Active Management: A New Strategy for Managing Data Collection

Luc Tremblay (Statistics Canada)

1. Introduction

In the past, managing the collection of data at Statistics Canada has traditionally been limited to verifying the response rate of a survey. There has been no process in place to monitor the survey in detail, with the goal of, say, fine-tuning the collection procedures to cut costs or improve response rates.

For example, just knowing the best times to phone a respondent should enable interviewers to make fewer unanswered calls to households. A small adjustment such as altering the time of day in which an interview calls a respondent may reap untold benefits. It may result in major additional savings. It may also help to avoid biases in the results.

During the past year, Statistics Canada has achieved several breakthroughs in this area by implementing a strategy the Agency calls “Active Management”. This strategy goes far beyond monitoring response rates.

Active Management is a process that controls the collection of data dynamically from start to finish. On one level, it means that operations managers get regular reports to assess the survey’s progress. But it also provides full control over operational parameters that can be changed quickly in the field in response to emerging collection issues.

This paper will review Statistics Canada’s approach to the strategy of Active Management. It will examine the different tools Statistics Canada staff have built using Blaise software to support this concept.

2. Active management: Keeping the finger on the pulse

Active Management means that senior managers can now keep their fingers on the pulse of a survey literally from start to finish. It means they can examine production data to identify various parameters which might be adjusted to fine-tune the conduct of a survey.

These parameters include, so far: the best time to call, maximum number of tries, refusal conversion rates per try after initial refusal, and the most efficient number of busy dials to use and their best repetition.

More often than not, collection management tends to begins when a survey starts in the field. However, Active Management starts long before that.

Statistics Canada has been collecting Blaise transaction history (BTH) files since the start of 2001. More than three million BTH records associated with social surveys are now available in a metadata library, which covers a sample size of nearly half a million cases and more than 900 interviewers.

This metadata library has become a tool to help determine best practices for collecting social data. The Operations Research and Development Division of Statistics Canada recently released two studies that have affected the way the Agency conducts social surveys.

The first study focused on the time and effort required by interviewers to reach targeted response rates. An analysis of calling patterns centered on:

- the number of attempts and time to resolve a case
- the effort to convert recalcitrant respondents, and
- the effort associated with hard-to-reach groups

The second study analysed the best time to call a respondent by examining when to make the call and corresponding effort interviewers required to reach targeted response rates at different times of the day.

Among their findings:

- The last 10% of the sample required between 29 and 183 calls (maximum ranges) and took a disproportional amount of interviewer time, that is, 22% for longitudinal surveys and 34% for random digital dialing (RDD) surveys.

- Considerable effort was spent after first definite contact was made, but no data were obtained in 65% of cases. The follow-up effort required six to 11 additional calls, and accounted for 25% of the system time for RDD surveys and 43% for longitudinal surveys.

- There were windows in which attempts to call were more likely to be successful and end in a response. A large percentage of the total interviewing effort analysed was outside the best time to call respondents[3].

- And finally, respondents who are called at their preferred times are more likely to respond.

In addition to improving patterns for calling interviewers, Statistics Canada faced several other challenges. For example, the Agency is becoming concerned about respondent burden resulting from requests for more and more data.

Furthermore, an analysis of BTH data showed that response rates were beginning to decline for a number of surveys and that there were more and more “refusal conversion calls” (calls that were necessary to try to change the mind of respondents who had refused to participate in the survey). Research also indicated that any attempt to contact respondents after two refusal calls was not worth the effort.

BTH research suggested that global response rates were not sufficient in terms of managing different strata within a sample. Consequently, proposals have been made to identify response rates at the stratum level.

3. Results of the analysis

The research and analysis group presented these findings to senior management at Statistics Canada which caused a number of changes to social survey collection:

[3] The effectiveness of a call can be measured by whether it results in a response (complete or partial complete) or a contact which in subsequent calls produces a response. Both measures were used in this analysis. All outcome codes were subdivided into three contact groups – definite contact where information was obtained from having spoken to a live person; possible contact where some information was obtained but not necessarily by live contact (i.e. answering machine); and no contact.

- A maximum of 25 call attempts[4] was placed on longitudinal surveys and 20 for RDD surveys.

- A limit of two "refusal conversion calls" was placed on all cases.

- Given the new limit on the number of call attempts, it was important to ensure that calls were properly distributed. As a result, "time slices" were introduced for a number of social surveys, to more specifically target the best time to call.

- In addition, stratum control was implemented by using different interviewer groups to target specific strata.

