# Findings of the Canadian Vehicle Fuel Pilot Survey 



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## Findings of the Canadian Vehicle Fuel Pilot Survey

## John Nicoletta (Transportation Division) and Jennifer Taylor (Business Survey Methods Division)

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## 1. Introduction

The Canadian Vehicle Fuel Survey pilot is being conducted by Statistics Canada on behalf of Transport Canada and Natural Resources Canada. The purpose of this pilot is to measure the response rates to proposed survey instruments. The survey measures fuel consumption of on-road vehicles registered in Canada. Buses, motorcycles, heavy construction equipment and road maintenance equipment, such as snow plows are excluded from the pilot.

Statistics Canada currently conducts a survey of vehicle use in Canada through its quarterly Canadian Vehicle Survey (CVS). This survey collects information, such as distance traveled, time of day, the number and age of passengers and the trip purpose, by vehicle trip. Collecting fuel use information via the CVS or in tandem with it would make use of the existing data elements collected by the CVS, many of which are required by the National Energy Use Database Initiative (NEUD).

The Fuel pilot survey consists of a computer assisted telephone interview (CATI) and a fuel and/or trip log. If vehicle owners can not be contacted by phone for the CATI, they may still be mailed a log. The type of log that is mailed depends on the log option of the sample they are in.

There were a total of five log options tested in the Fuel pilot. They include;

- Option 1 Fuel1 Log
- Option 2 Fuel2 Log
- Option 3 CVS Trip log followed by Fuell log
- Option 4 Fuel1 log followed by CVS Trip log
- Option 5 Combined Trip and Fuel log

Option 1 consists of the Fuell log which includes the fuel gauge reading before and after each fuel purchase. Some data variables include; quantity purchased, price per liter, amount spent and type of fuel.

Option 2 consists of the Fuel2 log which includes a fill-up indicator after each fuel purchase. The fuel gauge reading is recorded at the time the $\log$ is received and before returning it. Some data variables include; quantity purchased, price per liter, amount spent and type of fuel.

Option 3 consists of first sending out the current Canadian Vehicle Survey (CVS) Light (L) and Heavy (H) Trip log followed by the Fuell log. The Fuel1 log is mailed out after sufficient time has passed. This also includes Short Forms (SF) and Postcards (PC) associated with the CVS survey.

Option 4 consists of first sending out the Fuel1 log followed by the current CVS Light (L) and Heavy (H) Trip log.

Option 5 consists of a combined Fuel and Trip log. This includes the current CVS Light and Heavy log with the Fuell portion at the end of the log.

For a copy of the fuel logs and fuel and trip $\log$ please see Appendix H.
This report presents information on the response rates from the CATI calls, the distribution of the mail out, and the return rates of logs in the pilot survey. This report also includes a detailed analysis of the response rates and data quality of the five options. The information contained in this report will be used to determine the most appropriate option, costs, and recommendations for conducting CVS - Fuel and CVS - Trip surveys.

## 2. Description of the Pilot Survey

## Target Population, Survey Population and Frame

The CVS frame was used for the pilot survey as both surveys have the same target population and may both be run at the same time. This also permits savings in time and resources as the procedures and systems are already in place.

Originally, the target population for the pilot survey was supposed to include vehicles in Ontario and Quebec. When approval from Quebec came too late for sample selection, the target population was then changed to all active motor vehicles in Ontario and New Brunswick, except trailers, motorcycles, buses, off-road vehicles like snowmobiles, dune buggies and amphibious vehicles, and special equipment like cranes, street cleaners, snow plows and backhoes, etc. The target population for the pilot survey is thus the same as for the CVS for these two provinces, with the additional exclusion of buses.

The survey population, or the frame, for the pilot is all active vehicles belonging to the target population that are on the two provincial motor vehicle registration files (Ontario and New Brunswick). The information contained in these files permits the identification and contacting of in-scope vehicle owners based on characteristics and ownership of the vehicles.

The pilot survey reference period was the first eight weeks of the fourth quarter of 2002.

## Stratification

All vehicles from the survey population are stratified by province of registration and then by class of vehicle weight: under 4.5 t (light vehicles), 4.5 t to 15 t , and over 15 t. As for CVS, the vehicles are further divided by two vehicle-age strata of newer and older vehicles.

## Sample Allocation

The budget allowed for a sample size of 5,000 vehicles for the pilot: 1,000 for each option to be tested. With the low response rates expected, a sixth-root allocation method was applied to allocate among the vehicle type - age groups to ensure that there would be a sufficient number of heavier vehicles responding for each option to permit analysis of the results. The sample in the province of New Brunswick was sized to ensure that a sufficient number of the interviews and logs would be done in French so $60 \%$ of the 5,000 vehicles were allotted to New Brunswick and $40 \%$ to Ontario.

