**Framework to assess the maximum expected response rate for different survey designs and field conditions**

*François Laflamme and Sylvie Bonhomme, Statistics Canada*

## Introduction

Statistics Canada, like many national statistical organizations, has observed a downward trend in response rates for household surveys, particularly since 2011. Changes in the external environment (e.g., an increased number of cell phone-only households, increased use of telephone caller display and new technologies) as well as internal structural changes (e.g., the introduction of electronic questionnaires (EQs) as a collection mode and the introduction of the new Household Survey Frame that now includes cellular phones) have led to a sustained decrease in response rates for household surveys. To address this complex issue, the agency is currently looking at various options to improve data collection processes and is formulating strategies and introducing initiatives to improve response rates. In the meantime, recent surveys have provided the agency with a better understanding of external and internal factors that might impact response rates before and during data collection. Data collection units have either no direct responsibility or shared responsibility over some of these factors, while they have the primary responsibility over other factors, especially during collection. Given all these factors, before collection even begins there is a “maximum/optimum” attainable response rate that can be achieved by the data collection units. The main objective for each data collection unit is to reach the “maximum response rate” using best practices before and during collection. In theory, this maximum response rate should be very close to the target response rate.

The target response rate is generally determined conjointly by data collection units, subject matter and methodology during the survey planning step. This target response rate is either based on historical information for regular/ongoing surveys or on comparable surveys for the first-time or occasional surveys. In practice, we expect that this target response rate is realistic e.g. very close to the maximum attainable response rate given the overall survey design features and field conditions of a given survey.

This document starts by providing an overview of the factor categories that have an impact on response rates. These categories are based on the “level of responsibility” data collection units within organizations have over each of these factors. The next two sections describe, in more detail, the factors that have an impact on response rates—before collection starts (section 3) and during collection (section 4). Section 5 discusses the relationship between the maximum and observed response rates in relation to developing an indicator to assess the performance of the field data collection units.

## Factors impacting response rates

Several factors can impact response rates before and during data collection. The framework presented in Table 1 summarizes the most important ones according to the ”level of responsibility” data collection units have over each of these factors. These factors are divided in three categories: (1) factors over which data collection units have generally **no direct responsibility**; (2) factors that are more flexible and over which data collection units have **shared responsibility;** and (3) factors over which data collection units have **the primary responsibility**. Following are the descriptions of each category:

* **Category 1:** Items in the red boxes (1) represent the factors over which data collection units have no direct responsibility. These items are usually the responsibility of methodology and subject-matter units, and they are related to the intrinsic nature and sample design of the survey. The decisions related to these aspects occur at the early stages of the survey design process in which data collection units have generally limited involvement (with the exception of Collection Front Door collection[[1]](#footnote-1)). These parameters are constant and fixed before collection starts, and for the entire data collection period. If one of theses generally fixed parameter is changed for any reason during the collection period (e.g. increase in survey budget, survey incentives or length of collection), this will also possibly change the maximum response rate.
* **Category 2:** Items in the yellow boxes (2) represent more flexible factors for which data collection have shared responsibility with various collection partners (e.g. of methodology and subject-matter units) before collection starts, for example predetermined collection rules (including caps on call, time slice and transfer of cases between collection groups), and collection strategy (including length of collection period, response rate targets, survey cost, collection tools used, follow-up and non-response strategy). The different collection partners usually agree on these parameters.
* **Category 3**: Items in the green boxes (3) represent the factors for which data collection units have the primary responsibility before and during collection. Collection managers have varying control of assets either before or during collection (i.e., capacity planning, production plans, assignment and scheduling of interviewers, training, use of adaptive/responsive design and active monitoring). These factors are under the responsibility of data collection units.

According to the new, emerging and constantly evolving data collection challenges, there is a clear advantage for the whole statistical organization to involve data collection managers (in addition to Collection Front Door) earlier in the survey design decision-making process. In that regard, future surveys will benefit from the most recent lessons learned in the field that will limit the eventual and negative impact on response rates of some of these influencing factors.