4. Technical changes in data collection operations

Implementing the new approach approved by senior Agency managements required a number of technical changes to be introduced through the Blaise software. This section examines these technical changes.

A) Maximum number of attempts and maximum number of refusals

The first technical change was to modify the application to include two counters. Once the counter reached the maximum number of attempts, the case would be finalized with a specific code. If it reached two refusal calls, it would be coded "final refusal and sent to head office.

Since the maximum number of call attempts can vary depending on the type of survey, a variable was created on the sample file that could, if necessary, be modified to adjust the maximum number of attempts.

To allow for exceptions, the number of attempts can be set to a maximum of 999 in the sample file. This way the standard application will not need to be changed, eliminating the need for additional development or testing.

B) Time slice implementation

The second technical change involved the best time to call. The BTH analysis showed that a large number of calls were attempted at a less than optimal time. Consequently new procedures had to be implemented to target the best time to call respondents.

The Survey of Labour and Income Dynamics (SLID) was chosen as a pilot to implement "Time Slices".

Three different Time Slice Sets were created for SLID. The first was for households with at least one elderly person. The second was for people living alone, and the third for all other cases.

The table below represents the distribution of the 25[5] tries[6] by Time Slice Set:

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[4] A "call attempt" is an internal counter in the system that represents every time a case has been called, no matter its outcome. It includes busy, no answer, access for verification, etc. Every attempt is considered.

[5] Even if the total number of tries is equal to 25, which is also the maximum number of attempts, the maximum number of tries will not always be met, as it only counts the no answer dials (or the max number of busy dials that result in a no answer dial) and the answering machine. The attempts will count everything.

[6] Try is a technical term to represent a time slice incrementation.

Figure 4.1

Time Slice Set	Definition	8:00h - 17:00h	17:00h - 19:00h	19:00h - 21:00h	Week-Ends 9:00h - 21:00h
TS1	**Elderly**	18	5	2	N/A
TS2	**Single**	2	5	13	5
TS3	**Others**	3	13	9	N/A

This table provides the following information:

- The elderly Time Slice Set puts priority on the day-time calls without differentiating weekend calls.

- The single Time Slice Set has a high priority at night and ensures that at least five calls are made on weekends.

- The “others” Time Slice Set targets the supper hour as the best time to call, with no differences between weekdays and weekends.

At the time of writing this paper, SLID was still in the early stages of collection. As a result, the impact of the new strategy is not yet known. However, a number of initial observations have been made by field staff:

- Day-time calls are becoming more productive as there are fewer calls per contact.

- Since the elderly are being called during the day, there is more time to reach non-elderly people at night, making this Time Slice much more effective.

The major challenge with implementing Time Slices for SLID was the need to plan the interviewer’s workload more precisely and identify how many interviewers would be needed, given the new distribution of work against the three time slice sets.

To help the situation, new reports were developed for managers and supervisors to plan collection activities more precisely. Figure 4.2 gives a picture of the existing daybatch report, which is an important report for field staff. This report has become a complement to the new Time Slice report which provides a complete overview of where to put collection efforts.

Figure 4.2

22/02/2006

Composition of the DayBatch
Survey of Labour and Income Dynamics

Group	Quantity	%
Interviewer English	72	50.70%
Interviewer French	17	12.00%
Refusal English	3	2.10%
Refusal French	4	2.80%
Tracing English	13	9.20%
Tracing French	10	7.00%
Senior Interviewer	3	2.10%
Project Manager	20	14.10%
No group assigned	0	0.00%
Total cases	142	100%

The daybatch report drafted for SLID collection provides the number of cases that are eligible for a specific Time Slice definition. Figure 4.3 illustrates this. Even if the daybatch report is not live it is quite useful when combined with the live daybatch report.

Figure 4.3

22/02/2006

Survey of Labour and Income Dynamics
Time Slice's Report
Availability of Cases

	TS1 - Elderly				TS2 - Single				
		Monday to Sunday				Monday to Friday			Weekend
	Total	Start 17:00	17:00 19:00	19:00 End	Total	Start 17:00	17:00 19:00	19:00 End	Start End
Panel 4 English	52	43	46	36	33	1	31	30	0
Panel 4 French	3	0	3	3	0	0	0	0	0
Panel 5 English	66	16	59	46	44	3	19	43	0
Panel 5 French	0	0	0	0	1	0	0	1	0
Refusal English	293	293	293	290	56	49	55	56	0
Refusal French	11	11	11	11	2	2	2	2	0
Tracing English	0	0	0	0	0	0	0	0	0
Tracing French	0	0	0	0	0	0	0	0	0
Senior Interviewer	89	89	89	87	11	11	11	11	0
Project Manager	0	0	0	0	0	0	0	0	0
Total	514	452	501	473	147	66	118	143	0