Table 1. Sample Allocation

| Province | Vehicle Weight Type | Sample Size | Sample Size <br> per Option |
| :--- | :--- | :---: | :---: |
|  | under 4.5t (Light) | 1,532 | 306 |
|  | 4.5 to under 15t | 774 | 155 |
|  | 15 t and over | 694 | 139 |
|  | Total | 3,000 | 600 |
| Ontario | under 4.5t (Light) | 1,009 | 202 |
|  | 4.5 to under 15t | 486 | 97 |
|  | 15 t and over | 505 | 101 |
|  | Total | 2,000 | 400 |
| Total |  | 5,000 | 1,000 |

## Sample Selection

A sample of vehicles was randomly selected from the survey population. Within each stratum, vehicles in the sample for the previous three quarters of CVS are removed and the remaining vehicles are sorted by postal code. Then a systematic sample is selected using a random start. The sample of 5,000 was added to the number to be selected for the $4^{\text {th }}$ quarter 2002 CVS sample. The units were later split between the fuel pilot and the CVS and then among the 5 options, before being assigned a start date from among the first eight weeks of the $4^{\text {th }}$ quarter (Oct 5 to Nov 29). To reduce response burden, no vehicle selected for the pilot was selected for the current and previous three quarters of CVS.

The sample of 5,000 vehicles was drawn in September 2002. One thousand units were allotted for each option to be tested with 600 in New Brunswick and 400 in Ontario.

## Data Collection

Of the total 5,000 units, 26 were not included in the sample file for Computer Assisted Telephone Interview (CATI) because the contact information received back from the Canadian Council of Motor Transport Administrators was insufficient. The CATI phone calls and first mail out began in September 2002.

The data collection procedure follows the CVS pattern. First is the CATI where it is verified that the owner on file does own or lease the vehicle. The vehicle type is verified to determine the appropriate $\log$ type to send in the case of the trip log. Questions on driving habits and an odometer reading are asked. For the pilot survey, additional questions pertaining to the maintenance of the vehicle and the household characteristics of the owner were also asked.

Contacted owners that agree to be sent a log will be contacted by telephone on the first day of the reporting period to inquire if they have received the log and begun filling it out, answer questions, and motivate them to complete the log. Those who do not respond to the CVS-Trip log in Options 3 and 4 are asked to fill out a postcard of odometer readings only instead (no fuel component).

Owners not contacted by telephone are mailed a $\log$ and sent a reminder letter by mail. Those who do not respond to the CVS-Trip log in Options 3 and 4 are asked to fill out a short form of the $\log$ instead, which is similar to the postcard of odometer readings only (no fuel component), but with the several questions that would otherwise have been asked during the CATI.

## 3. Analysis of Response Rates to the Computer Assisted Telephone Interview

## Overall Response Rates

Figure 1 illustrates the results of the attempts to contact $4,974(=5,000-26)$ vehicle owners and conduct a Computer Assisted Telephone Interview (CATI).

Figure 1. CATI Contact Rates and Results


From Figure 1, we note that over $63 \%$ of the vehicle owners were contacted and a full or partial response was obtained for $2,858(=2,779+79)$ of these. The 79 partial respondents agreed to be sent a log. Of the 2,779 full respondents, $2,189(78.8 \%)$ accepted to be mailed a log or postcard. Among those not contacted by phone, logs were mailed to 1,442 . Thus a total of 3,710 vehicle owners were mailed a log or postcard.

Among the 2,858 vehicles for which owners provided a full or partial response, 590 were not mailed a $\log$ or postcard. As seen in Table 2, 393 were not mailed to because the vehicle would not be in use (based on Questions 4 and 8) whereas 197 refused to be mailed a $\log$ or postcard. Thus only $6.9 \%[=197 /(2,779+79)]$ of the full and partial respondents refused to be mailed a log or postcard. The results by language are found in Table A. 2 of Appendix A. Results by vehicle type are below. Here, heavy vehicles are those weighing 4.5 t and over.

Table 2: Reaction of the 2,858 Full and Partial Respondents to the Request for Their Cooperation in Completing a Postcard or Log, by Vehicle Type (1,666 Light, 1,192 Heavy)

| Question |  | Vehicle <br> Type | Accept |  | Refuse/ Other |  | Don't Know |  | Not Applicable (not in use) |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Freq. | Percent | Freq. | Percent | Freq. | Percent | Freq. | Percent |
| $\begin{aligned} & \text { Q25 \& } \\ & \text { Q29 } \end{aligned}$ | Mail $\log /$ postcard |  | Light | 1369 | 82.2\% | 109 | 6.5\% | 0 | 0.0\% | 188 | 11.3\% |
|  |  | Heavy | 899 | 75.4\% | 88 | 7.4\% | 0 | 0.0\% | 205 | 17.2\% |
|  |  | Total | 2268 | 79.4\% | 197 | 6.9\% | 0 | 0.0\% | 393 | 13.8\% |

## Highlights

Appendix A contains tables of the response rates for individual CATI questions for the 2,858 full and partial respondents by language (Table A.3) and by type of vehicle (Table A.1): light vehicles which weigh less than 4.5 t and heavy vehicles which weigh 4.5 t and over. The following are points of interest drawn from these tables.

- The individual questions were generally very well reported. Few refusals ( $2.8 \%$ of responses) were encountered in general, but this was somewhat higher for the household questions: $4.4 \%$ of light vehicle owners refused to give the size of the household, $3.5 \%$ of light vehicle owners refused to provide the number of vehicles in the household, and $13.5 \%$ of light vehicle owners refused to provide the household income.
- The number who did not know the answer was high in some cases: $11.8 \%$ did not know the distance driven the previous week (Question 7) and $17.9 \%$ did not know the odometer reading of the vehicle (Question 10). This is not unexpected, however, for these questions. Almost $5 \%$ did not know whether or not the vehicle has an anti-lock braking system (Question 11E).
- The frequencies of "Don't know" and refusals are similar for both light and heavy vehicles.
- Only 349 of the 2,858 complete and partial interviews were conducted in French (see Table A. 2 of Appendix A). An examination of the differences between the frequencies of "Don't know" for French and English does not indicate that any questions may be unclear in one of the two languages.