Table 1: Framework to assess the maximum expected response rate[[2]](#footnote-2)



## Factors impacting response rates before data collection

Before collection starts, in order to plan for the expected and realistic response rate, many key factors must be taken into account. Depending on the characteristics of these factors, response rates can be influenced positively or negatively. In the following examples, the factors that have an impact on response rates before and during collection are described according to the level of responsibility data collection units have in the current Statistics Canada context. Finally, it should be noted that many potential interactions exist between these factors that could be considered in a generalized theoretical framework to assess the maximum expected response rate. For example, increasing question length or survey incentives would possibly increase surveys costs.

**3.1 Factors over which data collection units have no direct responsibility — Red boxes (1)**

* Nature of the survey
	+ Topic and survey objective(s)
	+ Type of survey: ongoing, regular or occasional (including first-time surveys)
	+ Characteristics of the target population
	+ Status of the survey (voluntary/mandatory)
	+ Use of incentives
* Questionnaire content and length
	+ Complexity of concepts and definitions
	+ Length of the questionnaire / Respondent burden
* Survey frame
	+ Quality and timeliness of the contact information including the number of contact information sources (e.g., quantity of telephone numbers, email addresses)
	+ Type of frame and characteristics of the frame (e.g., available phone and/or dwelling frames)
	+ Composition of the frame (e.g., cellular versus landline)
	+ **The type of frame available is often the main driver, along with budget, in the choice of a given collection strategy.**
* Sample design
* Sample size and expected quality of estimates
* Stratification and sample allocation (e.g., proportion of cases in more difficult regions or in more difficult-to-reach populations (e.g., oversampling of immigrants)
* Rostering and random selection of respondents
* Collection modes
* Response rates can vary greatly by collection mode (CATI \ CAPI \ Web or mixed-mode)
* Operational constraints
* Some operational constraints such as the a unionized workforce (i.e. interviewers need to receive their working schedule one month in advance) and interviewing (workload) capacity are two important operational factors that need to be considered.
* The communication flow between Head Office (HO), Regional Offices (RO’s) and CAPI interviewers is also a key element that needs to be taken into account because it can possibly limit the scope, type and timeliness of possible interventions / actions in the field.
* External factors (survey climate)
* External survey environment factors can influence response rates, over which collection units generally have no direct responsibility (e.g., increased privacy concerns; growth in the number of public opinion research surveys and telemarketing calls; increased use of telephone call display technologies for screening calls; and an increased proportion of cellular phone only households ). However, Lorenc et al. (2013) “argue for increased efforts by national statistical institutes (NSIs) toward positively influencing the external survey environment in which they operate” in order to improve response rates. For example, increasing effort to strengthen an NSI’s brand and improve their broader public perception will improve the likelihood of participation in surveys. In fact, the extensive advertising of the Canadian census every five years benefits household surveys that are in the field during that period with higher recorded response rates.

**3.2 Factors over which data collection units have shared responsibility — Yellow boxes (2)**

* Budget
	+ Resources are predetermined (fixed) and limited. Collection budgets are generally negotiated with subject-matter areas based on the initial cost estimates provided by Collection Front Door. Increased budgets represent a change in the data collection strategy and a potential increase in the maximum response rate.
* Data collection strategy
* Before the start of survey development, collection partners agree upon the parameters defined in the collection strategy. Parameters include length of collection period, response rate targets, survey cost, collection tools used, initial mode of contact versus mode of collection, interaction between modes of collection (when to switch from one mode to another) and non-response strategy.
* Length of collection period
	+ The timing of the collection strategy is determined based on many factors over which data collection has no direct responsibility (e.g., sample size and allocation and duration of the interview) as well as the capacity of field operations during the targeted collection period. With regard to the budget, an extension of the collection period would represent a change in the data collection strategy and a potential increase in the maximum response rate.
	+ Surveys with short collection periods (e.g., 10 days for some agricultural surveys) are more at risk (in terms of potential impact on the response rate) because there is little time to react if important problems occur in the field.
* Predetermined collection rules
	+ Predetermined collection rules and strategy are generally fixed before collection starts, and include pre-contact strategy, cap on calls (i.e., limit of calls per case) and routing tables (e.g., rules to escalate cases to the next group and level—regular group to refusal, refusal group to senior interviewer group, and transferring rules from one collection mode to another).
	+ These parameters are fixed for the whole data collection period.