	TS3 - Other				Summary				
		Monday to Sunday				Monday to Friday			Weekend
	Total	Start 17:00	17:00 19:00	19:00 End	Total	Start 17:00	17:00 19:00	19:00 End	Start End
Panel 4 English	337	15	337	323	422	59	414	389	0
Panel 4 French	2	0	2	2	5	0	5	5	0
Panel 5 English	337	11	337	298	447	30	415	387	0
Panel 5 French	4	0	2	4	5	0	2	5	0
Refusal English	594	567	594	594	943	909	942	940	0
Refusal French	10	9	10	10	23	22	23	23	0
Tracing English	0	0	0	0	0	0	0	0	0
Tracing French	0	0	0	0	0	0	0	0	0
Senior Interviewer	82	78	82	82	182	178	182	180	0
Project Manager	0	0	0	0	0	0	0	0	0
Total	1366	680	1364	1313	2027	1198	1983	1929	0

Experience to date has shown that the following new features would make the tool even more effective:

- Since the time slice report is created from the .tdb (textual representation of the daybatch) file, the information about the time slices is not updated until a daybatch is redone, even if the .tdb is refreshed through CATI Management. The short-term plans for the Time Slice report is to run it using the BTH file instead. This would provide an instant picture of what is going on.

- Another enhancement would be to have the number of tries left per case, rather that just the actual number of cases available in that Time Slice. This would give longer term information about the workload, and help managers plan the workload more efficiently.

- The working arrangements of interviewers as specified by their contract with Statistics Canada also pose a challenge. Sometimes, if a shift goes particularly well, it empties the next shift's available cases. The work contract of our interviewers stipulates that shifts have to be modified 24-hours in advance before it can be changed. Consequently, it was necessary to introduce the concept of a “buffer”.

  The buffer is an adaptation parameter. As an example, please refer to Figure 4.1 and the time slice set 1, (8:00h - 17:00h). Even if the maximum number of tries is 18, the time slice will originally be set at 15, leaving a buffer of 3 tries. When a shift runs out of cases, the number of tries can be increased (to 18 in this case). The daybatch is then redone and the interviewers are advised of the changes in tomorrow’s shifts. Consequently enough work becomes available for the current shift and enough time is now allowed to change the shift for the next day.

C) Stratum control

Good response rates are more and more difficult to obtain and it is important to ensure that all strata of any given survey are publishable. For that reason, ensuring that all strata’s minimum requirements are met is very important.

The first survey which incorporated the use of stratum control was the Follow-up of Graduates Survey (FOG). Four different levels of education were examined: college degrees, university undergraduates, master’s degrees and doctorates. However, the survey managers were also interested in the distribution among the 10 Canadian provinces and three territories. In other words, there were 48 different strata to accommodate within the stratum control strategy.

Statistics Canada surveys need specific interviewer groups for workload assignments and as a result, 99 Z[7] groups were created to handle both English and French speaking respondents.

Initially, all interviewers were assigned to all groups, provided that they met the language requirements. All groups were assigned as secondary groups, so that they had an equal chance of being selected. The primary group of interviewers was assigned to a group that wasn’t used in this survey.