The following highlights concern those who responded to the question with an answer other than "Don't know" (the Response column).

- Of the 2,665 who responded to Question $6 \mathrm{~A}, 82 \%$ fill-up their vehicle when purchasing fuel, compared to $18 \%$ who partially fill the vehicle. This is promising for obtaining the 2 fill-ups necessary to estimate fuel consumption. It remains to be seen if this is also observed in the completed logs.
- Of the 2,355 reporting the distance driven the previous week (Question 7), 74\% indicated that this was a typical distance (Question 7B).
- Of the 2,349 who responded to Question 7 G about the seasonal use of the vehicle, over $33 \%$ indicated that the usage of the vehicle depends on the season.
- Of the 2,679 who responded to Question $8,88 \%$ indicated that the sampled vehicle would be used in the next 6 weeks.
- Among the 325 who reported that the vehicle would not be used in the next 6 weeks, seasonal use was the most common reason (over 65\%) given (Question 8B). Under repair counted for over $8 \%$ of the responses.
- Less than $2 \%$ of the 2,356 who responded to Question 9 reported that they use the vehicle less than once a week, whereas almost $56 \%$ reported daily use.


## 4. Mail Out

Table 3 includes all data for Ontario and New Brunswick and is based on the entire pilot survey sample.

Table 3. First Log Mail Out, by Log Option ${ }^{1}$

| Frequency | Log Option |  |  |  |  | Total |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: |
| Percent | 1 | 2 | 3 | 4 | 5 |  |
| CATI | $\mathbf{4 7 3}$ | $\mathbf{4 5 5}$ | $\mathbf{4 6 0}$ | $\mathbf{4 4 1}$ | $\mathbf{4 3 9}$ | $\mathbf{2 , 2 6 8}$ |
|  | 9.5 | 9.1 | 9.3 | 8.9 | 8.9 | 45.6 |
| Dry Mail Out | $\mathbf{2 8 9}$ | $\mathbf{2 7 7}$ | $\mathbf{2 8 2}$ | $\mathbf{2 9 5}$ | $\mathbf{2 9 9}$ | $\mathbf{1 , 4 4 2}$ |
|  | 5.8 | 5.6 | 5.7 | 5.9 | 6.0 | 29.0 |
| Not Mailed | $\mathbf{2 3 4}$ | $\mathbf{2 6 4}$ | $\mathbf{2 5 1}$ | $\mathbf{2 6 0}$ | $\mathbf{2 5 5}$ | $\mathbf{1 , 2 6 4}$ |
|  | 4.7 | 5.3 | 5.1 | 5.2 | 5.1 | 25.4 |
| Total | $\mathbf{9 9 6}$ | $\mathbf{9 9 6}$ | $\mathbf{9 9 3}$ | $\mathbf{9 9 6}$ | $\mathbf{9 9 3}$ | $\mathbf{4 , 9 7 4}$ |
|  | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 100.0 |

Of the total 4,974 units (all $\log$ options) in the sample, almost $75 \%$ were mailed a log. Close to $46 \%$ of the total were vehicle owners contacted through the CATI who agreed to accept a log. Dry mail-outs accounted for $29 \%$ and the remaining $25 \%$ were not mailed out. Dry mail-outs pertain to vehicle owners who could not be contacted by phone. Those not mailed out include cases such as refusals, vehicles not in use, moved out of province etc.

The number of vehicle owners agreeing to accept a $\log$ was fairly equal between $\log$ options, ranging between $8.9 \%$ and $9.5 \%$ of the total logs mailed.

[^1]
## 5. Analysis of the Return Rates of the Logs

The return rates presented in this section pertain to actual logs received from the mail out. Return rates do not include any item responses, only that the $\log$ was returned. The logs can have information or can be blank.

Table 4. Number of Returned Logs, by Log Option and Type, as of April 18, 2003

| Log Option | 1 | 2 | 3 |  |  |  | 4 |  |  |  | 5 |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | 1st log |  |  | 2nd log <br> Fuel1 | 1st log Fuel1 | 2nd log |  |  | Combined Log |  |  |
| Log Type | Fuel1 | Fuel2 | L | H | L\&H |  |  | L | H | L\&H | L5 | H5 | Total |
| Total Mailed | 762 | 732 | 416 | 326 | 742 | 656 | 736 | 367 | 267 | 634 | 421 | 317 | 738 |
| Total Returned | 277 | 280 | 186 | 127 | 313 | 197 | 299 | 149 | 73 | 222 | 143 | 102 | 245 |
| \% of total | 36.4 | 38.3 | 44.7 | 39.0 | 42.2 | 30.0 | 40.6 | 40.6 | 27.3 | 35.0 | 34.0 | 32.2 | 33.2 |

The numbers presented in Table 4 indicate the number of logs returned as of April 18, 2003. The majority of the logs we continue to receive, although very few, pertain to the second $\log$ of options 3 and 4. The rate of $\log$ returns ranged between $33.2 \%$ and $42.2 \%$ for all $\log$ options. The first log of option 3 (the current CVS Light and Heavy logs recorded the highest return rate at $42.2 \%$ returned. The Fuell $\log$ of option 4 (the first $\log$ of the two $\log$ option) was next at $40.6 \%$ followed by option 2 (Fuel2 log) and option 1 (Fuel1 log) with $38.3 \%$ and $36.4 \%$ respectively. The combined $\log$ (option 5) recorded a return rate of $33.2 \%$. As indicated in Table 4, the second logs of options 3 and 4 have return rates of $30 \%$ and $35 \%$, respectfully. The low return rate of second logs can be explained by the longer period of time required to complete the first $\log$ and return it before a second $\log$ can be mailed out, as well as the response burden added to completing two logs over a longer period of time. It should be noted that log options 3 and 4 will yield a higher return rate given that there was added follow-up including postcards and short forms.

