Experiences in Implementing a Responsive Collection Design (RCD) for Blaise CATI Social Surveys

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Over the past few years, paradata research has focused on gaining a better understanding of data collection processes, leading to the identification of strategic improvement opportunities that could be operationally viable and lead to improvements in cost efficiency or quality. For Computer-Assisted Telephone Interview (CATI) surveys, research findings have indicated that the same data collection approach does not work effectively throughout an entire data collection cycle, stressing the need to develop a more flexible and efficient data collection strategy. To that extent, Statistics Canada has developed, implemented and tested a Responsive Collection Design (RCD) strategy on several CATI social surveys. RCD is an adaptive approach to survey data collection that uses information available prior to and during data collection to adjust the collection strategy for the remaining cases. In practice, the RCD approach monitors and analyses collection progress against a pre-determined set of indicators for two purposes: to identify critical data collection milestones that require significant changes to the collection approach and to adjust collection strategies to make the most efficient use of remaining available resources. In the RCD context, control of the data collection process is not determined solely by a desire to maximize the response rate or reduce costs. Numerous other considerations come into play when determining which aspects of data collection to adjust and how to adjust them. These include quality, productivity, the response propensity of in-progress cases, the collection mode and the competition from other surveys for collection resources. This paper presents Blaise implementation of the RCD strategy used for CATI social surveys. The highlights and lessons learned are described as along with the current and future RCD research plans and activities.

1. Introduction

Paradata research conducted over the past few years at Statistics Canada has indicated that the same collection approach does not work effectively throughout an entire data collection cycle. As Mohl and Laflamme (2007) have indicated, the data collection strategy used generally remains fairly static, i.e., a collection plan is developed prior to the collection start date using about the same collection approach from the beginning to the end of the collection period and specifying how collection effort (interviewer hours) will be applied. Once collection begins, collection plans are usually modified in response to the cumulative use of collection resources (proportion of budget spent) and progress. Therefore, operational paradata research has stressed the need to develop a more flexible and efficient data collection strategy for CATI social surveys, not only to maintain or reduce data collection costs but also to make better use of remaining available resources throughout the collection period. This approach implies an adaptive data collection or Responsive Collection Design (RCD) strategy. Responsive Design was first discussed by Groves and Heeringa (2006) for Computer-Assisted Personal Interview (CAPI) surveys. Mohl and Laflamme (2007) expanded the application of RCD to CATI surveys, developed an RCD conceptual framework and proposed several RCD strategies in the Statistics Canada context.

The framework proposed by Mohl and Laflamme (2007) includes two main components: active management (Hunter and Carbonneau (2005) and Laflamme, Maydan and Miller. (2008a)) and adaptive collection. The main idea is to constantly assess the data collection process using the most recent paradata information available (active management), and adapt data collection strategies in order to make the most efficient use of available resources remaining (adaptive collection). In other words, RCD strategy aims to use information available prior to and during collection (accumulated paradata) to identify when changes to the collection approach are required in response to how well the collection progresses. The RCD strategy breaks down the survey data collection process into four different phases: planning, initial

collection, RCD Phase 1 (which aims to improve the response rate) and RCD Phase 2 (which aims to improve sample representativity).

The paper begins with an overview of the data collection context for CATI social surveys at Statistics Canada including a brief description of the main paradata sources available and those that are used for RCD. Section 3 presents the RCD strategy used for CATI surveys while Section 4 describes the tools, key indicators and approach used to actively manage the RCD surveys. Section 5 provides an overview of the highlights and the results obtained along with lessons learned. Finally, the current and future RCD research plans and activities are discussed in the last sections of the paper.

2. Data Collection for CATI Surveys at Statistics Canada

Data collection for CATI social surveys is conducted and managed in Statistics Canada's five Regional Office (RO) call centres located across the country. All survey applications are built using the Blaise software and the call scheduler automatically[1] assigns individual cases to interviewers working out of a centralized environment. The call scheduler takes into account the interviewers' profile, paradata information collected since the beginning of the data collection period (e.g., outcomes of the previous calls) and some data collection.

Interviewer profile

An interviewer profile is based on the interviewer's characteristics, skills and experience. It is an important component of the call scheduler. During the data collection period, a given interviewer can be identified to receive in priority (or exclusively) cases that belong to one primary interviewer group and one or more secondary interviewer groups. For example, experienced interviewers (or interviewers with very good convincing skills) are assigned to the Refusal group in order to try to convert those cases for which at least one refusal was recorded. The assignment of specific interviewers to the Tracing[2] group is also another very good example.

Collection parameters

In addition to the routing table, other collection parameters are considered by the call scheduler such as time slices, cap on calls, appointments and other technical parameters. The time slice feature in the CATI call scheduler was utilized to assist in managing the new cap on calls policy which limits the number of calls that can be made for each case. In practice, time slices ensure that a specific number of calls are attempted at different times of the day, and on different days of the week, before a case is finalized. It should be noted that only cases with a "no answer" treatment for the last call are subject to be influenced by the time slice parameters. The call scheduler also needs to manage appointments to make sure that cases are assigned at the appropriate time to an interviewer. In addition, some other technical parameters are considered by the call scheduler, for example, time between "busy" calls, minimum time between other "no answer", etc.

The management strategy for each survey can vary by regional office depending on the mix of surveys in collection and the workload and availability of interviewers. Survey management uses the standard Management Information System (MIS) and customized active management reports that are based on the

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[1] Interviewers have the opportunity to use a browser tool to access any in-progress case. This means that the interviewer can scroll the list of all cases and manually select a case, thus skipping the call scheduler.

[2] Tracing consists of strategic and logical searches using all available resources to locate a respondent e.g. for those where the frame provided a wrong or missing telephone number.

Blaise Transaction History (BTH) files, Survey Operations Payroll System (SOPS) files for interviewers and sample design information available prior to data collection.

Blaise Transaction History (BTH) record

A BTH record is automatically created each time a case is closed, whether it was opened for data collection or other purposes. The BTH record contains detailed information about each call made to contact each sampled unit during the data collection period. It also includes information on the survey and case identification, the date, the amount of time the case was open, the interviewer who worked on it, the resulting interviewer group (e.g., Refusal, Tracing, Regular, Home (finalized)), the result of the call (e.g., no contact, appointment, complete interview) plus additional relevant information. The call scheduler considers, for example, the number and time of calls that have been made to an individual case, the result and the interviewer group of the last call to assign cases to a given interviewer. These rules essentially refer to the 'routing table' of the survey application.

Survey Operations Pay System (SOPS)

This file contains financial information about interviewer pay claims for all collection activities. A SOPS record is generated each time an interviewer enters a claim for a particular survey and task on a given day, either for direct data collection activities (interviewing, tracing, etc.) or for other purposes (supervision, specific training, etc.). Each claim includes the following: interviewer identification, type of interviewer (regular or senior), survey name, date, task code (interview, training, tracing, etc.), and number of payroll hours.

It is important to note that both BTH and SOPS paradata are accumulated throughout the collection period. The most recent information becomes available the day after a given transaction (call) took place or the day after an interviewer entered a claim. The timely availability and accessibility of this information are a key feature of the RCD approach.

3. Responsive Collection Design Strategy

Figure 1 presents a summary of the RCD strategy for Blaise social survey. The strategy is applied independently for every RO. The first phase (planning) occurs before data collection starts. During the planning phase, data collection activities and strategies are planned out, developed and tested for the other three data collection phases including the development of the propensity model(s). The second phase (initial collection) includes the first portion of the data collection process, from the collection start date up until it is determined that RCD Phase 1 needs to be initiated. An intermediate cap on calls was also introduced to avoid cases capping out before the last data collection phase. During this initial collection phase, many key indicators of the quality, productivity, cost and responding potential of in-progress cases are closely monitored to identify when the next RCD phase should be initiated. The third phase (RCD Phase 1) categorizes and prioritizes in-progress cases using information available prior to the beginning of collection and paradata information accumulated during collection with the objective of improving the overall response rates. During this phase, key indicators continue to be monitored. In particular, the sample representativity indicator provides information on the variability of response rates between domains of interest to help determining when the last phase should begin. The last phase (RCD Phase 2) aims at reducing the variance of response rates between the domains of interest (improving sample representativity) by targeting cases that belong to the domains with lower response rates.