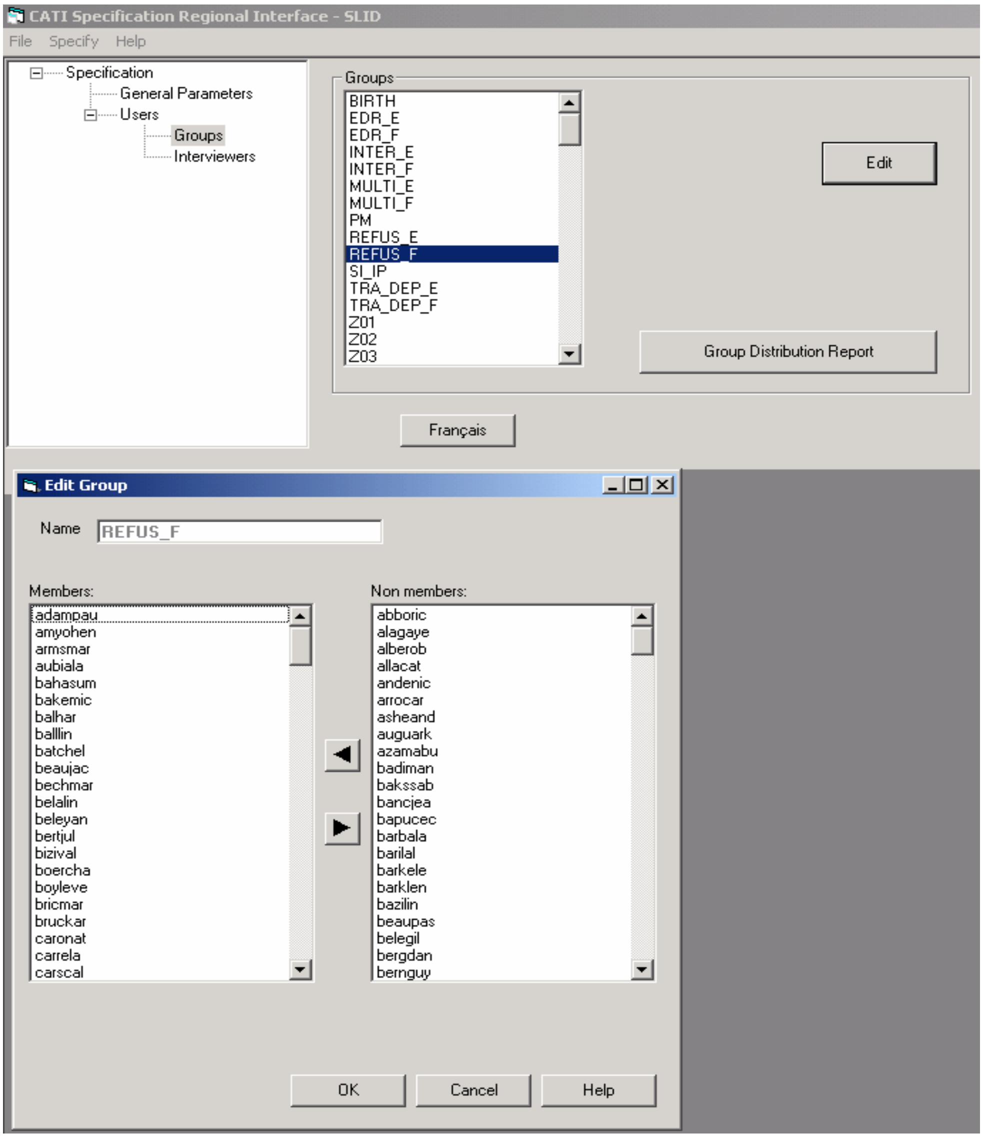
By consulting the production report each day, project managers in Statistics Canada’s various Regional Offices were able to determine if any stratum was falling behind. If that was the case, the associated group for that particular stratum would be assigned as the primary group for some interviewers, so that particular stratum was given priority. At the same time, appointments for other groups (or stratum) were respected.

The extensive manipulation of groups meant that Regional Offices had to rethink their methods and process to handle the increased volume of changes. In its original design, the Generic Interface for Regional Offices (GIRO) permitted management of all groups and users from a central location. Consequently, accounts modifications were made across all surveys. The original idea was to allow an interviewer proficient at converting refusals to be in the same function for all surveys.

[7] Z was choosen for these groups so that they would appear at the bottom of the list when selecting whom to send the case to, as there were few surveys using these groups, effort was minimized by not having to scroll through every time we needed a regular popular group.

The agency is moving away from this approach. Since the introduction of Z groups, the definition of a specific group can vary from survey to survey. The use of the Blaise component pack permits managers to create survey specific levels of users and group managers. Figure 4.4 is a print screen of the Specification Regional Interface (SRI).

Figure 4.4



A major concern introducing this new approach for FOG was the increased amount of work required to manage the new approach. However, a training program was instituted for field managers and the results to data are impressive.

5. Active Management: What's on the horizon?

So, what is on the horizon at Statistics Canada in terms of Active Management?

Several initiatives are under way which will broaden the current scope of Active Management.

The first initiative is targeted for implementation in the spring of 2006.

A) Transfer of cases from One Regional Office to Another

Statistics Canada has 6 Regional Offices (CATI Sites). Sample are being sent to each individual site separately and often there is a need to transfer capacity from one site to another during the course of a survey. This fundamentally does not exist today.