Table 5. Returned Logs, Options 3 and 4, $1^{\text {st }}$ and $2^{\text {nd }}$ Logs, as of April 18, 2003

| Log Option | 3 |  | 4 |  |
| :--- | :---: | :---: | :---: | :---: |
|  | Returned | \% of mailed | Returned | \% of mailed |
| First Log Only | 167 | 22.5 | 155 | 21.1 |
| Second Log Only | 51 | 6.9 | 78 | 10.6 |
| Both Logs | 146 | 19.7 | 144 | 19.6 |
| No Logs | 378 | 50.9 | 359 | 48.8 |
| Number Mailed | 742 | 100.0 | 736 | 100.0 |

Note: The total number of first logs returned is the sum of the first log only and both logs. The total number of second logs returned is the sum of the second log only and both logs.

Table 5 shows the number of returned logs for options 3 and 4 for both the first and second logs. (Option 3 consists of first mailing out the current CVS Light and Heavy logs followed by the Fuel1 log. Option 4 consists of first mailing out the Fuel1 log followed by the current CVS Light and Heavy logs.)

Two main observations can be made from Table 5.

- Only half of the respondents returning the first log also returned the second log, 47\% (146 of 313 ) and $48 \%$ (144 of 299) for option 3 and 4, respectively.
- There are a significant number of respondents who returned only one log. There were 167 respondents who returned the first log only in Option 3 and 155 in Option 4. For both options, only $20 \%$ returned both the trip and the fuel log.

These observations highlight an important disadvantage for Options 3 and 4: not even half of the vehicles for which logs are returned, return both the trip and fuel logs

Another interesting observation is with the return of the second $\log$ and no first $\log$ returned. There were 51 second logs (Fuel 1) returned for Option 3 without a corresponding first log (CVS). This is reasonable considering the Fuel1 log is shorter and less burdensome. However, 78 respondents, in Option 4, returned the much longer log (CVS) without returning the shorter first $\log$ (Fuel 1).

When comparing return rates for all log options, (this is taking into account both logs for options 3 and 4) option 2 recorded the highest overall return rate at $38.3 \%$ followed by option 1 and option 5 at $36.4 \%$ and $33.2 \%$, respectively. The first $\log$ of option 3 recorded a higher return rate at $42.2 \%$ but when coupled with the second log, the return rate decreased dramatically to only $19.7 \%$. Option 4 followed a similar pattern where the first log amounted to a return rate of $40.6 \%$ but only $19.6 \%$ when both logs were taken into account. This was the concept behind both options 3 and 4 to determine the response rates for completing two logs.

Table 6. Number of Returned Logs, by Type of Information, by Log Option, as of April 18, 2003


Table 6 contains the various types of responses from returned logs for all log options. The different responses have been divided into two categories: "Information Reported" and "Information Not Reported".

Logs with reported information include items such as fuel purchases and/or trips, information on vehicles not in use (this can include vehicles stored for the winter, heavy trucks not operated at this specific time, seasonal vehicles and vehicles under repair), vehicles scrapped and postcards and short forms (which pertain to the current CVS survey). Logs with no information reported include items such as data is not available or unable to report (N/A), refusals, vehicles sold (for which no contact with the current vehicle owner was made), post office returns and blank logs.

The majority of returned logs contain useful survey information (between $80.2 \%$ and $92.1 \%$ ). (See details in Appendix B).

## 6. Analysis of the Response Rates of the Logs

Response rates are a first indication of the quality of the estimates. When response rates are low, there is a significant potential for nonresponse bias. Furthermore, not all completed CVS-Fuel logs or fuel portions of the CVS-Fuel combined log will contain sufficient information to be used to calculate the fuel consumption.

Evidence appears to indicate in the current CVS that low response rates result in biased estimates. The CVS data suggest that when a vehicle is extensively used, owners tend not to complete the $\log$, as this is a large burden for them. On the other hand, owners whose selected vehicle is rarely used tend not to respond under the incorrect impression that their contribution to the survey results is insignificant. Although these two extremes may compensate each other to a certain extent when it comes to reporting averages, an important part of the travel pattern will be missing.

In order to compare some of the response rates observed, tests of statistical hypotheses were conducted in order to determine which options had rates significantly different from each other. The results of these tests are shown in the diagrams following the table of results. Options for which the response rates are not significantly different are joined by a line. Tests between pairs of options were done with $95 \%$ confidence level. Thus the results of all the tests combined together are at less than $95 \%$. For a description of the statistical tests conducted, see Appendix E.

Note that the pilot survey data used for the comparisons has not gone through an edit and imputation process. Some basic editing has been done to correct for obvious errors in the dates of fuel purchases (such as the date November 31, 2002 which does not exist) and glaring inconsistencies between odometer readings.