Figure 1. RCD strategy for Blaise CATI surveys
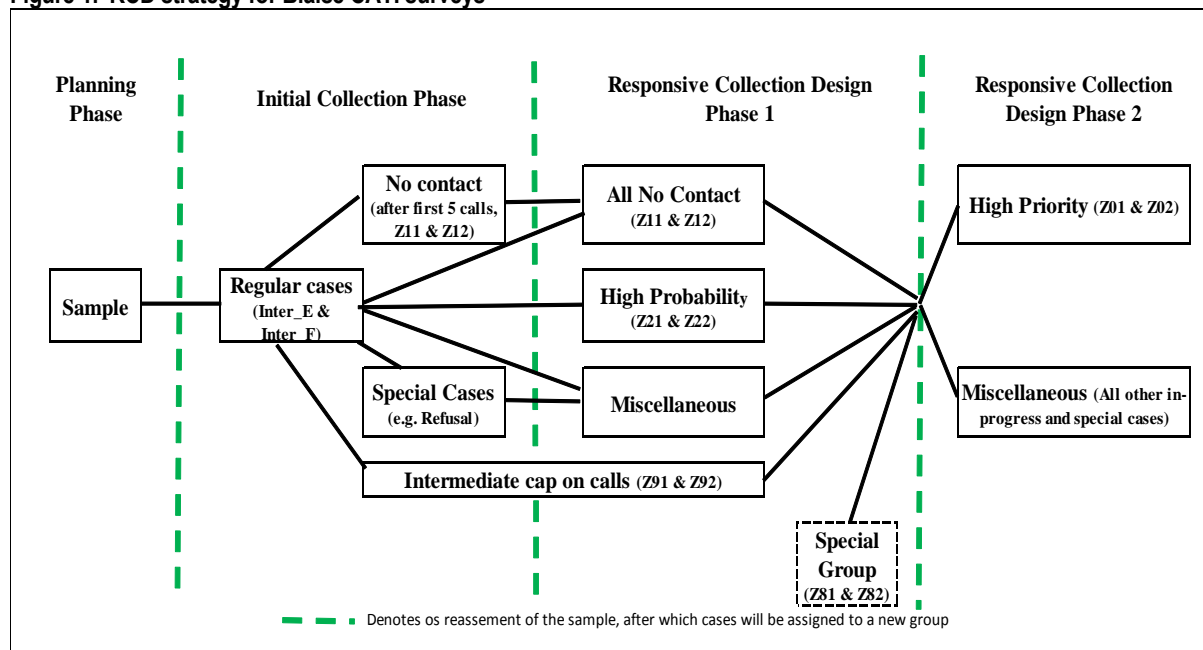
3.1 Planning Phase

During the planning phase, data collection activities and strategies are planned and tested for the three following collection phases. In practice, RCD objectives, in-depth analysis of the previous collection cycle, sample validation, intermediate cap on calls, active management strategy and response propensity model(s) are investigated, developed and/or determined.

When applicable, the previous data collection cycles is analysed to validate the current sample, identify opportunities for improvement, develop a response propensity model to create high probability group(s) and determine collection strategies to be used in RCD phases. This analysis is also used to determine data collection parameters for the key indicators to identify critical data collection milestones for deciding when to move on to the next collection phase.

The concept of an intermediate cap on calls is used with two goals in mind. The first goal is to ensure that cases do not reach the global cap on calls (and then be resolved and sent to head office) too soon during the collection period. The second objective is to guarantee the best usage of the last few calls before cases reached the global cap by taking into account the characteristics and results of the previous calls.

A propensity logistic model is used to evaluate a household's likelihood of being interviewed during collection and to categorize and prioritize each in-progress case during RCD Phase 1. The surveys response propensity model(s) are developed for each regional office using different sources of information: sample design information, paradata available prior to the collection of the last collection cycle (when applicable) and paradata available and accumulated during the last collection cycle to identify the explanatory variables to be included in each model. In practice, sample design information (e.g., household composition and stratification variables), paradata from the previous data collection cycle available prior to collection (e.g., number of calls needed to complete previous interview, time of previous interview) and paradata from current collection cycle (i.e., variables accumulated since the beginning of the collection, such as the number of calls/contacts/appointments by period of the day, number of calls with specific outcome codes (e.g., refusal, tracing), number of calls after the first refusal or tracing outcome) are used in the propensity model to assign a response probability to each outstanding case in the sample. It should be noted that the variables included in the model(s) remain the same during the entire data collection period while the parameters of the model are re-evaluated daily using the most recent

accumulated paradata at the end of each collection day. The model is developed and validated during the planning stage for each RO to ensure that the model assigned higher completion probabilities to cases that ended up as completed interviews as opposed to cases that end-up as non-responses.

Active management refers to a set of plans and tools used to manage data collection while in progress. It is an essential and critical feature of any RCD strategy. At the planning stage, the four main steps of the active management approach (namely, survey monitoring, identifying/predicting problems (timely analysis), taking appropriate corrective actions and reporting/communicating) should be designed, developed and well tested. In particular, the reporting plan should identify the type of information needed as well as any variables that are required for reporting at various levels of aggregation and ensure that this information is available on a timely basis during the data collection period. The most important indicators for monitoring progress and which reports might be required at any given time during data collection (including the communication plan) also need to be determined during the planning phase since data needs vary depending on the point in time along the data collection process. The resulting active management information has also to be streamlined to avoid overwhelming survey managers. The active management strategy, tools and activities used in the following collection phases are described in more detail in Section 4.

3.2 Phase 2 – Initial Collection

Phase 2 (initial collection) is like regular CATI collection with the exception of one new: an intermediate cap on calls. Based on the analysis of the call patterns and their potential impact on the response rate, a cap on calls was introduced in 2006 for CATI surveys. This cap limits the maximum number of calls that can be made on one case in order to reduce respondent burden and make better use of available resources. Once a case reaches the determined threshold, the case goes into an intermediate cap group for further analysis. Detailed information about these cases is provided to each RO to make a decision on the best use of the last available calls for each case. It should be noted that "easier cases" (ones that required fewer calls and less effort to complete) are more likely to be contacted and interviewed during this phase.[3] During the initial collection phase, key quality, productivity and cost indicators are closely monitored along with the responding potential of in-progress cases. These indicators are assessed separately for each RO to identify when to initiate RCD Phase 1 since their collection progressed at different paces.

3.3 Phase 3 – RCD Phase 1

RCD Phase 1 essentially aims at improving overall response rate. During that phase, paradata from previous survey available prior to collection or cycle and paradata accumulated during collection are used to assign a response probability to each outstanding case in the sample (by applying the response propensity model). Cases with higher scores have higher chances of being completed during the remaining data collection period. One of the main objectives is to use all relevant paradata information collected so far about each individual sample unit to reduce the amount of additional effort required to contact and get cooperation from remaining in-progress units or to identify a non-responding units. At the beginning of each day during the RCD Phase 1, all in-progress cases are categorized and prioritized based

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[3] Previous research has shown that 40% to 50% of the total numbers of CATI respondents are reached on the first contact attempt (Laflamme (2008b)). Reaching the remaining half of respondents requires significant additional effort and a different collection strategy to achieve higher collection efficiency.

on the response probability and the analysis of the sequence of calls. Cases are grouped in the following way:

- o The intermediate cap on calls group (created at the initial phase) continues to be used until the end of this phase. A case assigned to the intermediate cap group remains in that group unless it reached the cap on calls or is finalized.
- o The 'no contact' group consists of all cases for which no contact with a respondent had ever been made since the beginning of the collection period (excluding cases in the intermediate cap on calls group). These cases are considered as either requiring an extra effort to make contact (hard-to-reach respondents) or as not having been given enough effort due to how the Blaise scheduler would bring up the cases. In either situation, separating these cases helps focus collection efforts.
- o The high probability group consists of in-progress cases with the highest probability of completion as assigned by the propensity model (excluding cases in the intermediate cap on calls and 'no contact' groups). These cases are considered to be the most likely to be completed according all the information collected at some point in time during collection.
- o The miscellaneous group consists of all other outstanding cases that are not assigned to one of the first three groups. In practice, these cases remains in the interviewer groups defined in the initial collection phase.

