SSC Annual Meeting, June 2001
Proceedings of the Survey Methods Section, pp. 93-98

SAMPLE DESIGN OF THE CANADIAN MENTAL HEALTH AND WELLBEING SURVEY

Yves Béland[1], Johane Dufour and Ronald Gravel

ABSTRACT

As part of the Canadian Community Health Survey (CCHS) biennial strategy, the provincial survey component of the CCHS first cycle will focus on different aspects of the mental health and wellbeing of Canadians living in private dwellings. Moreover, this new survey will collect data on both prevalences of specific mental disorders and problems, utilisation of mental health services and economic and personal costs of having a mental illness. Data collection is scheduled to begin in May 2002 and would extend over 8 months. All interviews are conducted face-to-face using a computer-assisted application. This paper describes several key aspects of the sample design of this new survey as well as some challenges encountered in the testing and validation of the questionnaire. In parallel, a brief overview of the sample design of a special survey supplement on the mental health of the Canadian Armed Forces members is given.

KEY WORDS: Area frame; Cross-sectional; Mental health; Wellbeing.

RÉSUMÉ

Dans le cadre de la stratégie biennale de l'Enquête sur la santé dans les collectivités canadiennes (ESCC), la composante provinciale du premier cycle de l'ESCC mettra l'accent sur différents aspects de la santé mentale et du bien-être des Canadiens résidant dans des logements privés. De plus, cette nouvelle enquête recueillera des données tant sur les prévalences de certains désordres et problèmes mentaux spécifiques, l'utilisation des soins de service en matière de santé mentale de même que sur les coûts sociaux et personnels associés aux problèmes de santé mentale. Il est proposé que la collecte des données débute en mai 2002 et qu'elle s'échelonne sur une période de huit mois. Cet article décrit plusieurs aspects clés du plan d'échantillonnage de cette nouvelle enquête. Il décrit également les différents défis rencontrés durant les étapes de validation du questionnaire. En parallèle, un bref aperçu du plan d'échantillonnage d'une enquête supplémentaire portant sur la santé mentale des militaires des Forces Armées canadiennes est fourni.

MOTS CLÉS: Base aréolaire; bien-être; santé mentale; transversal.

1. INTRODUCTION

The Canadian Community Health Survey (CCHS) is funded as part of the *Health Information Roadmap* Initiative (CIHI, 1999), a plan to modernize and standardize health information across the country. Statistics Canada, the Canadian Institute for Health Information (CIHI) and Health Canada jointly support the series of projects that make up the *Roadmap* Initiative. The CCHS has a two-year collection cycle comprised of two surveys: a regional survey in the first year and a province-level survey in the second. Each second year of the survey cycle is designed to focus in depth on a particular topic. During consultations for the development of the Canadian Community Health Survey (Béland, Bailie, Catlin and Singh, 2000), mental health was frequently identified as a high priority topic to be measured. Therefore, the focus topic being considered for the provincial component of the CCHS, scheduled to take place in 2002, is mental health and wellbeing.

Mental illness is increasingly recognised as a serious and growing problem. The economic and personal costs of mental illness are major social and public health issues. The World Health Orga-nization (WHO) reports that 5 of the 20 leading causes of disability are mental disorders (www.who.int/mental_health/aboutmh.html).

There are currently no national prevalence estimates for major disorders, and more information is required about the needs and provision of appropriate and adequate health care.

The major objectives of this new survey are: i) to determine prevalence rates of selected mental disorders to assess the impact of burden of illness; ii)

[1] Yves Béland, 16K, R.H. Coats, Tunney's Pasture, Ottawa, Ontario, K1A 0T6, yves.beland@statcan.ca.

to juxtapose access utilisation of mental health services with respect to perceived needs and iii) to assess the disability associated with mental health problems to individuals and society. This CCHS component will also cover other determinants and correlates of mental health such as distress, social support, wellbeing, stressors and coping strategies, work stress, and spirituality.

Mental health disorders were selected based on the conditions that a 12-month prevalence rate would be at least 1%, that they could be measured with a widely recognised and validated instrument, and that they are amenable to intervention. The disorders being considered are:

- depression
- mania
- panic
- social phobia
- agoraphobia.