For the analyses that follow, vehicles are grouped into two classes: light vehicles (under 4.5t) and heavy vehicles ( 4.5 t and over).

## Global Response Rates

The return rates discussed in Section 5 and the results of the Computer Assisted Telephone Interview (CATI) discussed in Section 3 are both aspects that make up the overall response to the Pilot Survey. Both of these parts are considered in the global response rate depicted here as a very basic measurement of overall survey response.

A vehicle is considered to be a respondent in the following cases:

- a vehicle determined out of scope or not in use via CATI or the logs
- a vehicle still owned or lease by the contacted individual with at least one answer on a returned log
- a vehicle for which a response was obtained through the follow-up procedure (Options 3 and 4 and the CVS) on a postcard or short form.

The global response rates are thus different from the return rates as they are based both on the returned logs, postcards and short forms, and the CATI. As well, the global response rates for Options 3 and 4 indicate only that a response was obtained from the vehicle, but not that both trip and fuel information (both logs) was provided.

The global response rates were calculated in order to test for significant differences among the options and are found in Table 7. Figures 2 and 3 depict the results of the tests of statistical hypotheses by joining by a line those options for which the response rates are not significantly different from each other.

The Fuel Pilot Survey data used was that which was received and captured on or before April 16, 2003, and did not go through an edit and imputation process. Some basic editing was done to correct for obvious errors in the dates of trips and glaring inconsistencies between odometer readings. The CVS data used is from the first eight weeks of the fourth quarter, 2002, for vehicles registered in the provinces of Ontario and New Brunswick, excluding buses. The data used was that before the edit and imputation step, but with the same basic editing as was done for the Fuel Pilot Survey.

Table 7. Global Response Rates

| Vehicle <br> Weight Type | Type of Response | Option |  |  |  |  |  |  |  |  |  | CVS |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | 1 |  | 2 |  | 3 |  | 4 |  | 5 |  |  |  |
|  |  | Freq. | \% | Freq. | \% | Freq. | \% | Freq. | \% | Freq. | \% | Freq. | \% |
| Light | Response | 178 | 32.5\% | 169 | 30.7\% | 222 | 40.7\% | 215 | 39.0\% | 155 | 28.8\% | 224 | 46.3\% |
|  | NonResp. | 369 | 67.5\% | 381 | 69.3\% | 323 | 59.3\% | 336 | 61.0\% | 383 | 71.2\% | 260 | 53.7\% |
|  | Total | 547 | 100.0\% | 550 | 100.0\% | 545 | 100.0\% | 551 | 100.0\% | 538 | 100.0\% | 484 | 100.0\% |
| Heavy | Response | 141 | 31.4\% | 150 | 33.6\% | 165 | 36.8\% | 170 | 38.1\% | 134 | 29.5\% | 84 | 40.6\% |
|  | NonResp. | 308 | 68.6\% | 296 | 66.4\% | 283 | 63.2\% | 276 | 61.9\% | 320 | 70.5\% | 123 | 59.4\% |
|  | Total | 449 | 100.0\% | 446 | 100.0\% | 448 | 100.0\% | 446 | 100.0\% | 454 | 100.0\% | 207 | 100.0\% |
| Total | Response | 319 | 32.0\% | 319 | 32.0\% | 387 | 39.0\% | 385 | 38.6\% | 289 | 29.1\% | 308 | 44.6\% |
|  | NonResp. | 677 | 68.0\% | 677 | 68.0\% | 606 | 61.0\% | 612 | 61.4\% | 703 | 70.9\% | 383 | 55.4\% |
|  | Total | 996 | 100.0\% | 996 | 100.0\% | 993 | 100.0\% | 997 | 100.0\% | 992 | 100.0\% | 691 | 100.0\% |

Figure 2. Light Vehicles: Response Rates to the Options


Note: Options for which the response rates are not significantly different according to the Chi-square Test are joined by a line. See Appendix E for more information.

Figure 2 has three lines indicating that three groups of options are found to be not significantly different from each other. The global response rates for Options 1,2 and 5 are not significantly different among light vehicles. The global response rates for Options 3 and 4 are also not significantly different among light vehicles. Lastly, the global response rates for Option 3 and the CVS are not significantly different among light vehicles.

Figure 3. Heavy Vehicles: Response Rates to the Options


Note: Options for which the response rates are not significantly different according to the Chi-square Test are joined by a line. See Appendix E for more information.

Figure 3 also has three lines indicating that three groups of options are found to be not significantly different from each other. The global response rates for Options 1, 2 and 5 are not significantly different among heavy vehicles, as for light vehicles. The global response rates for Options 1, 2 and 3 are also not significantly different among heavy vehicles. Lastly, the global response rates for Options 2, 3, 4 and the CVS are not significantly different among heavy vehicles.

The response rates for the Fuel Pilot Survey range from $29 \%$ to $39 \%$ compared with nearly $45 \%$ achieved for the current CVS. Noteworthy is that response rates to Options 1,2 and 5 are not significantly different from each other although Options 1 and 2 are the easiest logs to complete. For both heavy and light vehicles, the overall response rate to Option 5 is significantly different than for options 3 and 4 as well as the current CVS. Although Option 3 and 4 achieve higher response rates, it must be remembered that this is simply a response to at least one of the questionnaires, not to both. As seen in Section 5, only 20\% of the vehicle owners returned both a trip and a fuel $\log$ for Options 3 and 4.

