rates by the person and household scales, since two persons were selected in some households. Appendix 9d shows the PBDE/PCB sub-sample combined response rates and the relevant information for calculating them for each site.

Below is a description of how the different components of the equation must be manipulated to calculate the combined response rate correctly.

Questionnaire response rate at the person scale for the PBDE/PCB sub-sample among households where one person was selected

$$\text{PBCQ1} = \frac{\text{PBQ1}}{\text{PBPS1}} = \frac{\text{\# of respondents to the questionnaire for the PBDE/PCB sub-sample among households where one person was selected}}{\text{\# of persons within the scope of the survey for the PBDE/PCB sub-sample among households where one person was selected}}$$

Questionnaire response rate at the person scale for the PBDE/PCB sub-sample among households where two persons were selected

$$\text{PBCQ2} = \frac{\text{PBQ2}}{\text{PBPS2}} = \frac{\text{\# of respondents to the questionnaire for the PBDE/PCB sub-sample among households where two persons were selected}}{\text{\# of persons within the scope of the survey for the PBDE/PCB sub-sample among households where two persons were selected}}$$

Clinic response rate at the person scale for the PBDE/PCB sub-sample among households where one person was selected

$$\text{PBCC1} = \frac{\text{PBC1}}{\text{PBQ1}} = \frac{\text{\# of participants in the clinic for the PBDE/PCB sub-sample among households where one person was selected}}{\text{\# of respondents to the questionnaire for the PBDE/PCB sub-sample among households where one person was selected}}$$

Clinic response rate at the person scale for the PBDE/PCB sub-sample among households where two persons were selected

$$PBCC2 = \frac{PBC2}{PBQ2} = \frac{\text{\# of participants in the clinic for the PBDE/PCB sub-sample among households where two persons were selected}}{\text{\# of respondents to the questionnaire for the PBDE/PCB sub-sample among households where two persons were selected}}$$

Response rate at the person scale of people who were actually fasted and provided blood for the PBDE/PCB sub-sample among households where one person was selected

$$PBCB1 = \frac{PBB1}{PBC1} = \frac{\text{\# of participants who were fasted and provided blood for the PBDE/PCB sub-sample among clinic participants where one person was selected}}{\text{\# of participants in the clinic for the PBDE/PCB sub-sample among households where one person was selected}}$$

Response rate at the person scale of people who were actually fasted and provided blood for the PBDE/PCB sub-sample among households where two persons were selected

$$PBCB2 = \frac{PBB2}{PBC2} = \frac{\text{\# of participants who were fasted and provided blood for the PBDE/PCB sub-sample among clinic participants where two persons were selected}}{\text{\# of participants in the clinic for the PBDE/PCB sub-sample among households where two persons were selected}}$$

PBDE/PCB sub-sample combined response rate

$$PBCOMBRR = HR * [(RR1 * PBCQ1 * PBCC1 * PBCB1) + (RR2 * PBCQ2 * PBCC2 * PBCB2)]$$

where HR, RR1 and RR2 are described in section 10.1.

Now here is an example of calculating the PBDE/PCB sub-sample combined response rate for Canada using the information provided in Appendixes 9a and 9d.

$$\text{HR} = \frac{6,106}{8,772} = 0.696$$

$$\text{PBCQ1} = \frac{1,745}{1,983} = 0.880$$

$$\text{PBCC1} = \frac{1,438}{1,745} = 0.824$$

$$\text{PBCQ2} = \frac{458}{530} = 0.864$$

$$\text{PBCC2} = \frac{403}{458} = 0.880$$

$$\text{RR1} = \frac{4,734}{6,106} = 0.775$$

$$\text{RR2} = \frac{2,744 \div 2}{6,106} = 0.225$$

$$\text{PBCB1} = \frac{1,324}{1,438} = 0.921$$

$$\text{PBCB2} = \frac{372}{403} = 0.923$$

PBDE/PCB sub-sample combined response rate =

$$0.696 * [(0.775 * 0.880 * 0.824 * 0.921) + (0.225 * 0.864 * 0.880 * 0.923)]$$

$$= 0.470$$

$$= \mathbf{47.0\%}$$

10.1.4 Inorganic mercury sub-sample response rates

From the 6,106 respondent households, 1,592 persons were selected to participate in the Inorganic mercury sub-sample, of whom 1,414 responded to the questionnaire, for a response rate of 88.8%. Of these persons, 1,191 then reported to the CHMS mobile examination centre for physical measurements, for a response rate of 84.2%. Of these persons, 1,123 had a measure done. At the Canadian scale, a combined response rate of 49.4% was observed. It is important to note that the combined response rate is not necessarily obtained by multiplying the response rates by the person and household scales, since two persons were selected in some households. Appendix 9e shows the Inorganic mercury sub-sample combined response rates and the relevant information for calculating them for each site.

Below is a description of how the different components of the equation must be manipulated to calculate the combined response rate correctly.

Questionnaire response rate at the person scale for the Inorganic mercury sub-sample among households where one person was selected

$$IMQ1 = \frac{MQ1}{MPS1} = \frac{\text{\# of respondents to the questionnaire for the Inorganic mercury sub-sample among households where one person was selected}}{\text{\# of persons within the scope of the survey for the Inorganic mercury sub-sample among households where one person was selected}}$$

Questionnaire response rate at the person scale for the Inorganic mercury sub-sample among households where two persons were selected

$$IMQ2 = \frac{MQ2}{MPS2} = \frac{\text{\# of respondents to the questionnaire for the Inorganic mercury sub-sample among households where two persons were selected}}{\text{\# of persons within the scope of the survey for the Inorganic mercury sub-sample among households where two persons were selected}}$$

Clinic response rate at the person scale for the Inorganic mercury sub-sample among households where one person was selected

$$IMC1 = \frac{MC1}{MQ1} = \frac{\text{\# of participants in the clinic for the Inorganic mercury sub-sample among households where one person was selected}}{\text{\# of respondents to the questionnaire for the Inorganic mercury sub-sample among households where one person was selected}}$$

Clinic response rate at the person scale for the Inorganic mercury sub-sample among households where two persons were selected

$$\text{IMC2} = \frac{\text{MC2}}{\text{MQ2}} = \frac{\text{\# of participants in the clinic for the Inorganic mercury sub-sample among households where two persons were selected}}{\text{\# of respondents to the questionnaire for the Inorganic mercury sub-sample among households where two persons were selected}}$$

Response rate at the person scale of people who were actually fasted and provided blood for the Inorganic mercury sub-sample among households where one person was selected

$$\text{IMB1} = \frac{\text{MB1}}{\text{MC1}} = \frac{\text{\# of participants who were fasted and provided blood for the Inorganic mercury sub-sample among clinic participants where one person was selected}}{\text{\# of participants in the clinic for the Inorganic mercury sub-sample among households where one person was selected}}$$

Response rate at the person scale of people who were actually fasted and provided blood for the Inorganic mercury sub-sample among households where two persons were selected

$$\text{IMB2} = \frac{\text{MB2}}{\text{MC2}} = \frac{\text{\# of participants who were fasted and provided blood for the Inorganic mercury sub-sample among clinic participants where two persons were selected}}{\text{\# of participants in the clinic for the Inorganic mercury sub-sample among households where two persons were selected}}$$

Inorganic mercury sub-sample combined response rate

$$\text{IMCOMBRR} = \text{HR} * [(\text{RR1} * \text{IMQ1} * \text{IMC1} * \text{IMB1}) + (\text{RR2} * \text{IMQ2} * \text{IMC2} * \text{IMB2})]$$

where HR, RR1 and RR2 are described in section 10.1.

Now here is an example of calculating the Inorganic mercury sub-sample combined response rate for Canada using the information provided in Appendixes 9a and 9e.

$$\text{HR} = \frac{6,106}{8,772} = 0.696$$

$$\text{IMQ1} = \frac{868}{981} = 0.885$$

$$\text{IMC1} = \frac{719}{868} = 0.828$$

$$\text{IMQ2} = \frac{546}{611} = 0.894$$

$$\text{IMC2} = \frac{472}{546} = 0.864$$

$$\text{RR1} = \frac{4,734}{6,106} = 0.775$$

$$\text{RR2} = \frac{2,744 \div 2}{6,106} = 0.225$$

$$\text{IMB1} = \frac{702}{719} = 0.976$$

$$\text{IMB2} = \frac{421}{472} = 0.892$$

Inorganic mercury sub-sample combined response rate =

$$0.696 * [(0.775 * 0.885 * 0.828 * 0.976) + (0.225 * 0.894 * 0.864 * 0.892)]$$

$$= 0.494$$

$$= \mathbf{49.4\%}$$

10.1.5 Perfluorinated compounds sub-sample response rates

From the 6,106 respondent households, 4,036 persons were selected to participate in the Perfluorinated compounds sub-sample, of whom 3,563 responded to the questionnaire, for a response rate of 88.3%. Of these persons, 2,971 then reported to the CHMS mobile examination centre for physical measurements, for a response rate of 83.4%. Of these persons, 2,880 had a measure done. At the Canadian scale, a combined response rate of 49.7% was observed. It is important to note that the combined response rate is not necessarily obtained by multiplying the response rates by the person and household scales, since two persons were selected in some households. Appendix 9f shows the Perfluorinated compounds sub-sample combined response rates and the relevant information for calculating them for each site.

Below is a description of how the different components of the equation must be manipulated to calculate the combined response rate correctly.

Questionnaire response rate at the person scale for the Perfluorinated compounds sub-sample among households where one person was selected

$$\text{PFCQ1} = \frac{\text{PFQ1}}{\text{PFPS1}} = \frac{\text{\# of respondents to the questionnaire for the Perfluorinated compounds sub-sample among households where one person was selected}}{\text{\# of persons within the scope of the survey for the Perfluorinated compounds sub-sample among households where one person was selected}}$$

Questionnaire response rate at the person scale for the Perfluorinated compounds sub-sample among households where two persons were selected

$$\text{PFCQ2} = \frac{\text{PFQ2}}{\text{PFPS2}} = \frac{\text{\# of respondents to the questionnaire for the Perfluorinated compounds sub-sample among households where two persons were selected}}{\text{\# of persons within the scope of the survey for the Perfluorinated compounds sub-sample among households where two persons were selected}}$$

Clinic response rate at the person scale for the Perfluorinated compounds sub-sample among households where one person was selected

$$\text{PFCC1} = \frac{\text{PFC1}}{\text{PFQ1}} = \frac{\text{\# of participants in the clinic for the Perfluorinated compounds sub-sample among households where one person was selected}}{\text{\# of respondents to the questionnaire for the Perfluorinated compounds sub-sample among households where one person was selected}}$$

Clinic response rate at the person scale for the Perfluorinated compounds sub-sample among households where two persons were selected

$$\text{PFCC2} = \frac{\text{PFC2}}{\text{PFQ2}} = \frac{\text{\# of participants in the clinic for the Perfluorinated compounds sub-sample among households where two persons were selected}}{\text{\# of respondents to the questionnaire for the Perfluorinated compounds sub-sample among households where two persons were selected}}$$

Response rate at the person scale of people who were actually fasted and provided blood for the Perfluorinated compounds sub-sample among households where one person was selected

$$\text{PFCB1} = \frac{\text{PFB1}}{\text{PFC1}} = \frac{\text{\# of participants who were fasted and provided blood for the Perfluorinated compounds sub-sample among clinic participants where one person was selected}}{\text{\# of participants in the clinic for the Perfluorinated compounds sub-sample among households where one person was selected}}$$

Response rate at the person scale of people who were actually fasted and provided blood for the Perfluorinated compounds sub-sample among households where two persons were selected

$$\text{PFCB2} = \frac{\text{PFB2}}{\text{PFC2}} = \frac{\text{\# of participants who were fasted and provided blood for the Perfluorinated compounds sub-sample among clinic participants where two persons were selected}}{\text{\# of participants in the clinic for the Perfluorinated compounds sub-sample among households where two persons were selected}}$$

Perfluorinated compounds sub-sample combined response rate

$$\text{PFCCOMBRR} = \text{HR} * [(\text{RR1} * \text{PFCQ1} * \text{PFCC1} * \text{PFCB1}) + (\text{RR2} * \text{PFCQ2} * \text{PFCC2} * \text{PFCB2})]$$

where HR, RR1 and RR2 are described in section 10.1.

Now here is an example of calculating the Perfluorinated compounds sub-sample combined response rate for Canada using the information provided in Appendixes 9a and 9g.

$$\text{HR} = \frac{6,106}{8,772} = 0.696$$

$$\text{PFCQ1} = \frac{2,798}{3,167} = 0.883$$

$$\text{PFCC1} = \frac{2,308}{2,798} = 0.825$$

$$\text{PFCQ2} = \frac{765}{869} = 0.880$$

$$\text{PFCC2} = \frac{663}{765} = 0.867$$

$$\text{RR1} = \frac{4,734}{6,106} = 0.775$$

$$\text{RR2} = \frac{2,744 \div 2}{6,106} = 0.225$$

$$\text{PFCB1} = \frac{2,242}{2,308} = 0.971$$

$$\text{PFCB2} = \frac{638}{663} = 0.962$$

Perfluorinated compounds sub-sample combined response rate =

$$0.696 * [(0.775 * 0.883 * 0.825 * 0.971) + (0.225 * 0.880 * 0.867 * 0.962)]$$

$$= 0.497$$

$$= \mathbf{49.7\%}$$

10.1.6 Activity monitor response rate

Of the 5,604 participants who reported to the CHMS mobile examination centre for physical measurements, 5,468 participants were offered an activity monitor. Of these persons, 4,441 returned the activity monitor with at least four days of valid entries. The combined response rate for the activity monitor was 41.8%. It is important to note that the combined response rate is not obtained by multiplying the response rates by the person and household scales, since two persons were selected in some households. Appendix 9g shows the combined response rates and the relevant information for calculating them for each site.

Below is a description of how the different components of the equation must be manipulated to calculate combined response rates correctly. Two additional response rates are required to derive the activity monitor combined response rates:

Response rate at the person scale among households where one person was selected (activity monitor)

$$AM1 = \frac{V1}{OF1} = \frac{\text{\# of participants who returned the activity monitor with at least four days of valid entries among clinic participants where one person was selected}}{\text{\# of participants in the clinic who were offered an activity monitor among households where one person was selected}}$$

Response rate at the person scale among households where two persons were selected (activity monitor)

$$AM2 = \frac{V2}{OF2} = \frac{\text{\# of participants who returned the activity monitor with at least four days of valid entries among clinic participants where two persons were selected}}{\text{\# of participants in the clinic who were offered an activity monitor among households where two persons were selected}}$$

Activity monitor combined response rate

$$AMCBRR = HR * [(RR1 * PQ1 * PC1 * AM1) + (RR2 * PQ2 * PC2 * AM2)]$$

where HR, RR1, PQ1, PC1, RR2, PQ2 and PC2 are described in section 10.1.

Now here is an example of calculating the activity monitor combined response rate for Canada using the information provided in Appendixes 9a and 9g.

$$\text{HR} = \frac{6,106}{8,772} = 0.696$$

$$\text{PQ1} = \frac{4,158}{4,734} = 0.878$$

$$\text{PC1} = \frac{3,463}{4,158} = 0.833$$

$$\text{PQ2} = \frac{2,446}{2,744} = 0.891$$

$$\text{PC2} = \frac{2,141}{2,446} = 0.875$$

$$\text{RR1} = \frac{4,734}{6,106} = 0.775$$

$$\text{RR2} = \frac{2,744 \div 2}{6,106} = 0.225$$

$$\text{AM1} = \frac{2,709}{3,372} = 0.803$$

$$\text{AM2} = \frac{1,732}{2,096} = 0.826$$

Activity monitor combined response rate =

$$0.696 * [(0.775 * 0.878 * 0.833 * 0.803) + (0.225 * 0.891 * 0.875 * 0.826)]$$

$$= 0.418$$

$$= \mathbf{41.8\%}$$

10.1.7 Phthalates sub-sample response rates

From the 6,106 respondent households, 4,439 persons were selected to participate in the Phthalates sub-sample, of whom 3,902 responded to the questionnaire, for a response rate of 87.9%. Of these persons, 3,310 then reported to the CHMS mobile examination centre for physical measurements, for a response rate of 84.8%. Of these persons, 3,237 had a measure done. At the Canadian scale, a combined response rate of 50.1% was observed. It is important to note that the combined response rate is not necessarily obtained by multiplying the response rates by the person and household scales, since two persons were selected in some households. Appendix 9h shows the Phthalates sub-sample combined response rates and the relevant information for calculating them for each site.

Below is a description of how the different components of the equation must be manipulated to calculate the combined response rate correctly.

Questionnaire response rate at the person scale for the Phthalates sub-sample among households where one person was selected

$$\text{PHTQ1} = \frac{\text{PHQ1}}{\text{PHPS1}} = \frac{\text{\# of respondents to the questionnaire for the Phthalates sub-sample among households where one person was selected}}{\text{\# of persons within the scope of the survey for the Phthalates sub-sample among households where one person was selected}}$$

Questionnaire response rate at the person scale for the Phthalates sub-sample among households where two persons were selected

$$\text{PHTQ2} = \frac{\text{PHQ2}}{\text{PHPS2}} = \frac{\text{\# of respondents to the questionnaire for the Phthalates sub-sample among households where two persons were selected}}{\text{\# of persons within the scope of the survey for the Phthalates sub-sample among households where two persons were selected}}$$

Clinic response rate at the person scale for the Phthalates sub-sample among households where one person was selected

$$\text{PHTC1} = \frac{\text{PHC1}}{\text{PHQ1}} = \frac{\text{\# of participants in the clinic for the Phthalates sub-sample among households where one person was selected}}{\text{\# of respondents to the questionnaire for the Phthalates sub-sample among households where one person was selected}}$$

Clinic response rate at the person scale for the Phthalates sub-sample among households where two persons were selected

$$\text{PHTC2} = \frac{\text{PHC2}}{\text{PHQ2}} = \frac{\text{\# of participants in the clinic for the Phthalates sub-sample among households where two persons were selected}}{\text{\# of respondents to the questionnaire for the Phthalates sub-sample among households where two persons were selected}}$$

Response rate at the person scale of people who were actually fasted and provided blood for the Phthalates sub-sample among households where one person was selected

$$\text{PHTB1} = \frac{\text{PHB1}}{\text{PHC1}} = \frac{\text{\# of participants who were fasted and provided blood for the Phthalates sub-sample among clinic participants where one person was selected}}{\text{\# of participants in the clinic for the Phthalates sub-sample among households where one person was selected}}$$

Response rate at the person scale of people who were actually fasted and provided blood for the Phthalates sub-sample among households where two persons were selected

$$\text{PHTB2} = \frac{\text{PHB2}}{\text{PHC2}} = \frac{\text{\# of participants who were fasted and provided blood for the Phthalates sub-sample among clinic participants where two persons were selected}}{\text{\# of participants in the clinic for the Phthalates sub-sample among households where two persons were selected}}$$

Phthalates sub-sample combined response rate

$$\text{PHTCOMBRR} = \text{HR} * [(\text{RR1} * \text{PHTQ1} * \text{PHTC1} * \text{PHTB1}) + (\text{RR2} * \text{PHTQ2} * \text{PHTC2} * \text{PHTB2})]$$

where HR, RR1 and RR2 are described in section 10.1.

Now here is an example of calculating the Phthalates sub-sample combined response rate for Canada using the information provided in Appendixes 9a and 9h.

$$\text{HR} = \frac{6,106}{8,772} = 0.696$$

$$\text{PHTQ1} = \frac{2,348}{2,720} = 0.863$$

$$\text{PHTC1} = \frac{1,948}{2,348} = 0.830$$

$$\text{PHTQ2} = \frac{1,554}{1,719} = 0.904$$

$$\text{PHTC2} = \frac{1,362}{1,554} = 0.876$$

$$\text{RR1} = \frac{4,734}{6,106} = 0.775$$

$$RR2 = \frac{2,744 \div 2}{6,106} = 0.225$$

$$PHTB1 = \frac{1,921}{1,948} = 0.986$$

$$PHTB2 = \frac{1,316}{1,362} = 0.966$$

Phthalates sub-sample combined response rate =

$$\begin{aligned} & 0.696 * [(0.775 * 0.863 * 0.830 * 0.986) + (0.225 * 0.904 * 0.876 * 0.966)] \\ & = 0.501 \\ & = \mathbf{50.1\%} \end{aligned}$$

10.1.8 Tobacco sub-sample response rate

Of the 4,530 participants aged 12 to 79 who reported to the CHMS mobile examination centre for physical measurements, 4,356 participants provided urine and consented to storage of their urine sample for future health studies. The tobacco sub-sample was selected among these participants. The combined response rate was 50.1%. It is important to note that the combined response rate is not obtained by multiplying the response rates by the person and household scales, since two persons were selected in some households. Appendix 9i shows the combined response rates and the relevant information for calculating them for each site.

Below is a description of how the different components of the equation must be manipulated to calculate combined response rates correctly. Two additional response rates are required to derive the tobacco sub-sample combined response rates:

Response rate at the person scale among households where one person was selected (tobacco)

$$NN1 = \frac{UC1}{C1} = \frac{\text{\# of participants in the clinic who provided urine and consented to storage of their urine sample for future health studies in households where one person was selected}}{\text{\# of participants in the clinic among households where one person was selected}}$$

Response rate at the person scale among households where two persons were selected (tobacco)

$$NN2 = \frac{UC2}{C2} = \frac{\text{\# of participants in the clinic who provided urine and consented to storage of their urine sample for future health studies in households where two persons were selected}}{\text{\# of participants in the clinic among households where two persons were selected}}$$

Tobacco sub-sample combined response rate

$$\text{NNCBRR} = \text{HR} * [(\text{RR1} * \text{PQ1} * \text{PC1} * \text{NN1}) + (\text{RR2} * \text{PQ2} * \text{PC2} * \text{NN2})]$$

where HR, RR1, PQ1, PC1, RR2, PQ2 and PC2 are described in section 10.1.

Now here is an example of calculating the tobacco sub-sample combined response rate for Canada using the information provided in Appendixes 9a and 9i.

$$\text{HR} = \frac{6,106}{8,772} = 0.696$$

$$\text{PQ1} = \frac{4,156}{4,732} = 0.878$$

(12 to 79 only)

$$\text{PC1} = \frac{3,462}{4,156} = 0.833$$

(12 to 79 only)

$$\text{PQ2} = \frac{1,200}{1,373} = 0.874$$

(12 to 79 only)

$$\text{PC2} = \frac{1,068}{1,200} = 0.890$$

(12 to 79 only)

$$\text{RR1} = \frac{4,734}{6,106} = 0.775$$

$$\text{RR2} = \frac{2,744 \div 2}{6,106} = 0.225$$

$$\text{NN1} = \frac{3,330}{3,462} = 0.962$$

(12 to 79 only)

$$\text{NN2} = \frac{1,026}{1,068} = 0.961$$

(12 to 79 only)

Tobacco sub-sample combined response rate =

$$0.696 * [(0.775 * 0.878 * 0.833 * 0.962) + (0.225 * 0.874 * 0.890 * 0.961)]$$

$$= 0.501$$

$$= \mathbf{50.1\%}$$

10.2 Errors in surveys

The survey yields estimates based on the information collected from a sample of persons. Somewhat different estimates might have been obtained if a complete census had been conducted using the same questionnaire, the same interviewers, the same measurement experts, the same supervisors, the same processing methods, etc. as used for the survey. The difference between the estimates based on the sample and those resulting from a complete enumeration conducted in similar conditions is called the sampling error of the estimates.

Errors that are not related to sampling may be made at almost any stage of a survey. Interviewers may have misunderstood the instructions; respondents may have made errors when completing the questionnaire; responses may have been incorrectly captured; measurements may have been made incorrectly; errors may have crept in when the data were processed and totalled. All these are examples of non-sampling errors.

10.2.1 Non-sampling errors

Over a great number of observations, random errors will have little effect on the estimates drawn from the survey. However, errors that occur systematically will contribute to biases in the estimates from the survey. Much time and effort was devoted to reducing non-sampling errors in the survey. Quality assurance measures were applied at each stage of the data collection and processing cycle to control the quality of the data. Further details on the quality assurance procedures for each stage of the survey are provided in the Quality Assurance and Control section .

The effect of non-response on survey results is a major source of non-sampling error in surveys. The scope of non-response varies from partial non-response (where the respondent does not respond to one or more questions) to total non-response. In cycle 1 of the CHMS, there is little partial non-response, since once the questionnaire began, respondents tended to complete it. There was total non-response when the person selected to participate in the survey refused to do so or could not be contacted by the interviewer. In some collection sites, the sample was augmented over the course of the year in order to reach the targeted size. Lastly, cases of total non-response were taken into account during weighting by correcting the weights of persons who responded to the survey in order to compensate for those who did not respond. See chapter 9 (Weighting) for more information on the correction of weighting for non-response.

10.2.2 Sampling errors

Since the estimates from a sampling survey inevitably include sampling errors, good statistical methods require researchers to provide users with some indication of the scope of this error. Measuring the possible scope of sampling errors is based on the standard deviation of the estimates drawn from the survey results. However, owing to the great diversity of estimates that can be drawn from a survey, the standard deviation of an estimate is usually expressed in terms of the estimate that it relates to. The resulting measure, called the coefficient of variation (CV), is obtained by dividing the standard deviation of the estimate by the estimate itself, and it is expressed as a percentage of the estimate.

For example, assume that a person estimates that 20% of Canadians aged 12 to 79 smoke regularly and this estimate has a standard deviation of 0.005. The CV of this estimate is then calculated as follows:

$$(0.005/0.20) \times 100\% = 2.5\%$$

Statistics Canada often uses the CV results for data analysis, and it strongly advises users producing estimates based on the data files from cycle 1 of the CHMS to do the same.

Table 10.1 Sampling variability guidelines

Type of Estimate	CV (in %)	Guidelines
Acceptable	$0.0 \leq CV \leq 16.6$	Estimates can be considered for general unrestricted release. Requires no special notation.
Marginal	$16.6 < CV \leq 33.3$	Estimates can be considered for general unrestricted release but should be accompanied by a warning cautioning subsequent users of the high sampling variability associated with the estimates. Such estimates should be identified by the letter E (or in some other similar fashion).
Unacceptable	$CV > 33.3$	Statistics Canada recommends not to release estimates of unacceptable quality. However, if the user chooses to do so then estimates should be flagged with the letter F (or in some other fashion) and the following warning should accompany the estimates: "The user is advised that . . . (specify the data) . . . do not meet Statistics Canada's quality standards for this statistical program. Conclusions based on these data will be unreliable and most likely invalid. These data and any consequent findings should not be published. If the user chooses to publish these data or findings, then this disclaimer must be published with the data."

10.3 Quality assurance and control

There are many problems that can introduce errors in a direct measures survey. These errors can significantly affect the integrity of survey results. To ensure the success of the Canadian Health Measures Survey (CHMS) in meeting its objectives, quality assurance and quality control measures were implemented in all the processes. Quality assurance (QA) anticipates problems, and therefore consists of those activities that take place before data collection or in improving and refining data collection. Quality control (QC) responds to observed problems and thus consists of those activities that take place during and after data collection. The goal of QA and QC is to ensure the reliability and validity of the data and to reduce systematic bias to the lowest possible level.

10.3.1 Training of household interview and mobile examination centre (MEC) Staff

10.3.1.1 Initial training

Training of all staff emphasized the goals and objectives of the survey, survey methodology and quality control guidelines. Training also included questionnaire/application content and functionality, standardization of survey procedures, data transmission, refusal conversion techniques and administrative procedures.

Training involved both formal classroom training and mandatory reading of procedures and training manuals. The core of the position specific training involved hands-on practice with instructors. Experts from various fields related to the survey measures (e.g., blood pressure) and biospecimen collection/processing protocols provided seminar sessions to the appropriate staff and participated in aspects of the hands-on training.

Household interviewers:

A week of training was provided to household interviewers. Household interviewers took part in mock interviews to familiarize themselves with the household questionnaire, to simulate difficult situations and to practice potential non-response situations. They also discussed techniques for dealing with sensitive questions.

Retraining was conducted with household interviewers anytime a change was made with the application, or when clarification was needed on the household questionnaire. Formal and informal training was on-going in order to ensure that proper protocols were followed.

Mobile examination centre staff:

A month of training was provided to MEC staff prior to collection. The administrative staff received specific training on refusal conversion techniques, telephone skills and on the calibration and maintenance of the dental equipment.

The health measures specialists were provided additional training on calibration and maintenance of equipment, health and occupational safety guidelines (including both respondent and staff safety), emergency procedures and media awareness. They also received specific training on *Canadian Physical Activity, Fitness and Lifestyle Approach* (CPAFLA)³ protocols, blood pressure and heart rate measurement, spirometry and on how to accommodate respondents with disabilities.

The laboratory technologists received supplementary training on blood and urine collection, processing, storage and running of laboratory tests, as well as re-enforcement training on laboratory protocols.

The dentists received specific training on the CHMS dental examination procedure and were calibrated against the World Health Organization gold standard.

The site logistics officer received specific training on how to set-up the trailers for the beginning of collection at each site and how to prepare the trailers for their move to the next collection site once collection was finished. As well, the site logistics officers received training on information technology maintenance and troubleshooting.

10.3.1.2 Dress rehearsal

Before the start of the actual survey, a one month dress rehearsal was done in Ottawa using Statistics Canada, Health Canada and Public Health Agency of Canada employees and their relatives who volunteered. The purpose of the dress rehearsal was to allow both the household interview staff and the MEC staff to practice their skills before beginning collection. The MEC staff had the opportunity to set-up, run and prepare the MEC trailers for transport to another location in the same format as was to be done during the actual survey. This included booking volunteers into the mobile examination centre using the same schedule that the staff was going to use when operating at a site. The dress rehearsal also allowed the MEC staff the opportunity to refine the flow through the MEC and work on other processes that needed testing (e.g., shipping). The dress rehearsal allowed for verification of the accuracy of the documentation (e.g., procedures manuals), and the household interview and MEC staff's understanding of the procedures, processes, and the flows. It also allowed for training/re-training issues to be identified prior to going into the field.

10.3.1.3 Ongoing training – Dry run day

Prior to the start of collection at each site, one day was set aside for community volunteers to participate in a visit to the MEC. These days were referred to as dry runs. The purpose of the dry runs was to perform on-going training for the MEC team. It gave them the opportunity to practice their skills before the beginning of collection at every site, as well as ensure that all the equipment was functioning correctly.

10.3.1.4 Annual retraining

Half way through cycle 1, the household interviewers took part in a debriefing and retraining session. During this session items that were discussed included refusal avoidance and conversion techniques, techniques on dealing with non-response and how to handle sensitive questions.

An eight day annual retraining was attended by MEC staff, during the middle of cycle 1 at head office. These sessions were similar to the initial training and were performed in collaboration with experts in different fields related to the survey but focused on elements that specifically needed retraining.

10.3.2 Household component

10.3.2.1 Monitoring – Household interview

Monitoring of the work performed by the household interviewers was an integral part of the household collection processes. Observations were completed on all interviewers at the beginning of the collection cycle and, thereafter, two to three scheduled observations were done at each site as well as on an ad hoc basis. Debriefing sessions were held in seven of the fifteen sites where factors affecting data quality were discussed.

In addition to monitoring the work of the interviewers, staff from head office performed interview observations to monitor the functionality of the household interviewing system, the respondents' understanding of the household survey content and the usefulness of the communications tools. Observers provided feedback on these items to the content development and communications teams at head office and problems were addressed as required.

10.3.2.2 Household questionnaire response rates

Monitoring the household collection response rates was conducted throughout the cycle by staff at head office preparing collection progress reports. Staff monitored the reasons for non response by age and sex, the number of contact attempts, the distribution of contact attempts by time of day, the refusal rates and refusal conversions attempts and the distribution of the fasting/non-fasting flag to ensure that the target number of respondents per age and sex group would be achieved.

10.3.2.3 Validation of questionnaire responses

At the end of each site notes and remarks made by interviewers within a respondent's case file were reviewed and adjustments to the data were made, when required. In addition, the frequency of answer categories within a question was determined for "other, specify", "don't know", and "refusal". Questions with a high rate of response for these categories were monitored according to expected rates from other Statistics Canada health surveys and investigated if the rate was higher than expected. These data were also monitored between CHMS collection sites to identify site-specific problems.

Validation of questionnaire responses was also performed on questions that are included in other Statistics Canada health survey with similar content, namely cycles 3.1 and 4.1 of the Canadian Community Health Survey.

10.3.3 Mobile examination centre (MEC) component

The following section will provide information concerning the quality assurance and quality control procedures that were put in place and are specific to collection of the physical measures and laboratory data during the visit to the MEC.

10.3.3.1 Equipment selection

The quality of the equipment used for collection was essential to ensure data accuracy and validity. In selecting the appropriate equipment, a combination of consulting, researching, testing, and evaluation was employed. This was done considering industry standards and in conjunction with partners (e.g., Health Canada, Public Health Agency of Canada), experts from other physical measures surveys (e.g., NHANES in the United States) and CHMS advisory committees.

When determining the MEC laboratory equipment needs, many considerations were taken into account such as the size of the equipment (due to space constraints), the cost of the equipment, the accuracy and precision of the testing equipment, as well as the comparability to other international surveys. The reliability of the instrumentation, including frequency of breakdowns, repairs and maintenance, were also examined. Other items considered when selecting the equipment used for data collection include the infrastructure needs (e.g., use of water, energy consumption, waste disposal), the ease of operation and maintenance, training courses included, the availability and timeliness of service throughout the country, the laboratory biosafety guidelines and the test throughput.

10.3.3.2 Protocols and procedures

To ensure consistency between MEC staff on all measurement techniques, several procedures manuals containing detailed protocols for each measure were developed. These protocols were developed in consultation with, and reviewed by experts in each measurement field (when appropriate), ensuring the highest quality and least biased data collection. For standardization purposes, these protocols were covered thoroughly during staff training and scripted within the data capture application. Staff were required to review these protocols periodically during collection so as to keep themselves up to date. When changes to protocols were made all staff members were informed, provided with the updated protocols and re-training was provided if necessary. All changes to protocols were documented (date of update, reason for updating, process that was followed).

An Equipment Verification, Calibration and Maintenance Manual was also developed to ensure that calibration and maintenance of all testing equipment during collection was performed to meet or exceed the established standards. These standards were established by the equipment manufacturers and the experts with whom we consulted for the clinic laboratory standard operating procedures (SOP). This included pre-analytical functions (mixing, aliquoting), testing protocols (e.g., complete blood count (CBC)), non-testing procedures (e.g., specimen storage and shipping), quality control procedures and equipment use, calibration and maintenance.

All three CHMS reference laboratories also followed standard operating procedures that were developed for every test and technique performed in their laboratory. These provided uniform assay protocols that laboratory staff used to ensure similar results and consistent performance.

10.3.3.3 Mobile examination centre (MEC) environment

All efforts were made to ensure measurements were carried out under controlled and standardized conditions and according to specified procedures. Due to the fact that certain measures and equipment were highly sensitive to changes in room temperature (e.g., spirometry, blood pressure, laboratory equipment), every effort was made to keep the MEC at a comfortable and constant room temperature ($21^{\circ}\text{C} \pm 2^{\circ}\text{C}$). The environmental conditions of the MEC testing rooms (temperature, humidity and barometric pressure) were recorded at a minimum once per shift as well as anytime the temperature went outside of the $\pm 2^{\circ}\text{C}$ range. In addition, careful monitoring of the conditions within the mobile examination centre laboratory was undertaken to ensure that the collection, analysis, storage and shipment of samples was performed under the appropriate conditions.

10.3.3.4 Adherence to pre-testing guidelines

At the beginning of the visit to the MEC adherence to the pre-testing guidelines (see appendix 1) was verified and documented within the data capture application and adherence rates were assessed at head office. The purpose of these guidelines was to ensure testing standardization, by minimizing the potential that external factors would affect the results of certain tests. Pre-testing standardization was done to enhance the quality of the data collected.

10.3.3.5 Equipment monitoring

Regular verification, calibration and maintenance of all the equipment used for data collection during the CHMS was performed to ensure data accuracy and validity. This testing was performed to meet or exceed the standards established by the equipment manufacturers and/or by experts in the field.

10.3.3.6 Data entry verification

All paper forms such as the respondent verification sheet, the consent form, the PAR-Q as well as all the worksheets from the home visits or MEC visits done on paper, were manually entered and subsequently verified by a manager to ensure data entry accuracy.

10.3.3.7 Spirometry data review

All spirometry tests were reviewed by an external reviewer via a custom application that was developed for the CHMS. The application was designed to reject invalid curves based on American Thoracic Society testing¹¹ criteria and the reviewer's role was to confirm these rejections as well as to identify other ones not flagged by the application.

10.3.3.8 Data validation

Data validation was performed to ensure that the CHMS data were consistent with other similar data sources including other Statistics Canada surveys, as well as international surveys. Data validation was done to compare various physical measures, laboratory measures and the oral health data by site, and to compare self-reported data from the household interview to directly measured data from the MEC visit (e.g., height, weight), by site and overall. The physical measures and oral health data were also compared against data sources that contained directly measured data, such as the Canadian Community Health Survey cycle 2.2 (physical measures only) and the National Health and Nutrition Examination Survey (NHANES) in the United States.

All CBC data received from the mobile examination centre were monitored by comparing the mean values and standard deviations to a normal reference range in order to identify any increased outliers and trends in the QC findings and respondent results. The laboratory measures analyzed by the reference laboratories were also examined and compared to other surveys such as NHANES.

Prior to the release of cycle 1 data, external data validation was performed by making information available to Health Canada and the Public Health Agency of Canada who informed Statistics Canada of any concerns or anomalies related to data quality.

10.3.3.9 Mobile examination centre (MEC) laboratory

Procedures were put into place to allow for quick detection of errors related to the MEC laboratory CBC analysis. These procedures included internal and external QC monitoring, and allowed the CHMS to ensure accurate results and data quality for laboratory measures. Aside from weekly review, regular comparisons were made with QC results obtained by other users of the haematology analyzer employed by the CHMS. In addition, external QC material from the College of American Pathologists (CAP) and Quality Management Program – Laboratory Service (QMP-LS) were tested according to their respective schedules. The results of these blind QC samples provided an evaluation of the testing accuracy.

10.3.3.10 Replicate Testing

Replicate samples were collected during dry-run days at the beginning of each site for a variety of laboratory tests, including the complete blood count, and tests analyzed at the reference laboratories (Health Canada only). Approximately 6-8 dry-run replicate samples were performed by splitting the blood and urine samples from the participants into two distinct specimen tubes with different identification numbers (IDs). As the corresponding split sample IDs were unknown to the technician/technologist testing the samples, these “blind QC samples” were meant to monitor the precision of the assay and poor performance was inferred if the coefficient of variation obtained from the replicate samples is greater than a pre-set criteria. All replicate samples were sent to the reference laboratories along with other respondent samples and were analyzed following the same procedures as respondent samples. Data from the dry-run replicate samples were transmitted as usual along with the other respondent results. The lab section at the head office analysed them and all results outside of the acceptable limit were followed up on with the testing laboratory. Replicates were also done at the MEC on the anthropometry, sit and reach and grip strength components.

10.3.3.11 Proficiency Testing

All CHMS reference laboratories were responsible for having their own quality control programs in place. However, the CHMS also sent reference quality control materials as a form of proficiency testing for the reference laboratories. The CHMS used BioRad control samples with known concentration for all tests included in the CHMS for which reference QC samples were available. The use of these materials allowed the CHMS to monitor the accuracy of the analytical testing being performed at the reference labs. The CHMS mobile examination centre laboratory sent these BioRad samples to the reference laboratories on a weekly basis during each collection site along with the regular shipments. The test samples were aliquotted into the same type of shipping tubes used for respondent samples and were labelled with unique sample identification numbers so as to blind the laboratories to the process. Testing results were sent back to the CHMS head office and were compared to the reference ranges provided by BioRad. The test results were assessed by head office laboratory staff and feedback was provided to the reference laboratories for review and remedial action, if necessary.

10.3.3.12 Processing and storage of the blood and urine samples

All blood specimens collected in the clinic were centrifuged in the clinic's laboratory within two hours of collection to preserve the quality and integrity of the specimens. The specimens were stored at the appropriate temperature (e.g., 2-8 °C fridge or -18 °C or colder freezer) and the fridge and freezer temperatures were monitored via readings at each staff shift and by an alarm system at all times. All samples were processed and stored within four hours of collection. Urine samples were refrigerated immediately upon collection and were subsequently processed and stored at the appropriate temperature as soon as possible.

10.3.3.13 Shipping

As described above under Laboratory Measures protocol section 6.5 shipment temperature monitoring ensured that only samples whose integrity remained intact were used for analysis of CHMS measures.

10.3.3.14 Field Blanks

In order to ensure that samples were not being contaminated by the mobile clinic laboratory environment and processes, and that any detected environmental measure was reflective of the respondent's physical status, the CHMS mobile clinic lab sent field blanks to the Institut national de la santé publique du Québec (INSPQ), the lab responsible for testing the environmental measures. The field blanks contained a blank solution that was tested to be free of any environmental contaminants and these samples were used to mimic the same processes carried out with respondent samples for collection and processing of environmental measures on blood and urine. De-ionized water was used as the blank solution for the baseline testing of environmental measures for all testing on urine and for metals being tested in blood. Similarly, vials of bovine serum were used for field blank collection of the organic components tested on blood. For sites 12-15 only water was used for the field blanks and all samples were sent in triplicate. These blanks were tested and compared to an acceptable upper limit that is three times the limit of detection of each analyte.

Results above these limits were reviewed by head office staff and deviations were investigated, in consultation with the analytical lab and other experts and, if necessary, corrective action is taken.