During RCD Phase 1, quality, productivity and cost indicators, the response propensity of the remaining cases continues to be closely monitored along with the representativity indicator to determine when a given RO should initiate the last RCD phase.

3.4 Phase 4 – RCD Phase 2

RCD Phase 2 aims at improving sample representativity by reducing the variance between the response rates among the domains of interest (e.g., sample design stratum). In other words, cases that belonged to underrepresented groups (i.e., groups with the lowest response rates) are prioritized during this last phase. In theory, the objective is to reach about the same targeted response rate in every domain of interest to improve sample representativity and to get more uniform non-response adjustment factors to reduce the variance.[4] In practice, however, the expected and achieved response rates varied by RO (and by domain of interest within each RO). It is somewhat utopian to expect to obtain a 75% response rate in every sample design stratum because some individual regions and sub-regions are more reluctant to participate in surveys than others, recording historically and consistently lower response rates. During this last phase, sample representativity is monitored on a daily basis so that collection efforts could be switched between different domains depending on collection progress and the response rates obtained.

4. Active Management for Responsive Collection Design (RCD)

In general, active management is defined as a set of plans and tools to manage data collection while in progress. The purpose of the active management program is to provide timely, topical and relevant data on survey performance and progress throughout collection, so that problems during collection are identified early and decisions about how to correct problems are based on cost, effort, and data quality in addition to the response rates attained so far. Active management includes five different steps:

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[4] It would be desirable to align the prioritization approach used during RCD Phase 2 with the non-response adjustment strategy used after collection (i.e., that both approaches should use about the same type of grouping (if applicable)).

planning, monitoring, identifying/predicting problems (timely analysis), taking appropriate corrective actions (when required) and communicating (including reporting).

First, active management requires planning at the time of application design and development. The plan should identify the paradata sources to be used, the most appropriate key progress indicators for that survey, the type of analyses to be performed, the types of actions that could be taken, and the strategy to deal with hard-to-reach cases. Planning could also include strategies for non-response follow-up as well as for moving cases from one mode to another. In sum, planning involves all aspects of data collection at all stages that are required to meet survey objectives. Second, monitoring survey progress is typically done through reports. The reporting plan for a survey should identify the type of information needed as well as any variables that are required for reporting at various levels of aggregation and ensure that this information is available on a timely basis during the data collection period. The plan should also identify which indicators are most important for monitoring progress and consequently which reports might be required for a given survey. Identifying and predicting problems represent the third step. The idea is to discover the problem when it occurs, or even before it happens, not when collection has ended. This requires a timely analysis plan and well-trained staff to quickly identify the nature of the problem. The monitoring reports do not presume to have all the answers to issues but are designed to identify possible problems and supplemental information that could guide or help the identification of the source of the problem. From that perspective, active management also provides mechanisms for handling unanticipated or emerging problems. This includes the ability to generate ad hoc reports to investigate situations as they develop. Taking appropriate corrective actions is the next step. The objective at this stage is to determine whether action is required to correct the problem and, if so, to decide what steps to take. The decision-making strategy and its implementation should have been planned at the initial planning stage. However, since the ability to take corrective action may depend on the design of the application and on operational constraints that might reduce the possible range of actions, it is important to include some contingency planning in the overall collection management plan. Finally, the communication plan has to identify the series of relevant reports that need to be distributed at different points in time during collection with the goal of not overburdening managers. The plan should clearly identify who needs to be contacted in the event of a problem, who has the authority to make decisions, and what the process should be for taking corrective action. The strategy should also identify who is responsible for monitoring different aspects of the collection process. A communication strategy that covers the collection phases of a survey can ensure that regional offices, methodologists and both survey collection managers and survey managers are informed of any decisions or discussions affecting data collection.

In the RCD context, active management has two objectives. The first one is to provide timely and relevant data on survey performance and progress based on key indicators and customized information, while the second one is to identify when data collection milestones are met and when changes to the collection strategy are required. The overall objective of active management is to make effective use of collection resources to find the most appropriate balance between data quality, timeliness and survey costs. The active management prototype tools used for the two RCD surveys consist of a series of SAS programs that have been consolidated into one master program. All paradata and other data sources are integrated and processed to produce a series of customized Excel reports on a daily basis.

The first two parts of this section describe the paradata sources and the key indicators used to actively manage both RCD surveys. The second part presents the strategy implemented to identify data collection milestones (i.e., when to initiate RCD phases) including other monitoring tools used to assess various aspects of data collection performance and progress (and to identify potential problems) at different points in time during data collection.

4.1 Paradata and Other Sources

Active management for RCD uses numerous data sources (i.e., paradata and other data sources) to monitor data collection performance and progress, namely, Blaise Transaction History (BTH) files, Survey Operations Payroll System (SOPS) files for interviewers, budget information, sample design and targeted response rates. The information can be available prior to data collection (e.g., sample design, budget information) or can become available at the beginning of collection and accumulated throughout the collection period (e.g., BTH and SOPS). In practice, the most recent BTH and SOPS information becomes available the day after a given transaction (call) takes place or the day after an interviewer enters a claim in the case of SOPS. The timely availability and accessibility of this information are key features of the RCD strategy.

Many other sources of information are also used. Budgeted system time for production and interview claim hours figures planned at the beginning of the survey are used to determine the proportion of resources still available at the end of each collection day. The sample design and frame information (e.g., demographic characteristics of sample units and stratification) are used in conjunction with the paradata to enhance the analytical value of active management monitoring reports. Finally, it should be noted that the results of the response propensity model that uses data from previous and current collection cycles for each of the two surveys are also used indirectly in the active management strategy.

4.2 Key Indicators

Response rate is not the only measure that should be used to monitor and assess data collection performance and progress. Instead, response rate should be used in conjunction with other measures such as survey productivity, cost and representativity indicators to make the best use of data collection resources while taking into account the trade-off between quality, timeliness and cost. Therefore, the following key indicators have been developed and implemented to better evaluate and monitor progress, quality and performance during data collection in the RCD context and to make more informed decisions about changes to the data collection strategy. The indicators are presented in a practical application in Figure 2 in section 4.3.

The productivity indicator is defined as the ratio of the system time devoted to the interviews themselves to the total system time including all unsuccessful and successful calls (Laflamme, 2009). Total system time represents the total time logged onto the system once a case is open. For RCD active management, two productivity indicators are defined: daily productivity and average productivity over the last five days. The purpose of the average productivity indicator is to smooth the daily series to reduce the daily variability that is more likely to occur during the weekend or at the end of the collection period.

The responding potential of in-progress cases is based on two measures. The first one represents the proportion of regular in-progress cases while the second one provides an indication of the effort already put into these cases as a function of the global cap on calls of the survey. The regular in-progress cases refer to cases (with at least one call made) that are not resolved (finalized) and for which no previous outcome(s) resulted in a refusal, tracing or special outcome. This includes cases with incomplete response, appointments, no contact or outcome codes other than the three mentioned above (refusal, tracing or special outcome). The proportion of regular cases in Figure 2 is simply the number of regular in-progress cases divided by the total sample size. As shown in Figure 2, the proportion of regular in-progress cases reaches a peak on the 6th day of collection where all cases were called at least once and about 30% of the sample units were resolved. After this day, the proportion decreases continually because cases are likely to change from their regular status. A relative measure

of the effort already put on these regular cases can be obtained by taking the ratio of the average number of calls made for the regular in-progress case divided by the global cap on calls for the survey.

The proportion of the budgeted interviewer payroll and system time hours spent since the beginning of the survey are both used as cost indicators. They are defined respectively as the cumulative interviewer claims (hours spent) divided by budgeted interviewer claims in hours and the cumulative system time spent divided by budgeted system time. These two indicators are generally well aligned (i.e., they evolve at the same pace) during data collection. Finally, the last indicator showed in Figure 2 is the response rate, which represents simply the cumulative response rate since the beginning of the survey. The series of key indicators is used to monitor and evaluate data collection performance and progress and also to determine data collection milestones where changes to collection strategy are required (i.e., when RCD Phase 1 and Phase 2 should be initiated). These milestones are first identified during planning and then fine tuned, if necessary, during collection.

