

Collecting Blood and Urine: The Experience of the Canadian Health Measures Survey

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Abstract

Having accurate information about the health of Canadians is essential to improving health care in Canada. The Canadian Health Measures Survey (CHMS) will collect key information relevant to the health of Canadians in the form of direct physical measurements such as blood pressure, height and weight, collecting blood and urine specimens, and physical fitness testing. The information gathered through direct measures of health is essential to evaluate the true extent of the problems associated with such major health concerns as diabetes, obesity, hypertension, and cardiovascular disease. While this is a relatively new survey in Canada, many other countries have conducted similar surveys and have uncovered important health findings. The CHMS will begin collection in the fall of 2006. In order to develop the best possible survey, the CHMS held a pre-test in the fall of 2004, in the city of Calgary. The goals of pre-test included evaluating response rates and current planning assumptions, and determining costs. The paper will highlight the results of the pre-test, give an overview of the main survey and discuss some of the unique challenges associated with this type of survey.

Keywords: direct measures, health survey

1. Introduction

In the last 35 years, some Canadian surveys have collected direct physical measures:

- Nutrition Canada Survey (1970-72)
- Canada Health Survey (1978)
- Canadian Heart Health Surveys (1988-92)
- Canadian Study of Health and Aging (1992)
- Canadian Community Health Survey 2.2 (2004)

Many countries have a long history of surveys including direct physical measures that have led to important findings. In the United States, for example, the National Health and Nutrition Examination Survey has helped develop the standard growth charts for children. The American survey's biggest impact was probably its findings about the link between high cholesterol and heart disease in the 1960s. The same survey also gave the first evidence that Americans had too much lead in their blood. This pushed the government to phase out the use of lead as an additive in gasoline. In Australia, a similar survey conducted

- evaluate response rates, and non-response characteristics to both components of the survey: household questionnaire and clinic visit

from 1999 to 2001 found that for every known case of diabetes, there was one undiagnosed case. In New Zealand, the 1996-97 health and nutrition surveys have shown three key nutrition problems in the population: obesity, food security and calcium inadequacy. These are all now priorities within the Ministry of Health for policy work. All of these improvements would not have been made possible without the information gathered through measurements of physical characteristics.

The Canadian Health Measures Survey (CHMS) will collect key information relevant to the health of Canadians in the form of direct physical measurements such as blood pressure, height and weight, collecting blood and urine specimens and physical fitness testing. Also, through questionnaires, it will gather information related to nutrition, smoking habits, alcohol use, medical history, current health status, sexual behaviour, lifestyle, physical fitness, as well as demographic and socioeconomic variables.

All this valuable information will help evaluate the extent of health problems associated with such major health concerns as diabetes, obesity, hypertension, cardiovascular disease, exposure to infectious diseases, and the extent of exposure to environmental contaminants. It will serve to ascertain relationships among disease risk factors, health protection practices, and health status based on direct measures.

To evaluate the willingness of Canadians to participate in such a survey, a pre-test was held in the city of Calgary in the fall of 2004.

2. Survey Objectives

The main objectives of the CHMS are to:

- monitor health trends
- help identify future health and health care challenges
- contribute to decision making in Canada
- provide participants with important information about their health.

In preparation for the launching of the CHMS, a pre-test was conducted in the Calgary Health Region, in the fall of 2004. Its main objectives were to:

- determine the willingness of Canadians to participate in such a survey
- evaluate planning assumptions associated with the setting used for the clinic, including logistics and costs of setting up clinical sites,

- conduct physical measures and laboratory analyses of specimens
- evaluate survey processes and materials
- determine true costs: human resources and financial

The survey will produce national estimates for 5 age groups by sex. The age groups are: six to 11, 12 to 19, 20 to 39, 40 to 59 and 60 to 79.