10.3.3.15 Activity Monitor Data Review

A data review process was also developed to clean and process the activity monitor data. The review process was broken down into four distinct steps: Step 1 involved the downloading and saving of respondent data, ensuring that no malfunctioning monitors were returned to the field, and following up with respondents who hadn't returned the monitor. Step 2 involved stacking of all respondent data into a single SAS file, and dropping non-valid/bad data (such as initialization errors, or spurious data); Step 3 involved accepting only those with at least 1 day of viable wear-time (at least 10hrs of data), and calculating the activity intensity per minute; and Step 4 involved applying reserve codes to missing data and generating the derived variables.

10.3.4 Head Office

10.3.4.1 Correcting for bias

The Canadian Health Measures Survey experienced several levels of non-response. First, the selected dwelling may refuse to provide the household composition. Second, the person(s) selected amongst the household members may refuse to answer the questionnaire. Third, the person may refuse to participate in the clinic component. Finally, the person may refuse to provide blood and/or urine for the laboratory tests for current or future analysis.

At each level of non-response characteristics available for respondents and non-respondents are used in a logistic regression model to identify variables which explain most non-response. Based on the results of each regression, homogeneous response groups are created. The non-response adjustments are applied within these groups.

The variables which were correlated most with response or non-response were used in the logistic regression models, and included region, whether the dwelling was detached or not, collection site, age group, sex, marital status, household size, education and income.

Concerns were expressed by data users that the results for the clinic respondents were biased because it was believed that less healthy people were less likely to go to the clinic. A study was done to compare estimates of some questionnaire variables before and after the clinic non-response adjustment was carried out. Estimates based on all household questionnaire respondents (weighted) were compared to estimates based on clinic respondents (weighted and adjusted for clinic non-response). Several person level variables were examined, including those used in the regression models and others such as stress level, quality of life, frequency of seeing a dental professional, having a regular medical doctor, smoking, alcohol consumption, taking prescription medications in the last month, job status, body mass index class and indicators of health such as cognition, dexterity, emotional problems, hearing problems, disability levels, mobility trouble, pain and vision. All variables examined above were not significantly different before and after the clinic adjustment. This suggests that clinic respondents, with the clinic non-response adjustment, are similar to household questionnaire respondents.

Another study was done to compare the 20- to 39- year-olds adults living with and without children aged 6 to 11. The ratio of 20- to 39- year-olds living with children is greater in the CHMS sample than it is in the Canadian population. This imbalance is a result of the 2-person selection in households where a child 6- to 11- year-olds is found. When a child 6 to 11 is selected, a second person aged 12 to 79 is selected as well. The second person selected is usually a parent in the 20- to 39- year-olds age range. As a result, a limited number of 20- to 39- year-olds not living with children aged 6 to 11 are selected. Since the post-stratification step did not differentiate between the two types of 20- to 39- year-olds, a potential bias could have been introduced by the selection method. To evaluate this potential bias, the ratio of 20- to 39- year-olds with and without children aged 6 to 11 was calculated using the 15 sites' dwelling frame (and household composition). A post-stratification was done using this observed ratio. Estimates were produced using these new weights and then compared to the original estimates. The new estimates were not statistically different from the original ones. The number of 20- to 39- year-olds living with children may be over estimated in CHMS but not high enough to introduce a bias in the overall results.

11. Guidelines for tabulation, analysis and release

This section of the documentation provides guidelines to be applied by data users in tabulating, analyzing, publishing or otherwise releasing any data derived from the survey files.

11.1 Rounding guidelines

In order that estimates for publication or other releases derived from the data files correspond to those produced by Statistics Canada, users are urged to adhere to the following guidelines regarding the rounding of such estimates:

- a) Estimates in the main body of a statistical table are to be rounded to the nearest hundred units using the normal rounding technique. In normal rounding, if the first or only digit to be dropped is 0 to 4, the last digit to be retained is not changed. If the first or only digit to be dropped is 5 to 9, the last digit to be retained is raised by one. For example, in normal rounding to the nearest 100, if the last two digits are between 00 and 49, they are changed to 00 and the preceding digit (the hundreds digit) is left unchanged. If the last digits are between 50 and 99 they are changed to 00 and the preceding digit is incremented by 1;
- b) Marginal sub-totals and totals in statistical tables are to be derived from their corresponding unrounded components and then are to be rounded themselves to the nearest 100 units using normal rounding;
- c) Averages, proportions, rates and percentages are to be computed from unrounded components (i.e., numerators and/or denominators) and then are to be rounded themselves to one decimal using normal rounding;
- d) Sums and differences of aggregates (or ratios) are to be derived from their corresponding unrounded components and then are to be rounded themselves to the nearest 100 units (or the nearest one decimal) using normal rounding;
- e) In instances where, due to technical or other limitations, a rounding technique other than normal rounding is used resulting in estimates to be published or otherwise released that differ from corresponding estimates published by Statistics Canada, users are urged to note the reason for such differences in the publication or release document(s);
- f) Under no circumstances are unrounded estimates to be published or otherwise released by users. Unrounded estimates imply greater precision than actually exists.

11.2 Sample weighting guidelines for tabulation

The sample design used for this survey is not self-weighted. In other words, the sampling weight is not the same for all the persons included in the sample. Even to produce simple estimates, including ordinary statistical tables, the user must employ the appropriate sampling weight. Otherwise, the estimates calculated on the basis of the master file cannot be considered representative of the population observed, and they will not correspond to those of Statistics Canada.

Users should also keep in mind that because of the treatment reserved for weights, some software packages do not yield estimates that exactly match those of Statistics Canada.

11.3 Precise variances or coefficients of variation

Calculation of a precise variance or coefficient of variation is not an easy matter, since there is no simple mathematical formula that can take into account all aspects of the CHMS sample design and weights. It is therefore necessary to turn to other methods to estimate these measures of precision, such as re-sampling methods. Among these, the bootstrap method is the one recommended for analysing CHMS data.

However, the calculation of coefficients of variation (or any other measure of precision) performed using the bootstrap method requires access to information that is considered confidential and is present only on the master file.

To calculate coefficients of variation, the bootstrap method is recommended. A macro program, called “Bootvar,” has been developed to facilitate calculation using the bootstrap method. The Bootvar program is available in SAS and SPSS formats, and it consists of macros for calculating the variances of totals and ratios differences between ratios, and for linear and logistic regressions.

Since geometric means cannot be calculated within BOOTVAR, other statistical packages such SUDAAN should be used. Because SUDAAN and BOOTVAR use different methods in calculating variance, using SUDAAN to replicate tables produced using BOOTVAR (and vice versa) may yield slightly different variance estimations.

11.4 Some Recommendations for doing analysis with data from Cycle 1 of CHMS

The Canadian Health Measures Survey (CHMS) was designed to provide national baseline prevalence estimates for a variety of health indicators. Because of cost considerations, 15 collection sites from 5 regional strata were chosen – 1 site from the Atlantic region, 4 sites from the Quebec region, 6 sites from the Ontario region, 2 sites from the Prairies region and 2 sites from the British Columbia region. Then a sample of individuals of all ages was selected from each chosen site. This design should yield approximately unbiased national prevalence estimates that would have cv's of approximately 16.5% for a prevalence of 10% for each of 5 age groups (6-11, 12-19, 20-39, 40-59, and 60-79) by sex.

While the small number of sampled collection sites can produce baseline prevalence estimates that meet the above criteria, it has the drawback of leaving just 11 “degrees of freedom”¹², for variance estimation. Limited degrees of freedom have several consequences for analysis and inference¹³; in particular:

- The variability of variance estimates of estimated quantities needs to be taken into account when doing analyses,
- Estimated covariance matrices of vectors of estimates (such as the vector of estimated coefficients of a model) could be singular or close to singular, thus possibly not invertible¹⁴,
- It may not be possible to calculate some test statistics,
- The usual asymptotic distributions of many test statistics may not hold when there is only a small number of primary sampling units (PSUs, in this case the collection sites) in the sample, even when the total sample size is large.

Because of the possible consequences of having a small number of PSUs, a researcher is advised to consider the following recommendations when analyzing CHMS data:

- Produce only national estimates since regional estimates will have even fewer than 11 degrees of freedom because fewer PSUs would be involved in variance estimation. This still allows the researcher to do analyses of many subpopulations such as a single age group or one sex, since all ages and both sexes are in the sample from each collection site.
- Avoid fitting models with a large number of coefficients.
- Use analytical methods that are less impacted by the limited degrees of freedom, or are conservative. In particular, when testing a hypothesis involving a vector of quantities, avoid Wald statistics and their modifications since they have been found to be unstable. Better choices would be Satterthwaite-adjusted statistics or conservative Bonferroni tests.
- Since bootstrap weights are used for variance estimation with the CHMS, it will likely be necessary to specify the degrees of freedom in the software being used because often the default degrees of freedom is likely to be incorrect.

12. File Usage

12.1 Use of weight variable

The CHMS is a sample survey, which means that the respondents “represent” many other Canadians not included in the survey. For example, a 1% sample would mean that each CHMS respondent represented 100 other Canadians. In order that the results of the survey are representative of the population, the CHMS methodologists have created weights. These weights, when applied to the survey results, enable data users to create estimates for the entire population.

Each respondent record on the master file has a unique weight attached to it. In order to produce estimates for a particular characteristic, the data user must sum the weights for each respondent with that characteristic. The total created by that calculation would produce an estimate of that characteristic in the total population.

Because of the small sample size for cycle 1 of the CHMS the results should only be used to produce national estimates. Due to the different number of respondents contained within the various files output for cycle 1, each file produced will contain a different weighting variable. If sub-sample files are linked to the master file, then the weight stored on the sub-sample file should be used for creating the estimates.

12.2 Environment Canada climate and air quality file

One of the modules included in the CHMS is spirometry, which measures lung function. As lung function can be affected by the atmosphere, it may be necessary for researchers to adjust for the weather and air quality at the time of the clinic visit when analyzing data from the spirometry module. To address these needs, a file has been created which contains hourly climate and air quality data for the dates when clinic collection took place at each of the 15 sites. Data have been obtained from the National Climate Data and Information Archive (<http://www.climate.weatheroffice.gc.ca>) and from the National Air Pollution Surveillance Program (<http://etc-cte.ec.gc.ca/NAPS/>).

The following indicators are on the climate and air quality file:

Air quality: Ozone, nitrogen dioxide, particulate matter (2.5 microns)

Climate: Temperature, barometric pressure, precipitation, relative humidity, humidex, wind speed, wind direction, wind chill

Supporting documentation is available for this file upon request.

12.3 Variable naming convention

The CHMS naming convention follows the same pattern as that used by the Canadian Community Health Survey (CCHS) and, in fact, many Statistics Canada surveys. The variable name is constructed in a way that allows the data users to easily identify the originating section of the survey, the type of variable and the survey question that collected the data. The variable names have also been created in such a way as to identify similar data between different cycles of the CHMS.

Each variable name must adhere to a mandatory requirement, which restricts variable names to a maximum of 8 characters for ease of use by analytical software products. As a result, each character of the variable name contains information about the data contained in the variable.

Generally speaking:

Positions 1- 3: Section name

Position 4: “_” or Variable type

Position 5 - 8: Question reference

For example: The variable from question 101 of the household Chronic Conditions Section, CCC_101:

Position 1-3: CCC chronic conditions section

Position 4: _ underscore (_ = collected data)

Position 5-7: 101 question number

12.3.1 Positions 1-3: Module section name

The following values are used for the section name component of the variable name:

Subject	Variable
Activity Monitor Derived Variables – Master File	AMM
Activity Monitor Derived Variables – Sub-sample file (4+ days)	AMS
Alcohol use	ALC
Anthropometric – Measured height and weight	HWM
Anthropometric – Eligibility	ANC
Anthropometric – Skin Fold measurements	SFM
Birth information	BIR
Blood and urine laboratory tests	LAB
Blood collection	BDC
Blood pressure	BPM
Breast feeding information	BRI
Children’s physical activity	CPA
Chronic conditions	CCC
Clinic - General	SITE
	V2
Complete blood count	CBC
Consent	CON
Demographic and household variables	DHH
Dietary fat consumption	DFC
Education	EDU
Exposure to second-hand smoke	ETS
Family medical history	FMH
Fasting status	ATG
General health	GEN
Grains, fruits and vegetables consumption	GFV
Grip strength	GSM
Grip strength – Eligibility	GSC
Grooming product use	GPU
Health utility index	HUI
Height and weight - reported	HWT
Hepatitis	HEP
Hobbies	HOB
Housing characteristics	HSC
Human papillomavirus vaccine	HPV
Illicit drug use	IDU
Income	INC
Labour force activity	LBF
Maternal breastfeeding	MBF
Meat and fish consumption	MFC
Medication use	AHF
	ATC
	MED
Milk and dairy product consumption	MDC

Subject	Variable
modified Canadian Aerobic Fitness Test (mCAFT)	AFT
modified Canadian Aerobic Fitness Test (mCAFT) – Eligibility	AFC
Oral Health	OHE
	OHQ
	OHR
	OHM
Oral health – Eligibility	OHC
Partial curl-ups	PCM
Partial curl-up – Eligibility	PCC
Person providing information	PPI
Phlebotomy	BDC
Phlebotomy – Eligibility	PHB
Phlegm	PLM
Physical activity	PAC
Polybrominated biphenyls (PBBs)	PBB
Polybrominated diphenyl ethers (PBDEs)	PBD
Polychlorinated biphenyls (PCBs)	PCB
Pregnancy information	PRG
Pregnancy status	PRS
Report of measurements	RMC
Respondent verification	CLC
Salt consumption	SLT
Screening	ATG
	MHR
	ORS
	PAR
	PHC
	SPQ
Sedentary activities	SAC
Sexual behaviour	SXB
Sit and reach	SRM
Sit and reach – Eligibility	SRC
Sleep	SLP
Smoking	SMK
Socio-demographic characteristics	SDC
Spirometry	SPM
Spirometry – Eligibility	SPC
Strengths and difficulties	SDQ
Sun exposure	SEB
Urine collection	URC
Water and soft drink consumption	WSD
Weight change	WTC

12.3.2 Position 4: Place Holder or Variable Type

_ Collected variable: A variable that appeared directly on the questionnaire

C Coded variable: A variable coded from one or more collected variables (e.g., SIC, NAICS, ATC, Tar)

D Derived variable: A variable calculated from one or more collected or coded variables

G Grouped variable: Collected, coded, or derived variables collapsed into groups (e.g., age groups)

12.3.3 Positions 6-8: Question reference

In general, the last three positions follow the variable numbering used on the questionnaire. The letter "Q" used to represent the word "question" is removed, and all question numbers are presented in a two-digit format. For example, question Q01A in the questionnaire becomes simply 01A, and question Q15 becomes simply 15.

For questions which have more than one response option, the final position in the variable naming sequence is represented by a letter. For this type of question, new variables were created to differentiate between a "yes" or "no" answer for each response option. For example, if Q2 had multiple response options, the new questions would be named Q2A for option 1, Q2B for option 2, Q2C for option 3, etc. If only options 2 and 3 were selected, then Q2A = No, Q2B = Yes, Q2C = Yes and Q2D = No.

12.4 Access to Master file data

Access to the data is provided through the Research Data Centres (RDC). These centres require researchers to submit to Statistics Canada, a research project that will use respondent data from the released files. These projects are accepted based on a set of specific rules. When the project is accepted, the researcher is designated as a "deemed employee" of Statistics Canada for the duration of the research, and given access to the data from designated Statistics Canada sites. For more information, please consult the Statistics Canada webpage:

<http://www.statcan.gc.ca/rdc-cdr/index-eng.htm>.

Another means of access to the master file data is to provide to Statistics Canada specifications for tabulations. These tables are programmed and run against the data files by employees of Statistics Canada. This service allows users who do not possess knowledge of tabulation software products or who do not have access to the RDCs, to get custom results. The results are screened for confidentiality and reliability concerns before release.

12.5 Variable Concordance

Variable names found on the master file are different from those that were used to collect the data. The attached household and clinic questionnaires (see appendix 6) show the collection names. In order to ensure that data users are able to quickly and easily work with either the file or the questionnaires, a concordance table showing the master file variable names with the appropriate collection variable names is attached (see appendix 8) .

12.6 Special notes

- Please note that MEDF1 (a flag on the Canadian Community Health Survey (CCHS) indicating whether a person has taken medication in the past month) is not on the Canadian Health Measures Survey (CHMS) file. Users can find out how many medications a CHMS respondent took by using the variables MED_100B, MED_200B and MED_300B. These variables indicate the number of prescription medications, non-prescription medications, and herbal products and remedies, respectively, which were taken in the past month.
- Age and sex are collected twice during the survey process for the CHMS, first through the household interview, then again during the clinic component. Because the two appointments could be several days apart, it is possible that a respondent's age could be different on the household and clinic files. Each application uses the age and sex information that was collected as the reference for coverage and skip patterns for sections within that application. For that reason, it is important to use the appropriate age and sex variables for the data being analyzed. Incorrect usage of age and sex variables could lead to errors in analyses, due to respondents whose ages changed between the two appointments. For example, a respondent who is 11 at the time of the household interview and 12 at the time of the mobile examination centre (MEC) visit will be in different age groups depending on the data being analyzed (i.e. 6 – 11 for household analysis and 12 – 19 for clinic analysis).

For household variables, DHH_AGE and DHH_SEX should be used; for clinic variables, CLC_AGE and CLC_SEX should be used. If variables from both components are analyzed, use the age and sex variable for the module containing the most important variable of interest.

- To help give some context to the raw data that was collected at the MEC, normative scales used by analysts for specific types of data have been added to the master file. The norms used for Cycle 1 data collection were agreed upon at the start of collection, and respondents were informed of how they measured against those norms in the final report delivered to them. The norms used throughout Cycle 1 collection do not reflect changes that may have been made between the start of collection in 2007 and the present day. As the raw data is also included on the file, users are free to use norms other than those included on the file.

- It should be noted that the following laboratory tests had limitations with regards to stability.

Homocysteine:

This measure is time and temperature sensitive. MEC protocol required that samples be processed within four hours of collection. Under normal circumstances however, the time from blood draw to aliquotting and storage for this measure was under 1 ½ hours.

Bilirubin:

Two thirds of the way through the survey, steps were taken to preserve the integrity of the sample collected for bilirubin analysis. Changes were made to protect the sample from light during collection, processing and storage. A shift in results could be observed.

Bicarbonate:

Bicarbonate is time sensitive as levels can decrease over time due to loss of CO₂. Ideally, this analyte should be measured within 3 days of collection. Bicarbonate was part of the chemistry panel which was refrigerated and shipped once a week to the reference lab. As some of these samples could consequently be up to eight days old, this time sensitive measure may have been affected.

- During the household interview, respondents were asked to name all prescription, over the counter and herbal remedies they were taking, to a maximum of 15 per category. At the clinic interview, the respondent was then asked if they were still taking the medication(s) they listed during the household interview, as well as the names of any new ones they started taking since the household interview. A maximum of five additional medications could be added into each category (prescription, over the counter and herbal). In the case where a respondent indicated more than 5 new medications for a given category, only the first five of those medications were chosen and coded.
- **Anatomical Therapeutic Chemical (ATC) classification system:** The Anatomical Therapeutic Chemical (ATC) classification system was developed by the World Health Organization (WHO). It classifies pharmaceutical products according to the organ or system on which they act and their chemical, pharmacological and therapeutic properties. An ATC code was assigned to each medication using the Drug Identification Number (DIN) and Health Canada's ATC coding system. When a medication had more than one indication, the ATC code was decided based on the main indication of the medication. The main indication was determined by Health Canada reviewers using the Product Monograph (a factual document on a drug product that describes the properties, claims, indications, and conditions of use of the drug product). In cases where it was still not clear from the Product Monograph which ATC code to assign Health Canada contacted the ATC group at the WHO Collaborating Centre for Drug Statistics Methodology in Norway for clarification. A medication was not assigned an ATC code if the DIN was missing or if the DIN did not exist in the Health Canada drug database (for example experimental drugs). In these cases the ATC code appears as "not stated" on the file. The classification system is only available in English. For more information on Anatomical Therapeutic Chemical System please refer to: http://www.whocc.no/atc_ddd_index/.

- **American Hospital Formulary Service (AHFS) classification system:**

The American Hospital Formulary Service (AHFS) classification system is published by the American Society of Health-System Pharmacists to describe the mode of action of pharmaceutical products, including vitamin and mineral supplements. The classification system is only available in English. For more information on the American Hospital Formulary Service (AHFS) classification system please refer to: <http://www.ahfsdruginformation.com/>.

- **Tar values:**

The tar value was provided by Health Canada and was determined as follows:

- “Five conditioned cigarettes are smoked per port, using an automated 20-port constant volume smoking machine equipped with a CO analyzer, onto a conditioned, pre-weighed glass fiber filter disc (pad). The gas phase is collected in a Vapour Phase (VP) collection bag and then introduced into a Non-Dispersive Infra-Red analyzer (NDIR) and the % CO determined. The pad is then re-weighed and the difference is the Total Particulate Matter (TPM). The pad is extracted with Isopropanol (IPA) containing the internal standards, and the extract analyzed for nicotine and water by gas chromatography. The tar value is determined by subtracting the water and nicotine from the TPM.¹⁵”

- **Note to data users – phthalate metabolites:**

Canadian Health Measures Survey (CHMS) data on phthalate metabolites have been adjusted to correct a bias introduced by the inaccuracy of the standards used to calibrate the analytical instruments and to allow the comparison of data from one CHMS cycle to the next. The adjustment factors were established based on the difference in accuracy between the standards used in the analysis of the samples and those considered to be accurate. The application of these adjustment factors is currently undergoing peer review.

13. References and end notes

1. Stratum defined according composition of the household in the 2006 Census.
2. For the 6 to 11, 12 to 19 and Others strata, the multiplicative factor for the 12 to 19 age group was increased from 3 to 5 during collection to reach the target number of respondents for this age group.
3. Canadian Society for Exercise Physiology. 2003. *Canadian Physical Activity, Fitness and Lifestyle Approach (CPAFLA)*. 3rd edition. Ottawa.
4. Ross, W. D. & M.J. Marfell-Jones. 1991. "Kinanthropometry" in *Physiological Testing of the High-Performance Athlete*. 2nd edition. J. D. MacDougall, H. A. Wenger, & H. J. Green, eds., Human Kinetics Books, Champaign, Illinois, pp. 223-308.
5. Fitness Canada. 1986. *Canadian Standard Test of Fitness (CSTF) Operations Manual*. 3rd edition. Ottawa.
6. Campbell, Norm R.C., Joffre Michel R., McKayDonald W. 2005. "Hypertension Surveillance in Canada: Minimum Standards for Assessing Blood Pressure in Surveys." *Canadian Journal of Public Health* Vol 96, number 3. p. 217 - 220.
7. Miller M.R., J. Hankinson, V. Brusasco *et al.* 2005. "Standardization of spirometry." *Eur Respir*. Vol. 26 p. 319-338.
8. The five regions are: British Columbia, the Prairies (Alberta, Manitoba and Saskatchewan), Ontario, Quebec and the Atlantic provinces (Newfoundland and Labrador, Prince Edward Island, Nova Scotia and New Brunswick).
9. The number of sites selected for each SRB is given in Table 5.1 in section 5.3.1 (Sampling of collection sites).
10. Among the dwellings initially selected, some are not within the scope of the survey. These include, for example, vacant or demolished dwellings, non-residential dwellings or dwellings in which all household members are under 6 or over 79 years of age or are full-time members of the Canadian Forces. These dwellings are identified during collection; otherwise they would have been excluded during the selection process. They are not included when calculating response rates.
11. American Thoracic Society. 1995. "Standardization of Spirometry 1994 Update." *Am J Respir Crit Care Med*. Vol. 152, p. 1107-1136.

12. “Degrees of freedom” is being used as a generic term to reflect the amount of information used to estimate variances and covariances. An approximation often used for the value of “degrees of freedom” is (# of PSUs - # of strata). For the CHMS, the collection sites (15) are the PSUs. For the purpose of variance estimation, the one Atlantic region psu is collapsed in with the 4 Quebec region PSUs, thus leaving 4 strata and “degrees of freedom” equal to $(15 - 4) = 11$.
13. In particular confidence intervals and tests of hypotheses.
14. Invertible covariance matrices are needed to perform Wald tests for tests on vectors of parameters.
15. Health Canada. 1999. *Determination of “Tar”, Nicotine and Carbon Monoxide in Mainstream Tobacco Smoke*. Ottawa

Appendix 1 Pre-testing Guidelines

Pre-testing Guidelines for morning appointments

GUIDELINES TO FOLLOW

❖ **Please do not:**

- Eat or drink anything other than water during the **12 hours** prior to your clinic appointment—for example, you can't eat candies, cough lozenges, chewing gum or drink flavoured water during the fasting period
- Smoke or use other tobacco and nicotine products during the **2 hours** prior to your clinic appointment
- Drink any alcoholic beverages during the **12 hours** prior to your clinic appointment
- Exercise on **the day of** your clinic appointment (from midnight)
- Donate blood **2 days** prior to your clinic appointment
- Wear scented products **the day of** your clinic appointment

❖ Bring **loose fitting clothing** (e.g., shorts, sweat pants, short sleeved top), **footwear appropriate for exercise** (e.g., walking or running shoes) and your **health insurance card** to your clinic appointment.

❖ **Medication use:**

- **Take your medications as usual** on the day of your clinic appointment.
- Please bring with you **all medications** (prescription or over the counter), **herbal remedies** or **supplements** that you began taking since, or did not disclose during, the household interview.
- If you have a breathing condition (e.g., asthma), please bring your inhaler or medication to your clinic appointment.

Pre-testing Guideline for afternoon/ evening appointments

GUIDELINES TO FOLLOW

❖ Please do not:

- Eat or drink anything other than water during the **2 hours** prior to your clinic appointment—for example, you can't eat candies, cough lozenges, chewing gum or drink flavoured water during the fasting period
- Smoke or use other tobacco and nicotine products during the **2 hours** prior to your clinic appointment
- Drink any alcoholic beverages on **the day of** your clinic appointment (from midnight)
- Exercise on **the day of** your clinic appointment (from midnight)
- Donate blood **2 days** prior to your clinic appointment
- Wear scented products **the day of** your clinic appointment

❖ Bring **loose fitting clothing** (e.g., shorts, sweat pants, short sleeved top), **footwear appropriate for exercise** (e.g., walking or running shoes) and your **health insurance card** to your clinic appointment.

❖ Medication use:

- **Take your medications as usual** on the day of your clinic appointment.
- Please bring with you **all medications** (prescription or over the counter), **herbal remedies** or **supplements** that you began taking since, or did not disclose during, the household interview.
- If you have a breathing condition (e.g., asthma), please bring your inhaler or medication to your clinic appointment.

Appendix 2 Exclusion Criteria

Measure	Exclusion Criteria	
	Hard Coded	Staff Decision
Blood Pressure	None	<u>Test Screen Out</u> <ul style="list-style-type: none"> Blood pressure cuff too small or too large to fit arm Rashes, gauze dressings, casts, edema, paralysis, tubes, open sores or wounds, withered arms or a-v shunts on <u>both arms</u> <u>Right Arm Exclusion</u> <ul style="list-style-type: none"> Rashes, gauze dressings, casts, edema, paralysis, tubes, open sores or wounds, withered arms or a-v shunts on right arm Blood drawn from right arm in the last week Right mastectomy Cast on right arm Right arm amputation
Standing Height	None	<ul style="list-style-type: none"> Unable to stand unassisted Acute condition (e.g., cast on leg preventing them from standing up straight, unassisted)
Sitting Height	None	<ul style="list-style-type: none"> Unable to sit unassisted Acute condition (e.g., full leg cast)
Weight	None	<ul style="list-style-type: none"> Acute condition (e.g., plaster cast)
Waist Circumference	<ul style="list-style-type: none"> Pregnancy > 12 weeks 	<ul style="list-style-type: none"> Respondent in wheelchair (if unable to correctly landmark) Unable to stand unassisted Colostomy bag
Hip Circumference	<ul style="list-style-type: none"> Pregnancy > 12 weeks 	<ul style="list-style-type: none"> Respondent in wheelchair Unable to stand unassisted
Skinfolds	<ul style="list-style-type: none"> BMI $\geq 30 \text{ kg/m}^2$ Pregnancy > 12 weeks 	<u>Site-specific exclusions :</u> <ul style="list-style-type: none"> Acute condition (e.g., varicose veins, skin condition) Chronic condition (e.g. respondent in wheelchair, missing limb on right side)
Phlebotomy	<ul style="list-style-type: none"> Chemotherapy within the past 4 weeks Haemophilia Double mastectomy 	<ul style="list-style-type: none"> Rashes, gauze dressings, casts, edema, paralysis, tubes, open sores or wounds, withered arms or limbs missing, damaged, sclerosed or occluded veins, allergies to cleansing reagents, burned or scarred tissue, shunt or IV on <u>both arms</u>.
Urine	None	<ul style="list-style-type: none"> Mental/physical disability preventing providing a sample Important language barrier preventing proper instruction for collection

Measure	Exclusion Criteria	
	Hard Coded	Staff Decision
Spirometry	<ul style="list-style-type: none"> • Pregnancy (> 27 weeks) • Heart attack within the last 3 months • Major surgery on chest or abdomen within the last 3 months 	<ul style="list-style-type: none"> • Acute respiratory condition (e.g., cold, bronchitis, flu, etc.) • Respondent with a stoma • Important language barrier • Respondent taking medication for tuberculosis • Difficulty breathing at rest • Persistent cough • Recent eye surgery (ex: cataract, ≤ 6 weeks) • Any other reason (as assessed by the HMS, ex. Cleft pallet)
Activity Monitor	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • Respondent in wheelchair
Grip Strength	<ul style="list-style-type: none"> • Positive response(s) to PAR-Q questions 6 and condition is “aneurysm” 	<ul style="list-style-type: none"> • Positive response(s) to PAR-Q questions 5 or 7 (depending upon probing). • Drank alcohol since midnight (depending upon probing of amount) • Mentally or physically impaired • Acute condition (unable to grip with <u>both</u> hands) • Any other reason (as assessed by the HMS)
mCAFT	<ul style="list-style-type: none"> • Positive response(s) to PAR-Q questions 1, 2, 3, 6 • Positive response to PAR-Q question 4 and condition is “During or after exercise” or “At random” • Resting BP > 144/94 mmHg* (age>14) • Resting HR > 99 bpm* (age>14) • Pregnancy (> 12 weeks) • Blood donation in past 24 hours • Taking medication for breathing condition (e.g., asthma) and did not bring medication with them • Age > 69 years • Home visit 	<ul style="list-style-type: none"> • Positive response(s) to PAR-Q questions 4, 5, 7 (depending upon probing). • Heart rate or blood pressure altering medications • Difficulty breathing at rest • Appears ill or complains of fever • Persistent cough • Lower extremity swelling • Mentally/physically impaired • Insulin pump • Supplemental oxygen • Drank alcohol since midnight (depending upon probing of amount) • Large meal within 1 hour of appointment start time • Any other reason (as assessed by the HMS)
Sit and Reach	<ul style="list-style-type: none"> • Pregnancy (> 12 weeks) • Age > 69 years • Home visit 	<ul style="list-style-type: none"> • Positive response(s) to PAR-Q questions 5 and 7 (depending upon probing). • Colostomy bag • Drank alcohol since midnight (depending upon probing of amount) • Mentally or physically impaired • Acute condition (e.g., upper/lower limb cast)

Measure	Exclusion Criteria	
	Hard Coded	Staff Decision
		<ul style="list-style-type: none"> Chronic condition (e.g., lower body paralysis, missing arm) Any other reason (as assessed by the HMS)
Partial Curl-Ups	<ul style="list-style-type: none"> Positive response(s) to PAR-Q questions 1, 2, 3 Positive response(s) to PAR-Q questions 6 and condition is “aneurysm” Pregnancy (> 12 weeks) Resting BP > 144/94 mmHg* (age>14) Resting HR > 99 bpm* (age>14) Age > 69 years Home visit 	<ul style="list-style-type: none"> Positive response(s) to PAR-Q questions 5 and 7 (depending upon probing). Difficulty breathing at rest Persistent cough Lower extremity swelling Appears ill or complains of fever Colostomy bag Drank alcohol since midnight (depending upon probing of amount) Mentally or physically impaired Acute condition (e.g., upper/lower limb cast) Chronic condition (e.g. lower body paralysis) Any other reason (as assessed by the HMS)
Oral Health (exclusion from probing component only)	<ul style="list-style-type: none"> Haemophilia Chemotherapy within the past 4 weeks Any answer “yes” to one or more questions in the oral health restrictions (OHR) block < 15 yrs of age 	<ul style="list-style-type: none"> Acute condition (as assessed by the HMS in consultation with the dentist)

Appendix 3 PAR-Q

Physical Activity Readiness
Questionnaire - PAR-Q
(revised 2002)

PAR-Q & YOU

(A Questionnaire for People Aged 15 to 69)

Regular physical activity is fun and healthy, and increasingly more people are starting to become more active every day. Being more active is very safe for most people. However, some people should check with their doctor before they start becoming much more physically active.

If you are planning to become much more physically active than you are now, start by answering the seven questions in the box below. If you are between the ages of 15 and 69, the PAR-Q will tell you if you should check with your doctor before you start. If you are over 69 years of age, and you are not used to being very active, check with your doctor.

Common sense is your best guide when you answer these questions. Please read the questions carefully and answer each one honestly: check YES or NO.

YES	NO	
☐	☐	1. Has your doctor ever said that you have a heart condition <u>and</u> that you should only do physical activity recommended by a doctor?
☐	☐	2. Do you feel pain in your chest when you do physical activity?
☐	☐	3. In the past month, have you had chest pain when you were not doing physical activity?
☐	☐	4. Do you lose your balance because of dizziness or do you ever lose consciousness?
☐	☐	5. Do you have a bone or joint problem (for example, back, knee or hip) that could be made worse by a change in your physical activity?
☐	☐	6. Is your doctor currently prescribing drugs (for example, water pills) for your blood pressure or heart condition?
☐	☐	7. Do you know of <u>any other reason</u> why you should not do physical activity?

If
you
answered

YES to one or more questions

Talk with your doctor by phone or in person BEFORE you start becoming much more physically active or BEFORE you have a fitness appraisal. Tell your doctor about the PAR-Q and which questions you answered YES.

- You may be able to do any activity you want — as long as you start slowly and build up gradually. Or, you may need to restrict your activities to those which are safe for you. Talk with your doctor about the kinds of activities you wish to participate in and follow his/her advice.
- Find out which community programs are safe and helpful for you.

NO to all questions

If you answered NO honestly to all PAR-Q questions, you can be reasonably sure that you can:

- start becoming much more physically active — begin slowly and build up gradually. This is the safest and easiest way to go.
- take part in a fitness appraisal — this is an excellent way to determine your basic fitness so that you can plan the best way for you to live actively. It is also highly recommended that you have your blood pressure evaluated. If your reading is over 144/94, talk with your doctor before you start becoming much more physically active.

DELAY BECOMING MUCH MORE ACTIVE:

- if you are not feeling well because of a temporary illness such as a cold or a fever — wait until you feel better; or
- if you are or may be pregnant — talk to your doctor before you start becoming more active.

PLEASE NOTE: If your health changes so that you then answer YES to any of the above questions, tell your fitness or health professional. Ask whether you should change your physical activity plan.

Informed Use of the PAR-Q: The Canadian Society for Exercise Physiology, Health Canada, and their agents assume no liability for persons who undertake physical activity, and if in doubt after completing this questionnaire, consult your doctor prior to physical activity.

No changes permitted. You are encouraged to photocopy the PAR-Q but only if you use the entire form.

NOTE: If the PAR-Q is being given to a person before he or she participates in a physical activity program or a fitness appraisal, this section may be used for legal or administrative purposes.

"I have read, understood and completed this questionnaire. Any questions I had were answered to my full satisfaction."

NAME _____

SIGNATURE _____

DATE _____

SIGNATURE OF PARENT
or GUARDIAN (for participants under the age of majority) _____

WITNESS _____

Note: This physical activity clearance is valid for a maximum of 12 months from the date it is completed and becomes invalid if your condition changes so that you would answer YES to any of the seven questions.



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...continued from other side

PAR-Q & YOU

Physical Activity Readiness
Questionnaire - PAR-Q
(revised 2002)



Physical activity improves health.

Every little bit counts, but more is even better – everyone can do it!

Get active your way – build physical activity into your daily life...

- at home
 - at school
 - at work
 - at play
 - on the way
- ...that's active living!



Choose a variety of activities from these three groups:

Endurance

4-7 days a week
Continuous activities for your heart, lungs and circulatory system.

Flexibility

4-7 days a week
Gentle reaching, bending and stretching activities to keep your muscles relaxed and joints mobile.

Strength

2-4 days a week
Activities against resistance to strengthen muscles and bones and improve posture.

Starting slowly is very safe for most people. Not sure? Consult your health professional.

For a copy of the Guide Handbook and more information:
1-888-334-9769, or
www.nrcan.gc.ca

Get Active Your Way, Every Day – For Life!

Scientists say accumulate 60 minutes of physical activity every day to stay healthy or improve your health. As you progress to moderate activities you can cut down to 30 minutes, 4 days a week. Add-up your activities in periods of at least 10 minutes each. Start slowly... and build up.

Time needed depends on effort

Very Light Effort	Light Effort 60 minutes	Moderate Effort 30-60 minutes	Vigorous Effort 20-30 minutes	Maximum Effort
<ul style="list-style-type: none"> • Strolling • Dusting 	<ul style="list-style-type: none"> • Light walking • Volleyball • Easy gardening • Stretching 	<ul style="list-style-type: none"> • Brisk walking • Biking • Raking leaves • Swimming • Dancing • Water aerobics 	<ul style="list-style-type: none"> • Aerobics • Jogging • Hockey • Basketball • Fast swimming • Fast dancing 	<ul style="list-style-type: none"> • Sprinting • Racing

Range needed to stay healthy

You Can Do It – Getting started is easier than you think

Physical activity doesn't have to be very hard. Build physical activities into your daily routine.

- Walk whenever you can – get off the bus early, use the stairs instead of the elevator.
- Reduce inactivity for long periods, like watching TV.
- Get up from the couch and stretch and bend for a few minutes every hour.
- Play actively with your kids.
- Choose to walk, wheel or cycle for short trips.
- Start with a 10 minute walk – gradually increase the time.
- Find out about walking and cycling paths nearby and use them.
- Observe a physical activity class to see if you want to try it.
- Try one class to start – you don't have to make a long-term commitment.
- Do the activities you are doing

Appendix 4 Canadian Health Measure Survey cycle 1 protocols

1. Anthropometric component

1.1 Standing height

Standing height is an assessment of maximum vertical size. This measure was taken on all respondents ages 6 years and older who were able to stand unassisted. Standing height was measured with a fixed stadiometer with a vertical backboard and a moveable headboard using a procedure based on the Canadian Physical Activity, Fitness and Lifestyle Approach (CPAFLA).¹

1.1.1 Equipment

- ProScale M150 Digital Stadiometer.

1.1.2 Eligibility

- All respondents aged 6-79 who are able to stand unassisted.
- Respondents who were unable to stand unassisted.
- Respondents who suffered from an acute condition that prevented him/her from completing the measure (e.g., cast on leg preventing the respondent from standing up straight).

1.1.3 Exclusion criteria

- Respondents who were unable to stand unassisted.
- Respondents who suffered from an acute condition that prevented him/her from completing the measure (e.g., cast on leg preventing the respondent from standing up straight).

1.1.4 Administering height

1. The health measurement specialist (HMS) had the respondent remove his/her footwear and move or remove hair ornaments, jewellery, buns and braids from the top of his/her head.
2. The respondent was instructed to stand erect, arms hanging at the sides with his/her feet together. The respondent was instructed to keep his/her heels, buttocks, back and head in contact with the vertical backboard of the stadiometer. Depending on the overall body shape of the individual, there were times when not all of the points touched. In such cases, it was ensured that the respondent's trunk was vertical above the waist, and that the arms and shoulders were relaxed. The HMS made sure the body weight was evenly distributed, and that both feet were flat on the floor.
3. The HMS instructed the respondent to look straight ahead. The respondent's head was aligned in the Frankfort Plane. The head is considered to be in the Frankfort plane when the horizontal line from the ear canal to the lower border of the orbit of the eye is parallel to the floor and perpendicular to the vertical backboard. If required, the HMS gently tilted the head up or down until proper alignment was achieved with eyes looking straight ahead.

NOTE: If a respondent could not keep his/her head in contact with the stadiometer while the head was in the Frankfort plane position, the Frankfort plane position took precedence over ensuring the rear of the head was in contact with the stadiometer.

4. The respondent was instructed to stand as tall as possible, take a deep breath and hold it while the measurement was taken. A deep breath allowed the spine to straighten, yielding a more consistent and reproducible stature measurement.
5. The head board was positioned firmly on top of the head with sufficient pressure to compress the hair.
6. The standing height was recorded to the nearest 0.01cm while the breath was being held.

1.2 Sitting height

Sitting height is an assessment of maximum vertical size when the respondent is sitting. It was measured on all respondents ages 6 years and older who were able to sit unassisted. Sitting height was measured with a fixed stadiometer with a vertical backboard and a moveable headboard. Along with standing height, it helps in the assessment of body proportions (e.g., length of the legs relative to the body trunk). Combining stature with sitting height (using a predictive equation) provides an index of maturity status for younger populations. The sitting height was measured following the International Society for the Advancement of Kinanthropometry (ISAK) protocol.²

1.2.1 Equipment

- ProScale M150 Digital Stadiometer.
- Standardized bench or block.

1.2.2 Eligibility

- Respondents aged 6-79.

1.2.3 Exclusion criteria

- Respondents who were unable to sit unassisted.
- Respondents who suffered from an acute condition preventing them from completing the measure (e.g. full leg cast).