The representativity indicator is defined as (1 minus the standard deviation of response rates between the domains of interest). The domains of interest are based on the sample design information available prior to the beginning of the collection period. The implemented representativity indicator for RCD is conceptually different than the R-indicator proposed by Schouten, Cobben and Bethlehem (2009). For example, no assumption is made about the response propensity of each sample unit prior to collection. The objective was to develop a simple, standard and practical representativity indicator for data collection monitoring and operational purposes that can be easily implemented for all surveys.

4.3 Determining Critical Data Collection Milestones

The decision process used to determine when to move from one data collection phase to another one needs to be planned prior to the beginning of data collection. Decisions about collection strategy changes for RCD are based on cost, productivity, the responding potential of in-progress cases and data quality indicators in addition to response rates. During the planning phase, information from the previous data collection cycle is used to re-calculate all key indicators for each survey by Regional Office.[5]. One of the main objectives of this analysis is to determine the conditions or thresholds to be used for each key indicator to identify when changes to the collection strategy are required. Once decided, the same thresholds is used for all RO's even though the monitoring (and decision process) is done independently.

As shown in Figure 2, the response rate increases at the same rate as costs (% of budget spent expressed as % of budgeted system time and % of budgeted payroll hours) at the beginning of the survey. However, once average productivity over the last 5 days reached about 45% (around the 26th collection day), the gap between response rate and the two cost indicators started growing (the same effort produced fewer interviews than at the beginning). Early on, the proportion of in-progress regular cases started to decrease while the ratio of the average number of calls made for the regular in-progress cases divided by the global cap on calls for the survey continued to increase rapidly, also suggesting that effort was being spent on a smaller number of cases with less productivity. This is particularly obvious after the lines of these last two series crossed on 18th day.

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[5] It is worth noting that the shape of the series in Figure 2 and their relationship are very similar by RO even though they tend to progress at a different pace. This figure represents the RCD pilot collection process for HES 2009 in the Sturgeon Falls office. It is used as an example to illustrate the thought process used in the planning phase.

Figure 2. Key indicators
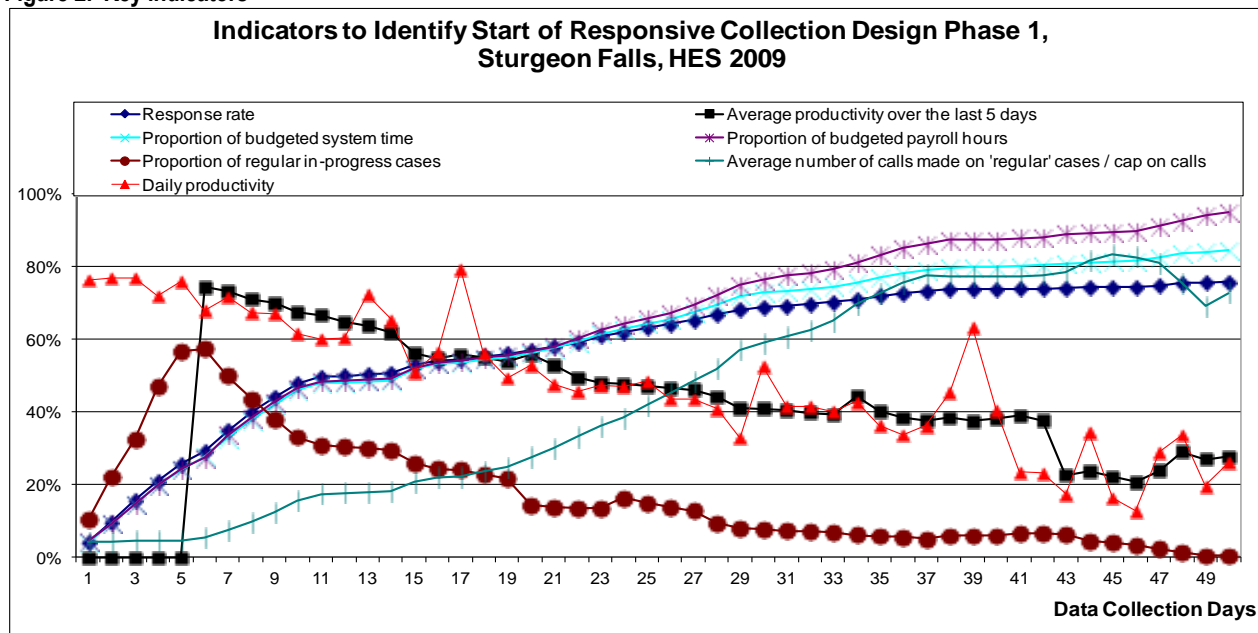
For HES 2009, we used a conservative[6] approach, the window to initiate RCD Phase 1 was identified to be between the 26th and 32nd day of data collection for this particular RO[7]. This critical window was defined using the following six conditions based on key indicators for each RO summarized in Table 1. This exercise was repeated for each RO.

Table 1. Conditions for RCD Phase 1 and Phase 2

Condition Number	Type of indicator	Conditions description	RCD Phase 1	RCD Phase 2
1	Quality	Response rate	> 50%	> 60%
2	Quality	Average response rate increases over the last 5 days	n/a	< 1%
3	Budget(cost)	% of budgeted payroll hours	> 50%	> 80%
4	Budget(cost)	% of budgeted system time	> 55%	> 80%
5	Productivity*	Initial minus current productivity*	> 15 pp**	> 25 pp**
6	Responding potential of in-progress cases	% of 'regular' in-progress cases	< 25%	< 20%
7	Responding potential of in-progress cases	Average number of calls made for the 'regular in-progress' case divided by the global cap on calls	> 32%	> 64%

 *Productivity is the average productivity over last 5 days

 **pp means percentage points

During the initial data collection phase, all these key indicators are closely monitored throughout the collection period for each RO on a daily basis. In order to facilitate interpretation and decision making for survey managers, the indicators and the status of each condition at a given point in time during collection are integrated and consolidated into one single dashboard as shown in Table 2. The value of each indicator and condition (1 means that the condition is met) is presented in the dashboard. The

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[6] For current RCD, we start the RCD Phase1 earlier to take more advantage of the responsive design approach.

[7] The decision process used to determine when to move to the next data collection phase also took into account operational constraints such as weekend and Labour Force Survey (LFS) week as well as advices from RO.

sum of the conditions is used to determine the status of each RO with respect to the initialization of the next phase. Therefore, when the sum of the 6 conditions is between 1 and 3, there is no need to start the next phase. However, when the sum of conditions equals 4 (yellow line), it indicates that this RO is approaching the threshold for moving to the next phase. Finally, when the sum of conditions adds up to 5 or 6 (red line), the RO should switch to the next phase if it has not already done so. The colours provide an easy way to evaluate the current status of each RO. It should be noted at this point that further research is required in order to more objectively identify the optimal data collection milestones where changes to data collection strategy are required.

Table 2. Dashboard of key indicators for RCD Phase 1

RO	Response Rate		Productivity (Average over last 5 days)			Budget and Cost				Propensity of In-Progress Cases				Sum of conditions
	Response Rate	Cond 1	Initial	Current	Cond 2	% of budget payroll hours	Cond 3	% of budget system time	Cond 4	% of regular In-progress cases	Cond 5	Avg. # of calls for regular in-progress cases / cap	Cond 6	
EDM	52.2%	1	64.3%	41.6%	1	56.6%	1	62.4%	1	28.3%	0	7.2	0	**4**
HFX	52.6%	1	63.6%	45.5%	1	62.8%	1	69.8%	1	27.0%	0	7.7	0	**4**
SHER	46.3%	0	66.9%	58.3%	1	49.8%	0	50.7%	0	34.5%	0	3.4	0	**1**
STURG	**64.2%**	**1**	**74.4%**	**46.6%**	**1**	**67.2%**	**1**	**65.6%**	**1**	**13.9%**	**1**	**11.3**	**1**	**6**
TOR	52.6%	1	65.7%	53.6%	1	58.0%	1	55.4%	1	27.9%	0	6.8	0	**4**
WIN	**62.4%**	**1**	**69.9%**	**46.8%**	**1**	**69.8%**	**1**	**69.0%**	**1**	**12.5%**	**1**	**13.0**	**1**	**6**

4.3.1 Moving from RCD Phase 1 to RCD Phase 2

During RCD Phase 1, the same key indicators used in the initial phase are monitored along with two additional ones (the representativity indicator[8] and the average response rate increases over the last 5 days) to determine when a given RO should initiate RCD Phase 2.

