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2010 round of censuses – innovations and lessons learned

Changes in the Canadian census of population

Note by Statistics Canada

Summary

The note describes important methodological changes in the 2011 census of population and dwellings in Canada. The 2011 approach was built on the successes of the 2006 census that introduced central mail-out with the use of an address register and an internet response option. The aim was to promote a higher rate of return via the internet while reducing non-response. The main element of the approach was a wave methodology consisting of repeated mail, telephone and face to face reminders to encourage non-respondents to self-enumerate, preferably via internet. The internet was also used to introduce a new support tool for field collection operations. The long-form sent to a sample of households in previous censuses was collected via a new voluntary survey, the National Household Survey.

I. Introduction

1. Canada conducts a census of population and dwellings every 5 years. The most recent was conducted in May 2011 and introduced several significant methodological changes. The approach in 2011 was built on the successes of the 2006 census that introduced central mail-out with the use of an address register and an internet response option. Many of the changes in 2011 were intended to promote a higher rate of return via the internet while reducing the risk of higher non-response. The main element of the approach was a wave methodology. The methodology consisted of repeated mail, telephone and face to face reminders to non-respondents to encourage them to primarily self-enumerate, and to do it by internet as a preferred mode. The internet was also used to introduce a new support tool for field collection operations. The long-form traditionally collected on a sample of households in previous censuses was collected via a new voluntary survey, the National Household Survey. The survey was generally collected in the same time frame as the census in 2011. These important changes are described in this paper.

II. The census collection methodologies

2. The Canadian census uses different methodologies in conducting its collection. They are briefly described in Rodrigue et al (2012). The main methodology consists of a mailout using the information available in an Address Register. This methodology was applied to approximately 79% of all dwellings in 2011. Central mailout is not used more widely because the national postal service (Canada Post Corporation) cannot deliver unaddressed mail to all dwellings. Statistics Canada does not have names of residents associated with dwellings as part of the Address Register. Since the dwelling is the basic starting point for the census enumeration of the population in Canada, it is imperative to provide specific letters or questionnaires to specific dwellings to determine who has responded and to ensure complete enumeration. In most rural areas, mail is delivered to a specific dwelling only if the occupant's name is included with the address.

3. In areas where the census is not mailed, a questionnaire was either delivered to the dwellings by a census enumerator as part of a list and leave operation (19%), or the census was collected directly at the door by a census enumerator (2%). Collection at the door is mostly used for First Nations communities, and those in remote and northern areas.

III. The wave approach

4. The wave approach used for the 2011 Canadian census is largely based on the theory of Dilman (2007). The approach was applied differently based on the main collection methodology. There were two different approaches for mailout areas, and one approach for list and leave areas. The choice of approaches in mailout areas was determined based on the propensity of the population to self-enumerate as demonstrated in the 2006 census and on the 2006 Census internet take-up rate.

IV. Approaches in mailout areas

5. For approximately 75% of dwellings in mailout areas, only a letter was sent in wave 1. This treatment was identified as group 1. Letters were all delivered on May 3 by Canada Post. It invited respondents to respond online using the personal Secure Access Code printed on the letter, and also included a toll free telephone number for respondents

who preferred to respond using a paper questionnaire (calls were directed to the Questionnaire Request System). The toll free number of the Census Help Line was also included in case respondents had any questions or required assistance. This approach which did not offer an immediate option to answer on paper was used in areas where self-enumeration was likely to be higher. The remaining 25% of dwellings in the mailout universe were mailed a questionnaire package. The package also included a personal Secure Access Code for the online option and the number to the Census Help Line. This approach was identified as group 2.

6. Wave 2 started on May 10 with the production and mailout of a reminder letter to all non-respondents from wave 1. The letter was in the same format as the letter from wave 1 and indicated to respondents that it was not too late to respond. It also included the dwelling's Secure Access Code again so that the initial letter or questionnaire package would not be required to respond online. Both groups received the same letter for wave 2. Letters were printed using an 'on demand' process in a self-mailer format where the letter folds into what is also the envelope (one piece of paper). This format allowed for the production of more than 6 million reminders over a 6 day period. The process also allowed for the easy matching of the address and the Secure Access Code for each letter, critical to ensure that a return has accounted for the right dwelling.