1.2.4 Administering sitting height

1. The HMS had the respondent move or remove hair ornaments, jewellery, buns and braids from the top of his/her head.
2. The respondent was instructed to sit on the measuring box with hands resting on his/her thighs and to keep his/her back, shoulders and head in contact with the vertical backboard of the stadiometer. Depending on the overall body shape of the individual, there were times when not all of the points touched. In such cases, it was ensured that respondent's trunk was vertical above the waist, and that the arms and shoulders were relaxed.

3. The HMS instructed the respondent to look straight ahead. The respondent's head was aligned in the Frankfort Plane. The head is considered to be in the Frankfort plane when the horizontal line from the ear canal to the lower border of the orbit of the eye is parallel to the floor and perpendicular to the vertical backboard. If required, the HMS gently tilted the head up or down until proper alignment was achieved with eyes looking straight ahead.

NOTE: If a respondent could not keep his/her head in contact with the stadiometer while the head was in the Frankfort plane position, the Frankfort plane position took precedence over ensuring the rear of the head was in contact with the stadiometer.

4. The respondent was instructed to sit as tall as possible, take a deep breath and hold it while the measurement was taken. The HMS ensured that the respondent did not contract the gluteal muscles nor push with the legs.
5. The head board was positioned firmly on top of the head with sufficient pressure to compress the hair.
6. The standing height was recorded to the nearest 0.01cm while the breath was being held.
7. The height of the box was subtracted to obtain the respondent's sitting height to the nearest 0.01cm.

1.3 Weight

The weight was measured in kilograms (kg) using a digital scale and was used to calculate body mass index. The procedure was based on the Canadian Physical Activity, Fitness and Lifestyle Approach (CPAFLA).¹

1.3.1 Equipment

- Mettler Toledo VLC with Panther Plus terminal scale.

1.3.2 Eligibility

- All respondents aged 6-79.

1.3.3 Exclusion criteria

- Respondent who suffered from an acute condition that prevented him/her from completing the measure (see special considerations section below).
- Respondent who were wearing a plaster cast.

1.3.4 Administering weight

1. The HMS had the respondent remove his/her footwear, any heavy accessories and empty his/her pockets.
2. The respondent was asked to step on the center of the scale facing the HMS, with his/her hands at the side and looking straight ahead.
3. The weight was recorded to the nearest 0.1kg.

1.3.5 Special considerations

Body weight could be measured with the standard procedure if the individual could support themselves on the scale without assistance. Measurements of body weight did not include the weight of assistive devices (e.g., artificial limbs, leg braces, crutches, etc.), although these were sometimes required in order for the individual to be weighed. In these cases, the assistive device was first placed on the scale and the scale tarred. The individual could then stand on the scale using the assistive device and the weight of the individual was then displayed.

Individuals who were unable to balance independently on the scale could be weighed sitting in a chair. The chair was placed on the scale, the scale was then tarred and the respondent sat in the chair. The weight of the individual was then displayed.

1.4 Waist circumference

The pattern of fat distribution is an important indicator of the health risks of obesity. Central fat (fat on the trunk) distribution, especially abdominal fat, is associated with increased risk of hypertension, type 2 diabetes, hyper-lipidemia, coronary artery disease and premature death. Waist circumference provides an indicator of abdominal fat distribution. The procedure was based on the third edition of the Canadian Physical Activity, Fitness and Lifestyle Approach (CPAFLA).¹

1.4.1 Equipment

- Gulick tape measure (150cm or 200cm)

1.4.2 Eligibility

- All respondents aged 6-79

1.4.3 Exclusion criteria

- Pregnant women
- Respondent in a wheelchair (if cannot correctly landmark)
- Respondent unable to stand unassisted
- Colostomy bag

1.4.4 Administering waist circumference

1. The HMS had the respondent stand erect, in a relaxed manner, with feet shoulder width apart and arms slightly forward (at a 45° angle) with palms facing in. The measure was to be taken directly on the skin.
2. Both sides of the respondent were landmarked with a washable marker. The location of the first landmark was at the bottom of the rib cage (last floating rib) and the second landmark was at the top of the iliac crest. Both marks were in the mid-axillary line. If needed, the HMS asked the respondent for assistance in locating the landmarks or to confirm the location. The mid-point between these two landmarks was measured and landmarked using the measuring tape.
3. Standing on the respondent's right side, the HMS placed the measuring tape around the trunk in a horizontal plane at the level marked on the respondent's trunk. A mirror was used to ensure proper level and positioning of tape. If there was a visible difference between the two reference marks, the mark on the right side was used as the guide. The HMS applied sufficient tension to the tape to maintain its position without causing indentation of the skin surface.
4. Once the measuring tape was in place, The HMS instructed the respondent to place both arms along the side of the body in a relaxed manner.
5. The respondent was instructed to breathe normally.
6. The HMS kept his/her eyes at the same level as the measuring tape. The measurement was taken at the end of a normal expiration. The cross-over technique was used, and the measure was read from the bottom of the tape.
7. The HMS recorded the measurement to the nearest 0.1cm.

1.5 Hip circumference

Hip circumference is the maximal circumference measured at the hips or buttocks region (whichever is larger). It is used to calculate the waist-to-hip ratio (WHR) (waist circumference divided by hip circumference). WHR is a simple method of determining body fat pattern. Although standards for risk vary by age and gender, health risk increases with higher WHR. The protocol for hip circumference was based on the Canadian Standardized Test of Fitness Third Edition.³

1.5.1 Equipment:

- Gulick tape measure (150cm or 200cm)

1.5.2 Eligibility:

- All respondents aged 6-79

1.5.3 Exclusion criteria:

- Pregnant women
- Respondent in a wheelchair
- Respondent who was unable to stand unassisted

1.5.4 Administering hip circumference

1. The respondent was asked to wear light clothing. The respondent was instructed to stand erect in a relaxed manner, with feet together and arms slightly forward (at a 45° angle) with palms facing in. If the respondent was not wearing light clothing (e.g., light weight shorts, exercise leggings or lightweight track pants), scrubs were given to ensure minimal clothing interference during the measurement.
2. The respondent was asked to stand with his/her weight evenly distributed to both feet. The respondent was asked to breathe normally.
3. The measurement was taken over the clothing. Standing on the respondent's right side, the HMS placed the measuring tape around the hips, at the level of the symphysis pubis and the greatest gluteal protuberance. The HMS used a mirror to ensure proper level and positioning of tape. The measuring tape was held snug but not tight.
4. Once the tape was in place, the HMS instructed the respondent to relax both arms along the body. The measurement was taken on the respondent's right side. The cross-over technique was used, and the measure was read from the bottom of the tape.
5. The HMS recorded the measurement to the nearest 0.1cm.

1.6 Skinfold measurement

Skinfold measurements are used to estimate general fatness and the distribution of subcutaneous adipose tissue. The principle behind this technique is that the amount of subcutaneous fat (fat that lies directly beneath the skin) is proportional to the total amount of body fat. Both too much fat and too little fat is associated with increased health risk. The skinfold procedure was based on the Canadian Physical Activity, Fitness and Lifestyle Approach (CPAFLA).¹

1.6.1 Equipment

- Harpenden skinfold caliper
- Fine tip washable marker
- Gulick tape measure (150cm)

1.6.2 Eligibility

- All respondents aged 6-79

1.6.3 Exclusion criteria

- Pregnant women
- Respondents with BMI ≥ 30 kg/m²
- Respondents who had an acute condition that prevents him/her from completing the measure (e.g., varicose veins, skin condition). This resulted in site-specific exclusion only.
- Respondents who had a chronic condition that prevented him/her from completing the measure (e.g., respondent in a wheelchair which impedes proper landmarking, or missing a limb on the right side of the body). This resulted in site-specific exclusion only.

1.6.4 Administering the skinfolds measurement

1. Prior to measuring the skinfolds, the HMS marked each site carefully. The HMS marked both the skinfold site and then the 1cm point from the skinfold landmark to identify where to place the upper edge of the caliper jaws. The marks indicated where the center of the fold would be. All marks and measurements were taken on the right side of the body.
2. The HMS completed the first set of skinfold measurements at all sites then repeated the procedure to obtain a second measurement at all sites.

NOTE: If the difference between the first and second measure of a particular skinfold site was found to be greater than 0.4mm, the HMS was prompted by the computer system to take a third measurement of that skinfold site. The computer would then choose, among the three values, the two measurements which most closely matched each other in value and determined the mean of those two measurements. The computer would determine the mean of the three measurements if the measures were of equal distance (e.g. 18.6, 19.4, 19.0mm).

3. It was important that the respondent relaxed the underlying musculature as much as possible during the skinfold measurement.
4. The HMS completely spread the index finger and the thumb to firmly grasp the fold of skin and underlying subcutaneous adipose tissue between his/her thumb and index finger. The amount grasped depended upon the thickness of the subcutaneous adipose tissue. The HMS grasped enough skin and adipose tissue to form a distinct fold that separated it from the underlying muscle. The HMS ensured that the landmark mark was at the center of the skinfold. The sides of the fold were to be roughly parallel. The skinfold was grasped at the point of the site measurement and gently held with the thumb and forefinger.
5. The HMS placed the jaws of the caliper at a right angle to the body surface, with the upper edge of the caliper jaws on the 1cm landmark below the point where the skinfold was raised. While maintaining the pressure on the skinfold with his/her fingers, the HMS fully released the trigger of the caliper.
6. The HMS measured the skinfold thickness to the nearest 0.2mm (nearest even decimal place) while continuing to hold the skinfold in his/her fingers. The HMS read the actual measurement from the caliper once the indicator had stabilized (about 2 seconds after the full pressure of the caliper had been applied to the skin).

7. The HMS read the skinfold measurement before releasing the fold. The HMS then removed the calipers, released the fold of skin and subcutaneous fat, and recorded the measurement.

1.6.5 Triceps skinfold method

1. The HMS had the respondent stand with his/her arms relaxed by his/her sides with palms facing the body.
2. To landmark, the HMS brought the forearm to 90° with the palm facing up.
3. The HMS palpated the acromion process and the tip of the olecranon process and determined the mid-point between these two locations on the medial aspect of the arm using a tape measure. The mid-point was marked using a washable marker. The mid-point was used as a reference to make a landmark on the midline of the back of the arm. The HMS then placed a second mark on the back of the arm, 1cm below the first mark, to indicate the placement of the upper edge of the caliper jaws.
4. The HMS had the respondent extend his/her arm down with the palm facing the upper leg.
5. The skinfold was raised at the midpoint so that the fold ran vertically along the midline of the back of the arm.
6. The upper edge of the caliper jaw was placed at the 1cm landmark, below the point where the skinfold was raised.
7. Once the indicator had stabilized, the HMS read the skinfold thickness to the nearest 0.2mm (nearest even decimal place) while continuing to hold the skinfold.

1.6.6 Biceps skinfold method

1. The HMS had the respondent extend his/her arm at the side with the palm facing forward (supinated).
2. The HMS marked the upper arm over the biceps at the same level as the mid-point for the triceps.
3. A second mark was placed 1cm below to indicate the placement of the upper edge of the caliper jaws.
4. The skinfold was raised at the mid-arm point, so the fold ran vertically along the midline of the front of the arm. The upper edge of the caliper jaws was placed at the 1cm landmark, below the point where the skinfold was raised.
5. Once the indicator had stabilized, the HMS read the skinfold thickness to the nearest 0.2mm (nearest even decimal place) while continuing to hold the skinfold.

1.6.7 Subscapular skinfold method

1. The HMS had the respondent stand with his/her back facing them, with shoulders relaxed and arms by the sides.
2. To landmark, the HMS palpated the inferior angle of the scapula. The HMS placed a mark 1cm below the inferior angle. The HMS placed a second mark 1cm below the skinfold landmark in the direction of the skinfold at an angle of 45° to the spine.
3. The skinfold ran downward and outward at an angle of 45° to the spine. The skinfold was to form a line extending diagonally toward the right elbow.
4. The HMS placed the upper edge of the caliper jaw at the 1cm landmark, below the point where the skinfold was raised.
5. Once the indicator had stabilized, the HMS read the skinfold thickness to the nearest 0.2 mm (nearest even decimal place) while continuing to hold the skinfold.

1.6.8 Iliac crest skinfold method

1. The HMS had the respondent stand in a normal erect position with the right arm raised to his/her side (so it was horizontal) with the right hand on the right shoulder. If the respondent was unable to place the right hand on the shoulder, they were to keep the horizontal arm extended.
2. To landmark, the HMS palpated the crest of the ilium and made a small mark 3cm above the crest at the midline (mid-axillary line) of the body. A second mark was placed 1cm anteriorly from the skinfold landmark in the direction of the skinfold.
3. The HMS raised the skinfold at the 3cm mark so that the fold ran forward and slightly downward.
4. The upper edge of the caliper jaws were placed on the 1cm anterior landmark, in the direction of the fold.
5. Once the indicator had stabilized, the HMS read the skinfold thickness to the nearest 0.2mm (nearest even decimal place) while continuing to hold the skinfold fingers.

1.6.9 Medial calf skinfold method

1. The HMS had the respondent place his/her unweighted (relaxed) right foot flat on a step so that the knee was at a 90° angle.
2. To landmark, the HMS used the tape measure to find the maximum calf girth. The HMS placed a mark on the medial aspect of the calf at the maximum girth point. A second mark was placed 1cm below the skinfold landmark.
3. The HMS raised the skinfold on the medial aspect of the right calf just at the level of the maximum calf girth so that the fold ran vertically along the midline.

4. The HMS placed the upper edge of the caliper jaws on the 1cm landmark, below the point where the skinfold was raised.
5. Once the indicator had stabilized, the HMS read the skinfold thickness to the nearest 0.2 mm (nearest even decimal place) while continuing to hold the skinfold.

1.6.10 Special considerations

Although skinfold measurements could virtually always be completed (except when a body part was missing), they may or may not have been appropriate. Skinfold measurements were only made on body parts whose composition was unaffected by disability since some disabilities can increase the difficulty in obtaining reliable skinfold measurements. For example, paralysis makes it difficult to obtain a correct skinfold because of the lack of tone in the underlying muscle. Rolling the skinfold between thumb and forefinger may help to isolate the fat from the muscle layers.

2. Blood pressure component

The respondent's resting heart rate and blood pressure (BP) were measured, following a new protocol created by the CHMS and inspired by the report entitled "Hypertension Surveillance in Canada: Minimum Standards For Assessing Blood Pressure In Surveys" report⁸. This report was published by an expert committee consisting of members of the Canadian Hypertension Society, the Canadian Coalition for High Blood Pressure Prevention and Control and the Heart and Stroke Foundation of Canada

For the purpose of standardization, all measurements were taken on the right arm, unless specific conditions prohibited the use of the right arm (e.g., right mastectomy), using the automated blood pressure cuff (BpTRU™). The BpTRU™ is designed to measure blood pressure and heart rate using an upper arm cuff. The device automatically inflates and deflates the cuff, and uses the oscillometric technique to calculate systolic and diastolic blood pressure. In the event that the automated cuff was not functioning properly, the HMS performed the measure manually by the auscultation method.

2.1 Equipment

Electronically

- Automated BP monitor: BpTRU™ BP-300 (with automatic input)
- Variety of automated BP cuff sizes (child – extra large adult)
- Foot stool for shorter respondents

Manually (auscultation method)

- Stethoscope: Littman Classic II SE (adults), Littman™ Classic II pediatric (children)
- Mercury manometer
- Variety of manual BP cuff sizes (child – extra large adult)
- Polar heart rate monitor
- Foot stool for shorter respondents
- Stopwatch

2.2 Eligibility

- All respondents aged 6-79

2.3 Exclusion criteria

Test exclusion

- Presence of the following on both arms: rashes, gauze dressings, casts, oedema, paralysis, tubes, open sores or wounds, withered arms, a-v shunts
- Blood pressure cuff too small or too large to fit on arm

Right arm exclusion

- Blood has been drawn from right arm within the last week
- Presence of the following: rash, gauze dressing, cast, oedema, paralysis, tubes, open sores or wounds, withered arm, a-v shunt
- Right mastectomy
- Right arm amputation
- Cast on right arm

2.4 Administering blood pressure**2.4.1 Electronically**

1. The respondent was situated in a quiet, comfortable environment. The respondent sat with his/her right arm supported and resting comfortably at heart level (the location of the heart was taken as the junction of the fourth intercostals space and the lower left sternal border).
2. The proper cuff size associated with the arm circumference was chosen.
3. The cuff was wrapped smoothly and snugly around the respondent's bare right arm, centering the bladder over the brachial artery. The lower edge of the cuff was placed 2-3cm above the antecubital space (elbow crease). The health measurement specialist (HMS) ensured that the respondent's clothing did not impede the blood flow to the arm (e.g., did not roll up the respondent's sleeve but rather provided a short sleeve shirt).

NOTE: If the respondent's right arm could not be used (refer to the right arm exclusion criteria), then the left arm was used.

4. The respondent was asked to rest in the seated position for at least 5 minutes prior to the measurement (with the cuff already on the arm). The respondent was asked to relax and not talk or move around during this 5 minute rest period.
5. The HMS ensured that the respondent was in the correct seated position, which was as follows:
 - a. Feet flat on the floor (for shorter respondents a foot rest was used)
 - b. Legs/ankles uncrossed
 - c. Back against the back rest of the chair
 - d. Right arm resting straight on the table at the level of the heart, with the palm of the hand facing down.
6. Before starting the measurement, the respondent were instructed not to move or talk during the test.
7. The blood pressure was determined automatically by the BpTRU™ BP-300 as the average of 5 replicate measurements obtained at 1 minute intervals. (A total of 6 blood pressures were taken, with the first reading excluded from the average calculation).
8. A minimum of 3 readings were required to complete the measurement. If more than 2 errors occurred (e.g., movement artefact), the HMS repeated the series of six measurements.

9. After the series of six measurements was taken, the HMS reviewed the measurements listed on the screen and either accepted or re-did the measurements. There were 3 reasons why the HMS would be prompted to re-do the measurements:
- Less than 3 valid measurements for BP and HR were recorded. A measurement was considered not valid if:
 - there was a BpTRU™ error
 - for any trial) systolic BP – diastolic BP was < 20 or > 200
 - If the variability between the measurements was too large
 - Highest systolic BP – lowest systolic BP > 30
 - Highest diastolic BP – lowest diastolic BP > 20
 - Highest HR – lowest HR > 30
 - If respondent's mean blood pressure (>144/94 mmHg) and/or heart rate (≥100 bpm) was elevated.
12. Once the results of the second set of blood pressure measurements were taken, the HMS decided whether or not a third set of measurements were needed by using the information in table 1.

Table 1 Blood pressure measurement decision table

Outcome of 1 st measurement	Outcome of 2 nd measurement	Action
	Obtained less than 3 valid measurements or the variability was too large.	Re-do the measurements a third and last time by auscultation.
Obtained less than 3 valid measurements or if the variability between measurements was too large	The respondent's BP (>144/94 mmHg) and/or heart rate (≥100 bpm) are elevated.	Re-do the measurements a third and last time with the BpTRU™ to confirm.
	Obtained at least 3 valid measurements, the variability is within the acceptable range and the BP is considered normal.	Accept the measurements and go to the end of the component.
<u>Elevated BP or HR</u>	BP (>144/94 mmHg) and/or HR (≥100 bpm) are elevated again.	Accept the measurements and go to the end of the component. Read the high BP and/or HR message to the respondent.
SBP >144 mmHg		
and/or		
DBP > 94 mmHg)	Obtained less than 3 valid measurements or the variability was too large.	Re-do the measurements a third and last time with the BpTRU™ to confirm the first set of results.
and/or		
HR ≥100 bpm	Obtained at least 3 valid measurements, the variability is within the acceptable range and mean BP is considered normal.	Accept the measurements and go to the end of the component.

2.4.2 Manually (auscultation method)

1. The respondent was situated in a quiet, comfortable environment. The respondent sat with his/her right arm supported and resting comfortably at heart level (the location of the heart was taken as the junction of the fourth intercostals space and the lower left sternal border).
2. The HMS assisted the respondent with putting on the heart rate monitor. The strap was adjusted to ensure a strong reading from the heart rate monitor.
3. The proper blood pressure cuff size associated with the arm circumference was chosen and the brachial artery was land-marked for proper cuff placement.
4. The cuff was wrapped smoothly and snugly around the respondent's bare right arm, centering the bladder over the brachial artery. The lower edge of the cuff was placed 2-3cm above the antecubital space (elbow crease). The HMS ensured that the respondent's clothing did not impede the blood flow to the arm (e.g., did not roll up the respondent's sleeve).

NOTE: If the respondent's right arm could not be used (refer to the right arm exclusion criteria), then the left arm was used.

5. The respondent was asked to remain in the seated position for at least 5 minutes prior to measurement (with the cuff already on his/her arm). The respondent was asked to relax and not talk or move around during the 5 minute rest period.
6. The HMS ensured that the respondent was in the correct seated position, which was as follows:
 - a. Feet flat on the floor (for shorter respondents a foot rest should be used)
 - b. Legs/ankles uncrossed
 - c. Back against the back rest of the chair
 - d. Right arm resting straight on the table at the level of the heart, with the palm of the hand facing down.
7. Before starting the measurement, the respondent was instructed not to move or talk during the test.
8. The maximum inflation level (MIL) was determined. The MIL or palpatory method provided an approximation of the systolic blood pressure to determine the highest level to which the cuff should be inflated when the actual measurement was made. The MIL was determined as follows:
 - a. The respondent was positioned with the right palm upward. The HMS located the radial pulse in the right arm.
 - b. The HMS inflated the cuff quickly to a pressure of 70-80 mmHg. Then they inflated the cuff in increments of 10 mmHg until the radial pulse was no longer palpable (palpated systolic). They continued inflating the cuff in increments of 10 mmHg to a final measure that was 30 mmHg above the pressure where the pulse was last palpated. This number was recorded as the MIL.
 - c. The cuff was rapidly deflated and the return of the pulse was confirmed.

- d. If the HMS was unable to obtain the MIL they waited 1 minute and repeated the process.
9. The following procedures were used for seated blood pressure readings:
- a. The HMS placed the stethoscope into his/her ear canals, angled forward to fit snugly.
 - b. The HMS confirmed that the stethoscope head was in one of the two low-frequency positions. The positions to listen to low frequency sounds were either the open bell or tunable diaphragm using very light skin contact. If the open bell of the stethoscope was used, it was positioned over the brachial artery and held it firmly in place. If the tunable diaphragm was used, it was positioned over the brachial artery and pressed lightly against skin. The HMS ensured that the head made contact with the skin, around its entire circumference, for both positions. The HMS tried to avoid allowing the cuff, tubing, bell or diaphragm to come in contact with each other.
 - c. The stopwatch was started (to time the intervals between measurements), and the cuff was rapidly and steadily inflated to the MIL.
 - d. When the MIL was reached, the thumb valve was opened and the cuff was smoothly deflated at a constant rate (about 2 mmHg or one mark per second) while the HMS concurrently listened for Korotkoff sounds.
 - e. Keeping the manometer at eye level, the HMS watched the top of the mercury column (meniscus) as the pressure in the bladder fell and noted the level of the meniscus when the first repetitive sounds were heard (Phase I) and when they disappeared (Phase V).
 - f. The cuff was deflated at 2 mmHg per second for at least another 10 mmHg past where the last sounds were heard.
 - g. The HMS rapidly deflated the cuff and disconnected the manometer tubing between measurements to ensure the cuff deflated completely to zero and had the respondent resting quietly for at least 30 seconds.
 - h. The HMS entered Phase I (the level of the meniscus on the manometer at the first appearance of repetitive sounds) as the systolic blood pressure reading, and Phase V (the level of the meniscus when the last muffled sound was heard) as the diastolic blood pressure reading.
- NOTE:** If phase I or V occurred between the millimetre marks on the glass column, then the HMS rounded upward to the nearest digit.
- i. The HMS repeated steps “a” to “h” five more times for a total of 6 measurements at 1 minute intervals.
 - j. After the 6th measurement was entered, the application automatically calculated the average based on predetermined guidelines.

- k. The data from all 6 measurements were displayed on the computer screen and the HMS reviewed the measurements and either chose to accept or re-do the measurements based on the same criteria as previously outlined in the procedure for the automated BP measurement.

3. Spirometry component

The Spirometry Component consists of two blocks, Spirometry Restriction (SPR) and Spirometry Measurement (SPM). Information related to the spirometry restriction block is included in the clinic questionnaire⁴.

The main volumes measured are:

- a. Forced vital capacity (FVC), which is the maximal volume of air exhaled through forced effort from a position of full inspiration, i.e. vital capacity performed with a maximally forced expiratory effort, expressed in litres at BTPS⁵.
- b. One second forced expiratory volume (FEV₁), which is the maximal volume of air exhaled in the first second of a forced expiration from a position of full inspiration. This is expressed in litres at BTPS⁵.

NOTE: For respondents aged 6-7 the predicted equations were taken from 'Corey 1976'. For respondents 8 years and older the predicted equations were taken from 'Hankinson (NHANES III)'.

If the respondent's age, height or weight, were outside the published range for the selected predicted equation, the predicted values calculated were by extrapolation.

3.1 Equipment

- Koko spirometer
- Disposable mouthpieces - filtered
- Paediatric adapter - if necessary
- Disposable nose clip
- 3L Calibration syringe
- Barometer/thermometer

3.2 Eligibility

- All respondents aged 6-79

3.3 Exclusion criteria

- Respondent with a stoma (A surgically created opening of an internal organ on the surface of the body, i.e.: colostomy, tracheostomy)
- Pregnant women (> 27 weeks)
- Heart attack within the last 3 months
- Major surgery on chest or abdomen within the last 3 months
- Taking medication for tuberculosis
- Recent eye surgery (e.g., cataract, ≤ 6 weeks)
- Acute respiratory condition such as a cold, bronchitis, flu
- Respondents with an important language barrier
- Difficulty breathing at rest
- Persistent cough

3.4 Administering the spirometry measurement

1. The health measurement specialist (HMS) recorded the respondent's appropriate 'race adjustment' category (see table 2). For a given standing height, people of certain ethnicities tend to have longer legs and shorter trunks than Caucasians. Consequently, these people have smaller lungs, and should not be assigned the same predicted lung capacity as Caucasians.

If, during the household interview, the respondent reported more than one cultural/racial background (e.g., answered both Black & Arab to question SDC_Q24) the HMS selected a racial adjustment based on visual cues. The race variable from the household represents the respondent's self-reported cultural and racial background while the race adjustment variable (SPM_022) is a variable used to perform a correction on the spirometry data based on the different morphology among the races and as such these two variables may not match for all respondents. Variable SMP_022 should only be used in conjunction with spirometry analyses.

Table 2 Race adjustment categories according to self-reported racial background provided during the household interview.

Race adjustment:	Reported racial background	Correction Factor	
		To Corey equation	To Hankinson equation
<1> White	White		
	Arab	None	None
	Aboriginal		
<2> Black	Black	10% decrease to equation used for whites	None
<3> Hispanic	Mexican American	None	None
<4> Asian	South Asian / South East Asian		
	West Asian		
	Chinese	10% decrease to equation used for whites	10% decrease to equation used for whites
	Japanese		
	Korean		
	Filipino		
<5> Other	Other		None
	Unknown	None	

2. The HMS provided thorough instructions, as well as a demonstration (without using the mouthpiece) of the test prior to having the respondent perform the test. The spirometry test depends greatly on the effort of the respondent; therefore it was important that the HMS adapted an appropriate coaching technique to ensure the best possible test results from each respondent.
3. The respondent was instructed to sit with good posture, with both feet flat on the floor throughout the test. They were instructed not bend over at the waist during the exhalation phase. When testing older respondents, well-fitting false teeth were not routinely removed, since they preserve oropharyngeal geometry and spirometry results are generally better with them in place⁵.
4. The HMS assisted the respondent to ensure the nose clip was on securely. The respondent must wear a nose clip during the test to avoid air escaping through his/her nose.
5. The respondent placed the mouthpiece in his/her mouth and ensured that a good seal was obtained with the lips and that the teeth were resting on the outside of the mouthpiece.
6. The respondent was instructed to breathe normally in and out through the mouthpiece.
7. After a few normal breaths, the respondent was instructed to take a big, quick and deep breath in, filling the lungs with as much air as possible.
8. At the end of the maximal inhalation, the respondent was instructed to immediately blast out all the air as forcefully and quickly as possible. It was important that the respondent did not hold his/her breath before blowing out.
9. The HMS provided encouragement to the respondent during the exhalation phase. Once the respondent had obtained a 1 second plateau on the volume/time curve and exhaled for at least 6 seconds (or 3 seconds for children 6-10 years old), the HMS told him/her to take a big breath in (2nd maximal inspiration).
10. Following the second maximal inspiration, the respondent was asked to remove the mouthpiece and nose clips.
11. After each trial the HMS had to decide whether or not to retain the effort. This was done after the HMS assessed the trial quality (explained in the 'Assessing Trial Quality' section below).
12. The respondent was given a short rest (about 30-45 sec) between trials to catch his/her breath. The HMS always observed the respondent for fatigue and did not allow another trial to be performed until the respondent had recovered from the previous trial.

13. The HMS performed a minimum of 3 acceptable trials over a maximum of 8 attempts. If after 8 trials, there was still no reproducibility in the trials, the HMS selected the best trial that was done by the respondent and saved the efforts.
14. The best test effort was determined by the sum of FVC and FEV₁. At the end of all trials, the HMS confirmed that the chosen trial was indeed the best. If this was not the case, or the chosen trial was unacceptable due to technique or procedure, the HMS selected another trial as 'best'.
15. All trials were saved and if fewer than 3 trials were performed, the HMS recorded the reason why.

3.5 Assessing Trial Quality

Two types of criteria assessments were done in order for the HMS to accept the trial: the within-manoeuvre criteria and the between-manoeuvre criteria.

3.5.1 Within-manoeuvre criteria

Within-manoeuvre criteria included two different criteria. First, the HMS needed to decide if the trial was usable, if it was, then they needed to decide if it was acceptable as follows:

Usable Trials

To be usable, the trial must:

- a. Have had a good start, which means no excessive hesitation or false start. The extrapolated volume (EV) must not have been greater than 0.5% of FVC or 0.150 L, whichever was greater. EV was determined by extrapolation through the steepest part of the curve, where flow was peak expiratory flow (PEF). FVC=4.291 L; EV=0.123 L (2.9% FVC)⁵.
- b. Have been without coughing during the first second of the manoeuvre, that would affect the measured FEV₁ value, or any other cough that, in the HMS's judgment, interfered with the measurement of accurate results.

Acceptable Trials

To be acceptable, the trial must have met all of the previous conditions (be usable), plus it must:

- a. Have been free from glottis closure (Valsalva manoeuvre) or hesitation that caused a cessation of airflow. This could be seen as an abrupt plateau in the volume-time curve and an abrupt decrease in flow at the end of the manoeuvre in the flow-volume curve.
- b. Have been free from early termination or cut-off where it was apparent that the respondent failed to exhale for 6 seconds (or 3 seconds for children 6-10 years old) and there was no 1 second plateau of the volume-time curve
- c. Have been free from leaks that could be seen in the volume-time curve as a loss of volume over the 6 second exhalation or even a slightly negative flow at the end of the manoeuvre.

- d. Have been free from obstruction (e.g., obstruction due to the tongue being placed in front of the mouthpiece, or teeth in front of the mouthpiece, or mouthpiece deformation due to biting).
- e. Have been free from evidence of an extra breath being taken during the manoeuvre⁵.
- f. Have had good starts:
 - Extrapolated volume 0.5% of FVC or 0.15 L, whichever is the larger value (refer to “a” in the usable trials section).
 - A ‘good peak’ was seen on the flow-volume [F(t)] curve (time to peak flow is less than 120 ms).
- g. Have shown satisfactory exhalation:
 - There was no early termination (refer to “d” in this section);
Or;
 - There was a plateau in the volume–time [V(t)] curve;
 - There was no instance where the respondent could not or should not continue to exhale;
 - There was an effort that is maximal throughout.

3.5.2 Between-manoeuvre criteria:

Between-manoeuvre criteria were used to assess reproducibility between trials. When three acceptable spiromograms were obtained, the HMS checked for between-manoeuvre reproducibility:

- a. If respondent’s FVC was $> 1.0\text{L}$ then reproducibility criteria were when:
 - The two largest FVCs were within $\leq 150\text{ml}$ of each other
 - The two largest FEV₁s were within $\leq 150\text{ml}$ of each other
- b. If respondent’s FVC was $\leq 1.0\text{L}$ then reproducibility criteria were when:
 - The two largest FVCs were within $\leq 100\text{ml}$ of each other
 - The two largest FEV₁s were within $\leq 100\text{ml}$ of each other

If, after three trials, both of the criteria were met, the test session could be concluded.

- The HMS ensured that the three trials were acceptable
- The HMS ensured that two of them were reproducible.

If, after three trials, both of the criteria were not met, the HMS continued testing until

- Both of the criteria were met with analysis of additional acceptable spiromograms
or
- A total of eight tests had been performed or,
- The patient/subject could not or should not continue⁵.

NOTE: A respondent could give a usable, acceptable, and reproducible effort without giving a maximal effort. The HMS tried to ensure that the respondent gave a maximal effort to blow as hard as possible for as long as possible (e.g., facial expression, body language, etc.). Even if the acceptability and reproducibility criteria were met after three trials, doing 1 or 2 extra trials was strongly suggested, particularly if a respondent continues to improve after each trial. There is a learning curve in performing spirometry and respondents often get better and better after each trial.

3.6 Assessing Data Quality

A quality review of all spirometry data was performed by a spirometry expert prior to the results being returned to respondents and data being released. The review included an evaluation of all trials to determine trial acceptability and test reproducibility/quality.

3.6.1 Trial Acceptability

All trials were given an acceptability code (1= acceptable or 2=unacceptable). Only acceptable curves were used in the determination of the best test data. A trial was coded as unacceptable if any of the following were noted in the trial:

- There is a cough in the first second of the trial; or
- There is a large extrapolated volume caused by excessive hesitation; or
- If the reviewer notes that data within the trial could affect the accuracy of best test data or derived variables (e.g., trial has largest FVC but QC reviewer feels end of test is not reliable); or
- If the reviewer notes that the entire trial is of insufficient quality to be used for analysis.

3.6.2 Test Quality and Reproducibility

All acceptable trials were reviewed to determine whether the test results for FVC and FEV1 represented a maximal effort by the respondent (quality) and met the reproducibility of 150ml. The FVC quality factor (SPM_QFVC) and FEV1 quality factor (SPM_QV1) indicate whether a reproducible FVC and/or FEV1 were obtained.

A: Excellent quality and reproducibility. Use in analysis.

B: Good quality and reproducibility. Use in analysis.

Example: A common case is for children and adolescents who do not exhale for the required length of time (3 or 6 seconds). If these respondent's trials show a 1 second plateau and the reviewer judges that the curves represent a maximum volume (FVC) then a code B is assigned.

C: Questionable quality and reproducibility. Use in analysis with caution.

Example: A respondent has only 2 acceptable curves which are not reproducible and the other curves are unacceptable due to early termination and large extrapolated volumes. However, the curves with the large extrapolated volumes do confirm the FVC reproducibility.

Example: A respondent with chronic obstructive pulmonary disease (COPD) and a low FEV1/FVC (e.g., <0.45). Because of COPD, the respondent cannot provide a repeatable FVC with even 8 manoeuvres. So, the grade should be at least a C or better as the lack of an acceptable curve due to end of test failures is not a sufficient reason to exclude or grade the subject's results with a D or F.

D: Highly questionable reproducibility and quality. Do not use in analysis.

F: Unacceptable test results. Do not use in analysis.

4. Musculoskeletal fitness

4.1 Grip strength component

Muscular strength refers to the maximum force that can be generated by a specific muscle or muscle group. The most common method of measuring muscular strength in the field is isometric grip strength. Isometric grip strength is measured using a handgrip dynamometer. The protocol for the Grip Strength Component was based on the Canadian Physical Activity, Fitness and Lifestyle Approach (CPAFLA)¹ for adults 15-69 and on the 1981 Canada Fitness Survey² for 7-14 year old children.

4.1.1 Equipment

- Smedley III hand dynamometer (Takei Scientific Instruments Grip A).

4.1.2 Eligibility

- Respondents aged 6-79.

4.1.3 Exclusion criteria

- Respondents who had positive response(s) to PAR-Q questions 5, 6 and 7 (depending upon probing by the HMS). (See appendix 3)
- Respondents who had limited upper extremity function—respondent was unable to hold the dynamometer with both hands (e.g., missing fingers on both hands, paralysis of both hands), were screened out. Respondents who were able to grip the dynamometer with one hand still performed the component.

4.1.4 Administering the grip strength

1. The HMS demonstrated the correct technique, emphasizing that the respondent should not hold his/her breath while performing the test (avoid Valsalva manoeuvre). The respondent was asked to remove any hand and wrist jewellery.
2. The respondent was instructed to grasp the dynamometer in his/her right hand, with the grip between the fingers and the palm at the base of the thumb.
3. The grip size of the dynamometer was adjusted using the screw until the second joint of the fingers fit snugly under the handle and took the weight of the instrument.
4. The respondent was instructed to hold the dynamometer in line with the forearm at the thigh level, away from the body at a 45° angle. The respondent was asked to adopt a stable body position with the feet hip width apart. The respondent was instructed that neither the hand nor the dynamometer were to touch the body or any other object during the test.
5. The respondent was then asked to squeeze vigorously to exert maximum force, exhaling while squeezing to avoid build-up of intra-thoracic pressure.

6. The dynamometer was reset and the test was repeated on the left hand. Both hands were measured twice, alternating hands between trials.
7. The scores were recorded for each hand to the nearest kilogram.

4.2 Sit and reach component

The protocol for the Sit and Reach Component was based on the Canadian Physical Activity, Fitness and Lifestyle Approach (CPAFLA)¹ for adults 15-69 and on the 1981 Canada Fitness Survey² for 7-14 year old children.

4.2.1 Equipment

- Exercise mat
- Flexometer

4.2.2 Eligibility

- Respondents 6-69 years old.

4.2.3 Exclusion criteria

- Respondents who had positive response(s) to PAR-Q questions 5 and 7 (depending upon probing). (See Appendix 3)
- Pregnant women (> 12 weeks)
- Respondents 70 years of age and older
- Colostomy bag
- Lower body paralysis
- Home visit

4.2.4 Administering sit and reach

1. Respondents performed this test without shoes, after a short stretching warm up. The test was demonstrated prior to having the respondent perform it.
2. The respondent was asked to sit with legs fully extended with the soles of the feet placed flat against the flexometer. The inner edge of the soles of the feet were positioned 6 inches apart. The flexometer was secured against the wall.
3. The respondent was asked to bend and reach forward without jerking, keeping the knees fully extended, arms evenly stretched with palms down, and hands placed one on top of the other. The respondent's finger tips pushed the sliding marker along the scale. The fingertips of one hand could not extend beyond the fingertips of the other hand.
4. The position of the maximum flexion was held for approximately two seconds. Respondents were advised that lowering the head and breathing out would maximize the distance reached.

5. If the respondent's knees flexed, the trial was not counted. Bouncing or jerking motions were not allowed.
6. The test was performed twice, with a short rest between trials. The maximum distance reached at the end of each trial was recorded to the nearest 0.1cm.

4.3 Partial curl-up component

The protocol for the Partial Curl-up Component is based on the Canadian Physical Activity, Fitness and Lifestyle Approach (CPAFLA)¹.

4.3.1 Equipment

- Gym mat with 10 cm metal strap on one end
- Goniometer
- Metronome

4.3.2 Eligibility

- Respondents 6-69 years of age.

4.3.3 Exclusion criteria

- Respondents who had positive response(s) to PAR-Q questions 1, 2, 3 (automatic) and 5, 6 and 7 (depending upon probing). (See Appendix 3)
- Pregnant women (> 12 weeks)
- Respondents 70 years of age and older
- Respondents with resting heart rate > 100 bpm or blood pressure > 144/94 mmHg as determined during the blood pressure component.
- Mentally and physically disabled individuals (at the discretion of the HMS)
- Difficulty breathing at rest
- Persistent cough
- Lower extremity swelling
- Appears ill or complains of fever
- Colostomy bag
- Home visit

4.3.4 Administering partial curl-ups

1. The correct positioning of the curl-up was first demonstrated to the respondent by the HMS.
2. The respondent was asked to get into the starting position as follows:
 - a. Lie in the supine position with the head resting on the mat, shoulders relaxed, arms straight at the sides and parallel to the trunk, palms of hands in contact with the mat, and the middle finger tip of both hands touching the back edge of the metal strap when the arms are fully extended. If the respondent had one arm that was longer than the other, the back edge of the metal strap was placed at the middle finger of the longest arm.
 - b. The respondent's legs were bent, shoulder-width apart, knees at a 90 degree angle (the goniometer was used to establish the correct angle).
 - c. The respondent's heels stayed in contact with the floor. The test was performed with shoes on. In the case where the respondent did not have appropriate footwear, the test was performed in sock feet.
3. Action:
 - a. The metronome set at 50 beats per minutes. The HMS was allowed to call out "up on a beat, down on a beat" during the test if respondents had difficulty following the beat of the metronome.
 - b. The respondent was told to slowly curl up far enough so that the tip of the middle finger of both hands reached the far end of the metal strap.
 - c. It was explained to the respondent that his/her fingers must remain in contact with the metal plate and his/her heels must remain in contact with the floor. Anchoring of the feet was not permitted.
 - d. The respondent was instructed that on return, the shoulder blades and head must come in contact with the mat, and the tip of the middle finger of both hands must touch the back edge of the metal strap.
 - e. The movement was to be performed in a slow, controlled manner in order to perform the lifting and lowering stages of the curl-up at a rate of 25 per minute (up on beat, down on a beat).
 - f. The respondent was asked to perform as many consecutive curl-ups as possible, without pausing, to a maximum of 25 in the one-minute time period.
 - g. Only properly executed curl-ups were counted and feedback was provided on incorrectly executed curl-ups.
4. The test was terminated before the one minute mark if the respondent was:
 - a. experiencing undue discomfort;
 - b. unable to maintain the required cadence;

- c. unable to maintain the proper curl-up technique (e.g., heels came off the floor) over two consecutive repetitions despite corrections by the HMS.