Differences in response rates may be explained by the follow-up procedure for the current CVS which was also conducted for Options 3 and 4. No follow-up procedure was conducted for Options 1, 2 and 5 and so no responses were incited from among those who initially did not respond. A follow-up process could be instituted for these options as well in order to increase the response rates. A follow-up procedure similar to that for CVS, a postcard of odometer readings with perhaps total cost or quantity of fuel purchased each day (as is found on the current CVS $\log$ ), could be implemented for Option 5 and would likely increase the response rate.

In order to compare the response rates without the impact of the follow-up procedure used for the CVS and Options 3 and 4 of the pilot survey, the postcards and the short forms of the log were excluded and the global response rates calculated again. The results are found in Table 8, and illustrate the importance of the follow-up procedure on the CVS response rates. The impact on the response rates for Options 3 and 4 is less since fewer postcards and short forms had been received by April 16, 2003, when the analysis began. Receiving a postcard, short form or second $\log$ (as in the case of Options 3 and 4) is in itself a reminder that the first log has not been returned and may motivate the return of the first $\log$ in some cases.

Table 8. Global Response Rates Excluding Responses to the Postcards and Short Forms

| Vehicle <br> Weight <br> Type | Type of Response | Option |  |  |  |  |  |  |  |  |  | CVS |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | 1 |  | 2 |  | 3 |  | 4 |  | 5 |  |  |  |
|  |  | Freq. | \% | Freq. | \% | Freq. | \% | Freq. | \% | Freq. | \% | Freq. | \% |
| Light | Response | 178 | 32.5\% | 169 | 30.7\% | 191 | 35.0\% | 207 | 37.6\% | 155 | 28.8\% | 183 | 37.8\% |
|  | NonResp. | 369 | 67.5\% | 381 | 69.3\% | 354 | 65.0\% | 344 | 62.4\% | 383 | 71.2\% | 301 | 62.2\% |
|  | Total | 547 | 100.0\% | 550 | 100.0\% | 545 | 100.0\% | 551 | 100.0\% | 538 | 100.0\% | 484 | 100.0\% |
| Heavy | Response | 141 | 31.4\% | 150 | 33.6\% | 165 | 36.8\% | 170 | 38.1\% | 134 | 29.5\% | 73 | 35.3\% |
|  | NonResp. | 308 | 68.6\% | 296 | 66.4\% | 283 | 63.2\% | 276 | 61.9\% | 320 | 70.5\% | 134 | 64.7\% |
|  | Total | 449 | 100.0\% | 446 | 100.0\% | 448 | 100.0\% | 446 | 100.0\% | 454 | 100.0\% | 207 | 100.0\% |
| Total | Response | 319 | 32.0\% | 319 | 32.0\% | 356 | 35.9\% | 377 | 37.8\% | 289 | 29.1\% | 256 | 37.0\% |
|  | NonResp. | 677 | 68.0\% | 677 | 68.0\% | 637 | 64.1\% | 620 | 62.2\% | 703 | 70.9\% | 435 | 63.0\% |
|  | Total | 996 | 100.0\% | 996 | 100.0\% | 993 | 100.0\% | 997 | 100.0\% | 992 | 100.0\% | 691 | 100.0\% |

The global response rates to the first $\log$ sent were also calculated with the exclusions of the postcards and the short forms of the log. The results are found in Table 9. Once again, receiving a postcard, short form or a second $\log$ (as in the case of Options 3 and 4) is in itself a reminder that the first $\log$ has not been returned and may motivate the return of the first $\log$ in some cases.

Table 9. Global Response Rate to the First Log Sent, Excluding Responses to the Postcards and Short Forms

| Vehicle <br> Weight Type | Type of Response | Option |  |  |  |  |  |  |  |  |  | CVS |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | 1 <br> Fuell Log |  | $2$ <br> Fuel2 Log |  | $3$ <br> CVS-Trip |  | $4$ <br> Fuel1 Log |  | 5 - Trip \& Fuel1 Log |  |  |  |
|  |  | Freq. | \% | Freq. | \% | Freq. | \% | Freq. | \% | Freq. | \% | Freq. | \% |
| Light | Response | 178 | 32.5\% | 169 | 30.7\% | 169 | 31.0\% | 178 | 32.3\% | 155 | 28.8\% | 183 | 37.8\% |
|  | NonResp. | 369 | 67.5\% | 381 | 69.3\% | 376 | 69.0\% | 373 | 67.7\% | 383 | 71.2\% | 301 | 62.2\% |
|  | Total | 547 | 100.0\% | 550 | 100.0\% | 545 | 100.0\% | 551 | 100.0\% | 538 | 100.0\% | 484 | 100.0\% |
| Heavy | Response | 141 | 31.4\% | 150 | 33.6\% | 146 | 32.6\% | 158 | 35.4\% | 134 | 29.5\% | 73 | 35.3\% |
|  | NonResp. | 308 | 68.6\% | 296 | 66.4\% | 302 | 67.4\% | 288 | 64.6\% | 320 | 70.5\% | 134 | 64.7\% |
|  | Total | 449 | 100.0\% | 446 | 100.0\% | 448 | 100.0\% | 446 | 100.0\% | 454 | 100.0\% | 207 | 100.0\% |
| Total | Response | 319 | 32.0\% | 319 | 32.0\% | 315 | 31.7\% | 336 | 33.7\% | 289 | 29.1\% | 256 | 37.0\% |
|  | NonResp. | 677 | 68.0\% | 677 | 68.0\% | 678 | 68.3\% | 661 | 66.3\% | 703 | 70.9\% | 435 | 63.0\% |
|  | Total | 996 | 100.0\% | 996 | 100.0\% | 993 | 100.0\% | 997 | 100.0\% | 992 | 100.0\% | 691 | 100.0\% |