7. Wave 3 started on May 18, 8 days after census day. For group 1, a questionnaire package was sent to all dwellings for which a response had not been received and a questionnaire had not been ordered via the Questionnaire Request System. This package contained a new access code for internet. The letter accompanying the package contained more direct wording concerning the mandatory requirement to complete the census. Again a matching process was put in place to ensure that the address and the Secure Access Code were associated to a specific dwelling.

8. For group 2 that had already received a questionnaire package in wave 1, a phone message was sent to non-responding dwellings using a voice broadcast service. The message was a reminder to complete the census either online or by mail and was sent mid-day in an attempt to be left on an answering machine. Telephone numbers were available for approximately 60% of dwellings, mostly from publically available sources.

9. Wave 4 started on June 1 and consisted of telephone or personal follow-ups of remaining non-respondents by enumerators. If personal contact was not established during initial follow-up, either a message would be left on the answering machine or a 'Notice of Visit' card would be left at the door indicating the purpose of the follow-up and asking the householders to call the Census Help Line or the nearest Local Census Office for assistance in completing the census. Follow-ups continued until response rate objectives were met for all areas and ended on August 5.

V. Treatment in list and leave areas

10. In list and leave areas, questionnaire packages were delivered to all dwellings by Statistics Canada enumerators in wave 1. Delivery took place from May 2 to May 10. The packages included a questionnaire and a personal Secure Access Code to the online application.

11. As list and leave areas by definition did not have mailable addresses, there was no means of sending the reminder only to non-respondent dwellings. Wave 2 thus consisted of a general reminder card to all dwellings as part of an ad-mail delivery. As well, there was no wave 3 for these areas, and thus non-response follow-up started on May 20, ten days after census day. The early start to non-response follow-up was consistent with the

approach used in the 2006 Census and ensured that the enumerators used for the drop-off of questionnaires would mostly still be available for follow-up.

VI. Questionnaire Request System

12. The Questionnaire Request System is an automated telephone system that was put in place to allow households who had received only a letter in wave 1 or 2 to order a paper questionnaire if this was their preference. After calling the number available on all letters, respondents would be prompted to enter their Secure Access Code using a touch tone phone. The system would then send a message to Canada Post to address a questionnaire package to be mailed to the household. The average return time for completed paper questionnaires issued in this manner was 12 days. Respondents without a touch tone telephone were routed to the Census Help Line for assistance.

VII. Response management

13. A strategy was implemented to manage the collection process to ensure that both target and uniform response rates were achieved by region. This strategy was deployed for optimum use of the human and financial resources in the pursuit of response objectives and required real time information on the progress of collection. The real time information was provided via the Field Management System used during collection. It also made use of a dynamic model to indicate the projected end of collection by region based on a number of parameters – self-response levels, productivity of enumerators in non-response follow-up, and the hours worked per day by enumerator by area. This information was analysed several times a week during collection to determine if different tiers of the collection management strategy needed to be invoked.

14. The strategy included four tiers that were applied individually to more than 45,000 collection units in the country. The collection units were the basis of the geography delineated for the planning and management of collection operations.

15. Tier 1 called for the stop of non-response follow-up in any collection unit across the country when the observed collection response rate reached 98%. It was determined that at this level, high quality information would be available for dissemination. It did not assume that response would be capped at 98% since self-completed questionnaires could continue to be received via the internet or by mail for these areas.

16. Tier 2 was to stop collection below 98% in very small collection units (just a few dwellings) as this would have a very marginal impact on the dissemination results. Tier 3 was to stop collection at the response level obtained in 2006, and Tier 4 was to introduce any measures that would ensure the highest response possible below 98% or 2006 results. As collection units reached their response target or where collection was stopped, collection resources were re-allocated to neighbouring collection units that were not yet completed. Tiers 2 to 4 were invoked only if it was determined around mid-point during operations that collection in an area would not be completed by the planned end date of July 2. The same would be done if it was determined that the budget for collection would all be expended before the end of collection. For 2011, tiers 3 and tier 4 were not invoked.

VIII. Response results

17. The various strategies and collection methodologies deployed ensured that the response objectives for the 2011 census were reached. The table below shows the national,

provincial and territorial global collection response rates, the internet collection response rates and the self-response collection rates.