The decision to initiate the last phase is based on these key indicators with a new set of conditions (see Table 1). Another dashboard (similar to Table 2) is also produced to monitor collection during RCD Phase 1. The representativity indicator is only used as a qualitative measure to evaluate the trend of sample representativity over time, that is, no specific conditions is set for this indicator during the planning phase. This last phase only prioritizes cases (i.e., no sub-sampling) that belong to under-represented groups of interest (groups with the lowest response rates)[9]. It is important to note that the RCD Phase 2 should not be initiated (if required) too late during data collection to provide some flexibility and time to improve sample representativity. The representativity indicator provides a summary measure within each RO as well as at the national level. This approach could potentially result in "conflicting" objectives. For example, the representativity indicator could be high (close to 1) in one particular RO while its overall response rate is lower than the national response rate[10] (see Figure 3). In other words, while no group priority would be required at the RO level, response rates would have to be increased in all domains to improve the national representativity indicator. In

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[8] The representativity indicator defined as (1 minus the standard deviation of response rates), tracking the variance between response rates in domains of interests (see Figure 3)).

[9] It should be noted that cases are still subject to the cap on calls policy during this last collection phase and this also have to be considered during implementation because prioritized cases are more likely to reach the global limit of calls.

[10]The national representativity indicator is lower than the regional indicators because ROs generally progress at different paces and the geographical dimension is often considered in the domains of interest.

practice, the expected and achieved response rates varied by RO, and these have to be taken into account to set realistic regional and national response rate expectations.

Figure 3.   Representativity indicator
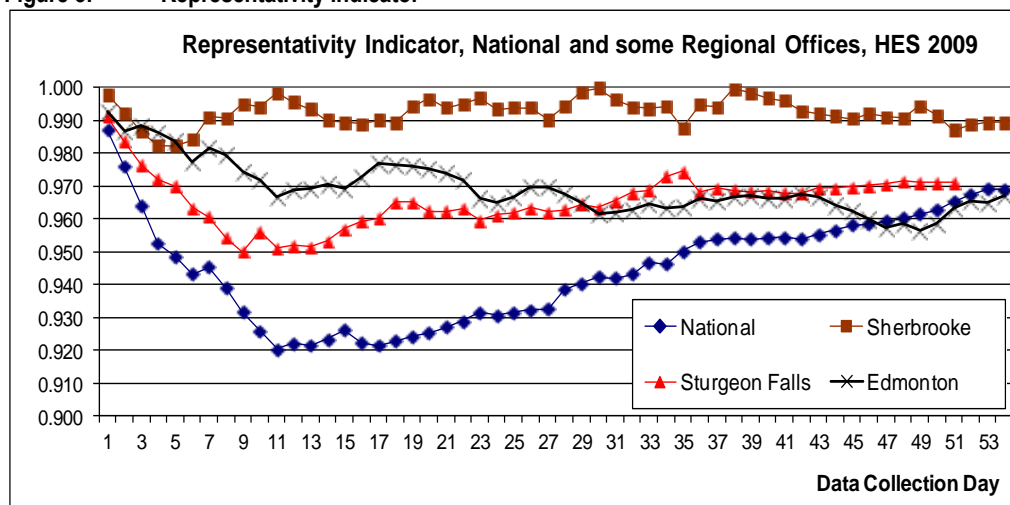
4.4 Other Monitoring Tools Used

The analysis of the previous data collection cycle during the planning phase is also used to improve existing active management tools and develop new approaches to closely monitor collection progress, to assess data collection performance and to identify/predict problems during data collection. The adopted strategy takes advantage of the active management experiences with many previous surveys. This section provides an overview of some of the most important tools used during collection.

4.4.1 Data Collection effort and Progress

Data collection effort, progress and results are monitored by RO. A comprehensive report provides daily and cumulative totals for all key indicators and other relevant measures since the beginning of the data collection period. In practice, this report consolidates the most important cumulative indicators shown in Figure 2 (including their sub-components) and a series of other measures that provide complementary information to get a better appreciation of the operational context at any point in time during collection. The report does not only give a snapshot of current survey progress status, but also provides the daily effort, progress and results since the beginning of data collection. For example, the survey progress can be monitored using the daily and cumulative number of resolved cases (and consequently the proportion of in-progress cases) at the end of each data collection day by final status of the cases (respondents, non-respondents, out-of-scope and capped cases). The achieved response rate and number of respondents can then be compared with the expected targets at any point in time according to the planned and expected survey progress. The no contact, refusal and tracing rates as well as the refusal rates at the first contact are other examples. The rest of this section presents in more detail some of the important active management tools used during collection of RCD surveys.

4.4.2 In-Progress Cases

During collection a lot of emphasis is spent on the in-progress cases to monitor the effort already put on these cases, to evaluate their characteristics and to assess their relative likelihood of being

interviewed. At any point in time during collection, changes to the collection strategy or corrective actions will only impact in-progress cases: no action can be undertaken on resolved cases except in special circumstances (such as non-response follow-up, re-interview).

Distribution of the number of calls for in-progress cases

The effort already spent on the in-progress cases is monitored by the distribution of the number of calls for these cases (but it could have been done by the system time spent by type of in-progress case). At first, this distribution is particularly useful to assess and predict the proportion of cases that will be sent to the intermediate cap group during the initial phase and RCD Phase 1. Later, this distribution is used to evaluate and predict the number of cases that will possibly reach the global cap on calls or be resolved. For example, it is not sufficient to monitor the proportion of cases that reach the global cap on calls to actively manage collection because the proportion of cases that will eventually reach this cap (and then be resolved if no action is taken) also needs to be monitored. This report can also be used to identify the proportion of cases with a low number of calls at the end of the RCD Phase 1 that might require specific attention through the special group as seen in Figure 1.

Distribution of in-progress cases by interviewer group

During collection, cases can be assigned to different interviewer queues (Inter (regular cases), Refusal, Tracing, Home (resolved), etc.) depending on the outcome of the calls. At the start of collection, cases are generally assigned to the regular case group. As the survey progresses, some cases are resolved, some are recorded as refusals and some others require tracing and are redirected to the interviewer queue. It means that the characteristics and portfolio of in-progress cases change during collection. In fact, as the survey progresses, the overall responding potential of in-progress cases decreases (along with survey productivity) because cases are on average less likely to respond. Therefore, the distribution of in-progress cases by interviewer group as well as the average number of calls made for cases in each group is monitored throughout collection. Since different groups are used in the data collection phases, there is also a need to provide each RO with guidelines to help with interviewer staffing, especially at the beginning of the RCD Phase 1.

Expected distribution by interviewer group between phases

A practical challenge ROs are facing is balancing a number of interviewers assigned to work on each of these groups. On the one hand, if too many interviewers are assigned to a group, there is the possibility that they would run out of cases. On the other hand, if not enough staff is assigned to a particular group; some cases would not be tried. The objective of this tool is to foresee the interviewing effort that will be required for each group in advance of starting RCD Phase 1. In other words, by the end of the initial collection phase, the distribution of in-progress cases among the groups for RCD Phase 1 (no contact, high response probability groups, etc.) is simulated (based on the current status of the cases) to provide each RO with guidelines to help with interviewer staffing at the beginning of RCD Phase 1. In practice, the report gives the distribution of cases that would be observed if RCD Phase 1 had started on this day. A second distribution is also provided, adjusting the distribution of cases to take into account the expected productivity of each group in RCD Phase 1. For example, even though the 'High probability' group represents less than 5% of the in-progress cases at the end of the initial collection phase, it does not mean that only 5% of the working force (interviewer staffing) needs to be assigned to this group because its expected productivity is more likely to be higher than other groups (e.g., the refusal group). The percentage of effort suggested is then derived by adjusting the proportion of in-progress cases by the expected productivity of each group in RCD Phase 1. In summary, this special report is essentially produced to provide ROs with guidelines for next-day planning of interviewers' assignments (data collection effort) between the various groups. These guidelines have to be adapted for each Regional Office according to their operational constraints (monthly planning of staff by some) and capacity (limited number of tracing or refusal

interviewers). This information is very important prior to the initiation of a new phase in order for regional managers to plan and maximize the allocation of interviewers.