NOTE: The same mistake had to have been made 2 times in a row for the test to be terminated. If two different mistakes were made consecutively then the test continued until two of the same mistakes were made in a row or 25 curl-ups were completed.

- 5. The number of partial curl-ups completed was recorded. Incorrect curl-ups were not recorded.

5. Modified Canadian Aerobic Fitness Test (mCAFT) component

The protocol for the modified Canadian Aerobic Fitness Test (mCAFT) Component is based on the Canadian Physical Activity, Fitness and Lifestyle Approach (CPAFLA)¹ for adults 15-69 years of age and on the 1981 Canada Fitness Survey⁶ for children aged 6-14 years of age.

5.1 Equipment

- BpTRU™ automated blood pressure cuff (including various cuff sizes)
- mCAFT step
- mCAFT CD
- CD player
- Timer or stopwatch
- Metronome (optional)
- Stethoscope (optional)
- Heart rate monitor (belt, strap, watch)
- Mercury sphygmomanometer (optional)

5.2 Eligibility

- All respondents aged 6-69

5.3 Exclusion criteria

- Positive response to PAR-Q questions 1, 2, 3 or 6 (automatic) or 4, 5 or 7 (depending upon probing). (See Appendix 3)
- Respondents taking heart rate or blood pressure altering medications
- Pregnant women (> 12 weeks)
- Respondents who are 15 years of age and older with resting heart rate > 99 bpm or resting blood pressure > 144/94 mmHg as determined during the screening component
- Mentally and physically impaired individuals, at the discretion of the HMS. Every effort should be made to be inclusive of individuals with disabilities provided that all safety precautions are taken into account
- Respondent donated blood within the last 24 hours
- Difficulty breathing at rest
- Respondents taking medication for a breathing condition that worsens during exercise, but do not have his/her medication with them (as assessed during the Screening Component)
- Appears ill or complains of fever
- Persistent cough
- Lower extremity swelling
- Insulin pump
- Supplemental oxygen
- Drank alcohol since midnight
- Consumed a large meal within 1 hour of appointment start time
- Home visit

5.4 Administering the mCAFT

1. The health measurement specialist (HMS) asked all respondents if they need to go to the washroom before they started the test.
2. The HMS explained the test and assisted the respondent in putting on the heart rate monitor. The strap was adjusted as needed to ensure a strong reading from the heart rate monitor. The HMS ensured that the room temperature was between $21^{\circ}\text{C} \pm 2^{\circ}\text{C}$.
3. The HMS demonstrated the two-step stepping pattern, first without music and then with the music set at the respondent's first stepping stage. Each respondent started stepping at a stage where the cadence intensity was 65-70% of the mean aerobic power expected of a person 10 years older than him/her. Male respondents 15-69 years old used a two-step pattern for stages 1 through 6 and a one-step pattern for stages 7 and 8. Female respondents 15-69 years old used the one-step pattern for stage 8 only. All stepping stages for respondents 6-14 years of age were done using the 2-step pattern and the music for the stages was always that of the adult female (based on the 1981 Canada Fitness Survey protocol)². The starting stage was stage 5, regardless of gender. If the respondent completed the 7th stage, the test was stopped regardless of whether the ceiling heart rate was reached. In these cases, the respondent's heart rate at the end of stage 7 was used to determine the fitness level.
4. The HMS had the respondent try the two-step stepping pattern with the music. The HMS then demonstrated the one-step stepping pattern to the respondent. If the respondent's heart rate after trying the two-step stepping pattern was under 100 bpm, the HMS had the respondent try the one-step stepping pattern. If the respondent's heart rate was above 100 bpm after trying the stepping patterns, the HMS had the respondent rest before starting the test. The respondent was reminded that each stepping stage was 3 minutes long and that when the music stopped he/she was to stop, turn to face the HMS and to stand still. The respondents were advised not to talk during the mCAFT unless it was necessary to do so.
5. The HMS began the test at the pre-calculated start stage. The HMS guided the respondent if they had difficulty keeping up with the rhythm. During the test, the HMS stood next to the respondent and monitored them for signs of discomfort. The test was stopped immediately if the respondent began to stagger, complained of dizziness, extreme leg pain, nausea, chest pain or if he/she shows facial pallor.

NOTE: If a respondent was unable to complete a stage the reason was recorded. Post-exercise heart rate and blood pressure were monitored in these cases.

Table 3 Reasons why a respondent did not complete the mCAFT test

Key	Reason	When to choose this answer
1	Refusal	Respondent refuses to participate
2	Unable to maintain proper cadence	Respondent cannot perform the test at the proper cadence
3	Dizziness	Respondent feels dizzy
4	Extreme leg pain	Respondent cannot go on or start the test due to leg pain (lactic acid build up, injury, arthritis...)
5	Nausea	Respondent feels nauseated or has an extreme headache
6	Chest pain	Respondent feels chest pain
7	Facial pallor	Respondent appears ill
8	Other – Specify	Any other reason not mentioned above. You will be prompted to explain this reason in a text box.

6. At the end of each stepping stage, the respondent stopped, turned towards the HMS and stood still. The HMS read the heart rate from the heart rate monitor when the instructor on the CD said “STOP EXERCISING”. This value was recorded into the data capture application.

NOTE: If the HMS was not able to get a reading from the heart rate monitor, they determined the heart rate manually, using the stethoscope. The HMS placed the stethoscope head near the sternum at the 2nd intercostal space. The HMS took the pulse for a 10-second timing sequence.

7. If the respondent’s heart rate was below the pre-calculated ceiling heart rate, the HMS had him/her prepare to start the next stepping stage. If the heart rate was equal to or above the pre-calculated ceiling heart rate, the stepping portion of the test was finished. If the respondent reached the pre-calculated ceiling heart rate during a stepping stage, he/she completed the full 3 minutes of the stage. As soon as the stepping portion was complete, the HMS started the stop watch and proceeded to the post-test procedures.

NOTE: If a respondent was unable to complete a stage record the reason why. Post-exercise heart rate and blood pressure were monitored in these cases.

5.5 Post-test procedures

1. Upon completion of the final stepping stage, the respondent was asked to walk around slowly for 1.5 minutes. The heart rate monitor was removed from the respondent's chest. If the respondent appeared overly fatigued or was light-headed at the end of the test, the HMS had him/her sit down and elevated the legs.
2. After 1.5 minutes, the respondent was asked to sit down.
3. The respondent's blood pressure was taken (electronically or manually) at 2:00 minutes post exercise and 3:30 minutes post exercise. These measurements were recorded.
4. If the respondent's blood pressure reading at 3:30 min was $> 144/94$ mmHg and/or the heart rate was > 99 bpm the HMS continued to measure the heart rate and blood pressure at two minute intervals until the respondent's readings had dropped below 145/95 mmHg and 100 bpm.

6. Oral Health component

A dentist's survey manual was designed to collect information needed to assess the oral health status of Canadians and was based on the World Health Organization (WHO) criteria. The survey responses were directly entered into a computer. The World Dental Federation (FDI) numbering system was used. There were 4 blocks to the dentist's survey manual; the Oral Health Component Introduction, the Oral Health Questions, the Oral Health Restriction and the Oral Health Examination. For more information, please refer to the Canadian Health Measures Survey 2007-2009, Dentist's Survey Manual and Coding Criteria⁷.

6.1 Equipment

- a plane mirror
- a graduated Williams periodontal probe
- cotton rolls and gauze

6.2 Eligibility

- All respondents aged 6-79

6.3 Exclusion criteria

The follow criteria excluded the respondent from the probing score assessment portion of the oral health examination component.

- Respondents who need to take antibiotics (for example, penicillin) before a check-up or get dental care.
- Respondents who have been diagnosed by a health professional with a heart murmur that requires them to take antibiotics for dental treatment.
- Respondents who have been diagnosed by a health professional with a heart valve problem.
- Respondents who have been diagnosed by a health professional with congenital heart disease.
- Respondents who have been diagnosed by a health professional with bacterial endocarditis?
- Respondents who have been diagnosed by a health professional with rheumatic fever?
- Respondents who have had bypass surgery in the past year.
- Respondents who have had a pacemaker or other automatic defibrillator for less than one year.
- Respondents who have other artificial material in his/ heryour heart, veins or arteries?
- Respondents who have had a joint replacement.
- Respondents who have ever received an organ transplant.
- Respondents who have kidney disease that requires dialysis.
- Respondents who are immuno-supressed or are on immuno-suppression therapy (for example, chemotherapy).
- Respondent who had haemophilia or had received chemotherapy in the past four weeks

6.4 Administering the oral health component

Oral health questions block (OHQ)

1. Next the dentist asked a series of questions pertaining to the oral health of the respondent. These questions compliment the examination block and help to build a better profile of the respondent. During this component the dental recorder entered the answers provided by the respondent into the data capture application.

Oral health restriction block (OHR)

2. Before the oral health examination block, the dentist asked specific oral health screening questions to determine whether the respondent could participate in the entire oral health component.
3. During this component the dental recorder entered the answers provided by the respondent in the data capture application.
4. If the respondent answered yes to any the restriction questions (with the exception of the question on pacemakers or other automatic defibrillators which had a second probing question) the oral health restrictions block was exited and the respondent was automatically screened out of the probing score assessment portion of the oral health examination component. Any respondent who had had haemophilia or had received chemotherapy in the past four weeks skipped this block of questions completely as he/she had been automatically screened out of probing because of these conditions.

Oral health examination block (OHE)

5. At the start of the oral health examination block, the dentist explained the process to the respondent and showed the respondent the tools that were used during the examination.
6. As the dentist progresses from question to question, the dental recorder cued the dentist on which assessment was next and, if applicable, with which tooth number the dentist should start. This was important as the flow of the tooth examinations varied from question to question and a prompt by the dental recorder helped to limit errors.
7. The oral health examination block assessed the following:
 - **Dentate status** - This section served to record the condition of the respondent's natural teeth.
 - **Prosthetic status** - This section served to record whether the respondent had any artificial teeth in either their upper or lower arch. The dentist asked if the respondent has any prosthetic appliances even if the respondent is not wearing them.
 - **Mucosal status** - This section served to record the presence or absence of any oral pathology. An oral pathology is defined as any abnormality in the oral cavity.
 - **Fluorosis** - This section served to record a fluorosis score for the anterior permanent maxillary incisors for respondents aged 6 - 12.
 - **Orthodontic status/treatment** - This section served to record the orthodontic status and treatment of respondents > 12 years of age. Respondents who are edentulous skipped this section of questions.

- **Periodontal assessments** - This portion of the examination included an assessment of gingivitis, debris, calculus, attachment loss and a probing score. The age of the respondent and the medical history already recorded (OHR block, haemophilia, chemotherapy) determined if the respondent could participate in attachment loss and periodontal probing. Respondents who were less than 15 years old or was not medically fit for attachment loss, periodontal probing or sub-gingival calculus assessment, the “Attachment loss” and “Probing score” skipped this section.
- **Tooth status** - This section served to record the status of each of the respondent’s teeth. For respondents aged 17 years or younger, the dentist did not perform a root examination. For a child with mixed dentition (having both primary and permanent teeth) the status of whichever tooth was present in the mouth was recorded. If both the primary and permanent teeth were present then the permanent tooth took precedence.
- **Amalgam count** - This section served to record the total number of tooth surfaces with amalgam (silver) fillings.
- **Traumatic injury** - This section served to record the condition of each of the four permanent upper and four permanent lower incisor teeth.
- **Treatment needs** - This section served to record the dentist’s view of the treatment needs of what the respondent needs on this day assuming there are no financial barriers. This included prosthetic needs and general treatment needs.
- **Urgent treatment needed** - Once the respondent has left the oral health room, the dentist completed the “Urgent Needs” section of the component.
- **Medical condition discovered** - If the dentist performing the examination noticed that the respondent has one of the following conditions: oral lesion, severe acute infection and/ or another serious condition requiring attention from a medical professional within a week, then it was recorded.

7. Urine Component

The purpose of the urine collection component was to obtain laboratory results for respondents ages 6-79 on a variety of measures that will be used to obtain prevalence estimates of disease, risk factors for diseases, and baseline information on health, nutritional status and environmental exposure of the population.

Approximately 70mL of urine was collected from each respondent aged 6-79 years. The Urine Collection Component could be completed at any time during the clinic visit.

7.1 Exclusion criteria

- if the respondent has a mental or physical condition that prevents him/her from providing a sample
- if there is a language barrier that prevents proper instruction of collection.

7.2 Equipment

- urine cup

7.3 Urine Collection

Table 1: Midstream urine collection instructions

1. Wash hands with soap and water.
2. Open the urine cup. Do not touch the inside of the cup or the lid.
3. Urinate a small amount of urine into the toilet and, without stopping, catch as much urine as possible in the cup. If possible, fill the cup up to the black line with urine.
4. Place the lid tightly on the container, taking care not to touch the edges of the inside of the container. Rinse and dry the container. Place the container in the brown paper bag provided.
5. Wash your hands with soap and water.
6. Return the urine cup in the brown paper bag to the CHMS staff member.

NOTE: On occasions it may have been necessary to obtain multiple urine samples to meet volume requirements. More than one urine sample was required only if the respondent's first urine sample was less than $\frac{3}{4}$ of the requested volume.

7.4 Handling urine samples

Upon receipt, urine samples were placed in the fridge with the barcode facing outward until processing. If a respondent provided more than one urine sample the sample containers were pooled upon receipt of the second sample. If time did not permit, they were kept together and labeled 1, 2 etc.

7.4.1 Urine splitting

Table 2: Urine processing protocol for regular respondents

Collection Type	Test ID #	Test Name	Age (years)	Preferred Sample Volume (mL)	Minimum Sample Volume (mL)	Specimen Tube Capacity (mL)	Specimen Tube Type	Cap Colour
Urine Cup	701	Microalbumin/ Creatinine	6-79	2.0	0.5	2.0	VWR Cryogenic	Blue
	751	Cotinine	6-79	4.5	0.5	5.0	VWR Cryogenic	Red
	752	Phthalates	6-49 (3500)	15.0	12.0	30.0	Nalgene	Clear
	753	Inorganic Mercury	6-79	4.5	1.6	5.0	VWR Cryogenic	Clear
	754	Bisphenol A	6-79 (5000)	(see note)	20.0	30.0	Nalgene	Clear
	702	Iodine	6-79	4.0	2.0	5.0	VWR Cryogenic	Green
	755	Organophosphate Pesticides	6-79 (5000)	(see note)	With test 754	30.0	Nalgene	Clear
	756	Phenoxy herbicide	6-79 (5000)	(see note)	With test 754	30.0	Nalgene	Clear
	971	Stored Urine 1	6-79	4.5	NA	5.0	VWR Cryogenic	Yellow
	972	Stored Urine 2	6-79	4.5	NA	5.0	VWR Cryogenic	Yellow

Note: Test numbers 754, 755, and 756 are all analyzed from the same 30ml bottle.

7.5 Specimen storage

Specimens were stored in the mobile clinic lab in the refrigerator and were shipped once a week to the reference labs. All specimens were to be stored as soon as processing was complete.

For more information regarding the laboratory standard operating procedures (SOP) please contact the Canadian Health Measures Survey at 1-888-253-1087 or chms-ecms@statcan.gc.ca.

8. Phlebotomy Component

During the Phlebotomy Component the phlebotomist collected blood samples in order to measure nutritional status, metabolic syndrome, cardiovascular disease and infectious disease markers.

8.1 Exclusion Criteria

- Chemotherapy within the past 4 weeks
- Haemophilia
- Double mastectomy
- Rashes, gauze dressings, casts, edema, paralysis, tubes, open sores or wounds, withered arms or limbs missing, damaged, sclerosed or occluded veins, allergies to cleansing reagents, burned or scarred tissue, shunt or IV on both arms.

8.2 Equipment

Table 1: Equipment and supplies that may be used for the venipuncture procedure

• Vacutainer 8.5mL Red/Grey SST	• Bandages/Non allergenic tape
• Vacutainer 2.0mL Light Grey	• CaviWipes
• Vacutainer 6.0mL Lavender EDTA	• Tourniquet
• Vacutainer 10mL Lavender EDTA	• Alcohol swabs
• Vacutainer 5.0mL Gold SST	• Gauze
• Vacutainer 1.8mL Light Blue	• Sharps bin
• Vacutainer 3.0mL Red	• Gloves- non sterile, latex free S M L, XL, XS
• 21 Gauge Needles	• Antibacterial hand sanitizer
• 22 Gauge Needles	• Virkon/ Haztab
• 21 Gauge Butterfly Needles	• Blood drop stamp
• 23 Gauge Butterfly Needles	• Vacutainer Tube Mixer
• 25 Gauge Butterfly Needles	

8.3 Performing the Venipuncture Procedure

8.3.1 Selecting the Appropriate Vein

Whenever possible, a vein on the left arm was looked for first.

The median cubital and cephalic veins were the most common veins to use for the venipuncture procedure. If there were no suitable veins in this area, on either arm, the phlebotomist looked at the back of the hands of the respondent. These veins were used as a last resort and a butterfly needle was always used for this procedure.

8.3.2 Preparing for the blood draw

1. The phlebotomist determined the appropriate needle size.
2. The site was cleaned with an alcohol wipe in a circular motion beginning with the centre of the site and moving outwards.
3. All the required supplies for the venipuncture were prepared. All the tubes required were placed in the proper order (see tables 2a and 2b).
4. The phlebotomist reapplied the tourniquet when they were ready to perform the procedure. They had the respondent make a fist and hold it. They instructed the respondent not to pump his/her fist as this can affect certain test results.

Table 2a: Order of draw for FASTED survey respondents (minimum 10 hours)

Tube Order	Tube Type	Size	Age in Years			
			6-11	12-13	14-19	20-79
01	Red/Grey SST	8.5mL	Y	Y	Y	Y
02	Light Grey	2.0mL	Y	Y	Y	Y
03	Lavender EDTA	6.0mL	Y	Y	Y	Y
04	Lavender EDTA	6.0mL	Y	Y	Y	Y
05	Red/Grey SST	8.5mL			Y	Y
06	Lavender EDTA	10mL				Y
07	Light Blue	1.8mL		Y	Y	Y
08	Gold SST	5.0mL	Y	Y	Y	Y
09	Lavender EDTA	10mL				Y
10	Lavender EDTA	10mL				Y
11	Red/Grey SST	8.5mL		Y	Y	Y

Table 2b: Order of draw for NON-FASTED survey respondents

Tube Order	Tube Type	Size	Age in Years			
			6-11	12-13	14-19	20-79
01	Red/Grey SST	8.5mL	Y	Y	Y	Y
02	Lavender EDTA	6.0mL	Y	Y	Y	Y
03	Lavender EDTA	6.0mL	Y	Y	Y	Y
04	Red-Grey SST	8.5mL			Y	Y
05	Light Grey	2.0mL	Y	Y	Y	Y
06	Lavender EDTA	10mL				Y
07	Light Blue	1.8mL		Y	Y	Y
08	Gold SST	5.0mL	Y	Y	Y	Y
09	Lavender EDTA	10mL				Y
10	Lavender EDTA	10mL				Y
11	Red/Grey SST	8.5mL		Y	Y	Y

8.4 Handling blood samples

Blood samples were brought into the lab by the phlebotomist as soon as possible after collection.

Table 3: Specimen Handling Steps Prior to Processing

Time	Tube Type (tube order)	Handling
During first 15 minutes post collection	6.0mL EDTA lavender (03 or 02)* 6.0mL EDTA lavender (04 or 03)* 2.0mL light grey (02 or 05)* 10.0mL EDTA lavender (06) 1.8mL light blue (07) 10.0mL EDTA lavender (09 and 10)	<ul style="list-style-type: none"> Place on mixer
	8.5mL red/grey (01) 8.5mL red/grey (05 or 04)* 5.0mL gold SST (08) 8.5mL red/grey (11) 3.0mL red (99)	<ul style="list-style-type: none"> Leave in collection rack at room temperature
After first 15 minutes	8.5mL red/grey (01) 8.5mL red/grey (05 or 04)* 5.0mL gold SST (08) 8.5mL red/grey (11)	<ul style="list-style-type: none"> Set the timer for 15 min Leave tubes in rack at room temperature to allow them to clot
	10.0mL EDTA lavender (09 and 10)	<ul style="list-style-type: none"> Parafilm tops and place in fridge in designated DNA rack
	6.0mL EDTA lavender (03 or 02) 3.0mL red top (99)	<ul style="list-style-type: none"> Aliquot 1.5mL into 3.0mL red top Put 6.0mL tube into rack in fridge
	6.0mL EDTA lavender (04 or 03)* 2.0mL light grey (02 or 05) 10.0mL EDTA lavender (06) 1.8mL light blue (07)	<ul style="list-style-type: none"> Place in fridge together in a rack
After second 15 minutes	6.0mL EDTA lavender (03 or 04)* 2.0mL light grey (02 or 05)* 10.0mL EDTA lavender (06) 1.8mL light blue (07) 8.5mL red/grey (01) 8.5mL red/grey (05 or 04)* 5.0mL gold SST (08) 8.5mL red/grey (11)	<ul style="list-style-type: none"> Centrifuge at: 17°C for 15 mins at 1300 RCF
After centrifugation	6.0mL lavender (03 or 02)* 3.0mL red (99) 8.5mL red/grey (01) 8.5mL red/grey (05 or 04)* 5.0mL gold SST (08) 8.5mL red/grey (11) 2.0mL light grey (02 or 05)* 6.0mL lavender (04 or 03)* 10.0mL EDTA lavender (06) 1.8mL light blue (07)	<ul style="list-style-type: none"> Group samples in order used for aliquotting Aliquot immediately or place rack in fridge (see note)

Note: *For the tube order, the first number is for fasted respondents, the second is for non-fasted respondents.

All samples were centrifuged within two hours and aliquotted within four hours of the blood draw. Test 132 (homocysteine) was aliquotted within 1.5 hours.

8.4.1 Serum handling

There were a maximum of four serum collection tubes that could be drawn depending on the age and test eligibility of the respondent. Serum from the SST tubes (red/grey and gold) was first pooled into the pre-labeled 30ml Nalgene bottle prior to being aliquotted into individual specimen tubes.

The phlebotomist was given the following instructions when performing serum handling:

1. After centrifugation, inspect all tubes for fibrin strands that may be left in the serum. If strands of fibrin are visible, remove them from the sample with an applicator stick and dispose of the stick in the biohazard waste. Also ensure that the gel has indeed separated the cells and serum as it should.
2. Repeat the above step for each serum collection tube (all red/grey and gold top collection tubes)
3. Pour off serum from each serum collection tube into the pooled serum bottle. The separation gel will prevent any red cells from decanting. Remove as much serum as possible from each collection tube.

Note: Avoid pooling serum that is moderately or grossly hemolyzed. Keep these tubes separate and use them for measures such as hepatitis and lipid profile where hemolysis is not an issue. Serum which is slightly hemolyzed would be acceptable to add to the pooled serum bottle.

4. Screw the lid tightly on the pooled serum bottle and mix the serum by briskly swirling or inverting the bottle 2-3 times.
5. Record whether there is any problem with the specimen that has been transferred to the pooled serum bottle. Removed text
6. Set the bottle aside until ready to separate into specimen tubes.

8.5 Specimen processing

Samples were processed as soon as possible to keep sample integrity at its highest.

8.5.1 Whole blood splitting

Table 4: Whole blood processing protocol for regular respondents

Collection Type	Test ID #	Test Name	Age (Years)	Preferred Sample Volume (mL)	Minimum Sample Volume (mL)	Specimen Tube Capacity (mL)	Specimen Tube Type	Cap Colour
6.0mL EDTA	111	Glycosylated Hemoglobin	6-79	1.5	1.0	2.0	Nalgene	Clear
	112	RBC Folate	6-79	0.2	0.1	2.0	VWR Cryogenic	Orange
	511	Metal Screen 1	6-79	1.8	0.8	2.0	Nalgene	Clear
	OR 512	Metal Screen 2	6-79	1.8	1.3	2.0	Nalgene	Clear
*10mL EDTA	09	DNA	20+	10.0	NA	10.0	Collection Tube	Lavender
*10mL EDTA	10	DNA	20+	10.0	NA	10.0	Collection Tube	Lavender

*Note: 10 ml EDTA tubes are not aliquotted

8.5.2 Plasma splitting

Table 5: Plasma processing protocol for regular respondents

Collection Type	Test ID #	Test Name	Age (Years)	Preferred Sample Volume (mL)	Minimum Sample Volume (mL)	Specimen Tube Capacity (mL)	Specimen Tube Type	Cap Colour
2.0mL Light Grey	131	Glucose	6-79	1.0	0.3	2.0	VWR Cryogenic	Blue
6.0mL Lavender	132	Homocysteine*	6-79	1.0	0.4	2.0	VWR Cryogenic	Orange
	133	Vitamin D	6-79	1.0	0.5	2.0	VWR Cryogenic	Green
	931	Stored Plasma 1	6-79	0.5	N/A	0.5	VWR SuperClear	Purple/White
10.0mL Lavender**	531	PBDE + Organochlorine Pesticides + Non-Coplanar PCBs	20-79 (fasting) (2500)	2.7	2.2	7.0	Supelco glass vial	Black
	532	Perfluorinated Compounds	20-79	1.8	1.2	2.0	VWR Cryogenic	Red
1.8mL Light Blue	134	Fibrinogen	12-79	0.5	0.2	2.0	VWR Cryogenic	Tan

* Homocysteine sample was aliquotted within 1.5 hrs of collection and put in the in the freezer immediately.

** Test 531 and 532 are sub-samples so not all respondents were eligible for these tests.

8.5.3 Pooled serum splitting

Table 6: Serum processing protocol for regular respondents

Collection Type	Test ID #	Test Name	Age (Years)	Preferred Sample Volume (mL)	Minimum Sample Volume (mL)	Specimen Tube Capacity (mL)	Specimen Tube Type (Size)	Cap Colour
Pooled Serum from SST Tubes (30ml bottle)	151	Lipid Profile	6-79 (fasting)	1.0	0.5	2.0	VWR Cryogenic	Pink
	152	Insulin	6-79 (fasting)	0.5	0.3	2.0	VWR Cryogenic	Orange
	153	Chemistry Panel	6-79	1.0	0.5	2.0	VWR Cryogenic	Blue
	154	C-Reactive Protein	6-79	0.5	0.2	2.0	VWR Cryogenic	Blue
	155	Vitamin B12	6-79	0.7	0.4	2.0	VWR Cryogenic	Orange
	351	Hepatitis Panel 1	14-79	1.0	0.5	3.0	Fisherbrand	Clear red O-ring
	OR							
	352	Hepatitis Panel 2	14-79	2.0	0.5	3.0	Fisherbrand	Clear red O-ring
	951	Stored Serum 1	6-79	0.5	NA	0.5	VWR SuperClear	Purple Yellow
	952	Stored Serum 2	6-79	0.5	NA	0.5	VWR SuperClear	Purple Yellow
	953	Stored Serum 3	6-79	0.5	NA	0.5	VWR SuperClear	Purple Yellow
	954	Stored Serum 4	6-79	0.5	NA	0.5	VWR SuperClear	Purple Yellow
	955	Stored Serum 5	12-79	0.5	NA	0.5	VWR SuperClear	Purple Yellow
	956	Stored Serum 6	12-79	0.5	NA	0.5	VWR SuperClear	Purple Yellow
	957	Stored Serum 7	12-79	1.0	NA	2.0	VWR Cryogenic	Yellow
	958	Stored Serum 8	12-79	1.0	NA	2.0	VWR Cryogenic	Yellow
	959	Stored Serum 9	12-79	1.0	NA	2.0	VWR Cryogenic	Yellow

8.6 Specimen storage

Specimens will be stored in the mobile clinic lab in either the refrigerator or the freezer, depending on the test, and will be shipped once a week (twice a week for DNA) to the reference labs. All specimens are to be stored as soon as processing is complete.

For more information regarding the laboratory standard operating procedures (SOP) please contact the Canadian Health Measures Survey at 1-888-253-1087 or chms-ecms@statcan.gc.ca.

9. Activity monitor component

Activity monitors, also known as accelerometers, are battery operated pager-sized, electronic devices that are worn on a belt around the waist. These devices record a movement count each minute proportional to the average intensity of motion (i.e., acceleration) over that minute.

9.1 Equipment

- Actical Activity monitor
- Disposable, adjustable belt

9.2 Eligibility

- Respondents aged 6-79

9.3 Exclusion criteria

- Persons in a wheelchair

9.4 Administering the activity monitor

1. Respondents who agreed to take part in the activity monitor component were given an activity monitor and an appropriately sized disposable, adjustable belt. If a respondent was not willing to wear an activity monitor, the reason for the refusal was recorded.
2. The health measurement specialist (HMS) showed the respondent how to put the belt on. The activity monitor was then placed securely on the belt. The belt was adjusted so that the activity monitor was positioned over the right hip, with the arrow pointing up. The activity monitor could be worn over or under clothing.
3. The HMS explained that the activity monitor should be put on when the respondent gets up from bed each day and should be worn until the respondent is ready to fall asleep. If the respondent reads or does any other activity before falling asleep, they were to keep wearing the activity monitor. The respondent was instructed to wear the activity monitor for 7 days.

10. References - Canadian Health Measure Survey cycle 1 protocols

1. Canadian Society for Exercise Physiology. 2003. *Canadian Physical Activity, Fitness and Lifestyle Approach (CPAFLA)*. 3rd edition. Ottawa.
2. Ross, W. D. & M.J. Marfell-Jones. 1991. "Kinanthropometry" in *Physiological Testing of the High-Performance Athlete*. 2nd edition. J. D. MacDougall, H. A. Wenger, & H. J. Green, eds., Human Kinetics Books, Champaign, Illinois, pp. 223-308.
3. Fitness Canada. 1986. *Canadian Standard Test of Fitness (CSTF) Operations Manual*. 3rd edition. Ottawa.
4. Statistics Canada. No date. Canadian Health Measures Survey Clinic Questionnaire. 92 p. http://stdsimdb/cgi-bin/imdb_reports/p2SV.pl?Function=getInstrumentLink&SurvId=25644&SurvVer=1&InstaId=25905&InstaVer=1&lang=en&db=imdb&adm=8&dis=1
5. Miller M.R., J. Hankinson, V. Brusasco *et al.* 2005. "Standardization of spirometry." *Eur Respir.* Vol. 26 p. 319-338.
6. Stephens, T. & C.L. Craig. 1985. *Fitness and activity measurement in the 1981 Canada Fitness Survey*. In: Drury, T. (ed.). 1989. *Assessing physical fitness and activity patterns in general population surveys*. Department of Health and Human Services, Public Health Service, Center for Disease Control, National Center for Health Statistics. Hyattsville, MD. pub. No. (PHS) 89-1253.
7. For a copy of the "Canadian Health Measures Survey 2006-2008, Dentist's Survey Manual and Coding Criteria" please contact the Canadian Health Measures Survey at 1-888-253-1087 or chms-ecms@statcan.gc.ca.
8. Campbell, Norm R.C., Joffre Michel R., McKayDonald W. 2005. "Hypertension Surveillance in Canada: Minimum Standards for Assessing Blood Pressure in Surveys." *Canadian Journal of Public Health* Vol 96, number 3. p. 217 - 220.

Appendix 5 Derived variable documentation

For more information on the derived variable documentation for Wave 1, 2, 3, 4 and supplementary data releases please see:

http://stdsimdb/cgi-bin/imdb_reports/p2SV.pl?Function=getSurvey&SDDS=5071&lang=en&db=imdb&adm=8&dis=1

Appendix 6 Questionnaires

For more information on the household or clinic questionnaires please see:

http://stdsimdb/cgi-bin/imdb_reports/p2SV.pl?Function=getInstrumentLink&SurvId=25644&SurvVer=1&InstaId=25905&InstaVer=1&lang=en&db=imdb&adm=8&dis=1

Appendix 7 Record layouts

7a Master file

Position	Variable name	Format
1	CLINICID	8
9	SITE	2
11	SITESTRT	8
19	SITEEND	8
27	DHH_PRN	2
29	DHH_OWN	1
30	DHH_MTG	1
31	DHH_BED	2
33	DHH_YOB	4
37	DHH_MOB	2
39	DHH_DOB	2
41	DHH_AGE	3
44	DHH_SEX	1
45	DHH_MS	2
47	DHH_ED1	1
48	DHH_ED2	1
49	DHH_ED3	1
50	DHH_ED4	2
52	DHHDDWE	2
54	DHHDHSZ	2
56	DHHDECF	2
58	DHHDLVG	2
60	DHHDLE5	2
62	DHHD611	2
64	DHHDL12	2
66	DHHDYKD	2
68	DHHDOKD	2
70	EDUDR04	1
71	EDUDR10	2
73	EDUDH04	1
74	EDUDH10	2
76	PROXY	1
77	PPI_02	1
78	PPI_03	1
79	GEN_11	1
80	GEN_12	1
81	GEN_13	1
82	GEN_14	1

Position	Variable name	Format
83	GEN_15	1
84	GEN_16	1
85	GEN_17	1
86	GEN_18	1
87	GEN_19	1
88	GEN_20	1
89	GENDHDI	1
90	GENDMHI	1
91	PRS_11	1
92	SLP_11	4.1
96	SLP_12	1
97	SLP_13	1
98	SLP_14	1
99	SLP_15	1
100	SLP_16	1
101	SLP_17	1
102	HWT_2	2
104	HWT_2A	2
106	HWT_2B	2
108	HWT_2C	2
110	HWT_2D	2
112	HWT_2E	2
114	HWT_2F	2
116	HWT_2G	2
118	HWTDCM	3
121	HWTDIN	2
123	HWT_3	3
126	HWT_3N	1
127	HWTDKG	3
130	HWTDLB	3
133	HWT_4	1
134	HWTDHTM	4.2
138	HWTDBMI	5.2
143	HWTDBMIA	2
145	HWTDBMIK	1
146	HWTDCOL	1
147	WTC_11	3
150	WTC_11N	1
151	WTCD11KG	3
154	WTCD11LB	3
157	WTC_12	1

Position	Variable name	Format
158	WTC_21	3
161	WTC_21N	1
162	WTCD21KG	3
165	WTCD21LB	3
168	WTC_22	3
171	WTC_22N	1
172	WTCD22KG	3
175	WTCD22LB	3
178	WTC_23	3
181	WTC_23N	1
182	WTCD23KG	3
185	WTCD23LB	3
188	WTC_24	2
190	WTC_25	3
193	WTC_25N	1
194	WTCD25KG	3
197	WTCD25LB	3
200	WTC_26	2
202	WTC_27	1
203	WTC_28	3
206	MFC_11	3
209	MFC_11N	1
210	MFCD11Y	4
214	MFC_12	3
217	MFC_12N	1
218	MFCD12Y	4
222	MFC_13	3
225	MFC_13N	1
226	MFCD13Y	4
230	MFC_14	3
233	MFC_14N	1
234	MFCD14Y	4
238	MFC_15	3
241	MFC_15N	1
242	MFCD15Y	4
246	MFC_16	3
249	MFC_16N	1
250	MFCD16Y	4
254	MFC_17	3
257	MFC_17N	1
258	MFCD17Y	4
262	MFC_18	3

Position	Variable name	Format
265	MFC_18N	1
266	MFCD18Y	4
270	MFC_19	3
273	MFC_19N	1
274	MFCD19Y	4
278	MFC_20	3
281	MFC_20N	1
282	MFCD20Y	4
286	MFC_21	3
289	MFC_21N	1
290	MFCD21Y	4
294	MDC_11	3
297	MDC_11N	1
298	MDCD11Y	4
302	MDC_12A	1
303	MDC_12B	1
304	MDC_12C	1
305	MDC_12D	1
306	MDC_12E	1
307	MDC_12F	1
308	MDC_12G	1
309	MDC_12H	1
310	MDC_12I	1
311	MDC_13	3
314	MDC_13N	1
315	MDCD13Y	4
319	MDC_14	3
322	MDC_14N	1
323	MDCD14Y	4
327	MDC_15	3
330	MDC_15N	1
331	MDCD15Y	4
335	GFV_11	3
338	GFV_11N	1
339	GFVD11Y	4
343	GFV_12	3
346	GFV_12N	1
347	GFVD12Y	4
351	GFV_13	3
354	GFV_13N	1
355	GFVD13Y	4

Position	Variable name	Format
359	GFV_14	3
362	GFV_14N	1
363	GFVD14Y	4
367	GFV_15	3
370	GFV_15N	1
371	GFVD15Y	4
375	GFV_16	3
378	GFV_16N	1
379	GFVD16Y	4
383	GFV_17	3
386	GFV_17N	1
387	GFVD17Y	4
391	GFV_18	3
394	GFV_18N	1
395	GFVD18Y	4
399	GFV_19	3
402	GFV_19N	1
403	GFVD19Y	4
407	GFV_20	3
410	GFV_20N	1
411	GFVD20Y	4
415	GFV_21	3
418	GFV_21N	1
419	GFVD21Y	4
423	GFV_22	3
426	GFV_22N	1
427	GFVD22Y	4
431	GFV_23	3
434	GFV_23N	1
435	GFVD23Y	4
439	DFC_11	3
442	DFC_11N	1
443	DFCD11Y	4
447	DFC_12	3
450	DFC_12N	1
451	DFCD12Y	4
455	WSD_11	3
458	WSD_11N	1
459	WSDD11Y	4
463	WSD_12	3
466	WSD_12N	1
467	WSDD12Y	4

Position	Variable name	Format
471	WSD_13	3
474	WSD_13N	1
475	WSDD13Y	4
479	WSD_14	3
482	WSD_14N	1
483	WSDD14Y	4
487	WSD_15	3
490	WSD_15N	1
491	WSDD15Y	4
495	WSD_16	3
498	WSD_16N	1
499	WSDD16Y	4
503	WSD_21	3
506	WSD_21N	1
507	WSDD21Y	4
511	WSD_22	1
512	WSD_23	1
513	WSD_24A	1
514	WSD_24B	1
515	WSD_24C	1
516	WSD_24D	1
517	WSD_24E	1
518	WSD_24F	1
519	SLT_11	1
520	SLT_12	1
521	SLT_13	1
522	PAC_11A	1
523	PAC_11B	1
524	PAC_11C	1
525	PAC_11D	1
526	PAC_11E	1
527	PAC_11F	1
528	PAC_11G	1
529	PAC_11H	1
530	PAC_11I	1
531	PAC_11J	1
532	PAC_11K	1
533	PAC_11L	1
534	PAC_11M	1
535	PAC_11N	1
536	PAC_11O	1

Position	Variable name	Format
537	PAC_11P	1
538	PAC_11Q	1
539	PAC_11R	1
540	PAC_11S	1
541	PAC_11T	1
542	PAC_11U	1
543	PAC_11V	1
544	PAC_11W	1
545	PAC_11X	1
546	PAC_11Y	1
547	PAC_12A	3
550	PAC_13A	1
551	PAC_12B	2
553	PAC_13B	1
554	PAC_12C	2
556	PAC_13C	1
557	PAC_12D	3
560	PAC_13D	1
561	PAC_12E	2
563	PAC_13E	1
564	PAC_12F	2
566	PAC_13F	1
567	PAC_12G	2
569	PAC_13G	1
570	PAC_12H	2
572	PAC_13H	1
573	PAC_12I	2
575	PAC_13I	1
576	PAC_12J	2
578	PAC_13J	1
579	PAC_12K	2
581	PAC_13K	1
582	PAC_12L	2
584	PAC_13L	1
585	PAC_12M	2
587	PAC_13M	1
588	PAC_12N	2
590	PAC_13N	1
591	PAC_12O	2
593	PAC_13O	1
594	PAC_12P	2
596	PAC_13P	1

Position	Variable name	Format
597	PAC_12Q	2
599	PAC_13Q	1
600	PAC_12R	2
602	PAC_13R	1
603	PAC_12S	2
605	PAC_13S	1
606	PAC_12T	2
608	PAC_13T	1
609	PAC_12U	2
611	PAC_13U	1
612	PAC_12V	3
615	PAC_13V	1
616	PAC_12X	3
619	PAC_13X	1
620	PAC_12Y	3
623	PAC_13Y	1
624	PAC_21	2
626	PAC_22	2
628	PAC_23	1
629	PACFD	1
630	PACFLEI	1
631	PACDFR	1
632	PACDFM	3
635	PACDEE	4.1
639	PACDPAI	1
640	CPA_11	1
641	CPA_12	1
642	CPA_13	1
643	CPA_14	1
644	CPA_15	1
645	CPA_16	1
646	CPA_17	2
648	CPA_18	2
650	CPADSAC	3
653	CPADTOT	3
656	SAC_11	2
658	SAC_12	2
660	SAC_13	2
662	SAC_14	2
664	SACDTOT	2
666	SEB_12	2

Position	Variable name	Format
668	SEB_13	1
669	OHM_11	1
670	OHM_12	1
671	OHM_21	1
672	OHM_22	1
673	OHM_23	1
674	OHM_24	1
675	OHM_25	4.1
679	OHM_31	3
682	OHM_31N	1
683	OHMD31Y	4
687	OHM_32	3
690	OHM_32N	2
692	OHMD32Y	4
696	OHM_33	1
697	OHM_34	2
699	OHM_41	1
700	OHM_42	1
701	OHM_43	1
702	OHM_44A	1
703	OHM_44B	1
704	OHM_44C	1
705	OHM_44D	1
706	OHM_44E	1
707	CCC_11	1
708	CCC_12	2
710	CCC_13	1
711	CCC_21	1
712	CCC_22	1
713	CCC_23	1
714	CCC_24	1
715	CCC_31	1
716	CCC_32	1
717	CCC_33	1
718	CCC_34	1
719	CCC_41	1
720	CCC_42	2
722	CCC_43	1
723	CCC_44	2
725	CCC_45	1
726	CCC_46	2
728	CCC_51	1