3. Survey Content

The CHMS will collect health information on Canadians that cannot be captured, or may be inaccurately reported, using data gathered through self-report or health care records. The exact survey content is still being finalised; the following are some of the measures that the CHMS is considering:

Physical measures

- anthropometry (height, sitting height, weight, waist circumference, skinfolds)
- cardiovascular fitness (blood pressure, modified Canadian Aerobic Fitness Test)
- musculoskeletal fitness (hand grip strength, sit and reach test, partial curl-ups)
- physical activity (accelerometry)
- Spirometry
- oral health

Blood and urine measures to assess

- indicators of nutritional status
- indicators of diabetes and kidney disease
- cardiovascular disease, including cholesterol level
- nutritional status (vitamin D, iron, calcium, vitamin B12, folic acid)

- environmental exposure to lead and mercury for example
- infectious disease markers

4. Data Collection

The target population of the CHMS includes all household residents, aged six to 79, with the principal exclusion of populations on Indian Reserves, members of the Canadian Forces, residents of institutions and residents in some remote areas. The pre-test reproduced as closely as possible the collection methodology envisioned for the survey, which is an in-home interview followed by a clinic visit. Interviewers list all members present in selected households and one person is selected, among the eligible household members (if there exists one), and interviewed. At the time of the pre-test, it was planned to run the clinic portion of the survey out of established medical facilities or fixed sites. In order to test the planning assumption of using fixed sites for the clinic portion of the survey, the clinic was run out of the Calgary Health Centre.

5. Pre-test Results

The pre-test sample consisted of 875 dwellings. After removing out-of-scope units the resulting net sample consisted of 800 eligible households.

Table #1 presents the response rates at the different survey stages. The responding household rate was 74%, with 89% of these having the selected respondents participating, giving a responding people rate of 66%. The responding people rate reflects what is typically achieved by health survey tests. In general, response rates achieved by pre-tests are considerably lower than what is achieved for surveys.

Table #1: Household and Person Level Response Rates

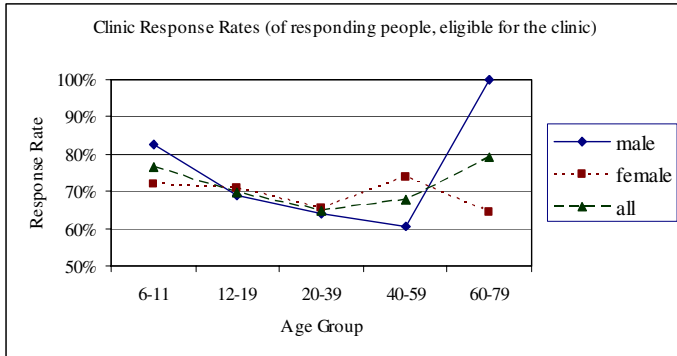
Response Level	Frequency	Response Rates		
		% of eligible households	% of responding households	% of responding people
Total dwellings	875			
Eligible households	800	100%		
Responding households	590	74%	100%	
Responding people (eligible for the clinic)	526	66%	89%	100%
Went to clinic	369	46%	63%	70%

Of the responding people (eligible for the clinic), 70% participated in the clinic portion of the survey, giving an overall response rate to every stage of the survey of 46%. Although

there is room for improvement at every stage of collection, these figures indicate that the challenge to improve response rates for the CHMS will be at the initial household contact. It should be

noted that due to the clinic capacity, it was necessary to stop household interviewing early. When collection was stopped, contact had been attempted but not achieved for 127 households. Had interviewing efforts continued, it is possible that some of these would have participated.

Figure #1: Clinic response rates by age group



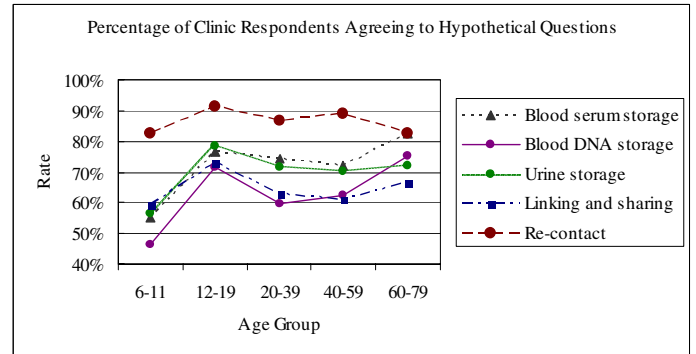
Examining the response rates for the clinic portion of the survey (calculated based on the number of responding people, eligible for the clinic), presented in Figure #1, the overall male response rate was higher than the overall female rate, 72% compared to 69% respectively. The reverse occurred at the responding people level; however, there was no difference in the overall response rate between the sexes, 62% compared to 63% respectively (not shown). The youngest and oldest age groups achieved the best overall response rates to the clinic portion of the survey. It is encouraging that the response rates for the six to 11 year old age group were higher than expected. It is interesting to note that the response rate for males aged 60 to 79 was 100% compared to 64% attained by females in the same age group.