Significant potential for nonresponse bias is certainly a factor for an ongoing fuel consumption survey as demonstrated by the low response rates achieved in the pilot survey. Response rates lower than that of the CVS will have a negative impact on the CVS-Trip results if both surveys share at least part of the same sample. A larger sample size will only partially improve the estimates, but will not address the problem of nonresponse bias.

## Item Response Rates

Response rates to the general information questions and each element of the fuel purchases are presented and analyzed in detail in Appendix C.

In summary, the date, odometer reading and fuel type are well reported for the fuel purchases. The fuel gauge reading before the fuel purchase was better reported than the fuel gauge reading after, which is what indicates whether or not the purchase was a fill-up. The fill-up indicator had a significantly higher response rate than did the fuel gauge reading after the purchase among light vehicles. This is reasonable as indicating a fill-up is easier than determining and recording the gauge reading. The price and the amount purchased in dollars are less well reported among heavy vehicles.

In general, the items were well reported among all the options. Often Options 3 and 5 were found to have significantly different response rates among the heavy vehicles and to be lower. This is consistent with the added response burden of the trip and fuel portions at once in the combined $\log$ of Option 5 and the fatigue of the respondent when answering the fuel $\log$ after the trip $\log$ as in Option 3. Among light vehicles, the purchases information reported for Option 4 tended to be less well reported than for Option 3 despite the fact that the fuel $\log$ was the second $\log$ received in Option 3. For both vehicle types, item response rates for Options 1 and 2 are often not significantly different. When there is a difference, Option 2 tends to have the higher response rate.

## 7. Analysis of the Data Quality of the Logs

## Quality of the Fuel Data

At Question 6A of the CATI, respondents were asked whether or not they fill-up their vehicle's tank when purchasing fuel. Among those who also provided fuel purchase information on the log, a comparison was made to see if the reported purchases were consistent with the CATI response. Overall, $69 \%$ of those claiming to do fill-ups reported at least $80 \%$ of their reported purchases as being fill-ups. Of those claiming to do partial fills, $59 \%$ reported no fill-ups, but close to $23 \%$ reported at least $80 \%$ of their reported purchases as being fill-ups. When considering the number reporting 2 or more fill-ups, $71 \%$ of those claiming to do fill-ups reported 2 or more fill-ups and $30 \%$ of those claiming to do partial fills did report 2 or more fill-ups.

For Option 5, if a fuel purchase was made during a trip, it was noted in the trip portion of the log and the details of the fuel purchase were to be reported in the fuel portion. It is interesting to note whether or not fuel purchases noted in the trip portion of the combined log of option 5 were recorded in the fuel portion and whether fuel purchases made during the 7 days of trip recording were indicated in the trip portion. In matching fuel purchases recorded on the two parts of the log, it was found that the majority are recorded in both parts of the log.

In order to calculate the fuel consumption and cost, the following variables from the fuel purchase information are needed: the odometer reading, fuel type, two of price or amount or quantity and quantity type, and the gauge reading/fill-up indicator after the purchase. Thus fuel purchase was termed complete if these variables were reported. An analysis of whether or not complete information was provided is found in Appendix D in the section Quality of the Fuel Data. It is noted that fuel purchases made later (fuel purchases 4 and 5) are more likely to have some missing information. Overall, $70 \%$ to $80 \%$ of fuel purchases are complete as seen in Table D.1. The more complete the information provided, the less imputation will need to be done for item nonresponse.

Table D. 2 in Appendix D highlights that $64 \%$ to $74 \%$ of fuel purchases are reported as fill-ups. It does not appear that people make fill-ups in order to send back the fuel log earlier (after 2 fill-ups as requested on the Fuel1 Log).

Fuel consumption without modeling can be calculated when two fill-ups are reported. The greater number of vehicles reporting two fill-ups, the better the quality of the fuel consumption estimates. From Table D. 5 in Appendix D, fuel consumption could be calculated directly for fewer than $70 \%(49 \%$ to $68 \%)$ of the light vehicles reporting fuel purchases and fewer than $80 \%(57 \%$ to $79 \%$ ) of the heavy vehicles reporting fuel purchases. For light vehicles, Option 5 has the fewest vehicles with two or more fill-ups. This is likely related to the fewer purchases reported by light vehicles in Option 5, perhaps as they mail back the $\log$ as soon as the 7 -day trip portion is completed. Adjustments to the $\log$ can be considered so as to help correct this problem.

The quality of the fuel data will be negatively affected by low response rates. The consideration of the data reported for the Fuel Pilot Survey does not show that any great differences among the options

## Quality of the Trip Data

It is desired to maintain the quality of the CVS-Trip data. A decrease in the response rate will affect the quality of the estimates and introduce a greater potential for biased estimates. The amount and type of data reported may also be affected by the addition of the CVS-Fuel. In order to compare the reported trip data of Options 3,4 and 5 with the reported trip data of the current CVS, a crude comparison of the provided data was performed to give an idea of the effect of the fuel component on the quality of the trip data reported.