The content development of the above disorders is based on World Mental Health Survey questionnaire (WMH2000). The WMH2000 includes a lay-administered mental diagnosis-oriented instrument that generates a profile of those with a disorder according to the definitions of both the ICD-10 (International Classification of Disease) and the DSM-IV (Diagnostic and Statistical Manual of Mental Disorders).

Other content areas proposed for the CCHS will include eating troubles and behaviours, gambling problems, suicidal thoughts and behaviours, and alcohol/illicit drug use and dependence. Infor-mation on the utilization of mental health services and use of medication will also be collected. Other health information such as self-perceived health status, restriction of activities and chronic conditions will also be part of the content. Basic socio-demographic information will complete the questionnaire.

Respondents will be asked to share their thoughts, feelings and experiences about issues which maybe perceived as sensitive and personal. Therefore special attention is being given to collection strategies in order to minimize negative public reaction, address privacy concerns and ensure greater security of information. Item nonresponse may be higher for this study, as respondents may find some questions too sensitive to answer.

An Expert Group of mental health professionals and consumers has been guiding the content development and strategic direction of the study. As well, the survey program is supported by a standing Advisory Committee, comprised of provincial and territorial ministries of health, Health Canada and CIHI representatives. Finally, Statistics Canada has been working closely with the WHO study developers so that information collected on mental health disorders and problems will have international comparability.

Section 2 gives an overview of the sample design, data collection, interviewer training and qualitative testing of the provincial component of the CCHS. A brief overview of the special survey component on the mental health of the Canadian Armed Forces members is given in section 3.

2. SAMPLE DESIGN

2.1 Target population

This CCHS component will cover only persons living in private dwellings in the ten provinces who are aged 15 years old or over. The survey excludes from its target population those living in the three territories, on Indian Reserves and Crown lands, clientele of institutions, full-time members of the Canadian Armed Forces and residents of some remote areas. The members of the Armed Forces will be part of a separate survey component conducted in parallel to this one.

2.2 Sample size and allocation

To satisfy reliability criteria for the key mental disorders for specified sub-populations, a total sample size of 30,000 responding sample units is proposed. In order to balance the reliability for provincial estimates

Table 1 - Provincial sample sizes

Province	Sample
Newfoundland	1,525
Prince Edward Island	1,000
Nova Scotia	1,975
New Brunswick	1,750
Québec	5,500
Ontario	6,725
Manitoba	2,150
Saskatchewan	2,050
Alberta	3,375
British Columbia	3,950
Canada	30,000

Note: All figures will be inflated before going in the field to account for non-response and vacant dwellings.

with the national ones, the sample of 30,000 units is allocated to the provinces using the root-N approach with the exception of allocating 1,000 sample units to the province of Prince Edward Island. Table 1 gives the details of the proposed provincial allocation for the CCHS Mental Health and Wellbeing.

2.3 Sample frame and sampling of households

The random sample of 30,000 respondents will be selected from an area probability frame. This area frame, as designed for the Canadian Labour Force Survey (LFS), covers almost the entire country, from which a sample of dwellings is selected under a multistage stratified cluster design (Statistics Canada, 1998). For those areas selected in the first stage of the design, a list of dwellings is prepared and maintained in the field. A sample of dwellings is then selected at the second stage from each list. The households in the selected dwellings then form the sample of households. To get a base sample of 30,000 responding households, approximately 44,000 dwellings will be selected from the area frame to account for the anticipated vacant dwellings (15%) and non-response (20%).

2.4 Sampling of persons

Various symptomologies associated with important mental health problems appear during teenage years. If undetected or untreated for many years, the mental health problems will often be more challenging to treat and represent a higher cost to health care services and society in general. In light of this, the Expert Group has recommended that a sufficient representation of young persons (15-24) be included in the final sample for more in-depth analyses of this important subgroup. With that concern in mind, various options for defining the rules for selecting persons within a household have been studied.

Interviewing more than one person in a same household allows for economies in the cost of collection, since a large part of these costs are attributable to the process required to reach the household. However, strong similarities observed among members of the same household can lead to an undesired cluster effect for certain important survey characteristics. Moreover and probably the most important disadvantage considering the sensitiveness of the topic, the response burden of the household is increased.

On the other hand, selecting only one person per household represents a significant increase in collection costs, since a greater number of households must be sampled. Also, as the chances of being part of a sample are inversely proportional to the number of persons in the household, certain age groups are either under- or over-represented. In particular, selecting only one person per household underrepresents persons coming from large households, typically parents and children, and overrepresents persons coming from small households, often single people and the elderly. Table 2 compares the age group distributions of the targeted population from the 1996 Census and a simulated CCHS sample where only one person is selected with equal probability.