A new project has been initiated called “RO to RO transfer”. It will permit the transfer of cases from one regional office to another – even after the case is started, without loosing any information.

The challenge associated with creating this functionality are many, given the complex data models used at Statistics Canada. A datamodel is often composed of multiple databases : for notes and remarks, for the tracing component that permits an interactive search for a respondent, for the customized record of calls, and sometimes for supplements or components of a survey that are rostered for everyone in the household.

Once a case is started, data reside in each of those associated databases. The object was to create a generic method for transferring cases across Regional Offices. Which would allow further flexibility in managing capacity, language choice and technical infrastructure.

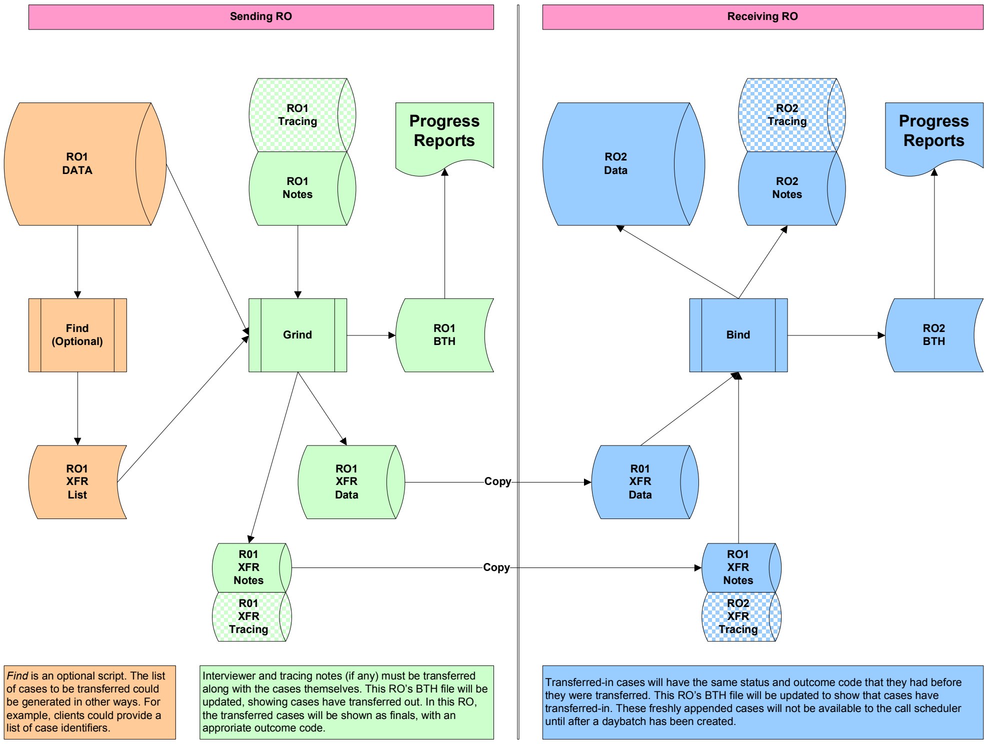
Three pieces of software are required for the “RO to RO data transfer” functionality. They are called **Find**, **Grind** and **Bind.** Each has a different function. The last two are generic, and take almost no time to implement in a survey. Once they have been tested in the field, they will be implemented on all surveys. Figure 5.1 illustrates the flow between the different software.

Find: This is the most non-standard piece. *Find* simply selects and creates a list of all cases to be transferred, regardless of the reason. There are various ways of identifying these elements, by the client, or language, stratum, sex, and so on therefore the function cannot be standardized.

Grind: This software extracts the cases from the Regional Office wishing to transfer them to another site**.** It looks at the list of cases generated by *Find*. Grind goes through all associated databases and creates a copy of the data from the databases. It then changes the outcome code of the case to "transferred to other RO". Finally, it updates the BTH files for the reports, and flags the case as to output status, so that overnight automated jobs don't extract the case and send it to head office.

Bind: This software loads cases that were extracted into the receiving Regional Office. Very simply, it takes the files created by *Grind* and attaches them to the associated Blaise databases. It changes a flag signalling that cases have been transferred, and updates the Regional Office code as well as the BTH files to reflect changes in the reports.