**Note:** As collection experts, data collection units should also play an important role in the decision-making process, and, in particular, for the predetermined collection rules and collection strategy.

**3.3 Factors over which data collection units have the primary responsibility — Green boxes (3)**

* Survey planning
	+ Determine realistic survey assumptions and targets (e.g., realistic response rates). In practice, the targeted response rate should be close to the maximum response rate.
	+ Evaluate the collection capacity for the targeted collection period by taking all concurrent surveys in the field into account.
* Production plan
* Plan for work intensity and interviewer allocation.
	+ Determine the milestones and plan to monitor survey progress.
* Work intensity and interviewer allocation, along with responsive collection design and active management, are the main factors over which data collection units have the responsibility (an more control) during collection.
* Properly planning and scheduling interviewers is a factor that ensures collection success (refer to Section 4: During data collection).
* Interviewer / respondent material, training, experience and motivation

Interviewer material, training, experience and motivation

* + - Good interviewer material and training will have a positive impact on response rates.
		- Good interviewer hiring practices will also benefit response rates as well as the retention of good interviewers (related to interviewer skills and experience).
		- Interviewer motivation can also have an impact on response rates.
		- It will be difficult, however, to find objective measures (e.g., for interviewer motivation) to evaluate some of these specific aspects related to interviewers.

Respondent relations materials

* + - The communications strategy is based on the complexity of the survey. This includes, for example, invitation letters; survey introduction; text messages; refusal conversion letters; documentation to help interviewers convince reluctant respondents to use the question and answer module on our website; brochures; bookmarks; social media; magazine articles; local and regional media; and videos. The collection strategy can also include communication initiatives related to the branding of the organization in order to address collection challenges.
* Plan and implement responsive/adaptive design and active management tools for
	+ Surveys at‑risk in particular
* Plan for high-quality survey procedures, including
	+ Consistent and coherent procedures
	+ Efficient refusal conversion strategy
	+ Sending refusal conversion letters at the right moment after the first refusal
	+ Interviewer assignments in the best-time-to-call period
	+ Interviewer assignments that take efficiency on the type of case into account

**Note:** At this point, before the first call or visit (i.e., before collection even starts), there is a maximum response rate that can be achieved given the factors over which data collection units have no direct or shared responsibility. In practice, this maximum targeted response rate varies by region, domain of interest or country. See below for four different examples to support this concept of maximum response rate.

**Example 1**

In many surveys, the expected response rates used at the planning phase vary by region (e.g., geography and/or by regional office (RO)). For example, based on the frame composition and historical results achieved, very different proportions of cell phone numbers can be observed by ROs for surveys that use the common household frame. This has an impact on response rates since those for cell phones are about 15 to 17 percentage points lower than for landlines. In addition, the western Canadian population is traditionally and generally more difficult to convince to participate in sampling surveys than the eastern population (i.e., response often depends on the characteristics of the survey population). The main challenge in that context is to be able to assess if the same amount and the same quality of effort (e.g. good distribution of resources) were deployed in order to achieve the maximum response rate given the particular situation of each RO.

**Example 2**

In the Canadian Community Health Survey (CCHS), the targeted response rates vary by health region within each regional office. For example, the targeted response rate is 55% for York region (Ontario) compared with 75% for Fredericton (New Brunswick). Similarly, expected response rates also vary by type of region (i.e., urban/rural) within each RO. It is implicitly recognized at the planning phase that target[[3]](#footnote-3) and maximum expected response rates vary by region and domains of interest.

**Example 3**

The European Social Survey (ESS) is a cross-national survey that has been conducted every two years across Europe since 2001. The survey measures the attitudes, beliefs and behaviour patterns of diverse populations in more than 30 nations. A key aim of the ESS has always been to implement high-quality standard procedures in the field of cross-national surveys to improve comparability. For the last few years, the ESS has had a targeted 70% response rate across all countries. In the ESS, the same survey instrument (questionnaire) is used for many countries.