Position	Variable name	Format
729	CCC_52A	1
730	CCC_52B	1
731	CCC_52C	1
732	CCC_53	2
734	CCC_61	1
735	CCC_62	2
737	CCC_63	1
738	CCC_71	1
739	CCC_72	1
740	CCC_73	2
742	CCC_74A	1
743	CCC_74B	1
744	CCC_74C	1
745	CCC_74D	1
746	CCC_74E	1
747	CCC_75A	1
748	CCC_75B	1
749	CCC_75C	1
750	CCC_75D	1
751	CCC_75E	1
752	CCC_81	1
753	CCC_82	1
754	CCC_83	1
755	CCC_84	1
756	CCC_85A	1
757	CCC_85B	1
758	CCC_85C	1
759	CCC_85D	1
760	CCC_91	1
761	CCC_92	1
762	CCC_93	1
763	CCC_94A	1
764	CCC_94B	1
765	CCC_94C	1
766	CCC_94D	1
767	CCC_94E	1
768	CCC_94F	1
769	CCC_94G	1
770	CCC_95	1
771	CCC_96A	1
772	CCC_96B	1

Position	Variable name	Format
773	CCC_96C	1
774	CCC_101	1
775	CCCF1	1
776	PLM_11	1
777	PLM_12	1
778	FMH_11	1
779	FMH_12	3
782	FMH_13	1
783	FMH_14	3
786	FMH_15	1
787	FMH_16	3
790	FMH_17	1
791	FMH_18	3
794	FMH_19	1
795	FMH_21	1
796	FMH_22	3
799	FMH_23	1
800	FMH_24	1
801	HEP_11	1
802	HEP_12	1
803	HEP_13	1
804	HUI_01	1
805	HUI_02	1
806	HUI_03	1
807	HUI_04	1
808	HUI_05	1
809	HUI_06	1
810	HUI_07	1
811	HUI_07A	1
812	HUI_08	1
813	HUI_09	1
814	HUI_10	1
815	HUI_11	1
816	HUI_12	1
817	HUI_13	1
818	HUI_14	1
819	HUI_15	1
820	HUI_16	1
821	HUI_17	1
822	HUI_18	1
823	HUI_19	1
824	HUI_20	1

Position	Variable name	Format
825	HUI_21	1
826	HUI_22	1
827	HUI_23	1
828	HUI_24	1
829	HUI_25	1
830	HUI_26	1
831	HUI_27	1
832	HUI_28	1
833	HUI_29	1
834	HUI_30	1
835	HUIDCOG	2
837	HUIDDEX	2
839	HUIDEMO	1
840	HUIDHER	2
842	HUIDMOB	2
844	HUIDPAD	1
845	HUIDSPE	1
846	HUIDVIS	2
848	HUIDHSI	5.3
853	HUIDHSC	1
854	SMK_11	1
855	SMK_12	1
856	SMK_21	2
858	SMK_22	2
860	SMK_23	2
862	SMK_24	2
864	SMK_31	2
866	SMK_41	2
868	SMK_42	2
870	SMK_51	1
871	SMK_52	2
873	SMK_53	2
875	SMK_54	2
877	SMK_60	1
878	SMK_TAR	5.2
883	SMK_DISC	2
885	SMKDSTY	2
887	SMKDSTP	3
890	SMKDYFS	3
893	ALC_11	1
894	ALC_12	2

Position	Variable name	Format
896	ALC_13	2
898	ALC_14	1
899	ALC_15A	2
901	ALC_15B	2
903	ALC_15C	2
905	ALC_15D	2
907	ALC_15E	2
909	ALC_15F	2
911	ALC_15G	2
913	ALC_16	1
914	ALC_17	1
915	ALC_18	1
916	ALC_19	2
918	ALCDTYP	1
919	ALCDWKY	3
922	ALCDDLX	3
925	IDU_11	1
926	IDU_12	1
927	IDU_13	1
928	IDU_14	1
929	IDU_15	1
930	IDU_16	1
931	SXB_11	1
932	SXB_12	1
933	SXB_13	1
934	SXB_21	1
935	SXB_22A	1
936	SXB_22B	1
937	SXB_22C	1
938	SXB_22D	1
939	SXB_22E	1
940	SXB_22F	1
941	SXB_22G	1
942	SXB_22H	1
943	SXB_22I	1
944	SXB_22J	1
945	SXB_23	1
946	SXB_24	1
947	MBF_11	1
948	MBF_12	2
950	MBF_21A	1
951	MBF_21B	2

Position	Variable name	Format
953	MBF_22A	1
954	MBF_22B	2
956	MBF_23A	1
957	MBF_23B	2
959	MBF_24A	1
960	MBF_24B	2
962	MBF_25A	1
963	MBF_25B	2
965	MBF_26A	1
966	MBF_26B	2
968	MBF_27A	1
969	MBF_27B	2
971	MBF_28A	1
972	MBF_28B	2
974	MBF_29A	1
975	MBF_29B	2
977	MBF_30A	1
978	MBF_30B	2
980	MBF_31A	1
981	MBF_31B	2
983	MBF_32A	1
984	MBF_32B	2
986	MBF_33A	1
987	MBF_33B	2
989	MBF_34A	1
990	MBF_34B	2
992	MBF_35A	1
993	MBF_35B	2
995	PRG_11	1
996	PRG_12	2
998	PRG_13A	1
999	PRG_13B	1
1000	PRG_13C	1
1001	PRG_13D	1
1002	BIR_11	1
1003	BIR_12	2
1005	BIR_13	2
1007	BIR_14	4
1011	BIR_21	1
1012	BIR_22	3
1015	BIR_23	1

Position	Variable name	Format
1016	BIR_24	1
1017	BIR_25	3
1020	BIR_26	2
1022	BRI_11	1
1023	BRI_12	2
1025	BRI_13	2
1027	BRIFEB6	1
1028	SDQ_11	1
1029	SDQ_12	1
1030	SDQ_13	1
1031	SDQ_14	1
1032	SDQ_15	1
1033	SDQ_16	1
1034	SDQ_17	1
1035	SDQ_18	1
1036	SDQ_19	1
1037	SDQ_20	1
1038	SDQ_21	1
1039	SDQ_22	1
1040	SDQ_23	1
1041	SDQ_24	1
1042	SDQ_25	1
1043	SDQ_26	1
1044	SDQ_27	1
1045	SDQ_28	1
1046	SDQ_29	1
1047	SDQ_30	1
1048	SDQ_31	1
1049	SDQ_32	1
1050	SDQ_33	1
1051	SDQ_34	1
1052	SDQ_35	1
1053	SDQDCON	2
1055	SDQDEMO	2
1057	SDQDHYP	2
1059	SDQDPRO	2
1061	SDQDPRP	2
1063	SDQDTOT	2
1065	SDQGCON	1
1066	SDQGEMO	1
1067	SDQGHYP	1
1068	SDQGPRO	1

Position	Variable name	Format
1069	SDQGPRP	1
1070	SDQGTOT	1
1071	ETS_11	1
1072	ETS_12	2
1074	ETS_13	1
1075	ETS_14	1
1076	ETS_15	1
1077	ETS_16	1
1078	ETS_17	1
1079	HSC_11	2
1081	HSC_12	2
1083	HSC_13A	1
1084	HSC_13B	1
1085	HSC_13C	1
1086	HSC_13D	1
1087	HSC_13E	1
1088	HSC_13F	1
1089	HSC_13G	1
1090	HSC_31	1
1091	HSC_33A	1
1092	HSC_33B	1
1093	HSC_33C	1
1094	HSC_33D	1
1095	HSC_33E	1
1096	HSC_33F	1
1097	HSC_33G	1
1098	HSC_33H	1
1099	HSC_33I	1
1100	HSC_34	2
1102	HSC_35	2
1104	HSC_36	2
1106	HSC_37	1
1107	HSC_41	1
1108	HSC_42	2
1110	HSC_43	2
1112	HSC_44	2
1114	HOB_11A	1
1115	HOB_11B	1
1116	HOB_11C	1
1117	HOB_11D	1
1118	HOB_11E	1

Position	Variable name	Format
1119	HOB_11F	1
1120	HOB_11G	1
1121	HOB_11H	1
1122	HOB_11I	1
1123	HOB_11J	1
1124	HOB_11K	1
1125	HOB_12	3
1128	HOB_12N	1
1129	HOBD12Y	4
1133	HOB_12T	1
1134	HOB_13	3
1137	HOB_13N	1
1138	HOBD13Y	4
1142	HOB_13T	1
1143	HOB_14	3
1146	HOB_14N	1
1147	HOBD14Y	4
1151	HOB_14T	1
1152	HOB_15	3
1155	HOB_15N	1
1156	HOBD15Y	4
1160	HOB_15T	1
1161	HOB_16	3
1164	HOB_16N	1
1165	HOBD16Y	4
1169	HOB_16T	1
1170	HOB_17	3
1173	HOB_17N	1
1174	HOBD17Y	4
1178	HOB_17T	1
1179	HOB_18	3
1182	HOB_18N	1
1183	HOBD18Y	4
1187	HOB_18T	1
1188	HOB_19	3
1191	HOB_19N	1
1192	HOBD19Y	4
1196	HOB_19T	1
1197	HOB_20	3
1200	HOB_20N	1
1201	HOBD20Y	4
1205	HOB_20T	1

Position	Variable name	Format
1206	HOB_21	3
1209	HOB_21N	1
1210	HOBD21Y	4
1214	HOB_21T	1
1215	GPU_11A	1
1216	GPU_11B	1
1217	GPU_11C	1
1218	GPU_11D	1
1219	GPU_11E	1
1220	GPU_11F	1
1221	GPU_11G	1
1222	GPU_11H	1
1223	GPU_12	3
1226	GPU_12N	1
1227	GPUD12Y	4
1231	GPU_13	3
1234	GPU_13N	1
1235	GPUD13Y	4
1239	GPU_14	3
1242	GPU_14N	1
1243	GPUD14Y	4
1247	GPU_15	3
1250	GPU_15N	1
1251	GPUD15Y	4
1255	GPU_16	3
1258	GPU_16N	1
1259	GPUD16Y	4
1263	GPU_17	3
1266	GPU_17N	1
1267	GPUD17Y	4
1271	GPU_18	3
1274	GPU_18N	1
1275	GPUD18Y	4
1279	LBF_01	1
1280	LBF_02	1
1281	LBF_03	1
1282	LBF_11	1
1283	LBF_13	2
1285	LBF_14	1
1286	LBF_21	1
1287	LBF_22	1

Position	Variable name	Format
1288	LBF_23	1
1289	LBF_31	1
1290	LBF_31A	1
1291	LBF_SIC	\$ 5
1296	LBF_SOC	\$ 4
1300	LBF_36A	1
1301	LBF_36B	1
1302	LBF_37	1
1303	LBF_41	2
1305	LBF_41A	1
1306	LBF_42	3
1309	LBF_44	2
1311	LBF_45	2
1313	LBF_46	1
1314	LBF_51	2
1316	LBF_52	2
1318	LBF_53	3
1321	LBF_54	1
1322	LBF_61	2
1324	LBF_71	2
1326	LBF_72	1
1327	LBF_73	2
1329	LBF_74	1
1330	LBFDHPW	3
1333	LBFDJST	2
1335	LBFDMJS	1
1336	LBFDPFT	1
1337	LBFDNRW	2
1339	LBFDSTU	1
1340	LBFDWSL	2
1342	LBFDWSS	1
1343	SDC_11	2
1345	SDCCCB	3
1348	SDC_12	1
1349	SDC_13	4
1353	SDC_21A	1
1354	SDC_21B	1
1355	SDC_21C	1
1356	SDC_21D	1
1357	SDC_21E	1
1358	SDC_21F	1
1359	SDC_21G	1

Position	Variable name	Format
1360	SDC_21H	1
1361	SDC_21I	1
1362	SDC_21J	1
1363	SDC_21K	1
1364	SDC_21L	1
1365	SDC_21M	1
1366	SDC_21N	1
1367	SDC_21O	1
1368	SDC_21P	1
1369	SDC_21Q	1
1370	SDC_21R	1
1371	SDC_21S	1
1372	SDC_21T	1
1373	SDC_21U	1
1374	SDC_22	1
1375	SDC_23A	1
1376	SDC_23B	1
1377	SDC_23C	1
1378	SDC_24A	1
1379	SDC_24B	1
1380	SDC_24C	1
1381	SDC_24D	1
1382	SDC_24E	1
1383	SDC_24F	1
1384	SDC_24G	1
1385	SDC_24H	1
1386	SDC_24I	1
1387	SDC_24J	1
1388	SDC_24K	1
1389	SDC_24L	1
1390	SDC_31A	1
1391	SDC_31B	1
1392	SDC_31C	1
1393	SDC_31D	1
1394	SDC_31E	1
1395	SDC_31F	1
1396	SDC_31G	1
1397	SDC_31H	1
1398	SDC_31I	1
1399	SDC_31J	1
1400	SDC_31K	1

Position	Variable name	Format
1401	SDC_31L	1
1402	SDC_31M	1
1403	SDC_31N	1
1404	SDC_31O	1
1405	SDC_31P	1
1406	SDC_31Q	1
1407	SDC_31R	1
1408	SDC_31S	1
1409	SDC_31T	1
1410	SDC_31U	1
1411	SDC_31V	1
1412	SDC_31W	1
1413	SDC_32	2
1415	SDC_33A	1
1416	SDC_33B	1
1417	SDC_33C	1
1418	SDC_33D	1
1419	SDC_33E	1
1420	SDC_33F	1
1421	SDC_33G	1
1422	SDC_33H	1
1423	SDC_33I	1
1424	SDC_33J	1
1425	SDC_33K	1
1426	SDC_33L	1
1427	SDC_33M	1
1428	SDC_33N	1
1429	SDC_33O	1
1430	SDC_33P	1
1431	SDC_33Q	1
1432	SDC_33R	1
1433	SDC_33S	1
1434	SDC_33T	1
1435	SDC_33U	1
1436	SDC_33V	1
1437	SDC_33W	1
1438	SDCDAIM	3
1441	SDCDCGT	2
1443	SDCDFL1	2
1445	SDCDLNG	2
1447	SDCDRES	3
1450	SDCFABT	1

Position	Variable name	Format
1451	SDCFIMM	1
1452	SDCGCB	2
1454	EDU_01	1
1455	EDU_02	1
1456	INC_11A	1
1457	INC_11B	1
1458	INC_11C	1
1459	INC_11D	1
1460	INC_11E	1
1461	INC_11F	1
1462	INC_11G	1
1463	INC_11H	1
1464	INC_11I	1
1465	INC_11J	1
1466	INC_11K	1
1467	INC_11L	1
1468	INC_11M	1
1469	INC_11N	1
1470	INC_12	2
1472	INC_21	6
1478	INC_22	1
1479	INC_23	1
1480	INC_24	1
1481	INC_25	1
1482	INC_26	1
1483	INC_27	1
1484	INC_28	1
1485	INC_31	6
1491	INC_32	1
1492	INC_33	1
1493	INC_34	1
1494	INC_35	1
1495	INC_36	1
1496	INC_37	1
1497	INC_38	1
1498	INCDHH	2
1500	INCDPER	2
1502	INCDDIA2	1
1503	INCDDIA4	1
1504	INCDDIA5	1
1505	C2_YEAR	4

Position	Variable name	Format
1509	C2_MTH	2
1511	C2_DAY	2
1513	V2_YEAR	4
1517	V2_MTH	2
1519	V2_DAY	2
1521	V2_HOUR	2
1523	V2_MIN	2
1525	V2_TYPE	1
1526	CLC_YOB	4
1530	CLC_MOB	2
1532	CLC_DOB	2
1534	CLC_AGE	3
1537	CLC_SEX	1
1538	CLC_LNG	1
1539	CON_11	1
1540	CON_15	1
1541	CON_16	1
1542	CON_23	1
1543	CON_24	1
1544	CON_25	1
1545	CON_26	1
1546	ATG_11H	2
1548	ATG_11M	2
1550	ATG_12	1
1551	ATGD12	1
1552	ATG_13	1
1553	ATG_21	1
1554	ATG_31	1
1555	ATG_32	1
1556	ATG_33A	1
1557	ATG_33B	1
1558	ATG_33C	1
1559	ATG_33D	1
1560	ATG_41	1
1561	ATG_42	1
1562	PHC_11	1
1563	PHC_12	2
1565	PHC_31	1
1566	PHC_32	1
1567	PHC_33	1
1568	PHC_34	1
1569	PHC_35	1

Position	Variable name	Format
1570	PHC_36	1
1571	PHC_37	1
1572	PHC_41	1
1573	PHC_42A	1
1574	PHC_42B	1
1575	PHC_42C	1
1576	PHC_42D	1
1577	PHC_42E	1
1578	PHC_42F	1
1579	PHC_42G	1
1580	PHC_42H	1
1581	PHC_42I	1
1582	PHC_42J	1
1583	PHC_42K	1
1584	PHC_51	1
1585	PHC_52	1
1586	SPQ_11	1
1587	SPQ_12	1
1588	SPQ_13	1
1589	SPQ_14	1
1590	SPQ_15	1
1591	SPQ_16	1
1592	SPQ_17	1
1593	SPQ_21	1
1594	SPQ_22	1
1595	SPQ_23	1
1596	SPQ_24	1
1597	SPQ_25	1
1598	MHR_411	1
1599	MHR_611A	1
1600	MHR_611B	1
1601	MHR_611C	1
1602	MHR_611D	1
1603	MHR_611E	1
1604	PAR_11	1
1605	PAR_21	1
1606	PAR_31	1
1607	PAR_41	1
1608	PAR_42	1
1609	PAR_43	1
1610	PAR_44A	1

Position	Variable name	Format
1611	PAR_44B	1
1612	PAR_44C	1
1613	PAR_44D	1
1614	PAR_44E	1
1615	PAR_44F	1
1616	PAR_44G	1
1617	PAR_44H	1
1618	PAR_44I	1
1619	PAR_45	1
1620	PAR_51	1
1621	PAR_52A	1
1622	PAR_52B	1
1623	PAR_52C	1
1624	PAR_52D	1
1625	PAR_52E	1
1626	PAR_52F	1
1627	PAR_52G	1
1628	PAR_52H	1
1629	PAR_52I	1
1630	PAR_52J	1
1631	PAR_52K	1
1632	PAR_5A1	2
1634	PAR_5A2A	1
1635	PAR_5A2B	1
1636	PAR_5A2C	1
1637	PAR_5A2D	1
1638	PAR_5A2E	1
1639	PAR_5A2F	1
1640	PAR_5A2G	1
1641	PAR_5A2H	1
1642	PAR_5A2I	1
1643	PAR_5A3A	1
1644	PAR_5A3B	1
1645	PAR_5A3C	1
1646	PAR_5A3D	1
1647	PAR_5A3E	1
1648	PAR_5B1	2
1650	PAR_5B2A	1
1651	PAR_5B2B	1
1652	PAR_5B2C	1
1653	PAR_5B2D	1
1654	PAR_5B2E	1

Position	Variable name	Format
1655	PAR_5B2F	1
1656	PAR_5B2G	1
1657	PAR_5B2H	1
1658	PAR_5B2I	1
1659	PAR_5B3A	1
1660	PAR_5B3B	1
1661	PAR_5B3C	1
1662	PAR_5B3D	1
1663	PAR_5B3E	1
1664	PAR_5C1	2
1666	PAR_5C2A	1
1667	PAR_5C2B	1
1668	PAR_5C2C	1
1669	PAR_5C2D	1
1670	PAR_5C2E	1
1671	PAR_5C2F	1
1672	PAR_5C2G	1
1673	PAR_5C2H	1
1674	PAR_5C2I	1
1675	PAR_5C3A	1
1676	PAR_5C3B	1
1677	PAR_5C3C	1
1678	PAR_5C3D	1
1679	PAR_5C3E	1
1680	PAR_5D1	2
1682	PAR_5D2A	1
1683	PAR_5D2B	1
1684	PAR_5D2C	1
1685	PAR_5D2D	1
1686	PAR_5D2E	1
1687	PAR_5D2F	1
1688	PAR_5D2G	1
1689	PAR_5D2H	1
1690	PAR_5D2I	1
1691	PAR_5D3A	1
1692	PAR_5D3B	1
1693	PAR_5D3C	1
1694	PAR_5D3D	1
1695	PAR_5D3E	1
1696	PAR_5E1	2
1698	PAR_5E2A	1

Position	Variable name	Format
1699	PAR_5E2B	1
1700	PAR_5E2C	1
1701	PAR_5E2D	1
1702	PAR_5E2E	1
1703	PAR_5E2F	1
1704	PAR_5E2G	1
1705	PAR_5E2H	1
1706	PAR_5E2I	1
1707	PAR_5E3A	1
1708	PAR_5E3B	1
1709	PAR_5E3C	1
1710	PAR_5E3D	1
1711	PAR_5E3E	1
1712	PAR_5F1	2
1714	PAR_5F2A	1
1715	PAR_5F2B	1
1716	PAR_5F2C	1
1717	PAR_5F2D	1
1718	PAR_5F2E	1
1719	PAR_5F2F	1
1720	PAR_5F2G	1
1721	PAR_5F2H	1
1722	PAR_5F2I	1
1723	PAR_5F3A	1
1724	PAR_5F3B	1
1725	PAR_5F3C	1
1726	PAR_5F3D	1
1727	PAR_5F3E	1
1728	PAR_5G1	2
1730	PAR_5G2A	1
1731	PAR_5G2B	1
1732	PAR_5G2C	1
1733	PAR_5G2D	1
1734	PAR_5G2E	1
1735	PAR_5G2F	1
1736	PAR_5G2G	1
1737	PAR_5G2H	1
1738	PAR_5G2I	1
1739	PAR_5G3A	1
1740	PAR_5G3B	1
1741	PAR_5G3C	1
1742	PAR_5G3D	1

Position	Variable name	Format
1743	PAR_5G3E	1
1744	PAR_5H1	2
1746	PAR_5H2A	1
1747	PAR_5H2B	1
1748	PAR_5H2C	1
1749	PAR_5H2D	1
1750	PAR_5H2E	1
1751	PAR_5H2F	1
1752	PAR_5H2G	1
1753	PAR_5H2H	1
1754	PAR_5H2I	1
1755	PAR_5H3A	1
1756	PAR_5H3B	1
1757	PAR_5H3C	1
1758	PAR_5H3D	1
1759	PAR_5H3E	1
1760	PAR_5I1	2
1762	PAR_5I2A	1
1763	PAR_5I2B	1
1764	PAR_5I2C	1
1765	PAR_5I2D	1
1766	PAR_5I2E	1
1767	PAR_5I2F	1
1768	PAR_5I2G	1
1769	PAR_5I2H	1
1770	PAR_5I2I	1
1771	PAR_5I3A	1
1772	PAR_5I3B	1
1773	PAR_5I3C	1
1774	PAR_5I3D	1
1775	PAR_5I3E	1
1776	PAR_5J1	2
1778	PAR_5J2A	1
1779	PAR_5J2B	1
1780	PAR_5J2C	1
1781	PAR_5J2D	1
1782	PAR_5J2E	1
1783	PAR_5J2F	1
1784	PAR_5J2G	1
1785	PAR_5J2H	1
1786	PAR_5J2I	1

Position	Variable name	Format
1787	PAR_5J3A	1
1788	PAR_5J3B	1
1789	PAR_5J3C	1
1790	PAR_5J3D	1
1791	PAR_5J3E	1
1792	PAR_5K1	2
1794	PAR_5K2A	1
1795	PAR_5K2B	1
1796	PAR_5K2C	1
1797	PAR_5K2D	1
1798	PAR_5K2E	1
1799	PAR_5K2F	1
1800	PAR_5K2G	1
1801	PAR_5K2H	1
1802	PAR_5K2I	1
1803	PAR_5K3A	1
1804	PAR_5K3B	1
1805	PAR_5K3C	1
1806	PAR_5K3D	1
1807	PAR_5K3E	1
1808	PAR_61	1
1809	PAR_62A	1
1810	PAR_62B	1
1811	PAR_62C	1
1812	PAR_62D	1
1813	PAR_62E	1
1814	PAR_62F	1
1815	PAR_62G	1
1816	PAR_62H	1
1817	PAR_71	1
1818	PAR_72A	1
1819	PAR_72B	1
1820	PAR_72C	1
1821	PAR_72D	1
1822	ORS_0	1
1823	ORS_1	1
1824	ORS_2	1
1825	ORS_3	1
1826	ORS_4	1
1827	ORS_5	1
1828	ANCDELG	2
1830	HWM_11	1

Position	Variable name	Format
1831	HWM_11CM	6.2
1837	HWMD11IN	4.1
1841	HWM_12CM	6.2
1847	HWMD12IN	4.1
1851	HWM_13	1
1852	HWM_13KG	6.2
1858	HWMD13LB	5.1
1863	HWM_14CM	5.1
1868	HWMD14IN	4.1
1872	HWM_15CM	5.1
1877	HWMD15IN	4.1
1881	HWMDBMI	5.2
1886	HWMDBMIA	2
1888	HWMDBMIA	1
1889	HWMDCOL	1
1890	HWMDWSTA	1
1891	HWMDWTH	4.2
1895	HWMDHTM	5.3
1900	HWMDLLN	6.2
1906	HWMDMAT	5.2
1911	SFM_01	\$ 1
1912	SFM_11	4.1
1916	SFM_12	4.1
1920	SFM_13	4.1
1924	SFM_14	4.1
1928	SFM_15	4.1
1932	SFM_21	4.1
1936	SFM_22	4.1
1940	SFM_23	4.1
1944	SFM_24	4.1
1948	SFM_25	4.1
1952	SFM_31	4.1
1956	SFM_32	4.1
1960	SFM_33	4.1
1964	SFM_34	4.1
1968	SFM_35	4.1
1972	SFMDTSA	4.1
1976	SFMDBSA	4.1
1980	SFMDSSA	4.1
1984	SFMDICA	4.1
1988	SFMDMCA	4.1

Position	Variable name	Format
1992	SFMD5	5.1
1997	SFMD5A	1
1998	SFMD5A	1
1999	BPM_100	1
2000	BPM_101A	3
2003	BPM_101B	3
2006	BPM_102	3
2009	BPM_111A	3
2012	BPM_111B	3
2015	BPM_112	3
2018	BPM_121A	3
2021	BPM_121B	3
2024	BPM_122	3
2027	BPM_131A	3
2030	BPM_131B	3
2033	BPM_132	3
2036	BPM_141A	3
2039	BPM_141B	3
2042	BPM_142	3
2045	BPM_151A	3
2048	BPM_151B	3
2051	BPM_152	3
2054	BPM_160	1
2055	BPMD161	3
2058	BPMD162	3
2061	BPMD163	3
2064	BPM_200	1
2065	BPM_201A	3
2068	BPM_201B	3
2071	BPM_202	3
2074	BPM_211A	3
2077	BPM_211B	3
2080	BPM_212	3
2083	BPM_221A	3
2086	BPM_221B	3
2089	BPM_222	3
2092	BPM_231A	3
2095	BPM_231B	3
2098	BPM_232	3
2101	BPM_241A	3
2104	BPM_241B	3
2107	BPM_242	3

Position	Variable name	Format
2110	BPM_251A	3
2113	BPM_251B	3
2116	BPM_252	3
2119	BPM_260	1
2120	BPMD261	3
2123	BPMD262	3
2126	BPMD263	3
2129	BPM_300	1
2130	BPM_301A	3
2133	BPM_301B	3
2136	BPM_302	3
2139	BPM_311A	3
2142	BPM_311B	3
2145	BPM_312	3
2148	BPM_321A	3
2151	BPM_321B	3
2154	BPM_322	3
2157	BPM_331A	3
2160	BPM_331B	3
2163	BPM_332	3
2166	BPM_341A	3
2169	BPM_341B	3
2172	BPM_342	3
2175	BPM_351A	3
2178	BPM_351B	3
2181	BPM_352	3
2184	BPM_360	1
2185	BPMD361	3
2188	BPMD362	3
2191	BPMD363	3
2194	BPMDSBPS	3
2197	BPMDSBPD	3
2200	BPMDSHR	3
2203	BPMDPBPS	3
2206	BPMDPBPD	3
2209	BPMDPHR	3
2212	BPMDBPA	2
2214	BPMDBPK	1
2215	PHBDELG	2
2217	BDC_11	1
2218	BDC_12	1

Position	Variable name	Format
2219	BDC_13Y	4
2223	BDC_13M	2
2225	BDC_13D	2
2227	BDCD13	1
2228	BDC_21	\$ 1
2229	BDC_23A	1
2230	BDC_23B	1
2231	BDC_23C	1
2232	BDC_23D	1
2233	BDC_23E	1
2234	BDC_23F	1
2235	BDC_23G	1
2236	BDC_23H	1
2237	BDC_23I	1
2238	BDC_23J	1
2239	BDC_23K	1
2240	BDC_24	1
2241	BDC_25	2
2243	URCDELG	2
2245	URC_01	1
2246	URC_02	1
2247	AMCDELG	2
2249	AMC_10	1
2250	AMC_11	1
2251	AMC_12	2
2253	AMC_21	1
2254	AMC_22	2
2256	SPCDELG	2
2258	SPR_11	1
2259	SPR_12	1
2260	SPM_022	1
2261	SPM_PFVC	4.2
2265	SPM_PV1	4.2
2269	SPM_PV1F	4.2
2273	SPM_CFVC	4.2
2277	SPM_CV1	4.2
2281	SPM_CV1F	4.2
2285	SPM_NUME	2
2287	SPM_NUMA	2
2289	SPM_REP	1
2290	SPM_QFVC	1
2291	SPM_QV1	1

Position	Variable name	Format
2292	SPM_BFVC	4.2
2296	SPM_B05	4.2
2300	SPM_B05F	5.3
2305	SPM_B75	4.2
2309	SPM_B75F	5.3
2314	SPM_B1	4.2
2318	SPM_B1F	5.3
2323	SPM_B3	4.2
2327	SPM_B3F	5.3
2332	SPM_B6	4.2
2336	SPM_B6F	5.3
2341	SPM_B16	5.3
2346	SPM_BPEF	5.2
2351	SPM_BF25	5.2
2356	SPM_BF50	5.2
2361	SPM_BF75	4.2
2365	SPM_BM25	4.2
2369	SPM_BM75	4.2
2373	SPM_BM1L	5.2
2378	SPMDBFVP	5.1
2383	SPMDB1P	5.1
2388	SPMDB1FP	5.1
2393	SPM_BMET	4.2
2397	SPM_BET	5.2
2402	SPM_BNUM	2
2404	SPM_1ACC	1
2405	SPM_1FVC	4.2
2409	SPM_105	4.2
2413	SPM_105F	5.3
2418	SPM_175	4.2
2422	SPM_175F	5.3
2427	SPM_11	4.2
2431	SPM_11F	4.2
2435	SPM_13	5.3
2440	SPM_13F	4.2
2444	SPM_16	5.3
2449	SPM_16F	4.2
2453	SPM_116	5.3
2458	SPM_1PEF	5.2
2463	SPM_1F25	5.2
2468	SPM_1F50	5.2

Position	Variable name	Format
2473	SPM_1F75	4.2
2477	SPM_1M25	4.2
2481	SPM_1M75	4.2
2485	SPM_1M1L	5.2
2490	SPM_1MET	4.2
2494	SPM_1ET	5.2
2499	SPM_1BV	4.2
2503	SPM_1BVF	4.2
2507	SPM_2ACC	1
2508	SPM_2FVC	4.2
2512	SPM_205	4.2
2516	SPM_205F	5.3
2521	SPM_275	4.2
2525	SPM_275F	5.3
2530	SPM_21	4.2
2534	SPM_21F	4.2
2538	SPM_23	5.3
2543	SPM_23F	4.2
2547	SPM_26	5.3
2552	SPM_26F	4.2
2556	SPM_216	5.3
2561	SPM_2PEF	5.2
2566	SPM_2F25	5.2
2571	SPM_2F50	5.2
2576	SPM_2F75	4.2
2580	SPM_2M25	4.2
2584	SPM_2M75	4.2
2588	SPM_2M1L	5.2
2593	SPM_2MET	4.2
2597	SPM_2ET	5.2
2602	SPM_2BV	4.2
2606	SPM_2BVF	4.2
2610	SPM_3ACC	1
2611	SPM_3FVC	4.2
2615	SPM_305	4.2
2619	SPM_305F	5.3
2624	SPM_375	4.2
2628	SPM_375F	5.3
2633	SPM_31	4.2
2637	SPM_31F	4.2
2641	SPM_33	5.3
2646	SPM_33F	4.2

Position	Variable name	Format
2650	SPM_36	5.3
2655	SPM_36F	4.2
2659	SPM_316	5.3
2664	SPM_3PEF	5.2
2669	SPM_3F25	5.2
2674	SPM_3F50	5.2
2679	SPM_3F75	4.2
2683	SPM_3M25	4.2
2687	SPM_3M75	4.2
2691	SPM_3M1L	5.2
2696	SPM_3MET	4.2
2700	SPM_3ET	5.2
2705	SPM_3BV	4.2
2709	SPM_3BVF	4.2
2713	SPM_4ACC	1
2714	SPM_4FVC	4.2
2718	SPM_405	4.2
2722	SPM_405F	5.3
2727	SPM_475	4.2
2731	SPM_475F	5.3
2736	SPM_41	4.2
2740	SPM_41F	4.2
2744	SPM_43	5.3
2749	SPM_43F	4.2
2753	SPM_46	5.3
2758	SPM_46F	4.2
2762	SPM_416	5.3
2767	SPM_4PEF	5.2
2772	SPM_4F25	5.2
2777	SPM_4F50	5.2
2782	SPM_4F75	4.2
2786	SPM_4M25	4.2
2790	SPM_4M75	4.2
2794	SPM_4M1L	5.2
2799	SPM_4MET	4.2
2803	SPM_4ET	5.2
2808	SPM_4BV	4.2
2812	SPM_4BVF	4.2
2816	SPM_5ACC	1
2817	SPM_5FVC	4.2
2821	SPM_505	4.2

Position	Variable name	Format
2825	SPM_505F	5.3
2830	SPM_575	4.2
2834	SPM_575F	5.3
2839	SPM_51	4.2
2843	SPM_51F	4.2
2847	SPM_53	5.3
2852	SPM_53F	4.2
2856	SPM_56	5.3
2861	SPM_56F	4.2
2865	SPM_516	5.3
2870	SPM_5PEF	5.2
2875	SPM_5F25	5.2
2880	SPM_5F50	5.2
2885	SPM_5F75	4.2
2889	SPM_5M25	4.2
2893	SPM_5M75	4.2
2897	SPM_5M1L	5.2
2902	SPM_5MET	4.2
2906	SPM_5ET	5.2
2911	SPM_5BV	4.2
2915	SPM_5BVF	4.2
2919	SPM_6ACC	1
2920	SPM_6FVC	4.2
2924	SPM_605	4.2
2928	SPM_605F	5.3
2933	SPM_675	4.2
2937	SPM_675F	5.3
2942	SPM_61	4.2
2946	SPM_61F	4.2
2950	SPM_63	5.3
2955	SPM_63F	4.2
2959	SPM_66	5.3
2964	SPM_66F	4.2
2968	SPM_616	5.3
2973	SPM_6PEF	5.2
2978	SPM_6F25	5.2
2983	SPM_6F50	5.2
2988	SPM_6F75	4.2
2992	SPM_6M25	4.2
2996	SPM_6M75	4.2
3000	SPM_6M1L	5.2
3005	SPM_6MET	4.2

Position	Variable name	Format
3009	SPM_6ET	5.2
3014	SPM_6BV	4.2
3018	SPM_6BVF	4.2
3022	SPM_7ACC	1
3023	SPM_7FVC	4.2
3027	SPM_705	4.2
3031	SPM_705F	5.3
3036	SPM_775	4.2
3040	SPM_775F	5.3
3045	SPM_71	4.2
3049	SPM_71F	4.2
3053	SPM_73	5.3
3058	SPM_73F	4.2
3062	SPM_76	5.3
3067	SPM_76F	4.2
3071	SPM_716	5.3
3076	SPM_7PEF	5.2
3081	SPM_7F25	5.2
3086	SPM_7F50	5.2
3091	SPM_7F75	4.2
3095	SPM_7M25	4.2
3099	SPM_7M75	4.2
3103	SPM_7M1L	5.2
3108	SPM_7MET	4.2
3112	SPM_7ET	5.2
3117	SPM_7BV	4.2
3121	SPM_7BVF	4.2
3125	SPM_8ACC	1
3126	SPM_8FVC	4.2
3130	SPM_805	4.2
3134	SPM_805F	5.3
3139	SPM_875	4.2
3143	SPM_875F	5.3
3148	SPM_81	4.2
3152	SPM_81F	4.2
3156	SPM_83	5.3
3161	SPM_83F	4.2
3165	SPM_86	5.3
3170	SPM_86F	4.2
3174	SPM_816	5.3
3179	SPM_8PEF	5.2

Position	Variable name	Format
3184	SPM_8F25	5.2
3189	SPM_8F50	5.2
3194	SPM_8F75	4.2
3198	SPM_8M25	4.2
3202	SPM_8M75	4.2
3206	SPM_8M1L	5.2
3211	SPM_8MET	4.2
3215	SPM_8ET	5.2
3220	SPM_8BV	4.2
3224	SPM_8BVF	4.2
3228	SPM_901	2
3230	AFCDELG	2
3232	AFTD01	1
3233	AFTD02	3
3236	AFT_11	3
3239	AFT_12	3
3242	AFT_13	3
3245	AFT_14	3
3248	AFT_15	3
3251	AFT_16	3
3254	AFT_17	3
3257	AFT_18	3
3260	AFTD21	2
3262	AFTD22	3
3265	AFT_22	1
3266	AFT_31A	3
3269	AFT_31B	3
3272	AFT_32	3
3275	AFT_41A	3
3278	AFT_41B	3
3281	AFT_42	3
3284	AFT_49	\$ 1
3285	AFT_51A	3
3288	AFT_51B	3
3291	AFT_52	3
3294	AFT_59	\$ 1
3295	AFT_61A	3
3298	AFT_61B	3
3301	AFT_62	3
3304	AFTD71	4.1
3308	AFTD72	3
3311	AFTD73	1

Position	Variable name	Format
3312	AFTD74	1
3313	AFT_81	2
3315	GSCDELG	2
3317	GSM_11	3
3320	GSM_12	3
3323	GSM_21	3
3326	GSM_22	3
3329	GSMD51	3
3332	GSMD52	1
3333	GSMD53	1
3334	SRCDELG	2
3336	SRM_01	4.1
3340	SRM_02	4.1
3344	SRMD11	4.1
3348	SRMD12	1
3349	SRMD13	1
3350	PCCDELG	2
3352	PCM_01	2
3354	PCMD11	1
3355	OHCDELG	2
3357	OHQ_11	1
3358	OHQ_12A	1
3359	OHQ_12B	1
3360	OHQ_12C	1
3361	OHQ_12D	1
3362	OHQ_12E	1
3363	OHQ_12F	1
3364	OHQ_12G	1
3365	OHQ_12H	1
3366	OHQ_12I	1
3367	OHQ_12J	1
3368	OHQ_12K	1
3369	OHQ_12L	1
3370	OHQ_21	1
3371	OHQ_22	1
3372	OHQ_23	1
3373	OHQ_24	1
3374	OHQ_25	1
3375	OHQ_26	1
3376	OHQ_27	1
3377	OHQ_28	1

Position	Variable name	Format
3378	OHR_11	1
3379	OHR_12	1
3380	OHR_13	1
3381	OHR_14	1
3382	OHR_15	1
3383	OHR_16	1
3384	OHR_17	1
3385	OHR_18	1
3386	OHR_19	1
3387	OHR_20	1
3388	OHR_21	1
3389	OHR_22	1
3390	OHR_23	1
3391	OHR_24	1
3392	OHRD25	1
3393	OHE_11	1
3394	OHE_12A	1
3395	OHE_12B	1
3396	OHE_12C	1
3397	OHE_12D	1
3398	OHE_12E	1
3399	OHE_12F	1
3400	OHE_13A	1
3401	OHE_13B	1
3402	OHE_13C	1
3403	OHE_13D	1
3404	OHE_13E	1
3405	OHE_13F	1
3406	OHE_14A	1
3407	OHE_14B	1
3408	OHE_14C	1
3409	OHE_14D	1
3410	OHE_14E	1
3411	OHE_14F	1
3412	OHE_14G	1
3413	OHE_14H	1
3414	OHE_14I	1
3415	OHE_14J	1
3416	OHE_15	1
3417	OHE_20	2
3419	OHE_21A	1
3420	OHE_21B	1

Position	Variable name	Format
3421	OHE_21C	1
3422	OHE_21D	1
3423	OHE_21E	1
3424	OHE_21F	1
3425	OHE_21G	1
3426	OHE_21H	1
3427	OHE_21I	1
3428	OHE_22	1
3429	OHE_23	1
3430	OHE_31G1	1
3431	OHE_31G2	1
3432	OHE_31G3	1
3433	OHE_31G4	1
3434	OHE_31G5	1
3435	OHE_31G6	1
3436	OHE_32D1	1
3437	OHE_32D2	1
3438	OHE_32D3	1
3439	OHE_32C1	1
3440	OHE_32C2	1
3441	OHE_32C3	1
3442	OHE_32R1	2
3444	OHE_32R2	2
3446	OHE_32R3	2
3448	OHE_32P1	2
3450	OHE_32P2	2
3452	OHE_32P3	2
3454	OHE_32D4	1
3455	OHE_32D5	1
3456	OHE_32D6	1
3457	OHE_32C4	1
3458	OHE_32C5	1
3459	OHE_32C6	1
3460	OHE_32R4	2
3462	OHE_32R5	2
3464	OHE_32R6	2
3466	OHE_32P4	2
3468	OHE_32P5	2
3470	OHE_32P6	2
3472	OHE_1T55	2
3474	OHE_1T54	2