4.4.3 Special Data Collection Activities

The purpose of this monitoring tool is to assess and monitor effort and progress for special data collection activities which include four particular types of cases: cases with at least one refusal outcome, cases with at least one tracing outcome, cases redirected at least once to Senior Interviewer (SI) or Project Manager (PM) Blaise groups and cases redirected to the intermediate cap on calls group.[11] For each of these four types of cases, the proportion of these cases still in-progress, the average number of calls made on both resolved and in-progress cases as well as the number (and the proportion) of cases converted to an interview are monitored. In addition, the report gives the distribution of the total number of calls made after the first occurrence of each type of case (e.g., after the first refusal). This can be seen as a measure of effort made by RO on the hard-to-reach and hard-to-interview cases.[12] These reports provide a comprehensive tool to assess the responding potential of the overall in-progress cases, particularly when close to the end of the data collection period. For example, in HES 2009, about 15% of the initial sample was still in-progress during the last few days of collection. By analysing the characteristics of these in-progress cases, it can be seen that the proportion of regular in-progress cases is very small (see Figure 2). Most of these in-progress cases are attached to one (or more) of the four types of particular cases for which a lot of effort had already been spent. In other words, the marginal daily gain in terms of response rates is generally very small close to the end of collection because the responding potential of the overall in-progress sample decreases as the survey progresses.

4.4.4 Survey Progress by Domain of Interest and Sample Representativity

This report provides a detailed view of survey progress in terms of response rate by domain of interest by taking advantage of sample design information available at the beginning of the data collection period. In particular, it compares the expected response rates (or number of respondents) with those actually achieved at a level of aggregation not available in the standard survey reports. Used in conjunction with the representativity indicator, it also provides a tool to prioritize domains of interest in RCD Phase 2 for which progress is below expectations.

4.4.5 Ad Hoc Reports

The active management reports do not aim at giving answers to all possible issues. They are planned and designed from past experiences to identify possible and common problems along with other data or information that could explain the source of these problems. However, they are also built in such a way as to highlight key elements that could either identify the source of the emerging or new issues, or point to the need for more in-depth investigation through the use of ad hoc investigations. These reports can be produced in a timely manner as they take advantage of the consolidated information produced by the active management infrastructure.

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[11] A case can fall into more than one of these types of cases.

[12] Refusal cases are of particular concern since Statistics Canada limits the number of follow-up contacts with a respondent once he/she states their unwillingness to cooperate.

5. Highlights of RCD Pilots

This section summarizes the results obtained as well as the highlights from the first two Responsive Collection Design surveys. In particular, response rates, data collection effort, productivity and representativity as well as the impact of the categorization and prioritization of cases in RCD Phase 1 and Phase 2 are discussed.

5.1 Response Rates, Data Collection Effort, Productivity and Representativity

Table 3 indicates that both HES 2009 and SLID 2010 achieved a better response rate under RCD than in their previous collection cycle (even with a higher proportion of difficult cases for both surveys).

Table 3. Response rates and representativity indicators for the previous two cycles of HES and SLID

	HES		SLID	
	Response Rate (%)	Representativity Indicator	Response Rate** (%)	Representativity Indicator
Previous survey (HES 2007, SLID 2009)	72.60	0.9593	71.10	0.8279
Last survey* (HES 2009, SLID 2010)	74.10	0.9704	72.20	0.8213

*RCD was only used in the last survey cycle for both HES and SLID

**For SLID, the overall response rate uses generated cases (included in the Control group) which had a relatively poor response rate. These cases are excluded for all RCD and Control group comparisons

When comparing within each survey the response rate between the RCD and control groups (Table 4), the differences are very small.

Table 4. Response rates, effort and productivity per data collection phases for HES and SLID

	HES - 2009			SLID - 2010		
	Response Rate (%)	Effort (System Time - hours)	Productivity (%)	Response Rate (%)	Effort (System Time - hours)	Productivity (%)
Control Group (CG)	74.0	4,841	53.1	73.0	13,133	35.1
Initial	57.2	3,346	60.6	55.8	5,405	67.4
RCD phase 1	14.3	1,262	37.5	26.0	3,021	23.7
RCD phase 2	2.2	233	30.3	19.2	4,707	5.4
Responsive Collection Design (RD) group	74.1	4,743	54.2	72.8	12,875	35.5
Initial	56.1	3,253	61.3	55.8	5,320	67.5
RCD phase 1	14.7	1,218	40.1	22.7	2,280	27.6
RCD phase 2	2.9	272	33.3	21.7	5,274	6.5

However, about the same response rates were achieved with less collection effort (calls and system time) for the RCD group than for the control group. For example, for HES, the average numbers of calls per case for the RCD and control groups were 7.3 and 7.6, respectively. For SLID, the corresponding numbers were 10.6 and 10.8. Furthermore, for both surveys, about 2% less system time was used for the RCD group than for the control group.

Table 4 shows response rates, data collection effort and productivity for the two surveys by data collection phase. Survey productivity is defined as the ratio of the amount of system time devoted to actual interviewing to the total system time (which includes both successful and unsuccessful calls). For HES, productivity was higher for all phases with less effort spent on the first two phases (initial and RCD Phase 1). For example, about 3% less system time was allocated to the initial phase for the RCD group. This could explain why the response rate for RCD group is slightly lower than that obtained by the control group and not equal as one would expect. SLID productivity was also higher

for all phases of the RCD group. However, contrary to our expectations, only RCD Phase 2 showed a better response rate. In RCD Phase 1, the RCD group had a lower response rate (22.7%) than the CG (26.0%).

The difference in rates is partially due to the fact that less effort was expended on the RCD group (24.5% less system time) during that phase. Productivity was only marginally higher for the RCD group during the initial phase of collection, but a wider gap appeared in RCD Phases 1 and 2. This occurred for both surveys. Higher productivity was expected for the two RCD since less time was spent on RCD groups (about 2% less compared to the control group) and both achieved similar response rates.

Table 5. Some statistics for in-progress cases at the end of collection for HES and SLID

	HES - 2009		SLID - 2010	
	CG	RCD group	CG	RCD group
End of collection - In-progress cases				
Percentage of cases	8.5%	13.3%	5.5%	6.3%
Average number of calls	12.7	15.2	18.0	20.0
Percentage of cases with 5 calls or less	24.0%	13.1%	7.6%	5.4%
End of collection - Capped cases (40 calls)	6.9%	2.9%	5.9%	4.9%

Finally, for HES cases remaining in-progress at the end of collection, about 15.2 calls were made on average for RCD cases compared to 12.7 for CG cases as shown in Table 5. In particular, at the end of collection, about 24% of in-progress cases in the CG had 5 calls or less compared to 13% for the RCD group. This observation again suggests that the effort was applied more effectively for the RCD group while leading to the same response rate. Overall, the variability of the distribution of the number of calls was smaller for the RCD group. In other words, the CG had more cases with few attempts (5 calls or less) as well as more capped out calls (especially for HES). Similar results were obtained for SLID but with smaller differences between the two groups. It might be possible that survey managers learned well after the first RCD survey.

5.2 Categorization and Prioritization of Cases in RCD Phase 1 and Phase 2

The paradata information collected throughout the collection period (including the sequence of calls) along with the results of the response propensity models permit the categorisation of each in-progress case in practical, meaningful and more homogeneous groups. This approach also facilitates continuing collection by assigning the grouping of cases to interviewers through the Blaise call scheduler according to interviewers' skills and profiles during data collection.