Figure 5.1



FIND ***GRIND*** ***BIND***

B) Preferred Time to Call a Respondent

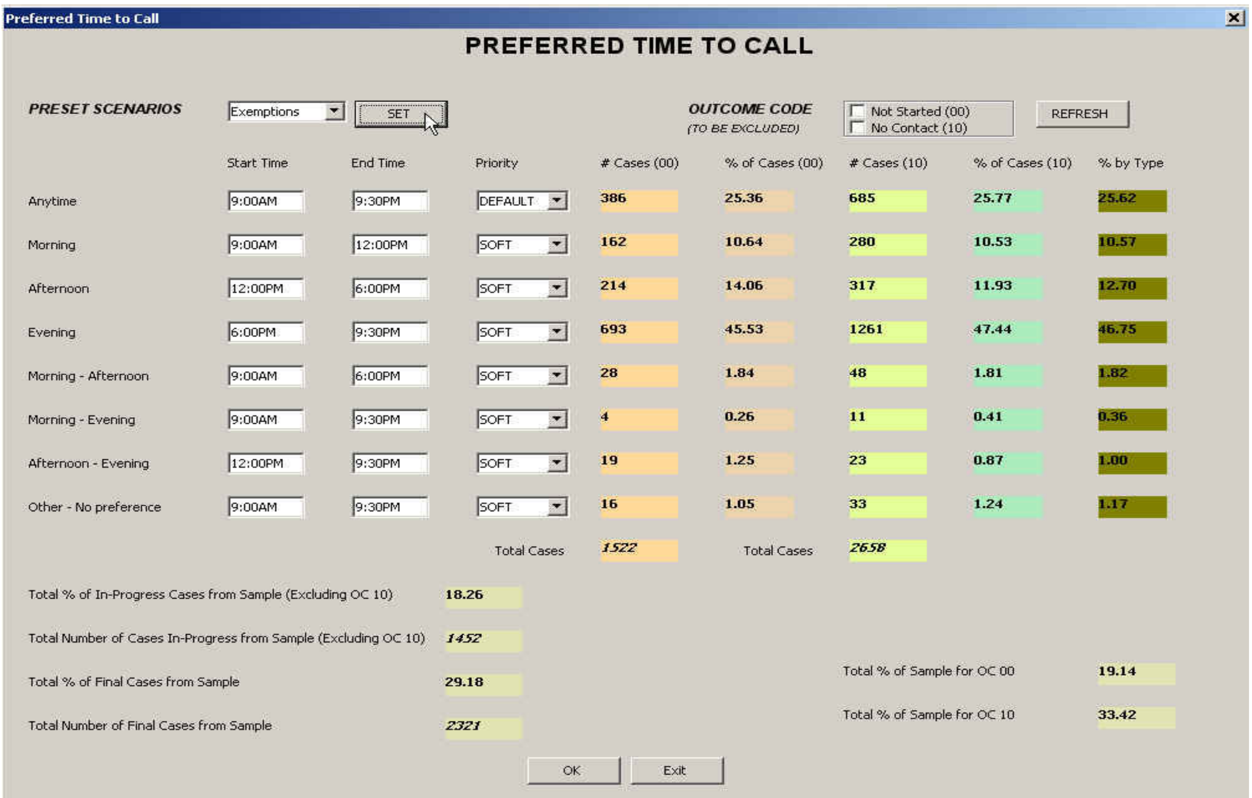
In order to provide maximum flexibility, especially for surveys with short collection windows and large volumes, a new tool has been created to allow managers to set priorities in the daybatch, based on individual respondents previously identified best time to call.

This is a very graphical tool, with preset scenarios and outcomes. See Figure 5.2. below.

The key benefit of this tool is its ability to prioritize cases without the removal of other non-prioritized cases. Therefore, if prioritized cases are exhausted, there are still cases left to keep the interviewers busy.

This tool is currently being presented to clients and feedback has been very positive.

Figure 5.2



6. Conclusion

The tools described in this paper have greatly improved the degree of control managers at Statistics Canada have over surveys. Previously, when a survey moved into the field, it was hard to change the set course of action. There were no tools or facilities available to track the survey at a detailed level to improve the day to day efficiency of the collection operation.

Today, however, new tools have allowed Agency managers to determine how to concentrate their efforts to improve collection practices. This ‘real-time’ monitoring might simply entail changing the times that certain respondents are called to complete a questionnaire.

Active Management is indeed a key way of “keeping the finger on the pulse” of collection activity at Statistics Canada.

8. References

[1] Lee, J. (2005): Analysis of Best Time to Call Across 30 Survey Cycles for Longitudinal and RDD Surveys, Statistics Canada, Ottawa, CA