Position	Variable name	Format
3476	OHE_1T53	2
3478	OHE_1T52	2
3480	OHE_1T51	2
3482	OHE_1T61	2
3484	OHE_1T62	2
3486	OHE_1T63	2
3488	OHE_1T64	2
3490	OHE_1T65	2
3492	OHE_1C17	2
3494	OHE_1C16	2
3496	OHE_1C15	2
3498	OHE_1C14	2
3500	OHE_1C13	2
3502	OHE_1C12	2
3504	OHE_1C11	2
3506	OHE_1C21	2
3508	OHE_1C22	2
3510	OHE_1C23	2
3512	OHE_1C24	2
3514	OHE_1C25	2
3516	OHE_1C26	2
3518	OHE_1C27	2
3520	OHE_1R17	2
3522	OHE_1R16	2
3524	OHE_1R15	2
3526	OHE_1R14	2
3528	OHE_1R13	2
3530	OHE_1R12	2
3532	OHE_1R11	2
3534	OHE_1R21	2
3536	OHE_1R22	2
3538	OHE_1R23	2
3540	OHE_1R24	2
3542	OHE_1R25	2
3544	OHE_1R26	2
3546	OHE_1R27	2
3548	OHE_1T75	2
3550	OHE_1T74	2
3552	OHE_1T73	2
3554	OHE_1T72	2
3556	OHE_1T71	2
3558	OHE_1T81	2

Position	Variable name	Format
3560	OHE_1T82	2
3562	OHE_1T83	2
3564	OHE_1T84	2
3566	OHE_1T85	2
3568	OHE_1C37	2
3570	OHE_1C36	2
3572	OHE_1C35	2
3574	OHE_1C34	2
3576	OHE_1C33	2
3578	OHE_1C32	2
3580	OHE_1C31	2
3582	OHE_1C41	2
3584	OHE_1C42	2
3586	OHE_1C43	2
3588	OHE_1C44	2
3590	OHE_1C45	2
3592	OHE_1C46	2
3594	OHE_1C47	2
3596	OHE_1R37	2
3598	OHE_1R36	2
3600	OHE_1R35	2
3602	OHE_1R34	2
3604	OHE_1R33	2
3606	OHE_1R32	2
3608	OHE_1R31	2
3610	OHE_1R41	2
3612	OHE_1R42	2
3614	OHE_1R43	2
3616	OHE_1R44	2
3618	OHE_1R45	2
3620	OHE_1R46	2
3622	OHE_1R47	2
3624	OHE_42	2
3626	OHE_3T12	2
3628	OHE_3T11	2
3630	OHE_3T21	2
3632	OHE_3T22	2
3634	OHE_3T32	2
3636	OHE_3T31	2
3638	OHE_3T41	2
3640	OHE_3T42	2

Position	Variable name	Format
3642	OHE_51A	1
3643	OHE_51B	1
3644	OHE_51C	1
3645	OHE_51D	1
3646	OHE_51E	1
3647	OHE_51F	1
3648	OHE_52A	1
3649	OHE_52B	1
3650	OHE_52C	1
3651	OHE_52D	1
3652	OHE_52E	1
3653	OHE_52F	1
3654	OHE_53A	1
3655	OHE_53B	1
3656	OHE_53C	1
3657	OHE_53D	1
3658	OHE_53E	1
3659	OHE_53F	1
3660	OHE_53G	1
3661	OHE_53H	1
3662	OHE_53I	1
3663	OHE_53J	1
3664	OHE_53K	1
3665	OHE_61	1
3666	OHE_62	1
3667	OHE_63	1
3668	OHE_64	1
3669	OHE_65	1
3670	OHE_66	1
3671	OHE_67	1
3672	OHE_68	1
3673	OHE_71	1
3674	OHE_72	1
3675	OHEDFLUO	2
3677	OHEDGS12	1
3678	OHEDGS16	1
3679	OHEDGS24	1
3680	OHEDGS32	1
3681	OHEDGS36	1
3682	OHEDGS44	1
3683	OHEDDS01	1
3684	OHEDDS02	1

Position	Variable name	Format
3685	OHEDDS03	1
3686	OHEDDS04	1
3687	OHEDDS05	1
3688	OHEDDS06	1
3689	OHEDCS01	1
3690	OHEDCS02	1
3691	OHEDCS03	1
3692	OHEDCS04	1
3693	OHEDCS05	1
3694	OHEDCS06	1
3695	OHEDAC01	2
3697	OHEDAC02	2
3699	OHEDAC03	2
3701	OHEDAC04	2
3703	OHEDAC05	2
3705	OHEDAC06	2
3707	OHEDAC07	2
3709	OHEDAC08	2
3711	OHEDAC09	2
3713	OHEDAC10	2
3715	OHEDAC12	2
3717	OHEDAC13	2
3719	OHEDAC14	2
3721	OHEDAC15	2
3723	OHEDAC16	2
3725	OHEDAC17	2
3727	OHEDAC18	2
3729	OHEDAC19	2
3731	OHEDAC20	2
3733	OHEDAC21	2
3735	OHEDAR01	2
3737	OHEDAR03	2
3739	OHEDAR04	2
3741	OHEDAR05	2
3743	OHEDAR06	2
3745	OHEDAR07	2
3747	OHEDAR11	2
3749	OHEDAR12	2
3751	OHEDAR13	2
3753	OHEDAR14	2
3755	OHEDAR15	2

Position	Variable name	Format
3757	OHEDAR16	2
3759	OHEDAR17	2
3761	OHEDAR19	2
3763	OHEDAR20	2
3765	OHEDAR21	2
3767	OHEDDT01	2
3769	OHEDDT02	2
3771	OHEDDT03	2
3773	OHEDDT04	2
3775	OHEDDT05	2
3777	OHEDDT06	2
3779	OHEDDT07	2
3781	OHEDDT08	2
3783	OHEDDT09	2
3785	OHEDDT10	2
3787	OHEDDT12	2
3789	OHEDDT13	2
3791	OHEDDT14	2
3793	OHEDDT15	2
3795	OHEDDT16	2
3797	OHEDDT17	2
3799	OHEDDT20	2
3801	OHEDDT21	2
3803	RMCDMSK	1
3804	RMCDBCK	1
3805	ECQ_LNK	1
3806	CBC_WBC	4.1
3810	CBC_RBC	4.2
3814	CBC_HGB	3
3817	CBC_HCT	5.3
3822	CBC_MCV	5.1
3827	CBC_MCH	4.1
3831	CBC_MCHC	3
3834	CBC_RDW	4.1
3838	CBC_PLT	3
3841	CBC_MPV	4.1
3845	CBC_LY	4.1
3849	CBC_MO	3.1
3852	CBC_NE	4.1
3856	CBC_EO	3.1
3859	CBC_BA	3.1
3862	LAB_HBA1	6.4

Position	Variable name	Format
3868	LAB_FOL	5.2
3873	LABDRBCF	4
3877	LAB_GLUP	4.1
3881	LAB_HCY	4.1
3885	LAB_VITD	8.4
3893	LAB_FIB	5.3
3898	LAB_TP	3
3901	LAB_URIC	3
3904	LAB_ALB	2
3906	LAB_CL	3
3909	LAB_K	3.1
3912	LAB_NA	3
3915	LAB_ECO2	2
3917	LAB_PHOS	4.2
3921	LAB_BCRE	3
3924	LAB_UREA	4.1
3928	LAB_CA	4.2
3932	LAB_TBIL	3
3935	LAB_AST	3
3938	LAB_ALKP	3
3941	LAB_ALT	3
3944	LAB_LDH	4
3948	LAB_GGT	4
3952	LAB_CRP	5.1
3957	LAB_B12	3
3960	LAB_HAV	1
3961	LAB_HBS	1
3962	LAB_HBC	1
3963	LAB_HBSA	1
3964	LAB_HCV	1
3965	LAB_HCVC	1
3966	LAB_UCRE	5.2
3971	LAB_IDNE	9.4
3980	LABDICR	5
3985	LAB_HDL	4.2
3989	LAB_CHOL	4.1
3993	LABDTCHR	5.2
3998	LAB_BAS	9.4
4007	LAB_BCD	9.5
4016	LAB_BCU	6.3
4022	LAB_BPB	7.5

Position	Variable name	Format
4029	LAB_BMN	8.3
4037	LAB_BHG	7.3
4044	LAB_BMO	7.3
4051	LAB_BNI	8.4
4059	LAB_BSE	6.4
4065	LAB_BU	9.6
4074	LAB_BZN	8.4
4082	LAB_MALB	4
4086	LABDMCR	6.2
4092	LAB_COT	11.6
4103	LABDCOT	10.4
4113	LAB_UHG	7.3
4120	LABDUHG	8.5
4128	LAB_UAS	8.5
4136	LABDUAS	8.6
4144	LAB_UCD	6.3
4150	LABDUCD	8.5
4158	LAB_UCU	8.5
4166	LABDUCU	9.7
4175	LAB_UMN	9.4
4184	LABDUMN	9.5
4193	LAB_UMO	7.2
4200	LABDUMO	11.7
4211	LAB_UNI	8.4
4219	LABDUNI	9.5
4228	LAB_UPB	8.6
4236	LABDUPB	8.3
4244	LAB_USE	6.4
4250	LABDUSE	8.4
4258	LAB_UU	9.6
4267	LABDUU	10.8
4277	LAB_UZN	6.3
4283	LABDUZN	7.5
4290	LAB_USB	8.5
4298	LABDUSB	8.6
4306	LAB_UV	6.2
4312	LABDUV	9.5
4321	LAB_BPA	8.4
4329	LABDBPA	8.4
4337	LAB_DEDT	9.6
4346	LABDDEDT	7.4
4353	LAB_DEP	10.6

Position	Variable name	Format
4363	LABDDEP	8.4
4371	LAB_DETP	10.6
4381	LABDDETP	8.4
4389	LAB_DMDT	10.6
4399	LABDDMDT	9.5
4408	LAB_DMP	9.5
4417	LABDDMP	8.4
4425	LAB_DMTP	10.6
4435	LABDDMTP	9.4
4444	LAB_CDCC	8.4
4452	LABDCDCC	9.6
4461	LAB_CDBC	5.3
4466	LABDCDBC	8.6
4474	LAB_TDCC	7.3
4481	LABDTDCC	9.6
4490	LAB_3PBA	7.3
4497	LABD3PBA	9.5
4506	LAB_4F3P	6.4
4512	LABD4F3P	9.6
4521	LAB_24D	8.5
4529	LABD24D	8.5
4537	LAB_24DX	8.5
4545	LABD24DX	8.5
4553	LAB_24DC	10.6
4563	LABD24DC	8.4
4571	AMMDACT1	9.4
4580	AMMDACT2	9.4
4589	AMMDACT3	9.4
4598	AMMDACT4	9.4
4607	AMMDACT5	9.4
4616	AMMDACT6	9.4
4625	AMMDACT7	9.4
4634	AMMDHR1	7.4
4641	AMMDHR2	7.4
4648	AMMDHR3	7.4
4655	AMMDHR4	7.4
4662	AMMDHR5	7.4
4669	AMMDHR6	7.4
4676	AMMDHR7	7.4
4683	AMMDIA1	4
4687	AMMDIA2	4

Position	Variable name	Format
4691	AMMDIA3	4
4695	AMMDIA4	4
4699	AMMDIA5	4
4703	AMMDIA6	4
4707	AMMDIA7	4
4711	AMMDLA1	4
4715	AMMDLA2	4
4719	AMMDLA3	4
4723	AMMDLA4	4
4727	AMMDLA5	4
4731	AMMDLA6	4
4735	AMMDLA7	4
4739	AMMDMA1	4
4743	AMMDMA2	4
4747	AMMDMA3	4
4751	AMMDMA4	4
4755	AMMDMA5	4
4759	AMMDMA6	4
4763	AMMDMA7	4
4767	AMMDMB1	4
4771	AMMDMB2	4
4775	AMMDMB3	4
4779	AMMDMB4	4
4783	AMMDMB5	4
4787	AMMDMB6	4
4791	AMMDMB7	4
4795	AMMDMVA1	4
4799	AMMDMVA2	4
4803	AMMDMVA3	4
4807	AMMDMVA4	4
4811	AMMDMVA5	4
4815	AMMDMVA6	4
4819	AMMDMVA7	4
4823	AMMDMVB1	4
4827	AMMDMVB2	4
4831	AMMDMVB3	4
4835	AMMDMVB4	4
4839	AMMDMVB5	4
4843	AMMDMVB6	4
4847	AMMDMVB7	4
4851	AMMDSA1	4
4855	AMMDSA2	4

Position	Variable name	Format
4859	AMMDSA3	4
4863	AMMDSA4	4
4867	AMMDSA5	4
4871	AMMDSA6	4
4875	AMMDSA7	4
4879	AMMDSST1	5
4884	AMMDSST2	5
4889	AMMDSST3	5
4894	AMMDSST4	5
4899	AMMDSST5	5
4904	AMMDSST6	5
4909	AMMDSST7	5
4914	AMMDTCT1	7
4921	AMMDTCT2	7
4928	AMMDTCT3	7
4935	AMMDTCT4	7
4942	AMMDTCT5	7
4949	AMMDTCT6	7
4956	AMMDTCT7	7
4963	AMMDVA1	3
4966	AMMDVA2	3
4969	AMMDVA3	3
4972	AMMDVA4	3
4975	AMMDVA5	3
4978	AMMDVA6	3
4981	AMMDVA7	3
4984	AMMDVB1	3
4987	AMMDVB2	3
4990	AMMDVB3	3
4993	AMMDVB4	3
4996	AMMDVB5	3
4999	AMMDVB6	3
5002	AMMDVB7	3
5005	AMMDBMV1	3
5008	AMMDBMV2	3
5011	AMMDBMV3	3
5014	AMMDBMV4	3
5017	AMMDBMV5	3
5020	AMMDBMV6	3
5023	AMMDBMV7	3
5026	INIT_FLG	1

Position	Variable name	Format
5027	WGT_FULL	15.8

7b Fasted sub-sample file

Position	Variable Name	Format
1	CLINICID	8
9	LAB_TRIG	5.2
14	LAB_APOA	4.2
18	LAB_APOB	4.2
22	LAB_LDL	4.2
26	LAB_INS	7.2
33	WGT_FAST	15.8

7c Inorganic mercury sub-sample file

Position	Variable Name	Format
1	CLINICID	8
9	LAB_BIHG	7
16	WGT_BIHG	15.8

7d Polybrominated diphenyl ether (PBDE) / Polychlorinated biphenyls (PCB) sub-sample file

Position	Variable Name	Format
1	CLINICID	8
9	LAB_ALD	5
14	LAB_ACHL	5
19	LAB_CNAC	7
26	LAB_GCHL	6
32	LAB_HCB	7
39	LAB_MIRX	7
46	LAB_OCHL	6
52	PAR_26	7
59	PAR_50	7
66	PBB_153	7
73	PBD_100	7
80	PBD_015	6
86	PBD_153	7
93	PBD_017	7
100	PBD_025	7
107	PBD_028	7
114	PBD_033	7
121	PBD_047	8
129	PBD_099	7
136	PCB_1260	8
144	PCB_101	7
151	PCB_105	7
158	PCB_118	7
165	PCB_128	6
171	PCB_138	6
177	PCB_146	6
183	PCB_153	6
189	PCB_156	7
196	PCB_163	6
202	PCB_167	6
208	PCB_170	6
214	PCB_178	7
221	PCB_180	6
227	PCB_183	6
233	PCB_187	6
239	PCB_194	7
246	PCB_201	7

Position	Variable Name	Format
253	PCB_203	7
260	PCB_206	7
267	PCB_028	6
273	PCB_052	5
278	PCB_066	6
284	PCB_074	7
291	PCB_099	6
297	LAB_DDE	9
306	LAB_DDT	7
313	LAB_BHCH	7
320	LAB_GHCH	6
326	LAB_TNAC	7
333	WGT_PBDE	15.8

7e Perfluorinated Compounds sub-sample file

Position	Variable Name	Format
1	CLINICID	8
9	LAB_PFHS	10
19	LAB_PFOA	9
28	LAB_PFOS	10
38	WGT_PFCs	15.8

7f Activity monitor file

Position	Variable Name	Format
1	CLINICID	8
9	AMSDACT1	9.4
18	AMSDACT2	9.4
27	AMSDACT3	9.4
36	AMSDACT4	9.4
45	AMSDACT5	9.4
54	AMSDACT6	9.4
63	AMSDACT7	9.4
72	AMSDHR1	7.4
79	AMSDHR2	7.4
86	AMSDHR3	7.4
93	AMSDHR4	7.4
100	AMSDHR5	7.4
107	AMSDHR6	7.4
114	AMSDHR7	7.4
121	AMSDIA1	4
125	AMSDIA2	4
129	AMSDIA3	4
133	AMSDIA4	4
137	AMSDIA5	4
141	AMSDIA6	4
145	AMSDIA7	4
149	AMSDLA1	4
153	AMSDLA2	4
157	AMSDLA3	4
161	AMSDLA4	4
165	AMSDLA5	4
169	AMSDLA6	4
173	AMSDLA7	4
177	AMSDMA1	4
181	AMSDMA2	4
185	AMSDMA3	4
189	AMSDMA4	4
193	AMSDMA5	4
197	AMSDMA6	4
201	AMSDMA7	4

Position	Variable Name	Format
205	AMSDMB1	4
209	AMSDMB2	4
213	AMSDMB3	4
217	AMSDMB4	4
221	AMSDMB5	4
225	AMSDMB6	4
229	AMSDMB7	4
233	AMSDMVA1	4
237	AMSDMVA2	4
241	AMSDMVA3	4
245	AMSDMVA4	4
249	AMSDMVA5	4
253	AMSDMVA6	4
257	AMSDMVA7	4
261	AMSDMVB1	4
265	AMSDMVB2	4
269	AMSDMVB3	4
273	AMSDMVB4	4
277	AMSDMVB5	4
281	AMSDMVB6	4
285	AMSDMVB7	4
289	AMSDSA1	4
293	AMSDSA2	4
297	AMSDSA3	4
301	AMSDSA4	4
305	AMSDSA5	4
309	AMSDSA6	4
313	AMSDSA7	4
317	AMSDSST1	5
322	AMSDSST2	5
327	AMSDSST3	5
332	AMSDSST4	5
337	AMSDSST5	5
342	AMSDSST6	5
347	AMSDSST7	5
352	AMSDTCT1	7
359	AMSDTCT2	7
366	AMSDTCT3	7
373	AMSDTCT4	7
380	AMSDTCT5	7

Position	Variable Name	Format
387	AMSDTCT6	7
394	AMSDTCT7	7
401	AMSDVA1	3
404	AMSDVA2	3
407	AMSDVA3	3
410	AMSDVA4	3
413	AMSDVA5	3
416	AMSDVA6	3
419	AMSDVA7	3
422	AMSDVB1	3
425	AMSDVB2	3
428	AMSDVB3	3
431	AMSDVB4	3
434	AMSDVB5	3
437	AMSDVB6	3
440	AMSDVB7	3
443	INIT_FLG	1
444	WGT_ACMO	15.8

7g Tobacco sub-sample file

Position	Variable Name	Format
1	CLINICID	8
9	LAB_UCGC	8.1
17	LAB_UCT	8.1
25	LAB_UHGC	8.1
33	LAB_UHT	9.1
42	LAB_UNGC	7.1
49	LAB_UNT	8.1
57	LAB_UA	6.1
63	LAB_UNLF	6.1
69	LAB_UNLT	7.1
76	WGT_SMOK	15.8

7h Phthalates sub-sample file

Position	Variable Name	Format
1	CLINICID	8
9	LAB_MMP	11.5
20	LABDMMP	9.3
29	LAB_MEP	12.6
41	LABDMEP	9.3
50	LAB_MBP	12.6
62	LABDMBP	9.3
71	LAB_MBZP	11.6
82	LABDMBZP	8.3
90	LAB_MCHP	10.6
100	LABDMCHP	9.5
109	LAB_MOP	8.6
117	LABDMOP	7.4
124	LAB_MCPP	10.6
134	LABDMCPP	8.4
142	LAB_MNP	9.6
151	LABDMNP	7.4
158	LAB_MEHP	11.6
169	LABDMEHP	9.4
178	LAB_MEHH	11.6
189	LABDMEHH	8.3
197	LAB_MEOH	11.6
208	LABDMEOH	8.3
216	WGT_PHTH	15.8

7i Medication file

Position	Variable Name	Format
1	CLINICID	8
9	MEDD100A	1
10	MEDD100B	2
12	MEDD101A	1
13	ATC_101A	\$ 7
20	AHF_101A	\$ 11
31	AHF_101B	\$ 11
42	MED_101B	1
43	MHR_101B	1
44	MEDD102A	1
45	ATC_102A	\$ 7
52	AHF_102A	\$ 11
63	AHF_102B	\$ 11
74	MED_102B	1
75	MHR_102B	1
76	MEDD103A	1
77	ATC_103A	\$ 7
84	AHF_103A	\$ 11
95	AHF_103B	\$ 11
106	MED_103B	1
107	MHR_103B	1
108	MEDD104A	1
109	ATC_104A	\$ 7
116	AHF_104A	\$ 11
127	AHF_104B	\$ 11
138	MED_104B	1
139	MHR_104B	1
140	MEDD105A	1
141	ATC_105A	\$ 7
148	AHF_105A	\$ 11
159	AHF_105B	\$ 11
170	MED_105B	1
171	MHR_105B	1
172	MEDD106A	1
173	ATC_106A	\$ 7
180	AHF_106A	\$ 11
191	AHF_106B	\$ 11
202	MED_106B	1
203	MHR_106B	1

Position	Variable Name	Format
204	MEDD107A	1
205	ATC_107A	\$ 7
212	AHF_107A	\$ 11
223	AHF_107B	\$ 11
234	MED_107B	1
235	MHR_107B	1
236	MEDD108A	1
237	ATC_108A	\$ 7
244	AHF_108A	\$ 11
255	AHF_108B	\$ 11
266	MED_108B	1
267	MHR_108B	1
268	MEDD109A	1
269	ATC_109A	\$ 7
276	AHF_109A	\$ 11
287	AHF_109B	\$ 11
298	MED_109B	1
299	MHR_109B	1
300	MEDD110A	1
301	ATC_110A	\$ 7
308	AHF_110A	\$ 11
319	AHF_110B	\$ 11
330	MED_110B	1
331	MHR_110B	1
332	MEDD111A	1
333	ATC_111A	\$ 7
340	AHF_111A	\$ 11
351	AHF_111B	\$ 11
362	MED_111B	1
363	MHR_111B	1
364	MEDD112A	1
365	ATC_112A	\$ 7
372	AHF_112A	\$ 11
383	AHF_112B	\$ 11
394	MED_112B	1
395	MHR_112B	1
396	MEDD113A	1
397	ATC_113A	\$ 7
404	AHF_113A	\$ 11
415	AHF_113B	\$ 11
426	MED_113B	1

Position	Variable Name	Format
427	MHR_113B	1
428	MEDD114A	1
429	ATC_114A	\$ 7
436	AHF_114A	\$ 11
447	AHF_114B	\$ 11
458	MED_114B	1
459	MHR_114B	1
460	MEDD115A	1
461	ATC_115A	\$ 7
468	AHF_115A	\$ 11
479	AHF_115B	\$ 11
490	MED_115B	1
491	MHR_115B	1
492	MEDD131A	1
493	ATC_131A	\$ 7
500	AHF_131A	\$ 11
511	AHF_131B	\$ 11
522	MHR_131B	1
523	MEDD132A	1
524	ATC_132A	\$ 7
531	AHF_132A	\$ 11
542	AHF_132B	\$ 11
553	MHR_132B	1
554	MEDD133A	1
555	ATC_133A	\$ 7
562	AHF_133A	\$ 11
573	AHF_133B	\$ 11
584	MHR_133B	1
585	MEDD134A	1
586	ATC_134A	\$ 7
593	AHF_134A	\$ 11
604	AHF_134B	\$ 11
615	MHR_134B	1
616	MEDD135A	1
617	ATC_135A	\$ 7
624	AHF_135A	\$ 11
635	AHF_135B	\$ 11
646	MHR_135B	1
647	MEDD200A	1
648	MEDD200B	2
650	MEDD201A	1
651	ATC_201A	\$ 7

Position	Variable Name	Format
658	AHF_201A	\$ 11
669	AHF_201B	\$ 11
680	MED_201B	1
681	MHR_201B	1
682	MEDD202A	1
683	ATC_202A	\$ 7
690	AHF_202A	\$ 11
701	AHF_202B	\$ 11
712	MED_202B	1
713	MHR_202B	1
714	MEDD203A	1
715	ATC_203A	\$ 7
722	AHF_203A	\$ 11
733	AHF_203B	\$ 11
744	MED_203B	1
745	MHR_203B	1
746	MEDD204A	1
747	ATC_204A	\$ 7
754	AHF_204A	\$ 11
765	AHF_204B	\$ 11
776	MED_204B	1
777	MHR_204B	1
778	MEDD205A	1
779	ATC_205A	\$ 7
786	AHF_205A	\$ 11
797	AHF_205B	\$ 11
808	MED_205B	1
809	MHR_205B	1
810	MEDD206A	1
811	ATC_206A	\$ 7
818	AHF_206A	\$ 11
829	AHF_206B	\$ 11
840	MED_206B	1
841	MHR_206B	1
842	MEDD207A	1
843	ATC_207A	\$ 7
850	AHF_207A	\$ 11
861	AHF_207B	\$ 11
872	MED_207B	1
873	MHR_207B	1
874	MEDD208A	1

Position	Variable Name	Format
875	ATC_208A	\$ 7
882	AHF_208A	\$ 11
893	AHF_208B	\$ 11
904	MED_208B	1
905	MHR_208B	1
906	MEDD209A	1
907	ATC_209A	\$ 7
914	AHF_209A	\$ 11
925	AHF_209B	\$ 11
936	MED_209B	1
937	MHR_209B	1
938	MEDD210A	1
939	ATC_210A	\$ 7
946	AHF_210A	\$ 11
957	AHF_210B	\$ 11
968	MED_210B	1
969	MHR_210B	1
970	MEDD211A	1
971	ATC_211A	\$ 7
978	AHF_211A	\$ 11
989	AHF_211B	\$ 11
1000	MED_211B	1
1001	MHR_211B	1
1002	MEDD212A	1
1003	ATC_212A	\$ 7
1010	AHF_212A	\$ 11
1021	AHF_212B	\$ 11
1032	MED_212B	1
1033	MHR_212B	1
1034	MEDD213A	1
1035	ATC_213A	\$ 7
1042	AHF_213A	\$ 11
1053	AHF_213B	\$ 11
1064	MED_213B	1
1065	MHR_213B	1
1066	MEDD214A	1
1067	ATC_214A	\$ 7
1074	AHF_214A	\$ 11
1085	AHF_214B	\$ 11
1096	MED_214B	1
1097	MHR_214B	1
1098	MEDD215A	1

Position	Variable Name	Format
1099	ATC_215A	\$ 7
1106	AHF_215A	\$ 11
1117	AHF_215B	\$ 11
1128	MED_215B	1
1129	MHR_215B	1
1130	MEDD231A	1
1131	ATC_231A	\$ 7
1138	AHF_231A	\$ 11
1149	AHF_231B	\$ 11
1160	MHR_231B	1
1161	MEDD232A	1
1162	ATC_232A	\$ 7
1169	AHF_232A	\$ 11
1180	AHF_232B	\$ 11
1191	MHR_232B	1
1192	MEDD233A	1
1193	ATC_233A	\$ 7
1200	AHF_233A	\$ 11
1211	AHF_233B	\$ 11
1222	MHR_233B	1
1223	MEDD234A	1
1224	ATC_234A	\$ 7
1231	AHF_234A	\$ 11
1242	AHF_234B	\$ 11
1253	MHR_234B	1
1254	MEDD235A	1
1255	ATC_235A	\$ 7
1262	AHF_235A	\$ 11
1273	AHF_235B	\$ 11
1284	MHR_235B	1
1285	MEDD300A	1
1286	MEDD300B	2
1288	MEDD301A	1
1289	ATC_301A	\$ 7
1296	AHF_301A	\$ 11
1307	AHF_301B	\$ 11
1318	MED_301B	1
1319	MHR_301B	1
1320	MEDD302A	1
1321	ATC_302A	\$ 7
1328	AHF_302A	\$ 11

Position	Variable Name	Format
1339	AHF_302B	\$ 11
1350	MED_302B	1
1351	MHR_302B	1
1352	MEDD303A	1
1353	ATC_303A	\$ 7
1360	AHF_303A	\$ 11
1371	AHF_303B	\$ 11
1382	MED_303B	1
1383	MHR_303B	1
1384	MEDD304A	1
1385	ATC_304A	\$ 7
1392	AHF_304A	\$ 11
1403	AHF_304B	\$ 11
1414	MED_304B	1
1415	MHR_304B	1
1416	MEDD305A	1
1417	ATC_305A	\$ 7
1424	AHF_305A	\$ 11
1435	AHF_305B	\$ 11
1446	MED_305B	1
1447	MHR_305B	1
1448	MEDD306A	1
1449	ATC_306A	\$ 7
1456	AHF_306A	\$ 11
1467	AHF_306B	\$ 11
1478	MED_306B	1
1479	MHR_306B	1
1480	MEDD307A	1
1481	ATC_307A	\$ 7
1488	AHF_307A	\$ 11
1499	AHF_307B	\$ 11
1510	MED_307B	1
1511	MHR_307B	1
1512	MEDD308A	1
1513	ATC_308A	\$ 7
1520	AHF_308A	\$ 11
1531	AHF_308B	\$ 11
1542	MED_308B	1
1543	MHR_308B	1
1544	MEDD309A	1
1545	ATC_309A	\$ 7
1552	AHF_309A	\$ 11

Position	Variable Name	Format
1563	AHF_309B	\$ 11
1574	MED_309B	1
1575	MHR_309B	1
1576	MEDD310A	1
1577	ATC_310A	\$ 7
1584	AHF_310A	\$ 11
1595	AHF_310B	\$ 11
1606	MED_310B	1
1607	MHR_310B	1
1608	MEDD311A	1
1609	ATC_311A	\$ 7
1616	AHF_311A	\$ 11
1627	AHF_311B	\$ 11
1638	MED_311B	1
1639	MHR_311B	1
1640	MEDD312A	1
1641	ATC_312A	\$ 7
1648	AHF_312A	\$ 11
1659	AHF_312B	\$ 11
1670	MED_312B	1
1671	MHR_312B	1
1672	MEDD313A	1
1673	ATC_313A	\$ 7
1680	AHF_313A	\$ 11
1691	AHF_313B	\$ 11
1702	MED_313B	1
1703	MHR_313B	1
1704	MEDD314A	1
1705	ATC_314A	\$ 7
1712	AHF_314A	\$ 11
1723	AHF_314B	\$ 11
1734	MED_314B	1
1735	MHR_314B	1
1736	MEDD315A	1
1737	ATC_315A	\$ 7
1744	AHF_315A	\$ 11
1755	AHF_315B	\$ 11
1766	MED_315B	1
1767	MHR_315B	1
1768	MEDD331A	1
1769	ATC_331A	\$ 7

Position	Variable Name	Format
1776	AHF_331A	\$ 11
1787	AHF_331B	\$ 11
1798	MHR_331B	1
1799	MEDD332A	1
1800	ATC_332A	\$ 7
1807	AHF_332A	\$ 11
1818	AHF_332B	\$ 11
1829	MHR_332B	1
1830	MEDD333A	1
1831	ATC_333A	\$ 7
1838	AHF_333A	\$ 11
1849	AHF_333B	\$ 11
1860	MHR_333B	1
1861	MEDD334A	1
1862	ATC_334A	\$ 7
1869	AHF_334A	\$ 11
1880	AHF_334B	\$ 11
1891	MHR_334B	1
1892	MEDD335A	1
1893	ATC_335A	\$ 7
1900	AHF_335A	\$ 11
1911	AHF_335B	\$ 11
1922	MHR_335B	1
1923	MED_100A	1
1924	MED_100B	2
1926	MED_200A	1
1927	MED_200B	2
1929	MED_300A	1
1930	MED_300B	2
1932	MHR_101A	1
1933	MHR_102A	1
1934	MHR_103A	1
1935	MHR_104A	1
1936	MHR_105A	1
1937	MHR_106A	1
1938	MHR_107A	1
1939	MHR_108A	1
1940	MHR_109A	1
1941	MHR_110A	1
1942	MHR_111A	1
1943	MHR_112A	1
1944	MHR_113A	1

Position	Variable Name	Format
1945	MHR_114A	1
1946	MHR_115A	1
1947	MHR_121	1
1948	MHR_122	2
1950	MHR_201A	1
1951	MHR_202A	1
1952	MHR_203A	1
1953	MHR_204A	1
1954	MHR_205A	1
1955	MHR_206A	1
1956	MHR_207A	1
1957	MHR_208A	1
1958	MHR_209A	1
1959	MHR_210A	1
1960	MHR_211A	1
1961	MHR_212A	1
1962	MHR_213A	1
1963	MHR_214A	1
1964	MHR_215A	1
1965	MHR_221	1
1966	MHR_222	2
1968	MHR_301A	1
1969	MHR_302A	1
1970	MHR_303A	1
1971	MHR_304A	1
1972	MHR_305A	1
1973	MHR_306A	1
1974	MHR_307A	1
1975	MHR_308A	1
1976	MHR_309A	1
1977	MHR_310A	1
1978	MHR_311A	1
1979	MHR_312A	1
1980	MHR_313A	1
1981	MHR_314A	1
1982	MHR_315A	1
1983	MHR_321	1
1984	MHR_322	2
1986	WGT_FULL	15.8

Appendix 8 Concordance table

Questionnaire variable name	Variable name on file	Comments
AFT_N11	AFT_11	record heart rate at the end of stage 1
	AFT_12	record heart rate at the end of stage 2
	AFT_13	record heart rate at the end of stage 3
	AFT_14	record heart rate at the end of stage 4
	AFT_15	record heart rate at the end of stage 5
	AFT_16	record heart rate at the end of stage 6
	AFT_17	record heart rate at the end of stage 7
	AFT_18	record heart rate at the end of stage 8
AFT_N22	AFT_22	
AFT_N81	AFT_81	
AFT_Q30	AFT_30	
AFT_Q31	AFT_31	
AFT_Q40	AFT_40	
AFT_R49	AFT_49	
ALC_Q11	ALC_11	
ALC_Q12	ALC_12	
ALC_Q13	ALC_13	
ALC_Q14	ALC_14	
ALC_Q15	ALC_15A	Sunday
	ALC_15B	Monday
	ALC_15C	Tuesday
	ALC_15D	Wednesday
	ALC_15E	Thursday
	ALC_15F	Friday
	ALC_15G	Saturday
ALC_Q16	ALC_16	
ALC_Q17	ALC_17	
ALC_Q18	ALC_18	
ALC_Q19	ALC_19	
AM_N11	AMC_10	
AM_N12	AMC_12	
AM_N21	AMC_21	
AM_N22	AMC_22	
AM_Q11	AMC_11	
ATG_N12	ATG_12	

Questionnaire variable name	Variable name on file	Comments
ATG_N13	ATG_13	
ATG_N32	ATG_32	
ATG_N33	ATG_33A	category 1
	ATG_33B	category 2
	ATG_33C	category 3
	ATG_33D	category 4
ATG_Q11	ATG_11H	hour
	ATG_11M	minute
	ATG_11X	am/ pm
ATG_Q21	ATG_21	
ATG_Q31	ATG_31	
ATG_Q41	ATG_41	
ATG_Q42	ATG_42	
AWC_AGE	DHH_AGE	
BD_Q01	DHH_BED	
BDC_B13	BDC_13D	day
	BDC_13M	month
	BDC_13Y	year
BDC_N24	BDC_24	
BDC_N25	BDC_25	
BDC_Q11	BDC_11	
BDC_Q12	BDC_12	
BDC_Q21	BDC_21	
BIR_N12	BIR_12	
BIR_N13	BIR_13	
BIR_N14	BIR_14	
BIR_Q11	BIR_11	
BIR_Q21	BIR_21	
BIR_Q22	BIR_22	
BIR_Q23	BIR_23	
BIR_Q24	BIR_24	
BIR_Q25	BIR_25	
BIR_Q26	BIR_26	
BJP_N3	PAR_5A3A	head/ jaw / category 1
	PAR_5A3B	head/ jaw / category 2
	PAR_5A3C	head/ jaw / category 3
	PAR_5A3D	head/ jaw / category 4

Questionnaire variable name	Variable name on file	Comments
	PAR_5A3E	head/ jaw / category 5
	PAR_5B3A	neck / category 1
	PAR_5B3B	neck / category 2
	PAR_5B3C	neck / category 3
	PAR_5B3D	neck / category 4
	PAR_5B3E	neck / category 5
	PAR_5C3A	back / spine (excluding neck) / category 1
	PAR_5C3B	back / spine (excluding neck) / category 2
	PAR_5C3C	back / spine (excluding neck) / category 3
	PAR_5C3D	back / spine (excluding neck) / category 4
	PAR_5C3E	back / spine (excluding neck) / category 5
	PAR_5D3A	shoulder / category 1
	PAR_5D3B	shoulder / category 2
	PAR_5D3C	shoulder / category 3
	PAR_5D3D	shoulder / category 4
	PAR_5D3E	shoulder / category 5
	PAR_5E3A	arm/ elbow / category 1
	PAR_5E3B	arm/ elbow / category 2
	PAR_5E3C	arm/ elbow / category 3
	PAR_5E3D	arm/ elbow / category 4
	PAR_5E3E	arm/ elbow / category 5
	PAR_5F3A	wrist / category 1
	PAR_5F3B	wrist / category 2
	PAR_5F3C	wrist / category 3
	PAR_5F3D	wrist / category 4
	PAR_5F3E	wrist / category 5
	PAR_5G3A	hand/ finger / category 1
	PAR_5G3B	hand/ finger / category 2
	PAR_5G3C	hand/ finger / category 3
	PAR_5G3D	hand/ finger / category 4
	PAR_5G3E	hand/ finger / category 5
	PAR_5H3A	hip / category 1
	PAR_5H3B	hip / category 2
	PAR_5H3C	hip / category 3
	PAR_5H3D	hip / category 4

Questionnaire variable name	Variable name on file	Comments
	PAR_5H3E	hip / category 5
	PAR_5I3A	leg/ knee / category 1
	PAR_5I3B	leg/ knee / category 2
	PAR_5I3C	leg/ knee / category 3
	PAR_5I3D	leg/ knee / category 4
	PAR_5I3E	leg/ knee / category 5
	PAR_5J3A	ankle / category 1
	PAR_5J3B	ankle / category 2
	PAR_5J3C	ankle / category 3
	PAR_5J3D	ankle / category 4
	PAR_5J3E	ankle / category 5
	PAR_5K3A	foot / toe / category 1
	PAR_5K3B	foot / toe / category 2
	PAR_5K3C	foot / toe / category 3
	PAR_5K3D	foot / toe / category 4
	PAR_5K3E	foot / toe / category 5
BJP_Q1	PAR_5A1	head/ jaw
	PAR_5B1	neck
	PAR_5C1	back / spine (excluding neck)
	PAR_5D1	shoulder
	PAR_5E1	arm/ elbow
	PAR_5F1	wrist
	PAR_5G1	hand/ finger
	PAR_5H1	hip
	PAR_5I1	leg/ knee
	PAR_5J1	ankle
	PAR_5K1	foot / toe
BJP_Q2	PAR_5A2A	head/ jaw / category 1
	PAR_5A2B	head/ jaw / category 2
	PAR_5A2C	head/ jaw / category 3
	PAR_5A2D	head/ jaw / category 4
	PAR_5A2E	head/ jaw / category 5
	PAR_5A2F	head/ jaw / category 6
	PAR_5A2G	head/ jaw / category 7
	PAR_5A2H	head/ jaw / category 8
	PAR_5A2I	head/ jaw / None
	PAR_5B2A	neck / category 1

Questionnaire variable name	Variable name on file	Comments
	PAR_5B2B	neck / category 2
	PAR_5B2C	neck / category 3
	PAR_5B2D	neck / category 4
	PAR_5B2E	neck / category 5
	PAR_5B2F	neck / category 6
	PAR_5B2G	neck / category 7
	PAR_5B2H	neck / category 8
	PAR_5B2I	neck / None
	PAR_5C2A	back / spine (excluding neck) / category 1
	PAR_5C2B	back / spine (excluding neck) / category 2
	PAR_5C2C	back / spine (excluding neck) / category 3
	PAR_5C2D	back / spine (excluding neck) / category 4
	PAR_5C2E	back / spine (excluding neck) / category 5
	PAR_5C2F	back / spine (excluding neck) / category 6
	PAR_5C2G	back / spine (excluding neck) / category 7
	PAR_5C2H	back / spine (excluding neck) / category 8
	PAR_5C2I	back / spine (excluding neck) / None
	PAR_5D2A	shoulder / category 1
	PAR_5D2B	shoulder / category 2
	PAR_5D2C	shoulder / category 3
	PAR_5D2D	shoulder / category 4
	PAR_5D2E	shoulder / category 5
	PAR_5D2F	shoulder / category 6
	PAR_5D2G	shoulder / category 7
	PAR_5D2H	shoulder / category 8
	PAR_5D2I	shoulder / None
	PAR_5E2A	arm/ elbow / category 1
	PAR_5E2B	arm/ elbow / category 2
	PAR_5E2C	arm/ elbow / category 3
	PAR_5E2D	arm/ elbow / category 4
	PAR_5E2E	arm/ elbow / category 5
	PAR_5E2F	arm/ elbow / category 6
	PAR_5E2G	arm/ elbow / category 7