5.2.1 Global and Intermediate Cap on Calls

The idea of an intermediate cap on calls in the RCD context is to set aside cases in the RCD group that reached this threshold during the initial phase or RCD Phase 1, so that the best use of the remaining calls can be made. For HES, the number of cases that reached the intermediate (20) and global (25) caps in the RCD group were 10.5% and 2.9%, respectively. In comparison with the CG, 12% of cases were called 20 times or more and 6.9% of cases reached the global cap on calls. It is clear that less collection effort (both in terms of average of calls (22.5 versus 23.8) and system time (163 hours versus 86 hours) was devoted on average for cases with 20 calls or more in the RCD group compared to the CG , which impacted the response rate. The response rate for the cases with 20 calls or more

were 14.1% and 17.8% of the RCD group and CG, respectively. However, it should be noted that the productivity was higher for the RCD group (36.7%) compared to 31.5% for the CG, suggesting that the collection effort was more efficiently used in the RCD group. However, in future RCD, effort will need to be better monitored in real time in order for capped cases to progress during collection and not just at the end. Because of technical problems with SLID, the analysis of the impact of the intermediate cap on calls was compromised, and there are no findings to report.

5.2.2 High Response Probability Groups

The RCD groups of both surveys experienced higher response rates at the end of RCD Phase 1 for cases that were placed at least once in the high probability group compared to similar cases in the RCD group (i.e., other regular cases not identified as high probability units in RCD Phase 1).

Table 6. Response rates for high probability group by RCD phase

| Phase | Type of Cases | | Response rates | | |
| | | HES - 2009 | | SLID - 2010 | |
		CG	RCD group	CG	RCD group
End of RCD Phase 1	Cases identified at least once in high probability group	n/a	44.4%	n/a	37.8%
	Cases identified as regular, but not in high probability group	39.0%	33.2%	33.9%	26.2%
End of RCD Phase 2 (End of Collection)	Cases identified at least once in high probability group	n/a	0.0%	n/a	0.0%
	Cases identified as regular, but not in high probability group	55.1%	0.0%	58.1%	0.0%

During the same period, the response rate for the CG for the same type of cases was lower than for the high probability RCD group for both surveys. In other words, the propensity model has properly identified cases more likely to respond and placed them rightfully in the high probability group. At the end of collection, the response rates for cases identified at least once for the high probability group were still higher than the rates obtained for the same type of cases in the control group. For SLID, a high probability tracing group was also created. Its response rate was 14.6% compared with 10.8% for tracing cases from the control group at the end of RCD Phase 1. Again, the propensity models seem to have helped pick out the cases that were most likely to complete the survey.

5.2.3 Non-Contact Group

The final response rates for cases that did not have any contact made at the beginning of RCD Phase 1 were 36.2% for RCD and 34.2% for CG for HES, and 14% for the RCD group and 15.8% for the CG for SLID.[13] It appears that the overall benefit of separating non-contact cases into a different group was modest. However, the prior knowledge of the cases' status provides added-value to interviewers (e.g., these cases have generally a lower productivity). Further experiments and research are suggested to allow more definite conclusions about the characteristics of respondents and the most effective collection methods for these cases.

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[13] The RCD non-contact group for SLID received 12% less effort in terms of system time than the non-contact cases in the control group.

5.3 Responsive Collection Design Phase 2

While the objective of RCD Phase 1 is to increase the overall response rate, the goal of RCD Phase 2 is to improve the representativity of the overall sample (not only for the RCD group) by reducing the variance in response rates between the domains of interest since the RCD groups and CG are combined during RCD Phase 2. Targeted cases that belong to domains of interest are put in priority groups during RCD Phase 2. However, no sub-sampling of cases is done, i.e., all in-progress cases can be worked on during this last phase.

Regarding the representativity indicator (or homogeneity of response rates), there was a gain for HES 2009 compared to HES 2007 (Table 3). In other words, there was less variability among response rates in domains of interest in 2009. To achieve this, during the RCD Phase 2, about 16% more system time was devoted to the RCD group than the control group. For SLID, the results are not as clear cut: there was an improvement in several regional offices, but representativity deteriorated somewhat at the national level. It is possible that some features of a longitudinal survey, such as differential attrition rates, may make it more difficult to maintain representativity over time. Further work using SLID data is needed to test this conjecture. Finally, RCD Phase 2 should not be initiated too late during data collection in order to provide some flexibility and time for improving sample representativity.

5.4 Analysis of RCD Variances

Studies were conducted for HES and SLID in order to evaluate the impact of the RCD on the estimates and on the variance estimates. The weighting process of both surveys took into account the fact that two different collection strategies were used, especially during RCD Phase 1. In other words, the non-response adjustment was adapted to consider the split sample for both surveys.

5.4.1 HES

The weighting strategy for HES can be briefly described as follows: 1) Derive initial HES weights based on the final CCHS weights; 2) Adjust for HES non-response and; 3) Obtain final weights by calibration. The non-response adjustment for the HES process was performed separately for the two groups (RCD and Control groups). Out of the 198 estimates, only 10 estimates were statistically different between the control group and the RCD group (using a 95% confidence level). These results suggest that no significant bias was introduced by the use of the RCD. Similarly, the impact of the RCD on the variance estimates was studied. It was found that the differences between the CVs of the RCD group domain estimates and those of the control group domain estimates were generally small and not systematically in the same direction. In addition, another study was done using the Kish statistic. This statistic only uses the weights; it does not require the selection of a set of variables. A number of alternative weighting strategies were studied and it was again concluded that both the control group and the RCD group were leading to similar variance estimates. In conclusion, the investigations for HES have shown that the domain estimates and the variance estimates produced using the units in the RCD group were not significantly different from those produced using the units in the control group.

5.4.2   SLID

Although SLID's weighting strategy is very complex, it can be summarized in four distinct steps: 1) Derive initial SLID weights based on the adjusted non-response Labour Force Survey (LFS) weights; 2) Adjust for SLID non-response; 3) Carry out other adjustments (e.g., Influential, Migration) and finally; 4) Obtain final weights by calibration.

As for HES, the non-response adjustment model for SLID (step 2) was modified to include an indicator for RCD and nine paradata variables to account for the RCD. First, two sets of non-response weights were generated: one using the old strategy (LFS variables only) and one in which paradata variables (including the RCD indicator) were combined with LFS variables. Both sets of weights then underwent other adjustments (step 3) and calibration (step 4) using the same set of auxiliary variables. Estimates and variance estimates were then produced for both sets of calibrated weights for selected SLID variables. In general, both methods yielded estimates that were statistically equivalent at all levels for all variables studied with very few exceptions. There was a slight tendency for the RCD model to yield slightly higher variance estimates (though not systematically). Secondly, units collected through RCD and units collected through regular SLID collection procedures were treated as two independent samples. Non-response adjusted weights were produced for each of the following scenarios: 1) Control sample using LFS variables only in the non-response adjustment; 2) RCD sample using LFS + Paradata variables in the non-response adjustment and; 3) RCD sample using LFS variables only in the non-response adjustment. For each set of non-response adjusted weights, calibrated weights were produced and, in turn, estimates and variance estimates were derived. Comparisons were made between two sets of estimates through statistical tests at the 5% level. In general, although there were some differences between the estimates produced using different non-response adjustment methods, these differences were not large enough to be statistically significant in the vast majority of cases. While the RCD method yielded point estimates similar to the regular process, it had a tendency to yield slightly higher estimates of variance. Work is being carried out to fully understand why there was an increase in the variance.

6. Lessons Learned

This section provides an overview of the lessons learned from these first two Responsive Collection Design surveys. The RCD feasibility and complexity, the active management, the communication, the staff knowledge, some technical aspects and interviewer staffing levels will be discussed.

6.1 RCD feasibility and complexity

Globally, the RCD concept for CATI social surveys is proved and viable. The RCD strategy used for SLID was slightly modified to take advantage of the lessons learned in the first RCD and to respond to its specific needs. It should be noted that SLID is one of Statistics Canada's most complex CATI surveys and yet it was still possible to use RCD effectively. For example, the prioritization and categorization of cases under the RCD (e.g., high probability and high probability - tracing during RCD Phase 1) had a positive impact on response rates, i.e., the propensity models had properly identified cases that were more likely to respond.