However, survey design elements and field procedures can vary from country to country and this has an influence on response rates—for example, the difference in the population’s willingness to participate in surveys; the quality of the sampling frame; active management and quality assurance during collection; multiple languages (within and across countries); data collection methods (phone/in-person); field collection efforts; interviewer experience; and training and motivation. Under those circumstances, is it realistic to target the same response rate for all countries, especially when such large variations in response rates are observed across countries? As for example 1, the main challenge is to asses and determine if the same amount and the same quality of data collection effort was deployed in each of these countries.

**Example 4 – “Extreme” example**

For anonymous web surveys or web surveys for which no additional collection (i.e., no non‑response follow-up) is done after the initial invitation to participate in the survey, the observed response rate is equal to the maximum response rate The observed response rate only depends on the factors and decisions made before collection (since there are absolutely no non-response follow-up efforts (e.g. reminder/call) during collection.

1. **Factors impacting response rates during data collection**

During the data collection period, important factors for which data collection units have the primary responsibility need to be considered in any collection strategy that aims to bring the final response rate as close as possible to the maximum/response rate achievable.

* 1. **Factors over which data collection units have the primary responsibility — Green box**
* Adaptive / Responsive collection design (RCD) and active management (AM)
	+ RCD is an adaptive collection approach that uses information available prior to and during data collection to adjust the collection strategy for in-progress cases. The purpose of active management in the RCD context is to provide timely and relevant information on individual survey performance and progress, to identify when data collection milestones are met and when changes to the collection strategy are required. Good active management practices can greatly help to achieve better response rates.
* Number of concurrent surveys
	+ The number of concurrent surveys in the field have an impact on the collection capacity of data collection and potentially on the achieved response rate. If the workload is larger than the data collection capacity because too many surveys are in the field in the same time, the collection effort will be reduced for some surveys which, in turn, will result in a decrease in the response rate.
* High quality of survey procedures
	+ Consistent, coherent and efficient procedures increase both efficiency and quality, including response rates.
	+ The success of the refusal conversion strategy has an important impact on the final observed response rate. For some surveys, the refusal conversion rate is in the 25% to 30% range—adding more than 12 percentage points to the overall response rate.
	+ Efficient work intensity and interviewer assignment procedures are also among the most important operational factors that can have an impact on the response rate.
* Work intensity and interviewer assignment

Data collection units need to plan the activities by addressing the five following questions related to the distribution of the collection effort (Figure 2):

* 1. At which level of intensity should we start collection (front loading)?
	2. How long should the intensity be maintained?
	3. At which pace/rhythm should we reduce this intensity (function) to take advantage of the entire collection period?
	4. During collection, how can we align workload and interviewer assignment efforts across groups better (e.g., Regular, Refusal and Special)? Note that this is closely linked to refusal conversion.
	5. During collection, what should the proportion of collection efforts between day, night and weekend shifts be?

Determining the right balance between these five dimensions and identifying guidelines for overall interviewer assignment allocation would be an important step in our goal of achieving a final response rate that is close to the maximum response rate.

**Figure 2**



Recent surveys and experiences have demonstrated that, given a fixed budget, the overall interviewer assignment allocation has an important impact on the final response rate. For example, about 10,000 non-respondents were selected from the first three waves of General Social Survey cycle 27 (Social Identity) for the GSS27 Non‑response Follow-up (GSS27–NRFU) study. The GSS27–NRFU achieved a 25% response rate. When GSS27–NRFU respondents are taken into account, the response rate for GSS27 (all waves combined) reaches 47%, rather than 42.7% (+ 4.3 pp). Does it mean that that we are now closer to the maximum response rate for the first three waves of GSS27? The response is Yes and No. “Yes” because it is obvious that a better response rate could have been achieved in the first three waves if more collection effort had been put on refusal conversion and specific types of cases. “No” because in order to increase the budget and collection period, the original collection parameters were changed. That is to say that the maximum response for the first three waves would have been slightly higher with this budget increase and longer collection period.