Table 2 – Percent Distribution by Age Group

Age group	1996 Census	*CCHS Sample (equal prob.)
15-24	16.7	11.8
25-44	39.2	38.0
45-64	29.3	29.7
65+	14.8	20.5

* Average distribution over 100 repetitions

The results clearly demonstrate that, by selecting one person per household with equal probability, the 15-to-24 age group is greatly under-represented while older persons are over-represented. To accommodate the user needs, the cost, the efficiency of the design, the response burden, and the operational constraints, it is suggested to select only one person per household but with unequal probability. In fact, the representativeness of the 15-to-24 age group will be improved by giving them, in specific households, a higher probability of selection compared to the other age groups. Table 3 describes the rule for selecting the person based on the household composition.

Table 3 – Selection Strategy based on House-hold Composition

Number of 15-24 (n)	Number of persons aged 25 or over (m)					
	0	1	2	3	4	5+
0	-	A	A	A	A	A
1	A	B	B	B	B	A
2	A	B	B	A	A	A
3+	A	A	A	A	A	A

A: selection of one person with equal probability
B: selection of one person where those in the 15-to-24 age group would have a probability of 2.6/(2.6*n+m) of being selected and the others would have a probability of 1/(2.6*n+m)

Table 4 – Expected CCHS Sample Distribution by Age Group

Age group	1996 Census	*CCHS Sample (unequal prob.)
15-24	16.7	16.0
25-44	39.2	35.9
45-64	29.3	27.7
65+	14.8	20.3

* Average distribution over 100 repetitions

Table 4 shows the expected distribution of a simulated CCHS sample using the rule described in Table 3. The results show that the 15-to-24 age group representativeness is improved without overly penalizing the other age groups.

2.5 Data collection

Data collection, which is scheduled to begin in May 2002, will span a 7-month period in order to spread out the interviewer workload in the field. All interviews will be face-to-face and conducted using the computer-assisted personal interviewing method (CAPI). Total non-response will be addressed in the field by visiting non-response cases again the following month. Non-response cases after two consecutive months will be forwarded to senior interviewers and an 8th month of collection will be added at the end for additional follow-up of this group.

2.6 Interviewer training

The two key elements of the CCHS Mental Health and Wellbeing interviewer training and support program will be sensitivity training and on-going support for the interviewers. The training of Statistics Canada (STC) interviewers must address a number of specific requirements. These needs will center on 3 elements: the CAPI application, the survey content and the sensitivity and awareness of mental health issues.

The training on the awareness and sensitivity aspect of the survey will be developed by the Centre for Addiction and Mental Health in Ontario and will be integrated into STC training application. The Centre, through the collaboration of 5 regional experts in mental health, will also provide on-going support for interviewers throughout the collection period. The sensitivity training is intended to raise interviewer awareness regarding mental illness and to ensure interviews are conducted in a sensitive yet professionnal manner. The Canadian Mental Health Association is supporting Statistics Canada through the offering of helpful information including general material on mental health and where to find resources and local help numbers will be identified to anyone asking for immediate help. Statistics Canada has also consulted with a number of associations. The Canadian Medical Association, the Canadian Psychiatric association, the Canadian Psychological Association, the Canadian Mental Health Association and the Canadian Alliance of Mental Health and Mental Illness were consulted in order to solicit their support and seek advice on adequately addressing respondents needs for information and help.

2.7 Qualitative testing

The goal of the qualitative testing was to evaluate respondent reactions with regards to the sensitivity of the subject matter and their ability to understand and willingness to respond to the questions. Cognitive testing and focus groups took place during summer 2001. The focus groups were held in Ottawa, Montréal, Edmonton and Red Deer.

The approach of the qualitative testing was to have individuals with known mental disorders as well as participants from the general population respond to the survey, and then provide feedback on their experience of participating in the survey. As part of the qualitative testing, fifty face-to-face interviews were conducted in both French and English and then respondents were debriefed on their interview experience. Mental health experts at St. Joseph's Hospital in Hamilton, and L'Hôpital L.-H. Lafontaine in Montréal conducted cognitive tests with target groups of participants diagnosed with a mental disorder. The conduct of these studies was reviewed and approved by the ethical review bodies within each host organization.