From a conceptual standpoint, it is essential to go through several thought processes during the planning phase before implementing an RCD. For example, when paradata from previous data collection cycles (or paradata for similar surveys) are available, simulations can be used to test the strategy and RCD active management programs. The different thresholds required to determine when to initiate RCD phases can be identified. It is also necessary to identify all the specificities of the survey, to incorporate them into the process if necessary and to thoroughly test all the modifications with their impact on the process. As we speak, the RCD surveys sample is no longer be split into two

groups (RCD and CG). This eases data collection management in regional offices. However, this approach does not prevent the implementation and analysis of embedded experiments.

6.2   Active management

In a RCD context, active management has two main objectives: to provide timely information on survey progress and performance and to decide when is the right moment to initiate RCD phases during collection. The pilots clearly demonstrated that the active management strategy in place was able to meet these two objectives and even more. However, these two surveys also revealed some issues for future RCD surveys. For example, one of the main challenges for active management is to produce relevant and manageable reports that can be easily used during collection and to avoid overwhelming survey managers with massive and detailed amounts of information. The right balance between the amount of information and level of detail needed to manage RCD and the amount of effort required by survey managers to analyse it also needs to be determined. The information required for monitoring, managing and analytical purposes also needs to be better identified. Some analytical information can be seen as 'good to know information' that is often only required at the end of collection. After a few experiences, we were able to simplify the process by streamlining it and by identifying the proper frequency and amount of information required to monitor and manage actively a RCD. Finally, the availability and accessibility of timely paradata information that permit the evaluation of survey progress through key indicators is critical to the development and implementation of a relevant active management strategy. Without this information, it is almost impossible to build an effective active management strategy, which is at the heart of any RCD survey.

6.3   Communication

The HES and SLID experiences clearly highlighted the importance of planning and implementing an efficient communication plan. Since a RCD project is a multidisciplinary team effort that uses an extensive collaborative approach, all parties involved in collection (e.g., regional offices, subject matter, methodologist, collection manager) had to maintain ongoing communication to identify collection issues and agree on any changes to collection strategies in a timely manner. Some technical issues also impacted collection and required constant communication to resolve them and assess their impact. Finally, ongoing communication was essential to discuss how well new collection strategies performed and whether any further adjustments were required.

6.4   Staff knowledge

One of the main RCD challenges is to produce relevant, customized and manageable reports that can be easily analysed and used by the multidisciplinary team at different points in time during collection. For HES and SLID, many new key indicators and monitoring tools and reports were used to provide all necessary information to manage RCD collection. Analysing this information requires new analytical skills that will need to be developed and maintained. This experience demonstrated the need to factor in additional training needs to support and use the more elaborate active management tools that are an integral part of RCD. At the same time, the information produced for active management need to be summarized and simplified (if possible) to prevent survey collection managers and project teams from being overcome by a massive amount of information.

6.5   Technical aspects

Overall, the technical feasibility of an RCD for CATI surveys is no longer in question. As with any CATI survey, a RCD application should be thoroughly tested before the start of collection in order to resolve most of the technical anomalies. It is necessary to remain proactive and on the lookout for other problems that may arise. Fortunately, technical problems in both surveys were very often detected as they arose during the analysis of RCD active management reports. RCD phase initiations, updates and any necessary corrective actions are generally released the day before by head office using overnight jobs. Thus, changes made were almost transparent for the regional offices except for the interviewer assignment required for each group, since the distribution of the cases among the interviewer groups can change significantly after the initiation of a new phase, especially between the initial phase and RCD Phase 1.

6.6   Interviewer staffing levels

As in many previous paradata researches, the two RCD surveys have suggested that the interviewer staffing levels are not always well aligned with the workload sample and the expected productivity. For example, the fact that in-progress units are likely to be called more often during a single day in the second half of the collection period suggests that at that point, the interviewer staffing levels are greater than the sample workload. The proportion of in-progress units attempted on the consecutive days, the rapid decrease in terms of productivity generally observed for CATI social surveys (Laflamme, 2008b, 2009), as well as the relatively large variability of the daily productivity during collection are also good indicators of some inefficiencies. In addition, the relationship observed between 'the proportion of in-progress regular cases' and 'the average number of calls made for the regular in-progress cases divided by the global cap on calls' (Figure 2) also suggested that effort was being spent on a smaller number of cases with less productivity. In that perspective, data collection managers need better interviewer staffing management and planning tools for all CATI surveys (not only for RCD surveys) to reduce some of the tension on collection productivity and costs (Couper et al., 1998) while maintaining a high level of data quality.

7. Conclusion

In the RCD context, active management represents an essential feature. However, active management for RCD faces several challenges. The first challenge for active management is to produce relevant, customized and manageable reports based on key indicators that can be easily analysed and used by survey managers at different points in time during collection. Analysing this information requires new analytical skills for survey managers that will need to be developed and maintained. A second challenge is to find the right balance between the amount and level of detail of information needed to manage RCD and the amount of effort required by survey managers to analyse it. A third challenge is to identify the information required for monitoring, managing and analytical purposes. Some analytical information can be seen as 'good to know information' that is often only required at the end of collection. To that extent, only the most important reports are used on daily basis to monitor and manage the RCD surveys to reduce survey management burden while the other reports are only used when required. Finally, most of our active management tools were developed with a research perspective rather than a production perspective. With more experience, it will be possible to improve the process by streamlining it and identifying the proper frequency and amount of information required to monitor and manage actively a RCD. The availability and accessibility of timely paradata information is critical to any RCD. Without this information, it is almost impossible to build an effective active management strategy for RCD.

Even though the RCD approach can be used to improve both the quality and cost-effectiveness of CATI social surveys, it should not be seen as a magic solution to all data collection issues. RCD is only one important new feature for data collection managers that need to be consolidated and used with other collection initiatives especially for those particularly interested in improving the cost-efficiency of data collection. For example, it is very important that the interviewer staffing composition (i.e., interviewer experience and skills) and levels (i.e., number of interviewers) used throughout data collection period should be aligned with the proposed RCD strategy to take the greatest advantage of the entire data collection period.

The purpose of this paper was to describe the RCD strategy and its implementation, including the active management tools along with the highlights and lessons learned from the first two surveys used as RCD pilots.

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References

Couper, M. P., Baker, R.P., Bethlehem, J., Clark, C.Z.F., Martin, J. Nicholls W.L. and O'Reilly, J.M. (1998), Computer Assisted Survey Information Collection, Wiley series in survey methodology section, Chapter 15 by Edwards, Suresh and Weeks, pp. 301-306.

Groves, R.M. and Heeringa, S.G. (2006), Responsive design for household surveys: Tools for actively controlling survey errors and costs. Journal of the Royal Statistical Society Series A. Volume 169, Part 3.

Hunter, L. and Carbonneau, J.-F. (2005), An Active Management Approach to Survey Collection. Proceedings from the 2005 Statistics Canada International Symposium on Methodological Issues.

Laflamme, F., Maydan, M. and Miller, A. (2008a), Using Paradata to Actively Manage Data Collection. 2008 American Statistical Association, Proceedings of the Section on Survey Research Methods.

Laflamme, F., (2008b), Data Collection Research using Paradata at Statistics Canada. Proceedings from the 2008 Statistics Canada International Symposium on Methodological Issues.

Laflamme, F., (2009), Experiences in Assessing, Monitoring and Controlling Survey Productivity and Costs at Statistics Canada. Proceedings from the 57th International Statistical Institute Conference.

Laflamme, F. and Karaganis, M. (2010), Development and Implementation of Responsive Design for CATI Surveys at Statistics Canada, presented at the European Quality Conference, Helsinki, Finland.

Laflamme, F. and St-Jean, H. (2011), Highlights and Lessons from the First Two Pilots of Responsive Collection Design for CATI Surveys, 2011 American Statistical Association, Proceedings of the Section on Survey Research Methods.

Mohl, C. and Laflamme, F. (2007), Research and Responsive Design Options for Survey Data Collection at Statistics Canada. 2007 American Statistical Association, Proceedings of the Section on Survey Research Methods.

Schouten, B., Cobben, F. and Bethlehem, J. (2009), Indicators for the representativeness of survey response, Survey Methodology, 35, pp. 101-114.

Tabuchi, T., Laflamme, F., Phillips, O., Karaganis, M. and Villeneuve, A. (2010), Responsive Design for the Survey of Labour and Income Dynamics. Proceedings from the 2010 Statistics Canada International Symposium on Methodological Issues.