1. **Maximum and achievable response rates versus data collection performance**

The main objective of any collection unit within a statistical organization is to achieve response rates that are as close as possible to the maximum response rate using the best possible practices before and during collection. This relationship essentially refers to the data collection performance (DCP) concept. In practice, the better the DCP, the smaller the relative difference between the maximum and observed responses rates. In other words, the relative or absolute difference between the maximum (M) and observed (O) response rates can be seen as a measure of performance for the data collection units. In practice, the DCP is equal to 1- ((M-O) / M) (i.e., 1 minus the relative difference between the maximum and observed response rates). Below is an example, using two countries (A and B), to illustrate the relationship between the maximum and observed response rates and the data collection performance.

* **Country A**
	+ 52% observed response rate
	+ 55% maximum response rate
	+ Difference of 3 percentage points or 5.5% of the maximum response rate
	+ DCP = 1-5.5% = 0.945
* **Country B**
	+ 70% observed response rate
	+ 80% maximum response rate
	+ Difference of 10 percentage points or 12.5% of the maximum response rate
	+ DCP = 1-12.5% = 0.875
* The best response rate was achieved by country B (70% versus 52%).
* The best data collection performance was achieved by Country A (5.5% from the maximum response rate compared with 12.5% for country B).

From that perspective, the assessment of the factors with an impact over which data collection units have the primary responsibility before and during collection is essential in the development of a potential DCP indicator. To be operationally useful, this DCP indicator should demonstrate the following characteristics:

* be objective and coherent
* be fair to all surveys and regional offices (in a Statistics Canada context)
* be easily understood and interpreted
* be fully automated and reproducible
* be able to take the collection effort and the results into account (i.e., success associated with the effort).

In that context, and considering the expected characteristics of this potential DCP indicator, is it realistic and possible to develop such an indicator? For example, all the factors presented in the framework (Table 1) are not easily and objectively measurable. In addition, what should the relative importance (e.g., weight) of each factor in an eventual DCP indicator be? These questions have brought forth many potential topics for discussion among survey researchers.

**Conclusion**

In summary, there are several factors and elements over which data collection organizations within statistical organizations have no direct, shared or primary responsibility before and during data collection that can have an impact on response rates. The choices made at the survey planning phase with respect to those factors predetermine a maximum reachable response rate that cannot be exceeded, in theory, by data collection units, regardless of what happens during collection**.** However, there will be an impact on the maximum response rate if any of the parameters or choices made at the survey planning phase are modified during collection.

In that context, the main objective of data collection is to achieve response rates that are as close as possible to the maximum response rate using the best possible collection processes and practices during collection. Responsive collection design (including active management), high quality of survey procedures (e.g., efficient refusal conversion strategy), and work intensity and interviewer assignment are among the most important factors that must be considered during collection in order to achieve high response rates by data collection units.

Implicitly, the concept of maximum response rate also introduces the concept of data collection performance—an indicator of the relative distance between the observed response rate and the maximum response rate. However, is it realistic and even possible to develop an objective indicator capable of assessing the overall performance of data collection units in order to compare performance across collection organizations? At this point in time, this is an open question that requires further discussion and research. In fact, the main objective of this paper is to promote future discussions about the concepts of maximum response rate and the data collection performance (DCP) indicator.

**Reference**

Lorenc, Boris, Geert Loosveldt, Mary H. Mulry and Duncan Wrighte. 2013. “Understanding and improving the external survey environment of official statistics.” *Survey Methods: Insights from the Field*. January 2013

<http://surveyinsights.org/?p=161>

1. The “Collection Front Door” collection unit at Statistics Canada is the initial contact that provides a single point of entry for all subject-matter divisions requiring collection services. Examples of some of the services include initial collection feasibility assessment, revision of survey specifications, evaluation of the required capacity, and preparation of preliminary cost estimates. [↑](#footnote-ref-1)
2. This framework was developed from a Statistics Canada perspective. It can also be applied to many other statistical organizations, potentially with few adjustments, to take their specific organizational context and environment into account. [↑](#footnote-ref-2)
3. For regular/ongoing surveys, this target response rate is essentially based on historical information. [↑](#footnote-ref-3)