Qualitative testing identified general acceptance and support to do the study."It's about time" was a phrase commonly stated. We found the length of interview to be too long, specific questions too verbose, and some screening criteria too broad. All of these findings have been addressed and as a result a much more respondent friendly questionnaire emerged.

2.8 Pilot test

Due to the complexities and sensitivities of this survey, a pilot test will be conducted prior to taking a decision to launch the study. The objectives of the pilot test will be to, once again, measure public reaction, determine the effectiveness of the training and communication strategies, test the pacing and timing of the training, provide a preliminary indication of the response rates, and to test the computer appli-cation. A sample of 600

households is being planned in order to meet the above criteria. To avoid any bias, the pilot will be conducted in both languages throughout the provinces of Québec and Saskatchewan. The test is planned for February 2002.

3. CANADIAN FORCES SUPPLEMENT

3.1 Background and objectives

With the objective of enlarging the scope of the CCHS, a separate survey component with a representative sample of the Canadian Forces (CF), both regular and reservist members, was added. This component, sponsored by the Department of National Defence (DND) is intended to provide reliable and analogous information for the CF members.

The CF supplement has identical objectives as the CCHS and will be drawing on the CCHS results for comparisons between civilian and military populations. The data collection is intended to take place at the same time period as the CCHS. The questionnaire content is very similar. Some instruments on the wellbeing and the determinants of mental health were not included in the DND questionnaire since they were already measured in other recent surveys. DND also added three WMH2000 disorder modules which were not considered for the CCHS: dysthymia, general anxiety disorder and post-traumatic stress.

3.2 Sample design

The target population for the CF supplement will be all regular members of the Canadian Forces and reservists who have paraded at least once in the past six months. As of May 2001, the Canadian Forces had 55,562 regular members and 23,528 reservists.

Factors such as cost, time, operational constraints and the desired precision of the final estimates were appraised and balanced before finalizing the required sample size. After looking at various scenarios, it was decided that 5,000 responding regular members and 3,000 responding reservists will be required for the various analysis.

In order to improve the efficiency of the survey design, the target population was further parti-tionned into strata. For this survey, each target population (regular members and reservists) was stratified by gender and rank. To avoid very small cells, the rank characteristic was collapsed into three categories for the male group and two categories for the female group. Within each design stratum, a systematic sampling scheme will be applied to draw the sample.

Table 5 – Sample sizes – CF regular members

Gender	Rank	Population	Sample
Male	Pte-MCpl	28,121	1,418
	Sgt-CWO	11,184	1,077
	Officers	10,790	1,065
		50,095	3,560
Female	Pte-CWO	4,796	834
	Officers	1,661	606
		6,457	1,440
Total		56,552	5,000

Table 6 – Sample sizes – CF reservists

Gender	Rank	Population	Sample
Male	Pte-MCpl	12,162	860
	Sgt-CWO	2,872	557
	Officers	3,555	595
		18,589	2,012
Female	Pte-CWO	4,263	627
	Officers	676	361
		4,939	988
Total		23,528	3,000

To meet DND requirements, a good balance between the reliability of the estimates for each design stratum and for the entire target population is required. To achieve this goal a well-known allocation schemecalled *power allocation* was applied using a power q=0.3 (Bankier, 1988).

Tables 5 and 6 give the population and the targeted sample sizes for each design stratum. Note that these figures represent responding sample units to be obtained at the end meaning that they will be inflated before going in the field for data collection.

ACKNOWLEDGEMENTS

The authors would like to thank Lorna Bailie and Dave Paton for their useful comments.

REFERENCES

Béland, Y., Bailie, L., Catlin, G. and Singh, M.P. (2000), CCHS and NPHS – An Improved Health Survey Program at Statistics Canada. *Procee-dings of the Survey Methods* Section, American Statistical Asociation.

Bankier, M. (1988), Power Allocations: Deter-mining Sample Sizes for Subnational Areas. *The American Statistician*, Vol. 42, 174-177.

Canadian Institute for Health Information (1999), *Health Information Roadmap: Beginning the Journey.* (1-895581-32-X).

Statistics Canada (1998). *Methodology of the Canadian Labour Force Survey.* Statistics Canada. Cat. No. 71-526-XPB.