Questionnaire variable name	Variable name on file	Comments
	PAR_5E2H	arm/ elbow / category 8
	PAR_5E2I	arm/ elbow / None
	PAR_5F2A	wrist / category 1
	PAR_5F2B	wrist / category 2
	PAR_5F2C	wrist / category 3
	PAR_5F2D	wrist / category 4
	PAR_5F2E	wrist / category 5
	PAR_5F2F	wrist / category 6
	PAR_5F2G	wrist / category 7
	PAR_5F2H	wrist / category 8
	PAR_5F2I	wrist / None
	PAR_5G2A	hand/ finger / category 1
	PAR_5G2B	hand/ finger / category 2
	PAR_5G2C	hand/ finger / category 3
	PAR_5G2D	hand/ finger / category 4
	PAR_5G2E	hand/ finger / category 5
	PAR_5G2F	hand/ finger / category 6
	PAR_5G2G	hand/ finger / category 7
	PAR_5G2H	hand/ finger / category 8
	PAR_5G2I	hand/ finger / None
	PAR_5H2A	hip / category 1
	PAR_5H2B	hip / category 2
	PAR_5H2C	hip / category 3
	PAR_5H2D	hip / category 4
	PAR_5H2E	hip / category 5
	PAR_5H2F	hip / category 6
	PAR_5H2G	hip / category 7
	PAR_5H2H	hip / category 8
	PAR_5H2I	hip / None
	PAR_5I2A	leg/ knee / category 1
	PAR_5I2B	leg/ knee / category 2
	PAR_5I2C	leg/ knee / category 3
	PAR_5I2D	leg/ knee / category 4
	PAR_5I2E	leg/ knee / category 5
	PAR_5I2F	leg/ knee / category 6
	PAR_5I2G	leg/ knee / category 7
	PAR_5I2H	leg/ knee / category 8

Questionnaire variable name	Variable name on file	Comments
	PAR_5I2I	leg/ knee / None
	PAR_5J2A	ankle / category 1
	PAR_5J2B	ankle / category 2
	PAR_5J2C	ankle / category 3
	PAR_5J2D	ankle / category 4
	PAR_5J2E	ankle / category 5
	PAR_5J2F	ankle / category 6
	PAR_5J2G	ankle / category 7
	PAR_5J2H	ankle / category 8
	PAR_5J2I	ankle / None
	PAR_5K2A	foot / toe / category 1
	PAR_5K2B	foot / toe / category 2
	PAR_5K2C	foot / toe / category 3
	PAR_5K2D	foot / toe / category 4
	PAR_5K2E	foot / toe / category 5
	PAR_5K2F	foot / toe / category 6
	PAR_5K2G	foot / toe / category 7
	PAR_5K2H	foot / toe / category 8
	PAR_5K2I	foot / toe / None
BPM_D411	BPMDBPA	
BPM_D412	BPMDBPK	
BPM_N101	BPM_100	
BPM_N160	BPM_160	
BPM_Q101	BPM_100A	
BPM_Q110	BPM_100B	
BPR_N1A	AFT_31A	
BPR_N1B	AFT_31B	
BPR_N2	AFT_32	
BPR_N3	AFT_33A	category #1
	AFT_33B	category #2
	AFT_33C	category #3
	AFT_33D	category #4
	AFT_33E	category #5
BRI_Q11	BRI_11	
BRI_Q12	BRI_12	
BRI_Q13	BRI_13	
CCC_Q101	CCC_101	
CCC_Q11	CCC_11	

Questionnaire variable name	Variable name on file	Comments
CCC_Q12	CCC_12	
CCC_Q13	CCC_13	
CCC_Q21	CCC_21	
CCC_Q22	CCC_22	
CCC_Q23	CCC_23	
CCC_Q24	CCC_24	
CCC_Q31	CCC_31	
CCC_Q32	CCC_32	
CCC_Q33	CCC_33	
CCC_Q34	CCC_34	
CCC_Q41	CCC_41	
CCC_Q42	CCC_42	
CCC_Q43	CCC_43	
CCC_Q44	CCC_44	
CCC_Q45	CCC_45	
CCC_Q46	CCC_46	
CCC_Q51	CCC_51	
CCC_Q52A	CCC_52A	
CCC_Q52B	CCC_52B	
CCC_Q52C	CCC_52C	
CCC_Q53	CCC_53	
CCC_Q61	CCC_61	
CCC_Q62	CCC_62	
CCC_Q63	CCC_63	
CCC_Q71	CCC_71	
CCC_Q72	CCC_72	
CCC_Q73	CCC_73	
CCC_Q74	CCC_74A	category #1
	CCC_74B	category #2
	CCC_74C	category #3
	CCC_74D	category #4
	CCC_74E	category #5
CCC_Q75	CCC_75A	category #1
	CCC_75B	category #2
	CCC_75C	category #3
	CCC_75D	category #4
	CCC_75E	category #5

Questionnaire variable name	Variable name on file	Comments
CCC_Q81	CCC_81	
CCC_Q82	CCC_82	
CCC_Q83	CCC_83	
CCC_Q84	CCC_84	
CCC_Q85	CCC_85A	category #1
	CCC_85B	category #2
	CCC_85C	category #3
	CCC_85D	category #4
CCC_Q91	CCC_91	
CCC_Q92	CCC_92	
CCC_Q93	CCC_93	
CCC_Q94	CCC_94A	category #1
	CCC_94B	category #2
	CCC_94C	category #3
	CCC_94D	category #4
	CCC_94E	category #5
	CCC_94F	category #6
	CCC_94G	category #7
CCC_Q95	CCC_95	
CCC_Q96	CCC_96A	category #1
	CCC_96B	category #2
	CCC_96C	category #3
CDP_Q1	MHR_101A	prescription medication #1
	MHR_102A	prescription medication #2
	MHR_103A	prescription medication #3
	MHR_104A	prescription medication #4
	MHR_105A	prescription medication #5
	MHR_106A	prescription medication #6
	MHR_107A	prescription medication #7
	MHR_108A	prescription medication #8
	MHR_109A	prescription medication #9
	MHR_110A	prescription medication #10
	MHR_111A	prescription medication #11
	MHR_112A	prescription medication #12
	MHR_113A	prescription medication #13
	MHR_114A	prescription medication #14
	MHR_115A	prescription medication #15
	MHR_201A	over-the-counter medication #1

Questionnaire variable name	Variable name on file	Comments
	MHR_202A	over-the-counter medication #2
	MHR_203A	over-the-counter medication #3
	MHR_204A	over-the-counter medication #4
	MHR_205A	over-the-counter medication #5
	MHR_206A	over-the-counter medication #6
	MHR_207A	over-the-counter medication #7
	MHR_208A	over-the-counter medication #8
	MHR_209A	over-the-counter medication #9
	MHR_210A	over-the-counter medication #10
	MHR_211A	over-the-counter medication #11
	MHR_212A	over-the-counter medication #12
	MHR_213A	over-the-counter medication #13
	MHR_214A	over-the-counter medication #14
	MHR_215A	over-the-counter medication #15
	MHR_301A	health product and herbal remedies #1
	MHR_302A	health product and herbal remedies #2
	MHR_303A	health product and herbal remedies #3
	MHR_304A	health product and herbal remedies #4
	MHR_305A	health product and herbal remedies #5
	MHR_306A	health product and herbal remedies #6
	MHR_307A	health product and herbal remedies #7
	MHR_308A	health product and herbal remedies #8
	MHR_309A	health product and herbal remedies #9
	MHR_310A	health product and herbal remedies #10
	MHR_311A	health product and herbal remedies #11
	MHR_312A	health product and herbal remedies #12
	MHR_313A	health product and herbal remedies #13
	MHR_314A	health product and herbal remedies #14
	MHR_315A	health product and herbal remedies #15
CDP_Q2	MHR_101B	prescription medication #1
	MHR_102B	prescription medication #2
	MHR_103B	prescription medication #3
	MHR_104B	prescription medication #4

Questionnaire variable name	Variable name on file	Comments
	MHR_105B	prescription medication #5
	MHR_106B	prescription medication #6
	MHR_107B	prescription medication #7
	MHR_108B	prescription medication #8
	MHR_109B	prescription medication #9
	MHR_110B	prescription medication #10
	MHR_111B	prescription medication #11
	MHR_112B	prescription medication #12
	MHR_113B	prescription medication #13
	MHR_114B	prescription medication #14
	MHR_115B	prescription medication #15
	MHR_201B	over-the-counter medication #1
	MHR_202B	over-the-counter medication #2
	MHR_203B	over-the-counter medication #3
	MHR_204B	over-the-counter medication #4
	MHR_205B	over-the-counter medication #5
	MHR_206B	over-the-counter medication #6
	MHR_207B	over-the-counter medication #7
	MHR_208B	over-the-counter medication #8
	MHR_209B	over-the-counter medication #9
	MHR_210B	over-the-counter medication #10
	MHR_211B	over-the-counter medication #11
	MHR_212B	over-the-counter medication #12
	MHR_213B	over-the-counter medication #13
	MHR_214B	over-the-counter medication #14
	MHR_215B	over-the-counter medication #15
	MHR_301B	health product and herbal remedies #1
	MHR_302B	health product and herbal remedies #2
	MHR_303B	health product and herbal remedies #3
	MHR_304B	health product and herbal remedies #4
	MHR_305B	health product and herbal remedies #5
	MHR_306B	health product and herbal remedies #6
	MHR_307B	health product and herbal remedies #7
	MHR_308B	health product and herbal remedies #8
	MHR_309B	health product and herbal remedies #9
	MHR_310B	health product and herbal remedies #10
	MHR_311B	health product and herbal remedies #11

Questionnaire variable name	Variable name on file	Comments
	MHR_312B	health product and herbal remedies #12
	MHR_313B	health product and herbal remedies #13
	MHR_314B	health product and herbal remedies #14
	MHR_315B	health product and herbal remedies #15
CON_AGE	CLC_AGE	
CON_N15	CON_15	
CON_N16	CON_16	
CON_N23	CON_23	
CON_N24	CON_24	
CON_N25	CON_25	
CON_N26	CON_26	
CON_Q11	CON_11	
CON_SEX	CLC_SEX	
CPA_Q11	CPA_11	
CPA_Q12	CPA_12	
CPA_Q13	CPA_13	
CPA_Q14	CPA_14	
CPA_Q15	CPA_15	
CPA_Q16	CPA_16	
CPA_Q17	CPA_17	
CPA_Q18	CPA_18	
DFC_B11	DFC_11	amount
	DFC_11N	reporting period
	DFCD11Y	per year
DFC_B12	DFC_12	amount
	DFC_12N	reporting period
	DFCD12Y	per year
ECQ_Q13	ECQ_LNK	
ECQ_Q22	ECQ_SHR	
ED_Q01	DHH_ED1	
ED_Q02	DHH_ED2	
ED_Q03	DHH_ED3	
ED_Q04	DHH_ED4	
EDU_Q01	EDU_01	
EDU_Q02	EDU_02	

Questionnaire variable name	Variable name on file	Comments
ETS_Q11	ETS_11	
ETS_Q12	ETS_12	
ETS_Q13	ETS_13	
ETS_Q14	ETS_14	
ETS_Q15	ETS_15	
ETS_Q16	ETS_16	
ETS_Q17	ETS_17	
FMH_Q11	FMH_11	
FMH_Q12	FMH_12	
FMH_Q13	FMH_13	
FMH_Q14	FMH_14	
FMH_Q15	FMH_15	
FMH_Q16	FMH_16	
FMH_Q17	FMH_17	
FMH_Q18	FMH_18	
FMH_Q19	FMH_19	
FMH_Q21	FMH_21	
FMH_Q22	FMH_22	
FMH_Q23	FMH_23	
FMH_Q24	FMH_24	
GEN_Q11	GEN_11	
GEN_Q12	GEN_12	
GEN_Q13	GEN_13	
GEN_Q14	GEN_14	
GEN_Q15	GEN_15	
GEN_Q16	GEN_16	
GEN_Q17	GEN_17	
GEN_Q18	GEN_18	
GEN_Q19	GEN_19	
GEN_Q20	GEN_20	
GFV_B11	GFV_11	amount
	GFV_11N	reporting period
	GFVD11Y	amount per year
GFV_B12	GFV_12	amount
	GFV_12N	reporting period
	GFVD12Y	amount per year
GFV_B13	GFV_13	amount
	GFV_13N	reporting period

Questionnaire variable name	Variable name on file	Comments
	GFVD13Y	amount per year
GFV_B14	GFV_14	amount
	GFV_14N	reporting period
	GFVD14Y	amount per year
GFV_B15	GFV_15	amount
	GFV_15N	reporting period
	GFVD15Y	amount per year
GFV_B16	GFV_16	amount
	GFV_16N	reporting period
	GFVD16Y	amount per year
GFV_B17	GFV_17	amount
	GFV_17N	reporting period
	GFVD17Y	amount per year
GFV_B18	GFV_18	amount
	GFV_18N	reporting period
	GFVD18Y	amount per year
GFV_B19	GFV_19	amount
	GFV_19N	reporting period
	GFVD19Y	amount per year
GFV_B20	GFV_20	amount
	GFV_20N	reporting period
	GFVD20Y	amount per year
GFV_B21	GFV_21	amount
	GFV_21N	reporting period
	GFVD21Y	amount per year
GFV_B22	GFV_22	amount
	GFV_22N	reporting period
	GFVD22Y	amount per year
GFV_B23	GFV_23	amount
	GFV_23N	reporting period
	GFVD23Y	amount per year
GPU_Q11	GPU_11A	category#1
	GPU_11B	category#2
	GPU_11C	category#3
	GPU_11D	category#4
	GPU_11E	category#5
	GPU_11F	category#6

Questionnaire variable name	Variable name on file	Comments
	GPU_11G	category#7
	GPU_11H	category#8
GPU_Q12	GPU_12	category 1 / amount
	GPU_12N	category 1 / reporting period
	GPUD12Y	category 1 / amount per year
	GPU_13	category 2 / amount
	GPU_13N	category 2 / reporting period
	GPUD13Y	category 2 / amount per year
	GPU_14	category 3 / amount
	GPU_14N	category 3 / reporting period
	GPUD14Y	category 3 / amount per year
	GPU_15	category 4 / amount
	GPU_15N	category 4 / reporting period
	GPUD15Y	category 4 / amount per year
	GPU_16	category 5 / amount
	GPU_16N	category 5 / reporting period
	GPUD16Y	category 5 / amount per year
	GPU_17	category 6 / amount
	GPU_17N	category 6 / reporting period
	GPUD17Y	category 6 / amount per year
	GPU_18	category 7 / amount
	GPU_18N	category 7 / reporting period
	GPUD18Y	category 7 / amount per year
GSM_N11	GSM_11	
GSM_N12	GSM_12	
GSM_N21	GSM_21	
GSM_N22	GSM_22	
HEP_Q11	HEP_11	
HEP_Q12	HEP_12	
HEP_Q13	HEP_13	
HOB_Q11	HOB_11A	category 1
	HOB_11B	category 2
	HOB_11C	category 3
	HOB_11D	category 4
	HOB_11E	category 5
	HOB_11F	category 6
	HOB_11G	category 7
	HOB_11H	category 8

Questionnaire variable name	Variable name on file	Comments
	HOB_11I	category 9
	HOB_11J	category 10
	HOB_11K	category 11
HOB_Q12	HOB_12	category 1 / amount
	HOB_12N	category 1 / reporting period
	HOB_13	category 2 / amount
	HOB_13N	category 2 / reporting period
	HOB_14	category 3 / amount
	HOB_14N	category 3 / reporting period
	HOB_15	category 4 / amount
	HOB_15N	category 4 / reporting period
	HOB_16	category 5 / amount
	HOB_16N	category 5 / reporting period
	HOB_17	category 6 / amount
	HOB_17N	category 6 / reporting period
	HOB_18	category 7 / amount
	HOB_18N	category 7 / reporting period
	HOB_19	category 8 / amount
	HOB_19N	category 8 / reporting period
	HOB_20	category 9 / amount
	HOB_20N	category 9 / reporting period
	HOB_21	category 10 / amount
	HOB_21N	category 10 / reporting period
HOB_Q13	HOB_12T	category 1 / time spent on each occasion
	HOBD12Y	category 1 / amount per year
	HOB_13T	category 2 / time spent on each occasion
	HOBD13Y	category 2 / amount per year
	HOB_14T	category 3 / time spent on each occasion
	HOBD14Y	category 3 / amount per year
	HOB_15T	category 4 / time spent on each occasion
	HOBD15Y	category 4 / amount per year
	HOB_16T	category 5 / time spent on each occasion
	HOBD16Y	category 5 / amount per year
	HOB_17T	category 6 / time spent on each occasion

Questionnaire variable name	Variable name on file	Comments
		occasion
	HOBD17Y	category 6 / amount per year
	HOB_18T	category 7 / time spent on each occasion
	HOBD18Y	category 7 / amount per year
	HOB_19T	category 8 / time spent on each occasion
	HOBD19Y	category 8 / amount per year
	HOB_20T	category 9 / time spent on each occasion
	HOBD20Y	category 9 / amount per year
	HOB_21T	category 10 / time spent on each occasion
	HOBD21Y	category 10 / amount per year
HSC_Q11	HSC_11	
HSC_Q12	HSC_12	
HSC_Q13	HSC_13A	category 1
	HSC_13B	category 2
	HSC_13C	category 3
	HSC_13D	category 4
	HSC_13E	category 5
	HSC_13F	category 6
	HSC_13G	category 7
HSC_Q31	HSC_31	
HSC_Q33A	HSC_33A	category 1
	HSC_33B	category 2
	HSC_33C	category 3
	HSC_33D	category 4
	HSC_33E	category 5
	HSC_33F	category 6
	HSC_33G	category 7
	HSC_33H	category 8
	HSC_33I	category 9
HSC_Q34	HSC_34	
HSC_Q35	HSC_35	
HSC_Q36	HSC_36	
HSC_Q37	HSC_37	
HSC_Q41	HSC_41	
HSC_Q42	HSC_42	
HSC_Q43	HSC_43	

Questionnaire variable name	Variable name on file	Comments
HSC_Q44	HSC_44	
HUI_Q01	HUI_01	
HUI_Q02	HUI_02	
HUI_Q03	HUI_03	
HUI_Q04	HUI_04	
HUI_Q05	HUI_05	
HUI_Q06	HUI_06	
HUI_Q07	HUI_07	
HUI_Q07A	HUI_07A	
HUI_Q08	HUI_08	
HUI_Q09	HUI_09	
HUI_Q10	HUI_10	
HUI_Q11	HUI_11	
HUI_Q12	HUI_12	
HUI_Q13	HUI_13	
HUI_Q14	HUI_14	
HUI_Q15	HUI_15	
HUI_Q16	HUI_16	
HUI_Q17	HUI_17	
HUI_Q18	HUI_18	
HUI_Q19	HUI_19	
HUI_Q20	HUI_20	
HUI_Q21	HUI_21	
HUI_Q22	HUI_22	
HUI_Q23	HUI_23	
HUI_Q24	HUI_24	
HUI_Q25	HUI_25	
HUI_Q26	HUI_26	
HUI_Q27	HUI_27	
HUI_Q28	HUI_28	
HUI_Q29	HUI_29	
HUI_Q30	HUI_30	
HWM_N11	HWM_11	
HWM_N13	HWM_13	
HWM_Q11, HWN_N11A, HWN_N11B, HWN_N11C	HWM_11CM	
HWN_N12A, HWN_N12B, HWN_N12C	HWM_12CM	

Questionnaire variable name	Variable name on file	Comments
HWN_N13A, HWN_N13B, HWN_N13C	HWM_13KG	
HWN_N14A, HWN_N14B, HWN_N14C	HWM_14CM	
HWN_N15A, HWN_N15B, HWN_N15C	HWM_15CM	
HWT_B3	HWT_3	amount
	HWT_3N	unit of measurement
	HWTDKG	in kilograms
	HWTDLB	in pounds
HWT_N2A	HWT_2A	
HWT_N2B	HWT_2B	
HWT_N2C	HWT_2C	
HWT_N2D	HWT_2D	
HWT_N2E	HWT_2E	
HWT_N2F	HWT_2F	
HWT_N2G	HWT_2G	
HWT_Q2	HWT_2	amount
	HWTDCM	centimeters
	HWTDIN	inches
HWT_Q4	HWT_4	
IDU_Q11	IDU_11	
IDU_Q12	IDU_12	
IDU_Q13	IDU_13	
IDU_Q14	IDU_14	
IDU_Q15	IDU_15	
IDU_Q16	IDU_16	
INC_Q11	INC_11A	category #1
	INC_11B	category #2
	INC_11C	category #3
	INC_11D	category #4
	INC_11E	category #5
	INC_11F	category #6
	INC_11G	category #7
	INC_11H	category #8
	INC_11I	category #9
	INC_11J	category #10
	INC_11K	category #11

Questionnaire variable name	Variable name on file	Comments
	INC_11L	category #12
	INC_11M	category #13
	INC_11N	category #14
INC_Q12	INC_12	
INC_Q21	INC_21	
INC_Q22	INC_22	
INC_Q23	INC_23	
INC_Q24	INC_24	
INC_Q25	INC_25	
INC_Q26	INC_26	
INC_Q27	INC_27	
INC_Q28	INC_28	
INC_Q31	INC_31	
INC_Q32	INC_32	
INC_Q33	INC_33	
INC_Q34	INC_34	
INC_Q35	INC_35	
INC_Q36	INC_36	
INC_Q37	INC_37	
INC_Q38	INC_38	
LBF_Q01	LBF_01	
LBF_Q02	LBF_02	
LBF_Q03	LBF_03	
LBF_Q11	LBF_11	
LBF_Q13	LBF_13	
LBF_Q14	LBF_14	
LBF_Q21	LBF_21	
LBF_Q22	LBF_22	
LBF_Q23	LBF_23	
LBF_Q31	LBF_31	
LBF_Q31A	LBF_31A	
LBF_Q36A	LBF_36A	
LBF_Q36B	LBF_36B	
LBF_Q37	LBF_37	
LBF_Q41	LBF_41	
LBF_Q41A	LBF_41A	
LBF_Q42	LBF_42	

Questionnaire variable name	Variable name on file	Comments
LBF_Q44	LBF_44	
LBF_Q45	LBF_45	
LBF_Q46	LBF_46	
LBF_Q51	LBF_51	
LBF_Q52	LBF_52	
LBF_Q53	LBF_53	
LBF_Q54	LBF_54	
LBF_Q61	LBF_61	
LBF_Q71	LBF_71	
LBF_Q72	LBF_72	
LBF_Q73	LBF_73	
LBF_Q74	LBF_74	
LNG_N11	CLC_LNG	
MBF_Q11	MBF_11	
MBF_Q12	MBF_12	
MBF_Q21	MBF_21A	child #1
	MBF_22A	child #2
	MBF_23A	child #3
	MBF_24A	child #4
	MBF_25A	child #5
	MBF_26A	child #6
	MBF_27A	child #7
	MBF_28A	child #8
	MBF_29A	child #9
	MBF_30A	child #10
	MBF_31A	child #11
	MBF_32A	child #12
	MBF_33A	child #13
	MBF_34A	child #14
	MBF_35A	child #15
MBF_Q22	MBF_21B	child #1
	MBF_22B	child #2
	MBF_23B	child #3
	MBF_24B	child #4
	MBF_25B	child #5
	MBF_26B	child #6
	MBF_27B	child #7
	MBF_28B	child #8

Questionnaire variable name	Variable name on file	Comments
	MBF_29B	child #9
	MBF_30B	child #10
	MBF_31B	child #11
	MBF_32B	child #12
	MBF_33B	child #13
	MBF_34B	child #14
	MBF_35B	child #15
MDC_B11	MDC_11	amount
	MDC_11N	reporting period
	MDCD11Y	amount per year
MDC_B13	MDC_13	amount
	MDC_13N	reporting period
	MDCD13Y	amount per year
MDC_B14	MDC_14	amount
	MDC_14N	reporting period
	MDCD14Y	amount per year
MDC_B15	MDC_15	amount
	MDC_15N	reporting period
	MDCD15Y	amount per year
MDC_Q12	MDC_12A	category #1
	MDC_12B	category #2
	MDC_12C	category #3
	MDC_12D	category #4
	MDC_12E	category #5
	MDC_12F	category #6
	MDC_12G	category #7
	MDC_12H	category #8
	MDC_12I	category #9
MED_B101B	MED_101B	prescription medication #1
	MED_102B	prescription medication #2
	MED_103B	prescription medication #3
	MED_104B	prescription medication #4
	MED_105B	prescription medication #5
	MED_106B	prescription medication #6
	MED_107B	prescription medication #7
	MED_108B	prescription medication #8
	MED_109B	prescription medication #9

Questionnaire variable name	Variable name on file	Comments
	MED_110B	prescription medication #10
	MED_111B	prescription medication #11
	MED_112B	prescription medication #12
	MED_113B	prescription medication #13
	MED_114B	prescription medication #14
	MED_115B	prescription medication #15
MED_B201B	MED_201B	non-prescription medication #1
	MED_202B	non-prescription medication #2
	MED_203B	non-prescription medication #3
	MED_204B	non-prescription medication #4
	MED_205B	non-prescription medication #5
	MED_206B	non-prescription medication #6
	MED_207B	non-prescription medication #7
	MED_208B	non-prescription medication #8
	MED_209B	non-prescription medication #9
	MED_210B	non-prescription medication #10
	MED_211B	non-prescription medication #11
	MED_212B	non-prescription medication #12
	MED_213B	non-prescription medication #13
	MED_214B	non-prescription medication #14
	MED_215B	non-prescription medication #15
MED_B301B	MED_301B	other health products and herbal remedies #1
	MED_302B	other health products and herbal remedies #2
	MED_303B	other health products and herbal remedies #3
	MED_304B	other health products and herbal remedies #4
	MED_305B	other health products and herbal remedies #5
	MED_306B	other health products and herbal remedies #6
	MED_307B	other health products and herbal remedies #7
	MED_308B	other health products and herbal remedies #8
	MED_309B	other health products and herbal remedies #9
	MED_310B	other health products and herbal remedies #10
	MED_311B	other health products and herbal

Questionnaire variable name	Variable name on file	Comments
		remedies #11
	MED_312B	other health products and herbal remedies #12
	MED_313B	other health products and herbal remedies #13
	MED_314B	other health products and herbal remedies #14
	MED_315B	other health products and herbal remedies #15
MED_Q100A	MED_100A	
MED_Q100B	MED_100B	
MED_Q200A	MED_200A	
MED_Q200B	MED_200B	
MED_Q300A	MED_300A	
MED_Q300B	MED_300B	
MFC_B11	MFC_11	amount
	MFC_11N	reporting period
	MFCD11Y	amount per year
MFC_B12	MFC_12	amount
	MFC_12N	reporting period
	MFCD12Y	amount per year
MFC_B13	MFC_13	amount
	MFC_13N	reporting period
	MFCD13Y	amount per year
MFC_B14	MFC_14	amount
	MFC_14N	reporting period
	MFCD14Y	amount per year
MFC_B15	MFC_15	amount
	MFC_15N	reporting period
	MFCD15Y	amount per year
MFC_B16	MFC_16	amount
	MFC_16N	reporting period
	MFCD16Y	amount per year
MFC_B17	MFC_17	amount
	MFC_17N	reporting period
	MFCD17Y	amount per year
MFC_B18	MFC_18	amount
	MFC_18N	reporting period
	MFCD18Y	amount per year

Questionnaire variable name	Variable name on file	Comments
MFC_B19	MFC_19	amount
	MFC_19N	reporting period
	MFCD19Y	amount per year
MFC_B20	MFC_20	amount
	MFC_20N	reporting period
	MFCD20Y	amount per year
MFC_B21	MFC_21	amount
	MFC_21N	reporting period
	MFCD21Y	amount per year
MHR_Q121	MHR_121	
MHR_Q122	MHR_122	
MHR_Q221	MHR_221	
MHR_Q222	MHR_222	
MHR_Q321	MHR_321	
MHR_Q322	MHR_322	
MHR_Q411	MHR_411	
MSWC_Q02	DHH_MS	
NDP_Q5	MHR_131B	prescription medication/ category #1
	MHR_132B	prescription medication/ category #2
	MHR_133B	prescription medication/ category #3
	MHR_134B	prescription medication/ category #4
	MHR_135B	prescription medication/ category #5
	MHR_231B	over-the-counter medication / category #1
	MHR_232B	over-the-counter medication / category #2
	MHR_233B	over-the-counter medication / category #3
	MHR_234B	over-the-counter medication / category #4
	MHR_235B	over-the-counter medication / category #5
	MHR_331B	health product and herbal remedies / category #1
	MHR_332B	health product and herbal remedies / category #2
	MHR_333B	health product and herbal remedies / category #3
	MHR_334B	health product and herbal remedies / category #4
	MHR_335B	health product and herbal remedies / category #5

Questionnaire variable name	Variable name on file	Comments
OHE_N11	OHE_11	
OHE_N12	OHE_12A	category #1
	OHE_12B	category #2
	OHE_12C	category #3
	OHE_12D	category #4
	OHE_12E	category #5
	OHE_12F	category #6
OHE_N13	OHE_13A	category #1
	OHE_13B	category #2
	OHE_13C	category #3
	OHE_13D	category #4
	OHE_13E	category #5
	OHE_13F	category #6
OHE_N14	OHE_14A	category #1
	OHE_14B	category #2
	OHE_14C	category #3
	OHE_14D	category #4
	OHE_14E	category #5
	OHE_14F	category #6
	OHE_14G	category #7
	OHE_14H	category #8
	OHE_14I	category #9
	OHE_14J	category #10
OHE_N15	OHE_15	
OHE_N20	OHE_20	
OHE_N21	OHE_21A	category #1
	OHE_21B	category #2
	OHE_21C	category #3
	OHE_21D	category #4
	OHE_21E	category #5
	OHE_21F	category #6
	OHE_21G	category #7
	OHE_21H	category #8
	OHE_21I	category #9
OHE_N22	OHE_22	
OHE_N23	OHE_23	
OHE_N31	OHE_31G2	Tooth 12 (52)

Questionnaire variable name	Variable name on file	Comments
	OHE_31G1	tooth 16 (55)
	OHE_31G3	tooth 24 (64)
	OHE_31G5	tooth 32 (72)
	OHE_31G4	tooth 36 (75)
	OHE_31G6	tooth 44 (84)
OHE_N32	OHE_32C1	calculus / teeth 17 & 16
	OHE_32C2	calculus / tooth 11
	OHE_32C3	calculus / teeth 26 & 27
	OHE_32C4	calculus / teeth 37 & 36
	OHE_32C5	calculus / tooth 31
	OHE_32C6	calculus / teeth 46 & 47
	OHE_32D1	debris / teeth 17 & 16
	OHE_32D2	debris / tooth 11
	OHE_32D3	debris / teeth 26 & 27
	OHE_32D4	debris / teeth 37 & 36
	OHE_32D5	debris / tooth 31
	OHE_32D6	debris / teeth 46 & 47
	OHE_32P1	probing score / teeth 17 & 16
	OHE_32P2	probing score / tooth 11
	OHE_32P3	probing score / teeth 26 & 27
	OHE_32P4	probing score / teeth 37 & 36
	OHE_32P5	probing score / tooth 31
	OHE_32P6	probing score / teeth 46 & 47
	OHE_32R1	Attachment loss / teeth 17 & 16
	OHE_32R2	Attachment loss / tooth 11
	OHE_32R3	Attachment loss / teeth 26 & 27
	OHE_32R4	Attachment loss / teeth 37 & 36
	OHE_32R5	Attachment loss / tooth 31
	OHE_32R6	Attachment loss / teeth 46 & 47
OHE_N41	OHE_1C11	crown 11
	OHE_1C12	crown 12
	OHE_1C13	crown 13
	OHE_1C14	crown 14
	OHE_1C15	crown 15
	OHE_1C16	crown 16
	OHE_1C17	crown 17
	OHE_1C21	crown 21
	OHE_1C22	crown 22

Questionnaire variable name	Variable name on file	Comments
	OHE_1C23	crown 23
	OHE_1C24	crown 24
	OHE_1C25	crown 25
	OHE_1C26	crown 26
	OHE_1C27	crown 27
	OHE_1C31	crown 31
	OHE_1C32	crown 32
	OHE_1C33	crown 33
	OHE_1C34	crown 34
	OHE_1C35	crown 35
	OHE_1C36	crown 36
	OHE_1C37	crown 37
	OHE_1C41	crown 41
	OHE_1C42	crown 42
	OHE_1C43	crown 43
	OHE_1C44	crown 44
	OHE_1C45	crown 45
	OHE_1C46	crown 46
	OHE_1C47	crown 47
	OHE_1R11	root 11
	OHE_1R12	root 12
	OHE_1R13	root 13
	OHE_1R14	root 14
	OHE_1R15	root 15
	OHE_1R16	root 16
	OHE_1R17	root 17
	OHE_1R21	root 21
	OHE_1R22	root 22
	OHE_1R23	root 23
	OHE_1R24	root 24
	OHE_1R25	root 25
	OHE_1R26	root 26
	OHE_1R27	root 27
	OHE_1R31	root 31
	OHE_1R32	root 32
	OHE_1R33	root 33
	OHE_1R34	root 34

Questionnaire variable name	Variable name on file	Comments
	OHE_1R35	root 35
	OHE_1R36	root 36
	OHE_1R37	root 37
	OHE_1R41	root 41
	OHE_1R42	root 42
	OHE_1R43	root 43
	OHE_1R44	root 44
	OHE_1R45	root 45
	OHE_1R46	root 46
	OHE_1R47	root 47
	OHE_1T51	baby tooth 51
	OHE_1T52	baby tooth 52
	OHE_1T53	baby tooth 53
	OHE_1T54	baby tooth 54
	OHE_1T55	baby tooth 55
	OHE_1T61	baby tooth 61
	OHE_1T62	baby tooth 62
	OHE_1T63	baby tooth 63
	OHE_1T64	baby tooth 64
	OHE_1T65	baby tooth 65
	OHE_1T71	baby tooth 71
	OHE_1T72	baby tooth 72
	OHE_1T73	baby tooth 73
	OHE_1T74	baby tooth 74
	OHE_1T75	baby tooth 75
	OHE_1T81	baby tooth 81
	OHE_1T82	baby tooth 82
	OHE_1T83	baby tooth 83
	OHE_1T84	baby tooth 84
	OHE_1T85	baby tooth 85
OHE_N42	OHE_42	
OHE_N43	OHE_3T11	tooth 11
	OHE_3T12	Tooth 12
	OHE_3T21	tooth 21
	OHE_3T22	Tooth 22
	OHE_3T31	tooth 31
	OHE_3T32	Tooth 32
	OHE_3T41	tooth 41

Questionnaire variable name	Variable name on file	Comments
	OHE_3T42	Tooth 42
OHE_N51	OHE_51A	category 1
	OHE_51B	category 2
	OHE_51C	category 3
	OHE_51D	category 4
	OHE_51E	category 5
	OHE_51F	category 6
OHE_N52	OHE_52A	category 1
	OHE_52B	category 2
	OHE_52C	category 3
	OHE_52D	category 4
	OHE_52E	category 5
	OHE_52F	category 6
OHE_N53	OHE_53A	category 1
	OHE_53B	category 2
	OHE_53C	category 3
	OHE_53D	category 4
	OHE_53E	category 5
	OHE_53F	category 6
	OHE_53G	category 7
	OHE_53H	category 8
	OHE_53I	category 9
	OHE_53J	category 10
	OHE_53K	category 11
OHE_N61	OHE_61	
OHE_N62	OHE_62	
OHE_N63	OHE_63	
OHE_N64	OHE_64	
OHE_N65	OHE_65	
OHE_N66	OHE_66	
OHE_N67	OHE_67	
OHE_N68	OHE_68	
OHE_N71	OHE_71	
OHE_N72	OHE_72	
OHM_N31	OHMD31Y	amount per year
	OHM_31N	reporting period
OHM_N32	OHMD32Y	amount per year

Questionnaire variable name	Variable name on file	Comments
	OHM_32N	reporting period
OHM_Q11	OHM_11	
OHM_Q12	OHM_12	
OHM_Q21	OHM_21	
OHM_Q22	OHM_22	
OHM_Q23	OHM_23	
OHM_Q24	OHM_24	
OHM_Q25	OHM_25	
OHM_Q31	OHM_31	
OHM_Q32	OHM_32	
OHM_Q33	OHM_33	
OHM_Q34	OHM_34	
OHM_Q41	OHM_41	
OHM_Q42	OHM_42	
OHM_Q43	OHM_43	
OHM_Q44	OHM_44A	category #1
	OHM_44B	category #2
	OHM_44C	category #3
	OHM_44D	category #4
	OHM_44E	category #5
OHQ_12	OHQ_12A	category #1
	OHQ_12B	category #2
	OHQ_12C	category #3
	OHQ_12D	category #4
	OHQ_12E	category #5
	OHQ_12F	category #6
	OHQ_12G	category #7
	OHQ_12H	category #8
	OHQ_12I	category #9
	OHQ_12J	category #10
	OHQ_12K	category #11
	OHQ_12L	category #12
OHQ_Q11	OHQ_11	
OHQ_Q21	OHQ_21	
OHQ_Q22	OHQ_22	
OHQ_Q23	OHQ_23	
OHQ_Q24	OHQ_24	
OHQ_Q25	OHQ_25	

Questionnaire variable name	Variable name on file	Comments
OHQ_Q26	OHQ_26	
OHQ_Q27	OHQ_27	
OHQ_Q28	OHQ_28	
OHR_D25	OHRD25	
OHR_Q11	OHR_11	
OHR_Q12	OHR_12	
OHR_Q13	OHR_13	
OHR_Q14	OHR_14	
OHR_Q15	OHR_15	
OHR_Q16	OHR_16	
OHR_Q17	OHR_17	
OHR_Q18	OHR_18	
OHR_Q19	OHR_19	
OHR_Q20	OHR_20	
OHR_Q21	OHR_21	
OHR_Q22	OHR_22	
OHR_Q23	OHR_23	
OHR_Q24	OHR_24	
ORS_N1	ORS_1	
ORS_N2	ORS_2	
ORS_N3	ORS_3	
ORS_N4	ORS_4	
ORS_N5	ORS_5	
ORS_Q1	ORS_0	
PAC_Q11	PAC_11A	category #1
	PAC_11B	category #2
	PAC_11C	category #3
	PAC_11D	category #4
	PAC_11E	category #5
	PAC_11F	category #6
	PAC_11G	category #7
	PAC_11H	category #8
	PAC_11I	category #9
	PAC_11J	category #10
	PAC_11K	category #11
	PAC_11L	category #12
	PAC_11M	category #13

Questionnaire variable name	Variable name on file	Comments
	PAC_11N	category #14
	PAC_11O	category #15
	PAC_11P	category #16
	PAC_11Q	category #17
	PAC_11R	category #18
	PAC_11S	category #19
	PAC_11T	category #20
	PAC_11U	category #21
	PAC_11V	category #22
	PAC_11W	category #23
PAC_Q11X	PAC_11X	
PAC_Q11Y	PAC_11Y	
PAC_Q12	PAC_12A	category #1 from PAC_Q11
	PAC_12B	category #2 from PAC_Q11
	PAC_12C	category #3 from PAC_Q11
	PAC_12D	category #4 from PAC_Q11
	PAC_12E	category #5 from PAC_Q11
	PAC_12F	category #6 from PAC_Q11
	PAC_12G	category #7 from PAC_Q11
	PAC_12H	category #8 from PAC_Q11
	PAC_12I	category #9 from PAC_Q11
	PAC_12J	category #10 from PAC_Q11
	PAC_12K	category #11 from PAC_Q11
	PAC_12L	category #12 from PAC_Q11
	PAC_12M	category #13 from PAC_Q11
	PAC_12N	category #14 from PAC_Q11
	PAC_12O	category #15 from PAC_Q11
	PAC_12P	category #16 from PAC_Q11
	PAC_12Q	category #17 from PAC_Q11
	PAC_12R	category #18 from PAC_Q11
	PAC_12S	category #19 from PAC_Q11
	PAC_12T	category #20 from PAC_Q11
	PAC_12U	category #21 from PAC_Q11
	PAC_12V	category #22 from PAC_Q11
	PAC_12X	activity from PAC_Q11X
	PAC_12Y	activity from PAC_Q11Y
PAC_Q13	PAC_13A	category #1 from PAC_Q11
	PAC_13B	category #2 from PAC_Q11