Table 1

	<i>Response</i>	<i>Internet</i>	<i>Self-response</i>
Canada	98.1%	54.4%	84.1%
Newfoundland	98.2%	37.6%	84.9%
Prince-Edward-Island	98.3%	36.4%	85.8%
Nova Scotia	98.0%	42.2%	85.4%
New Brunswick	97.7%	48.2%	85.3%
Quebec	98.2%	52.3%	84.9%
Ontario	98.3%	57.0%	84.7%
Manitoba	97.8%	47.4%	83.1%
Saskatchewan	97.8%	41.8%	82.7%
Alberta	98.0%	57.7%	82.1%
British Columbia	97.6%	60.5%	83.3%
Yukon	94.1%	35.5%	58.4%
Northwest Territories	96.6%	9.1%	26.2%
Nunavut	92.7%	0.0	0.4%

Notes: These preliminary rates are obtained directly from collection results, i.e. before data processing and data quality verification. They are calculated as the number of private dwellings that returned a questionnaire divided by the number of private dwellings classified as occupied by field staff. After processing and quality verification of the data, post-collection response rates will be produced. Among other improvements, these final response rates will include collective dwellings and adjustments to the number of occupied private dwellings based on a sample study of the quality of the dwelling occupancy status.

18. The wave collection approach was successful in generating not only high response by internet, but also most likely high self-response. The use of a letter only in waves 1 and 2 for a large portion of the census universe pushed respondents to massively use internet as their mode of response. The frequent reminders also seemed to have had the effect of pushing to action people who might have otherwise waited for the visit of the enumerator.

19. Post-collection qualitative evaluation of the respondent messages, including the wave letters and the paid advertising, have shown that Canadians interviewed were generally aware of the census and understood their obligation to respond. It is not clear if the controversy around the replacement of the long-form for the 2011 Census by the National Household Survey and the related media coverage affected the level of awareness.

20. When looking at response patterns with the wave approach, we observed an increase in response level approximately at the time new reminders were sent to non-respondents (Rodrigue et al, 2012, graphic not included). Because the waves may have overlapped more in some regions (fewer days to react to a reminder), it will be difficult to measure the actual impact level of each wave. We can conclude that sending a letter to a portion of the dwellings had the desired effect (table 2). Group 1 mostly responded by internet (71.6%). For group 2, the mail response level (50.1%) shows that respondents will use different ways of responding when they have readily available options.

21. These results are also logical in the sense that group 1 was comprised of regions with good self-response levels in 2006. Results still exceeded expectations globally as the target global response was 98%, the internet target response was 40% and the target self-response was 80%.

Table 2

Collection method	Response mode				Non-response	Total
	Mail	Internet	Help line	Non-response follow-up		
Group 1 - letter	16.1%	71.6%	0.7%	9.1%	2.3%	100%
Group 2 - questionnaire	50.1%	25.8%	0.8%	20.0%	3.4%	100%

IX. Field Management System

22. During the 2006 Census collection operations, communication to and from the field was inadequate. The approach was mostly based on paper reports and assignment lists that were transmitted by fax machine. As a result, the available information was not timely and therefore complicated the management of non-response follow-up. To address this deficiency, a Field Management System was developed for 2011 and used to manage collection operations (Hamel and al, 2008).

23. The Field Management System is a web based application used to provide enumerators with their work assignments, allowing them to enter their productivity and pay information, receive messages and manage the shipment of their completed questionnaires. Enumerators were compensated as part of their pay for using their own computer and internet account to access the system. Over 90% of enumerators had direct access to the system from their home in 2011. For the others, their direct supervisors (Crew Leaders) were performing functions on the system on their behalf. In addition, Crew Leaders had functions to create work assignments, recommend pay claims for approval, and had access to a number of reports to help them manage the operations. Detailed and aggregate progress and expenditure reports were also available to other levels of management. No important issues were experienced with the system during collection, and its implementation was a huge success. The Field Management System was the basis of timely management information.

X. The National Household Survey

24. The long-form used in previous censuses was replaced in 2011 by the National Household Survey. The survey was collected on a voluntary basis on a sample of 4.5 millions dwellings. Households in selected dwellings were asked to respond to both the census and the survey separately. A wave approach was also used for the collection of the survey. The approach was largely tailored on the census collection methodology and the way households responded to the census.