The CHMS is investigating the possibility of analysing some of the biological measures at a later date, when funds become available. This would likely involve the storage of biological specimens. However, before decisions are made on storage, more research needs to be conducted into the issues of privacy, costs, research ethics, and others. To this end, clinic respondents were asked to complete a questionnaire, regarding the hypothetical storage of their biological specimens, at the end of their clinic visit.

Figure #2 provides the rates of those that agreed to the hypothetical questions on storage of biological samples and sharing and linking their data as well as being re-contacted by the survey. The hypothetical storage of the DNA blood sample received the lowest rate of acceptance and being re-contacted by the survey received the highest rate of acceptance. It is interesting to note that the youngest age group, the six to 11 year olds, had the lowest rates of acceptance in all categories. Parents or legal guardians responded for this age group. The main reason given for not agreeing to these hypothetical

questions was a need for more information and a concern for confidentiality.

Figure #2: Clinic respondents agreeing to hypothetical questions by age group



In order to evaluate the CHMS planning assumptions, the pre-test followed as closely as possible the collection methodology envisioned for the survey proper, that is in-home interviewing and a follow-up visit, by the respondent, to a health clinic for the physical measures collection. It was planned to perform an oral glucose tolerance test (OGTT) on half of the sample. As the OGTT requires a 12 hour fasting period, half of the sample was randomly assigned a morning clinic appointment, for the OGTT to be performed, and the remaining sample was assigned an afternoon appointment (and no OGTT).

Table #3: Frequency distribution of clinic appointment time

Appointment Time	Response		Non Response	
	Frequency	%	Frequency	%
morning	182	49%	92	59%
afternoon	187	51%	65	41%
	χ^2	DF	p-value	
	3.7976	1	0.0513	

Table #3 presents the frequency distributions of the clinic respondents and non-respondents by pre-assigned appointment time. The chi-squared test shows that appointment time is related to responding to the clinic portion of the survey, with a greater proportion of non-respondents to the clinic having morning appointments. Of those eligible to go to the clinic, there was a response rate of 66% to the morning appointments and a response rate of 74% to the afternoon appointments (not shown). Also, those respondents with an afternoon appointment were asked if there had only been morning appointments available would they still have gone to the clinic. It was reported that 26% of this group would not have gone to the clinic for a morning appointment, with a further 12% who were not sure if they would have gone to the clinic for a morning appointment. There is a need to have more flexibility in terms of clinic appointment times to be able to accommodate these types of respondents.

Table #4: Frequency distribution of stress in ones life

Amount of stress:	Response		Non Response	
	Frequency	%	Frequency	%
not at all stressful	40	11%	18	11%
not very stressful	91	25%	27	17%
a bit stressful	118	32%	53	34%
quite or extremely stressful	36	10%	36	23%
not applicable	83	23%	23	15%
	χ^2	DF	p-value	
	20.1851	4	0.0005	

Table #4 shows a significant relationship between the amount of stress in ones life and attending the clinic portion of the survey. Those that reported being quite or extremely stressful were less likely to go to the clinic.

In addition, race and employment status were also found to be related to responding to the clinic portion of the survey. Results indicate that non-whites are less likely to respond to the clinic portion of the survey and those employed are less likely to respond to the clinic portion of the survey. Many other variables examined that were not related to responding to the clinic portion of the survey include self perceived general health, mental health, body mass index, hypertension, age group, sex, marital status, household size, mother tongue, student status, and income.

6. Concluding Remarks

Although the response rates achieved by the pre-test were lower than most Statistics Canada surveys, it was considered successful enough to continue with the survey proper. The pre-test showed that this type of survey can be conducted successfully in Canada and will aid in the planning and development for this survey. It also revealed that this survey is more costly than originally anticipated. Due to cost and for logistical reasons, mobile examination centres will be used as the setting for the clinic instead of using fixed sites as was done for the pre-test.

Most of the respondents that responded to the in-home interview, responded to all stages of the survey. In fact, the feedback received after the pre-test would suggest that many respondents were enticed, rather than put-off, by the physical measures examination.

The CHMS will collect measures from approximately 5,000 people representing 97% of the Canadian population aged 6-79 (including the territories). Survey development and testing are on-going, with the survey collection planned for 2006-2008.

Acknowledgements

The authors would like to thank all members of the CHMS team for their hard work and dedication to this project. Special thanks go to William Doré and Steve Thomas for their valuable comments and suggestions.

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