Questionnaire variable name	Variable name on file	Comments
	PAC_13C	category #3 from PAC_Q11
	PAC_13D	category #4 from PAC_Q11
	PAC_13E	category #5 from PAC_Q11
	PAC_13F	category #6 from PAC_Q11
	PAC_13G	category #7 from PAC_Q11
	PAC_13H	category #8 from PAC_Q11
	PAC_13I	category #9 from PAC_Q11
	PAC_13J	category #10 from PAC_Q11
	PAC_13K	category #11 from PAC_Q11
	PAC_13L	category #12 from PAC_Q11
	PAC_13M	category #13 from PAC_Q11
	PAC_13N	category #14 from PAC_Q11
	PAC_13O	category #15 from PAC_Q11
	PAC_13P	category #16 from PAC_Q11
	PAC_13Q	category #17 from PAC_Q11
	PAC_13R	category #18 from PAC_Q11
	PAC_13S	category #19 from PAC_Q11
	PAC_13T	category #20 from PAC_Q11
	PAC_13U	category #21 from PAC_Q11
	PAC_13V	category #22 from PAC_Q11
	PAC_13X	activity from PAC_Q11X
	PAC_13Y	activity from PAC_Q11Y
PAC_Q21	PAC_21	
PAC_Q22	PAC_22	
PAC_Q23	PAC_23	
PAR_26	PAR_26	
PAR_50	PAR_50	
PAR_N11	PAR_11	
PAR_N21	PAR_21	
PAR_N31	PAR_31	
PAR_N41	PAR_41	
PAR_N45	PAR_45	
PAR_N51	PAR_51	
PAR_N61	PAR_61	
PAR_N71	PAR_71	
PAR_N72	PAR_72A	category 1
	PAR_72B	category 2

Questionnaire variable name	Variable name on file	Comments
	PAR_72C	category 3
	PAR_72D	category 4
PAR_Q42	PAR_42	
PAR_Q43	PAR_43	
PAR_Q44	PAR_44A	category #1
	PAR_44B	category #2
	PAR_44C	category #3
	PAR_44D	category #4
	PAR_44E	category #5
	PAR_44F	category #6
	PAR_44G	category #7
	PAR_44H	category #8
	PAR_44I	category #9
PAR_Q52	PAR_52A	category #1
	PAR_52B	category #2
	PAR_52C	category #3
	PAR_52D	category #4
	PAR_52E	category #5
	PAR_52F	category #6
	PAR_52G	category #7
	PAR_52H	category #8
	PAR_52I	category #9
	PAR_52J	category #10
	PAR_52K	category #11
PAR_Q62	PAR_62A	category #1
	PAR_62B	category #2
	PAR_62C	category #3
	PAR_62D	category #4
	PAR_62E	category #5
	PAR_62F	category #6
	PAR_62G	category #7
	PAR_62H	category #8
PCM_D11	PCMD11	
PCM_N01	PCM_01	
PHC_N42	PHC_42A	category #1
	PHC_42B	category #2
	PHC_42C	category #3
	PHC_42D	category #4

Questionnaire variable name	Variable name on file	Comments
	PHC_42E	category #5
	PHC_42F	category #6
	PHC_42G	category #7
	PHC_42H	category #8
	PHC_42I	category #9
	PHC_42J	category #10
	PHC_42K	category #11
PHC_Q11	PHC_11	
PHC_Q12	PHC_12	
PHC_Q31	PHC_31	
PHC_Q32	PHC_32	
PHC_Q33	PHC_33	
PHC_Q34	PHC_34	
PHC_Q35	PHC_35	
PHC_Q36	PHC_36	
PHC_Q37	PHC_37	
PHC_Q41	PHC_41	
PHC_Q51	PHC_51	
PHC_Q52	PHC_52	
PLM_Q11	PLM_11	
PLM_Q12	PLM_12	
PPI_N02	PPI_02	
PPI_N03	PPI_03	
PRG_Q11	PRG_11	
PRG_Q12	PRG_12	
PRG_Q13	PRG_13A	category #1
	PRG_13B	category #2
	PRG_13C	category #3
	PRG_13D	category #4
PRS_Q11	PRS_11	
SAC_Q11	SAC_11	
SAC_Q12	SAC_12	
SAC_Q13	SAC_13	
SAC_Q14	SAC_14	
SDC_Q11	SDC_11	
SDC_Q12	SDC_12	
SDC_Q13	SDC_13	

Questionnaire variable name	Variable name on file	Comments
SDC_Q21	SDC_21A	category #1
	SDC_21B	category #2
	SDC_21C	category #3
	SDC_21D	category #4
	SDC_21E	category #5
	SDC_21F	category #6
	SDC_21G	category #7
	SDC_21H	category #8
	SDC_21I	category #9
	SDC_21J	category #10
	SDC_21K	category #11
	SDC_21L	category #12
	SDC_21M	category #13
	SDC_21N	category #14
	SDC_21O	category #15
	SDC_21P	category #16
	SDC_21Q	category #17
	SDC_21R	category #18
	SDC_21S	category #19
	SDC_21T	category #20
	SDC_21U	category #21
SDC_Q22	SDC_22	
SDC_Q23	SDC_23A	category #1
	SDC_23B	category #2
	SDC_23C	category #3
SDC_Q24	SDC_24A	category #1
	SDC_24B	category #2
	SDC_24C	category #3
	SDC_24D	category #4
	SDC_24E	category #5
	SDC_24F	category #6
	SDC_24G	category #7
	SDC_24H	category #8
	SDC_24I	category #9
	SDC_24J	category #10
	SDC_24K	category #11
	SDC_24L	category #12
SDC_Q31	SDC_31A	category #1

Questionnaire variable name	Variable name on file	Comments
	SDC_31B	category #2
	SDC_31C	category #3
	SDC_31D	category #4
	SDC_31E	category #5
	SDC_31F	category #6
	SDC_31G	category #7
	SDC_31H	category #8
	SDC_31I	category #9
	SDC_31J	category #10
	SDC_31K	category #11
	SDC_31L	category #12
	SDC_31M	category #13
	SDC_31N	category #14
	SDC_31O	category #15
	SDC_31P	category #16
	SDC_31Q	category #17
	SDC_31R	category #18
	SDC_31S	category #19
	SDC_31T	category #20
	SDC_31U	category #21
	SDC_31V	category #22
	SDC_31W	category #23
SDC_Q32	SDC_32	
SDC_Q33	SDC_33A	category #1
	SDC_33B	category #2
	SDC_33C	category #3
	SDC_33D	category #4
	SDC_33E	category #5
	SDC_33F	category #6
	SDC_33G	category #7
	SDC_33H	category #8
	SDC_33I	category #9
	SDC_33J	category #10
	SDC_33K	category #11
	SDC_33L	category #12
	SDC_33M	category #13
	SDC_33N	category #14

Questionnaire variable name	Variable name on file	Comments
	SDC_33O	category #15
	SDC_33P	category #16
	SDC_33Q	category #17
	SDC_33R	category #18
	SDC_33S	category #19
	SDC_33T	category #20
	SDC_33U	category #21
	SDC_33V	category #22
	SDC_33W	category #23
SDQ_Q11	SDQ_11	
SDQ_Q12	SDQ_12	
SDQ_Q13	SDQ_13	
SDQ_Q14	SDQ_14	
SDQ_Q15	SDQ_15	
SDQ_Q16	SDQ_16	
SDQ_Q17	SDQ_17	
SDQ_Q18	SDQ_18	
SDQ_Q19	SDQ_19	
SDQ_Q20	SDQ_20	
SDQ_Q21	SDQ_21	
SDQ_Q22	SDQ_22	
SDQ_Q23	SDQ_23	
SDQ_Q24	SDQ_24	
SDQ_Q25	SDQ_25	
SDQ_Q26	SDQ_26	
SDQ_Q27	SDQ_27	
SDQ_Q28	SDQ_28	
SDQ_Q29	SDQ_29	
SDQ_Q30	SDQ_30	
SDQ_Q31	SDQ_31	
SDQ_Q32	SDQ_32	
SDQ_Q33	SDQ_33	
SDQ_Q34	SDQ_34	
SDQ_Q35	SDQ_35	
SEB_Q12	SEB_12	
SEB_Q13	SEB_13	
SEX_Q01	DHH_SEX	
SFM_N11	SFM_11	1st measurement

Questionnaire variable name	Variable name on file	Comments
	SFM_21	2nd measurement
	SFM_31	3rd measurement
SFM_N12	SFM_12	1st measurement
	SFM_22	2nd measurement
	SFM_32	3rd measurement
SFM_N13	SFM_13	1st measurement
	SFM_23	2nd measurement
	SFM_33	3rd measurement
SFM_N14	SFM_14	1st measurement
	SFM_24	2nd measurement
	SFM_34	3rd measurement
SFM_N15	SFM_15	1st measurement
	SFM_25	2nd measurement
	SFM_35	3rd measurement
SFM_Q01	SFM_01	
SLP_Q11	SLP_11	
SLP_Q12	SLP_12	
SLP_Q13	SLP_13	
SLP_Q14	SLP_14	
SLP_Q15	SLP_15	
SLP_Q16	SLP_16	
SLP_Q17	SLP_17	
SLT_Q11	SLT_11	
SLT_Q12	SLT_12	
SLT_Q13	SLT_13	
SMK_Q25	SMK_25	
SMK_Q11	SMK_11	
SMK_Q12	SMK_12	
SMK_Q21	SMK_21	
SMK_Q22	SMK_22	
SMK_Q23	SMK_23	
SMK_Q24	SMK_24	
SMK_Q31	SMK_31	
SMK_Q41	SMK_41	
SMK_Q42	SMK_42	
SMK_Q51	SMK_51	
SMK_Q52	SMK_52	

Questionnaire variable name	Variable name on file	Comments
SMK_Q53	SMK_53	
SMK_Q54	SMK_54	
SMK_Q60	SMK_60	
SPM_N022	SPM_022	
SPM_N901	SPM_901	
SPM_Q021	SPM_021	
SPM_Q031	SPM_031	
SPM_Q032	SPM_032	
SPQ_Q11	SPQ_11	
SPQ_Q12	SPQ_12	
SPQ_Q13	SPQ_13	
SPQ_Q14	SPQ_14	
SPQ_Q15	SPQ_15	
SPQ_Q16	SPQ_16	
SPQ_Q17	SPQ_17	
SPQ_Q21	SPQ_21	
SPQ_Q22	SPQ_22	
SPQ_Q23	SPQ_23	
SPQ_Q24	SPQ_24	
SPQ_Q25	SPQ_25	
SPR_Q11	SPR_11	
SPR_Q12	SPR_12	
SRM_N01	SRM_01	
SRM_N02	SRM_02	
SXB_Q11	SXB_11	
SXB_Q12	SXB_12	
SXB_Q13	SXB_13	
SXB_Q21	SXB_21	
SXB_Q22	SXB_22A	category #1
	SXB_22B	category #2
	SXB_22C	category #3
	SXB_22D	category #4
	SXB_22E	category #5
	SXB_22F	category #6
	SXB_22G	category #7
	SXB_22H	category #8
	SXB_22I	category #9
	SXB_22J	category #10

Questionnaire variable name	Variable name on file	Comments
SXB_Q23	SXB_23	
SXB_Q24	SXB_24	
TN_Q01	DHH_OWN	
URC_N01	URC_01	
URC_N02	URC_02	
WSD_B11	WSD_11	amount
	WSD_11N	reporting period
	WSDD11Y	amount per year
WSD_B12	WSD_12	amount
	WSD_12N	reporting period
	WSDD12Y	amount per year
WSD_B13	WSD_13	amount
	WSD_13N	reporting period
	WSDD13Y	amount per year
WSD_B14	WSD_14	amount
	WSD_14N	reporting period
	WSDD14Y	amount per year
WSD_B15	WSD_15	amount
	WSD_15N	reporting period
	WSDD15Y	amount per year
WSD_B16	WSD_16	amount
	WSD_16N	reporting period
	WSDD16Y	amount per year
WSD_B21	WSD_21	amount
	WSD_21N	reporting period
	WSDD21Y	amount per year
WSD_Q22	WSD_22	
WSD_Q23	WSD_23	
WSD_Q24A	WSD_24A	category #1
	WSD_24B	category #2
	WSD_24C	category #3
	WSD_24D	category #4
	WSD_24E	category #5
	WSD_24F	category #6
WTC_B11	WTC_11	weight
	WTC_11N	unit of measurement
	WTCD11LB	in pounds

Questionnaire variable name	Variable name on file	Comments
	WTCD11KG	in kilograms
WTC_B21	WTC_21	weight
	WTC_21N	unit of measurement
	WTCD21LB	in pounds
	WTCD21KG	in kilograms
WTC_B22	WTC_22	weight
	WTC_22N	unit of measurement
	WTCD22LB	in pounds
	WTCD22KG	in kilograms
WTC_B23	WTCD23KG	weight
	WTC_23	unit of measurement
	WTC_23N	in pounds
	WTCD23LB	in kilograms
WTC_B25	WTC_25	weight
	WTC_25N	unit of measurement
	WTCD25LB	in pounds
	WTCD25KG	in kilograms
WTC_Q12	WTC_12	
WTC_Q24	WTC_24	
WTC_Q26	WTC_26	
WTC_Q27	WTC_27	
WTC_Q28	WTC_28	

Appendix 9 Response Rates

Appendix 9a CHMS cycle 1 response rates per collection site

Site	# households (hhld) targeted	# hhld response.	Hhld response rate	1 person selected					2 person selected					Overall Combined response rate
				# people selected	# respondent who completed the hhld questionnaire	Hhld questionnaire response rate	# clinic respondents	Clinic response rate	# people selected	# respondent who completed the hhld questionnaire	Hhld questionnaire response rate	# clinic respondents	Clinic response rate	
Canada	8 772	6 106	69.6	4 734	4 158	87.8	3 463	83.3	2 744	2 446	89.1	2 141	87.5	51.7
1	578	409	70.8	308	263	85.4	230	87.5	202	183	90.6	167	91.3	54.2
2	592	418	70.6	321	284	88.5	242	85.2	194	162	83.5	148	91.4	53.4
3	555	438	78.9	351	311	88.6	266	85.5	174	152	87.4	145	95.4	61.0
4	502	283	56.4	214	170	79.4	129	75.9	138	114	82.6	95	83.3	35.2
5	537	372	69.3	294	264	89.8	201	76.1	156	132	84.6	116	87.9	48.2
6	589	406	68.9	320	276	86.3	235	85.1	172	154	89.5	126	81.8	50.6
7	618	383	62.0	305	276	90.5	240	87.0	156	136	87.2	124	91.2	48.9
8	616	416	67.5	340	295	86.8	246	83.4	152	146	96.1	135	92.5	50.9
9	619	475	76.7	375	327	87.2	267	81.7	200	178	89.0	159	89.3	56.0
10	622	439	70.6	325	284	87.4	228	80.3	228	200	87.7	157	78.5	49.3
11	612	474	77.5	371	330	88.9	260	78.8	206	186	90.3	151	81.2	54.8
12	621	441	71.0	343	308	89.8	267	86.7	196	183	93.4	160	87.4	55.9
13	565	398	70.4	289	264	91.3	224	84.8	218	195	89.4	174	89.2	55.0
14	571	400	70.1	302	261	86.4	219	83.9	196	177	90.3	163	92.1	52.6
15	575	354	61.6	276	245	88.8	209	85.3	156	148	94.9	121	81.8	46.9

Appendix 9a CHMS cycle 1 response rates per collection site continued

Site	# households (hhld) targeted	# hhld response.	Hhld response rate	Response rate not adjusted for 1 or 2 persons selected				
				# people selected	# respondent who completed the hhld questionnaire	Hhld questionnaire response rate	# clinic respondents	Clinic response rate
Canada	8 772	6 106	69.6	7 478	6 604	88.3	5 604	84.9
1	578	409	70.8	510	446	87.5	397	89.0
2	592	418	70.6	515	446	86.6	390	87.4
3	555	438	78.9	525	463	88.2	411	88.8
4	502	283	56.4	352	284	80.7	224	78.9
5	537	372	69.3	450	396	88.0	317	80.1
6	589	406	68.9	492	430	87.4	361	84.0
7	618	383	62.0	461	412	89.4	364	88.3
8	616	416	67.5	492	441	89.6	381	86.4
9	619	475	76.7	575	505	87.8	426	84.4
10	622	439	70.6	553	484	87.5	385	79.5
11	612	474	77.5	577	516	89.4	411	79.7
12	621	441	71.0	539	491	91.1	427	87.0
13	565	398	70.4	507	459	90.5	398	86.7
14	571	400	70.1	498	438	88.0	382	87.2
15	575	354	61.6	432	393	91.0	330	84.0

Appendix 9b CHMS Cycle 1 Blood draw and Urine response rates per collection site

Site	1 person selected					2 persons selected					Blood draw Combined response rate	Urine Combined response rate
	# clinic respondents	# persons who provided blood	Blood draw response rate	# persons who provided urine	Urine response rate	# clinic respondents	# persons who provided blood	Blood draw response rate	# persons who provided urine	Urine response rate		
Canada	3 463	3 397	98.1	3 437	99.2	2 141	1 976	92.3	2 103	98.2	50.0	51.2
1	230	216	93.9	226	98.3	167	139	83.2	159	95.2	49.4	52.8
2	242	236	97.5	240	99.2	148	134	90.5	144	97.3	51.2	52.7
3	266	261	98.1	262	98.5	145	135	93.1	144	99.3	59.3	60.3
4	129	128	99.2	128	99.2	95	91	95.8	95	100.0	34.5	34.9
5	201	197	98.0	200	99.5	116	108	93.1	115	99.1	46.8	48.0
6	235	231	98.3	264	99.6	126	115	91.3	123	97.6	48.9	50.2
7	240	235	97.9	239	99.6	124	113	91.1	123	99.2	47.1	48.6
8	246	242	98.4	246	100.0	135	127	94.1	132	97.8	49.9	51.1
9	267	262	98.1	261	97.8	159	154	96.9	157	98.7	54.8	54.9
10	228	227	99.6	228	100.0	157	150	95.5	156	99.4	48.7	49.2
11	260	257	98.8	259	99.6	151	144	95.4	147	97.4	53.8	54.3
12	267	263	98.5	266	99.6	160	144	90.0	157	98.1	53.9	55.5
13	224	224	100.0	224	100.0	174	160	92.0	171	98.3	53.9	54.7
14	219	215	98.2	215	98.2	163	149	91.4	160	98.2	50.6	51.5
15	209	203	97.1	209	100.0	121	113	93.4	120	99.2	45.1	46.8

Appendix 9b CHMS Cycle 1 Blood draw and Urine response rates per collection site continued

Site	Response rate not adjusted for 1 or 2 persons selected				
	# clinic respondents	# persons who provided blood	Blood draw response rate	# persons who provided urine	Urine response rate
Canada	5 604	5 373	95.9	5 540	98.9
1	397	355	89.4	385	97.0
2	390	370	94.9	384	98.5
3	411	396	96.4	406	98.8
4	224	219	97.8	223	99.6
5	317	305	96.2	315	99.4
6	361	346	95.8	357	98.9
7	364	348	95.6	362	99.5
8	381	369	96.9	378	99.2
9	426	416	97.7	418	98.1
10	385	377	97.9	384	99.7
11	411	401	97.6	406	98.8
12	427	407	95.3	423	99.1
13	398	384	96.5	395	99.2
14	382	364	95.3	375	98.2
15	330	316	95.8	329	99.7

Appendix 9c CHMS Cycle 1 Fasted sub-sample response rates per collection site

Site	1 person selected							2 persons selected							Overall Combined response rate
	# persons selected for fasted subsample	# persons who completed the hhld questionnaire	Hhld questionnaire response rate	# clinic respondents	Clinic response rate	# respondents actually fasted	Fasted response rate	# persons selected for fasted subsample	# persons who completed the hhld questionnaire	Hhld questionnaire response rate	# clinic respondents	Clinic response rate	# respondents actually fasted	Fasted response rate	
Canada	2 522	2 206	87.5	1 840	83.4	1 672	90.9	1 426	1 277	89.6	1 129	88.4	962	85.2	46.3
1	150	127	84.7	112	88.2	99	88.4	86	77	89.5	71	92.2	50	70.4	44.7
2	168	149	88.7	126	84.6	112	88.9	94	74	78.7	67	90.5	62	92.5	46.3
3	184	164	89.1	144	87.8	131	91.0	84	73	86.9	73	100.0	65	89.0	50.5
4	109	89	81.7	68	76.4	64	94.1	66	58	87.9	49	84.5	43	87.8	41.9
5	151	132	87.4	98	74.2	94	95.9	80	67	83.8	60	89.6	54	90.0	44.2
6	182	158	86.8	137	86.7	125	91.2	88	78	88.6	65	83.3	51	78.5	46.1
7	159	144	90.6	124	86.1	116	93.5	94	82	87.2	72	87.8	64	88.9	50.0
8	177	150	84.7	132	88.0	124	93.9	70	70	100.0	67	95.7	60	89.6	51.2
9	203	172	84.7	141	82.0	130	92.2	102	90	88.2	81	90.0	74	91.4	45.9
10	176	151	85.8	119	78.8	115	96.6	126	114	90.5	92	80.7	77	83.7	44.8
11	196	175	89.3	137	78.3	122	89.1	112	103	92.0	87	84.5	68	78.2	43.1
12	187	166	88.8	141	84.9	127	90.1	106	98	92.5	82	83.7	69	84.1	46.8
13	164	151	92.1	132	87.4	118	89.4	116	104	89.7	92	88.5	80	87.0	49.6
14	167	145	86.8	119	82.1	102	85.7	124	115	92.7	106	92.2	94	88.7	44.8
15	149	133	89.3	110	82.7	93	84.5	78	74	94.9	65	87.8	51	78.5	43.9

Appendix 9c CHMS Cycle 1 Fasted sub-sample response rates per collection site continued

Site	Response rate not adjusted for 1 or 2 persons selected						
	# persons selected for fasted subsample	# persons who completed the hhld questionnaire	Hhld questionnaire response rate	# clinic respondents	Clinic response rate	# respondents actually fasted	Fasted response rate
Canada	3 948	3 483	88.2	2 969	85.2	2 634	88.7
1	236	204	86.4	183	89.7	149	81.4
2	262	223	85.1	193	86.5	174	90.2
3	268	237	88.4	217	91.6	196	90.3
4	175	147	84.0	117	79.6	107	91.5
5	231	199	86.1	158	79.4	148	93.7
6	270	236	87.4	202	85.6	176	87.1
7	253	226	89.3	196	86.7	180	91.8
8	247	220	89.1	199	90.5	184	92.5
9	305	262	85.9	222	84.7	204	91.9
10	302	265	87.7	211	79.6	192	91.0
11	308	278	90.3	224	80.6	190	84.8
12	293	264	90.1	223	84.5	196	87.9
13	280	255	91.1	224	87.8	198	88.4
14	291	260	89.3	225	86.5	196	87.1
15	227	207	91.2	175	84.5	144	82.3

Appendix 9d CHMS Cycle 1 Polybrominated diphenyl ether (PBDE) / Polychlorinated biphenyls (PCB) subsample response rates per collection site

Site	1 person selected							2 persons selected							Overall Combined response rate
	# persons selected for PBDE subsample	# persons who completed the hhld questionnaire	Hhld questionnaire response rate	# clinic respondents	Clinic response rate	# respondents with valid measure	PBDE response rate	# persons selected for PBDE subsample	# persons who completed the hhld questionnaire	Hhld questionnaire response rate	# clinic respondents	Clinic response rate	# respondents with valid measure	PBDE response rate	
Canada	1 983	1 745	88.0	1 438	82.4	1 324	92.1	530	458	86.4	403	88.0	372	92.3	47.0
1	126	108	85.7	93	86.1	85	91.4	34	28	82.4	25	89.3	23	92.0	47.0
2	133	117	88.0	97	82.9	91	93.8	36	26	72.2	23	88.5	22	95.7	46.5
3	148	131	88.5	114	87.0	106	93.0	37	31	83.8	31	100.0	30	96.8	51.3
4	96	79	82.3	62	78.5	58	93.5	28	23	82.1	20	87.0	19	95.0	43.2
5	123	109	88.6	81	74.3	78	96.3	25	19	76.0	17	89.5	17	100.0	44.9
6	143	122	85.3	106	86.9	100	94.3	28	25	89.3	20	80.0	17	85.0	47.2
7	126	115	91.3	97	84.3	91	93.8	38	32	84.2	26	81.3	25	96.2	49.3
8	153	129	84.3	111	86.0	104	93.7	26	26	100.0	26	100.0	23	88.5	50.5
9	170	148	87.1	119	80.4	109	91.6	40	35	87.5	30	85.7	27	90.0	45.2
10	134	115	85.8	88	76.5	86	97.7	49	44	89.8	36	81.8	33	91.7	45.2
11	142	129	90.8	101	78.3	89	88.1	42	39	92.9	33	84.6	28	84.8	44.3
12	135	122	90.4	103	84.4	92	89.3	37	32	86.5	27	84.4	26	96.3	47.8
13	117	107	91.5	94	87.9	86	91.5	38	32	84.2	28	87.5	26	92.9	50.4
14	123	110	89.4	88	80.0	76	86.4	46	41	89.1	39	95.1	37	94.9	45.9
15	114	104	91.2	84	80.8	73	86.9	26	25	96.2	22	88.0	19	86.4	46.0

Appendix 9d CHMS Cycle 1 Polybrominated diphenyl ether (PBDE) / Polychlorinated biphenyls (PCB) sub-sample response rates per collection site continued

Site	Response rate not adjusted for 1 or 2 persons selected						
	# persons selected for PBDE subsample	# persons who completed the hhld questionnaire	Hhld questionnaire response rate	# clinic respondents	Clinic response rate	# respondents with valid measure	PBDE response rate
Canada	2 513	2 203	87.7	1 841	83.6	1 696	92.1
1	160	136	85.0	118	86.8	108	91.5
2	169	143	84.6	120	83.9	113	94.2
3	185	162	87.6	145	89.5	136	93.8
4	124	102	82.3	82	80.4	77	93.9
5	148	128	86.5	98	76.6	95	96.9
6	171	147	86.0	126	85.7	117	92.9
7	164	147	89.6	123	83.7	116	94.3
8	179	155	86.6	137	88.4	127	92.7
9	210	183	87.1	149	81.4	136	91.3
10	183	159	86.9	124	78.0	119	96.0
11	184	168	91.3	134	79.8	117	87.3
12	172	154	89.5	130	84.4	118	90.8
13	155	139	89.7	122	87.8	112	91.8
14	169	151	89.3	127	84.1	113	89.0
15	140	129	92.1	106	82.2	92	86.8

Appendix 9e CHMS Cycle 1 Inorganic mercury sub-sample response rates per collection site

Site	1 person selected							2 persons selected							Overall Combined response rate
	# persons selected for Inorg. mercury subsample	# persons who completed the hhld questionnaire	Hhld questionnaire response rate	# clinic respondents	Clinic response rate	# respondents with valid measure	Inorg. mercury response rate	# persons selected for Inorg. mercury subsample	# persons who completed the hhld questionnaire	Hhld questionnaire response rate	# clinic respondents	Clinic response rate	# respondents with valid measure	Inorg. mercury response rate	
Canada	981	868	88.5	719	82.8	702	97.6	611	546	89.4	472	86.4	421	89.2	49.4
1	63	56	88.9	48	85.7	44	91.7	54	50	92.6	44	88.0	32	72.7	47.0
2	70	60	85.7	52	86.7	50	96.2	30	25	83.3	22	88.0	20	90.9	49.0
3	91	81	89.0	71	87.7	69	97.2	48	40	83.3	38	95.0	34	89.5	52.0
4	49	39	79.6	32	82.1	32	100.0	31	27	87.1	21	77.8	18	85.7	44.3
5	61	54	88.5	39	72.2	39	100.0	30	25	83.3	20	80.0	19	95.0	44.4
6	58	50	86.2	45	90.0	44	97.8	36	33	91.7	25	75.8	20	80.0	49.6
7	55	49	89.1	45	91.8	44	97.8	35	30	85.7	25	83.3	21	84.0	52.6
8	80	70	87.5	53	75.7	51	96.2	30	28	93.3	27	96.4	25	92.6	47.4
9	80	72	90.0	56	77.8	55	98.2	44	37	84.1	33	89.2	31	93.9	48.1
10	66	61	92.4	49	80.3	49	100.0	53	47	88.7	36	76.6	36	100.0	50.7
11	74	67	90.5	50	74.6	50	100.0	45	44	97.8	34	77.3	33	97.1	47.9
12	60	56	93.3	49	87.5	48	98.0	43	41	95.3	36	87.8	34	94.4	55.5
13	51	45	88.2	35	77.8	35	100.0	53	46	86.8	43	93.5	35	81.4	47.4
14	64	55	85.9	48	87.3	46	95.8	47	43	91.5	41	95.3	38	92.7	51.4
15	59	53	89.8	47	88.7	46	97.9	32	30	93.8	27	90.0	25	92.6	54.3

Appendix 9e CHMS Cycle 1 Inorganic mercury sub-sample response rates per collection site continued

Site	Response rate not adjusted for 1 or 2 persons selected						
	# persons selected for Inorg. mercury subsample	# persons who completed the hhld questionnaire	Hhld questionnaire response rate	# clinic respondents	Clinic response rate	# respondents with valid measure	Inorg. mercury response rate
Canada	1 592	1 414	88.8	1 191	84.2	1 123	94.3
1	117	106	90.6	92	86.8	76	82.6
2	100	85	85.0	74	87.1	70	94.6
3	139	121	87.1	109	90.1	103	94.5
4	80	66	82.5	53	80.3	50	94.3
5	91	79	86.8	59	74.7	58	98.3
6	94	83	88.3	70	84.3	64	91.4
7	90	79	87.8	70	88.6	65	92.9
8	110	98	89.1	80	81.6	76	95.0
9	124	109	87.9	89	81.7	86	96.6
10	119	108	90.8	85	78.7	85	100.0
11	119	111	93.3	84	75.7	83	98.8
12	103	97	94.2	85	87.6	82	96.5
13	104	91	87.5	78	85.7	70	89.7
14	111	98	88.3	89	90.8	84	94.4
15	91	83	91.2	74	89.2	71	95.9

Appendix 9f CHMS Cycle 1 Perfluorinated compounds sub-sample response rates per collection site

Site	1 person selected							2 persons selected							Overall Combined response rate
	# persons selected Perfluorinated compounds subsample	# persons who completed the hhld questionnaire	Hhld questionnaire response rate	# clinic respondents	Clinic response rate	# respondents with valid measure	Perfluorinated compounds response rate	# persons selected for Perfluorinated compounds subsample	# persons who completed the hhld questionnaire	Hhld questionnaire response rate	# clinic respondents	Clinic response rate	# respondents with valid measure	Perfluorinated compounds response rate	
Canada	3 167	2 798	88.3	2 308	82.5	2 242	97.1	869	765	88.0	663	86.7	638	96.2	49.7
1	140	119	85.0	100	84.0	92	92.0	53	45	84.9	41	91.1	37	90.2	46.4
2	144	124	86.1	104	83.9	101	97.1	45	36	80.0	31	86.1	28	90.3	47.6
3	138	122	88.4	104	85.2	99	95.2	34	30	88.2	29	96.7	28	96.6	51.6
4	95	77	81.1	57	74.0	54	94.7	26	22	84.6	20	90.9	19	95.0	42.1
5	117	104	88.9	81	77.9	77	95.1	25	21	84.0	19	90.5	18	94.7	46.8
6	254	216	85.0	183	84.7	174	95.1	59	52	88.1	41	78.8	37	90.2	46.8
7	238	217	91.2	186	85.7	177	95.2	62	52	83.9	45	86.5	42	93.3	50.7
8	296	254	85.8	209	82.3	205	98.1	58	54	93.1	51	94.4	47	92.2	50.1
9	313	280	89.5	225	80.4	217	96.4	76	68	89.5	59	86.8	59	100.0	49.6
10	241	213	88.4	171	80.3	168	98.2	88	78	88.6	63	80.8	61	96.8	48.5
11	269	242	90.0	188	77.7	186	98.9	83	75	90.4	60	80.0	60	100.0	48.6
12	253	231	91.3	200	86.6	196	98.0	64	57	89.1	51	89.5	51	100.0	54.3
13	225	204	90.7	173	84.8	172	99.4	75	65	86.7	58	89.2	58	100.0	53.4
14	229	203	88.6	166	81.8	164	98.8	69	61	88.4	57	93.4	55	96.5	51.1
15	215	192	89.3	161	83.9	160	99.4	52	49	94.2	38	77.6	38	100.0	51.6

Appendix 9f CHMS Cycle 1 Perfluorinated Compounds sub-sample response rates per collection site continued

Site	Response rate not adjusted for 1 or 2 persons selected						
	# persons selected for Perfluorinated compounds subsample	# persons who completed the hhld questionnaire	Hhld questionnaire response rate	# clinic respondents	Clinic response rate	# respondents with valid measure	Perfluorinated compounds response rate
Canada	4 036	3 563	88.3%	2 971	83.4%	2 880	96.9%
1	193	164	85.0%	141	86.0%	129	91.5%
2	189	160	84.7%	135	84.4%	129	95.6%
3	172	152	88.4%	133	87.5%	127	95.5%
4	121	99	81.8%	77	77.8%	73	94.8%
5	142	125	88.0%	100	80.0%	95	95.0%
6	313	268	85.6%	224	83.6%	211	94.2%
7	300	269	89.7%	231	85.9%	219	94.8%
8	354	308	87.0%	260	84.4%	252	96.9%
9	389	348	89.5%	284	81.6%	276	97.2%
10	329	291	88.4%	234	80.4%	229	97.9%
11	352	317	90.1%	248	78.2%	246	99.2%
12	317	288	90.9%	251	87.2%	247	98.4%
13	300	269	89.7%	231	85.9%	230	99.6%
14	298	264	88.6%	223	84.5%	219	98.2%
15	267	241	90.3%	199	82.6%	198	99.5%

Appendix 9g CHMS Cycle 1 Activity monitor response rates per collection site

Site	1 person selected			2 persons selected			Activity monitor Combined response rate
	# of clinic respondents offered an activity monitor	# of persons with at least 4 days of valid entries	Activity monitor response rate	# of clinic respondents offered an activity monitor	# of persons with at least 4 days of valid entries	Activity monitor response rate	
Canada	3 372	2 709	80.3	2 096	1 732	82.6	41.8
1	230	161	70.0	167	113	67.7	37.6
2	242	179	74.0	147	117	79.6	40.2
3	265	190	71.7	145	95	65.5	42.9
4	57	45	78.9	59	45	76.3	27.5
5	201	163	81.1	116	105	90.5	40.3
6	233	200	85.8	126	112	88.9	43.8
7	239	194	81.2	124	112	90.3	40.7
8	233	192	82.4	128	99	77.3	41.6
9	267	227	85.0	159	143	89.9	48.3
10	228	191	83.8	157	126	80.3	40.9
11	260	226	86.9	151	133	88.1	47.8
12	265	229	86.4	160	150	93.8	49.2
13	224	184	82.1	174	155	89.1	46.0
14	219	163	74.4	162	128	79.0	39.7
15	209	165	78.9	121	99	81.8	37.3

Appendix 9g CHMS Cycle 1 Activity monitor response rates per collection site continued

Site	Response rate not adjusted for 1 or 2 persons selected		
	# of clinic respondents offered an activity monitor	# of persons with at least 4 days of valid entries	Activity monitor response rate
Canada	5 468	4441	81.2
1	397	274	69.0
2	389	296	76.1
3	410	285	69.5
4	116	90	77.6
5	317	268	84.5
6	359	312	86.9
7	363	306	84.3
8	361	291	80.6
9	426	370	86.9
10	385	317	82.3
11	411	359	87.3
12	425	379	89.2
13	398	339	85.2
14	381	291	76.4
15	330	264	80.0

Appendix 9h CHMS Cycle 1 Phthalates sub-sample response rates per collection site

Site	1 person selected							2 persons selected							Overall Combined response rate
	# persons selected for Phthalates subsample	# persons who completed the hhld questionnaire	Hhld questionnaire response rate	# clinic respondents	Clinic response rate	# respondents with valid measure	Phthalates response rate	# persons selected for Phthalates subsample	# persons who completed the hhld questionnaire	Hhld questionnaire response rate	# clinic respondents	Clinic response rate	# respondents with valid measure	Phthalates response rate	
Canada	2 720	2 348	86.3	1 948	83.0	1 921	98.6	1 719	1 554	90.4	1 362	87.6	1 316	96.6	50.1
1	175	146	83.4	130	89.0	125	96.2	118	111	94.1	101	91.0	90	89.1	50.5
2	183	160	87.4	134	83.8	133	99.3	118	101	85.6	94	93.1	91	96.8	51.3
3	193	165	85.5	139	84.2	137	98.6	102	90	88.2	85	94.4	85	100.0	51.3
4	107	81	75.7	54	66.7	53	98.1	82	70	85.4	57	81.4	56	98.2	37.4
5	175	160	91.4	124	77.5	123	99.2	105	90	85.7	78	86.7	77	98.7	49.4
6	197	174	88.3	150	86.2	147	98.0	113	102	90.3	85	83.3	82	96.5	51.6
7	201	182	90.5	161	88.5	161	100.0	94	84	89.4	79	94.0	75	94.9	55.7
8	195	163	83.6	134	82.2	133	99.3	94	92	97.9	84	91.3	82	97.6	50.5
9	196	165	84.2	133	80.6	129	97.0	124	110	88.7	100	90.9	98	98.0	47.9
10	200	171	85.5	131	76.6	131	100.0	140	122	87.1	94	77.0	91	96.8	45.5
11	204	176	86.3	136	77.3	136	100.0	123	111	90.2	91	82.0	87	95.6	47.0
12	200	176	88.0	156	88.6	155	99.4	132	126	95.5	109	86.5	105	96.3	54.3
13	143	128	89.5	104	81.3	102	98.1	143	130	90.9	116	89.2	113	97.4	50.9
14	181	153	84.5	131	85.6	125	95.4	127	116	91.3	106	91.4	102	96.2	49.8
15	170	148	87.1	131	88.5	131	100.0	104	99	95.2	83	83.8	82	98.8	53.9

Appendix 9h CHMS Cycle 1 Phthalates sub-sample response rates per collection site continued

Site	Response rate not adjusted for 1 or 2 persons selected						
	# persons selected for Phthalates subsample	# persons who completed the hhld questionnaire	Hhld questionnaire response rate	# clinic respondents	Clinic response rate	# respondents with valid measure	Phthalates response rate
Canada	4 439	3 902	87.9	3 310	84.8	3 237	97.8
1	293	257	87.7	231	89.9	215	93.1
2	301	261	86.7	228	87.4	224	98.2
3	295	255	86.4	224	87.8	222	99.1
4	189	151	79.9	111	73.5	109	98.2
5	280	250	89.3	202	80.8	200	99.0
6	310	276	89.0	235	85.1	229	97.4
7	295	266	90.2	240	90.2	236	98.3
8	289	255	88.2	218	85.5	215	98.6
9	320	275	85.9	233	84.7	227	97.4
10	340	293	86.2	225	76.8	222	98.7
11	327	287	87.8	227	79.1	223	98.2
12	332	302	91.0	265	87.7	260	98.1
13	286	258	90.2	220	85.3	215	97.7
14	308	269	87.3	237	88.1	227	95.8
15	274	247	90.1	214	86.6	213	99.5

Appendix 9i CHMS Cycle 1 Tobacco sub-sample response rates per collection site

Site	1 person selected							2 persons selected							Nicotine Combined resp. rate
	# of 12 to 79 select.	# of 12 to 79 resp. hhld quest..	Quest. Resp. rate	# of 12 to 79 clinic partic.	Clinic resp. rate	# who provided urine and accepted to partic. in future studies	Nicotine resp. rate	# of 12 to 79 select.	# of 12 to 79 resp. hhld quest..	Quest. Resp. rate	# of 12 to 79 clinic partic.	Clinic resp. rate	# who provided urine and accepted to partic. in future studies	Nicotine resp. rate	
Canada	4732	4156	87.8	3 462	83.3	3 330	96.2	1373	1200	87.4	1 068	89.0	1 026	96.1	50.1
1	308	263	85.4	230	87.5	218	94.8	101	89	88.1	82	92.1	76	92.7	51.7
2	321	284	88.5	242	85.2	229	94.6	97	80	82.5	74	92.5	70	94.6	51.2
3	351	311	88.6	266	85.5	258	97.0	87	74	85.1	72	97.3	69	95.8	59.6
4	214	170	79.4	129	75.9	126	97.7	69	55	79.7	49	89.1	48	98.0	34.7
5	294	264	89.8	201	76.1	191	95.0	78	65	83.3	58	89.2	54	93.1	46.5
6	320	276	86.3	235	85.1	219	93.2	86	76	88.4	64	84.2	62	96.9	48.1
7	305	276	90.5	240	87.0	227	94.6	78	67	85.9	60	89.6	58	96.7	46.5
8	340	295	86.8	246	83.4	236	95.9	76	72	94.7	66	91.7	63	95.5	49.5
9	375	327	87.2	267	81.7	256	95.9	100	89	89.0	78	87.6	77	98.7	54.1
10	324	283	87.3	227	80.2	222	97.8	114	97	85.1	78	80.4	77	98.7	48.3
11	371	330	88.9	260	78.8	256	98.5	103	92	89.3	77	83.7	76	98.7	54.4
12	342	307	89.8	267	87.0	262	98.1	98	90	91.8	81	90.0	77	95.1	55.4
13	289	264	91.3	224	84.8	219	97.8	109	94	86.2	86	91.5	82	95.3	53.9
14	302	261	86.4	219	83.9	210	95.9	98	86	87.8	81	94.2	77	95.1	50.8
15	276	245	88.8	245	85.3	201	96.2	79	74	93.7	62	83.8	60	96.8	45.6

Appendix 9i CHMS Cycle 1 Tobacco sub-sample response rates per collection site

Site	Response rate not adjusted for 1 or 2 persons selected		
	# of clinic respondents 12 to 79	# who provided urine and accepted to participate in future studies	Nicotine response rate
Canada	4530	4 356	96.2
1	312	294	94.2
2	316	299	94.6
3	338	327	96.7
4	178	174	97.8
5	259	245	94.6
6	299	281	94.0
7	300	285	95.0
8	312	299	95.8
9	345	333	96.5
10	305	299	98.0
11	337	332	98.5
12	348	339	97.4
13	310	301	97.1
14	300	287	95.7
15	271	261	96.3