25. Households selected for the survey and responding to the census online in May were presented with the survey questionnaire online immediately upon submitting their census questionnaire. If they continued immediately with the survey, information for questions common to both questionnaires was automatically copied over to the survey and the application skipped to the next logical survey question. Those not continuing with the survey at that time received a reminder letter in early June. Enumerators started following-up on the survey as soon as census collection had sufficiently progressed in their area to ensure completion by the end of July.

26. Selected households completing the census on paper in May or those in list and leave areas had their survey questionnaire mailed out or delivered to them by an enumerator in the first week of June. In mailout areas, this was followed by a reminder letter to non-

respondents in mid June, and then enumerator follow-up. In list and leave areas, there was no reminder and non-respondents were followed-up by enumerators starting in mid-June.

27. There were also dwellings selected to be in the survey and for which a census questionnaire had still not been returned by June 1. These were simply visited by census enumerators to complete the survey at the door at the same time as the census.

XI. Reducing the risks of non-response biases on the National Household Survey

28. Non-response follow-up for the survey continued until August 19. On July 14, a sample of 450,000 of the remaining 1.3 million non-responding dwellings were selected for further follow-up (Rodrigue et al, 2012). This was done to focus the collection operations to ensure adequate response in every region, but also to better target remaining non-respondents in areas with known concentrations of specific subgroups of the population more at risk of being under-represented on the survey. The collection operations for the survey were managed in a similar fashion as those described for the census (Rodrigue et al, 2012).

29. These collection approaches permitted the completion of the survey collection with a national collection response rate of 69.3%, and to obtain good response levels in all large population centers.

XII. Lessons learned

30. The approaches used to increase internet response in the Canadian census were successful. There were still a number of important lessons learned which will lead to improvements for future censuses. The time required to produce and get the reminders to dwellings in various parts of the country took slightly more time than anticipated, which meant that we did not fully benefit from the effect of a wave before initiating the next. Statistics Canada will be assessing ways to implement a tighter application of the approach for the future, looking for ways to produce and mailout each wave in a much shorter time frame.

31. Using this approach also requires that the mailing list be of very high quality. We had a small number of duplicate addresses for some dwellings which actually were not multi-unit structures. In these cases, the respondent generally completed one of the questionnaires and ignored the other, which meant that they kept receiving reminders for the one not completed. These situations were not resolved until wave 4 when a census enumerator was able to verify that the second dwelling did not actually exist. Processes will be modified to improve the quality of the mailing list and to deal more efficiently with such situations during collection.

32. The post census evaluation of the communications material revealed that many Canadians do not make extensive use of traditional mail services, rendering the wave approach as implemented in 2011 less effective for them. These people manage most of their financial obligations online, and do not have a requirement to often go to their mailboxes. Although the size of this segment of the population is unknown, we can anticipate that it is only going to grow in the future. Statistics Canada will be evaluating options to deliver invitations to participate in the census in different ways for the future, such as inviting respondents to pre-register to complete the census online, or possibly using the e-post service offered by the Canada Post Corporation to reach some households. With

the e-post service, Canadians can register to obtain an electronic address from Canada Post, and have their bills and other similar mail sent to them via that address.

33. It is too early at this time to conclude on the quality of the data collected via the new National Household Survey. Data quality studies are underway with the first release date scheduled for early 2013.

XIII. Bibliography

Dillman, D.A., "Mail and Internet Surveys: The tailored Design Method, second edition", Wiley 2007.

Rodrigue, J.-F., Mathieu, P., Morin, J.-P., Taylor, J., « La méthodologie de collecte du Recensement et de l'Enquête nationale auprès des ménages de 2011 au Canada », Paper presented at the *Journées de méthodologie Statistiques* conference, Paris, France, January 24-26, 2012.

Côté, A.-M., Laroche, D., Wang, Q., "Identification des unités de collecte qui ont reçu la lettre destinée à promouvoir la réponse par internet au recensement de 2011", 2011.

Hamel, M., Hamilton, G., Gilmour, G., "Changes in the Management of Data Collection Operations for the Canadian Census in 2011", Proceeding for Statistics Canada's International Symposium, 2008.