The Fuel Pilot Survey data was that which was received and captured on or before April 16, 2003 and did not go through an edit and imputation process. Some basic editing was done to correct for obvious errors in the dates of trips and glaring inconsistencies between odometer readings. Only those vehicles for which information was provided were included for each analysis. The CVS data used is that for the first 8 weeks of quarter 4, 2002, for vehicles registered in the provinces of Ontario and New Brunswick, excluding buses and that has not gone through the edit and imputation process. The basic editing performed for the Fuel Pilot Survey was also done for the CVS data. When the number of days accounted for was available, the values were prorated so as to represent 7 days of reporting.

The details of the analysis are found in Appendix D in the Section Quality of the Trip Quality.
There was concern that vehicle owners would report that the vehicle was not in use more often due to respondent fatigue in Options 4 and 5, yet the average number of days not in use is not significantly different from that of the CVS in the case of each of Options 3, 4 and 5. Similarly, a decrease in the number of trips was a concern; however, the average number of trips reported was not significantly different from the CVS except for Option 5 which reported the greatest number of trips. Furthermore, the average distance traveled did not vary significantly among the options and the CVS.

The data reported for the fuel question of the trip $\log$ (not on the combined $\log$ of Option 5) for Options 3 and 4 CVS-Trip logs was compared to that of the CVS. In the case of light vehicles, the highest average cost was reported for Option 4 and was significantly different from the CVS. For heavy vehicles, the highest average quantity reported was for Option 3 and was significantly different from the CVS.

Although the data reported does not seem to be affected, response rates lower than those for the current CVS will result in lower quality of the estimates from the addition of the CVS-Fuel component. Although the sample sizes can be increased, this will not compensate for the bias of the estimates.

## 8. Comparison of the Options

Issues such as timeliness, response rates, data quality and costs are compared in the following table.

Table 10. Comparison of the Pilot Survey Options

|  | Option 1 | Option 2 | Option 3 | Option 4 | Option 5 |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Description | Fuell Log for the same period as CVS with different samples | Fuel2 Log for the same period as CVS with different samples | Vehicle owners first receive the CVS trip log and then the Fuel1 $\log$ | Vehicle owners first receive the Fuel1 log and then the CVS log | Combined trip and fuel log for the first week. Then fuel continues to be reported until two fill-ups or 5 purchases are made or another 3 weeks have passed |
| Operational pros and cons | - Simple mail out | - Simple mail out | - Mail out is very complicated ${ }^{2}$ | - Mail out is very complicated $^{2}$ | - Simple mail out |
| Return Rates (Returns as of April 18, 2003) | - Return rate of $36 \%$, comparable to that of Option 2 | - Return rate of $38 \%$, comparable to that of Option 1 | - Return rate of $42 \%$ for the trip ( $\left.1^{\text {st }}\right) \log$ which is comparable to CVS rates <br> - The fuel $\log$ had a return rate of $30 \%$ which is less than for Options 1 and 2 <br> - Only $20 \%$ return both the trip and fuel logs | - Return rate of $40 \%$ for the fuel $\log$ which is somewhat greater than Options 1 and 2, perhaps due to receiving a second $\log$ and then the follow-up process <br> - The trip $\log$ had a return rate of $35 \%$ which is less than CVS rates <br> - Only $20 \%$ return both the trip and fuel logs | - Return rate of $33 \%$ which is comparable to Options 1 and 2 which also did not have a follow-up procedure in the pilot survey <br> - This is less than CVS rates, but could be increased with a followup procedure similar to that used by CVS. |

[^2]|  | Option 1 | Option 2 | Option 3 | Option 4 | Option 5 |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Response <br> Rates | - Response rate of $32 \%$, but no follow-up done as in CVS | - Response rate of $32 \%$, but no follow-up done as in CVS | - Response rate of $39 \%$ which is not significantly different from that observed by CVS, yet this rate does not indicate that both logs were responded to | - Response rate of $39 \%$ which is not significantly different from that observed by CVS, yet this rate does not indicate that both logs were responded to | - Response rate of $29 \%$ which is not significantly different from Options 1 and 2 according to tests of statistical hypotheses, but is from CVS rates. <br> - The response rate could be increased by an appropriate follow-up, similar to that in the CVS. |
| Quality of the Fuel Data | - Fuel purchases reported with complete information less often than Option 2 | - Fuel purchases reported with complete information more often than Option 1 | - The type of data provided does not seem to be negatively impacted by receiving the fuel log after the trip $\log$ <br> - The lower response rate to the Fuel $\log$ as the second log would mean a higher risk of nonresponse bias | - Fuel data seems of good quality compared to the other options | - Fewer light vehicles reporting 2 or more fillups than for other options |


|  | Option 1 | Option 2 | Option 3 | Option 4 | Option 5 |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Quality of the Trip Data | - Trip data would not be affected as the samples would be different. | - Trip data would not be affected as the samples would be different. | - Basic trip data reported does not seem to differ much from the CVS reported data | - Basic trip data reported does not seem to differ much from the CVS reported data, <br> - The lower response rate to the Trip $\log$ as the second log would mean a higher risk of nonresponse bias | - Basic trip data reported does not seem to differ much from the CVS reported data |
| Timeliness ${ }^{3}$ pros and cons | - Fuel estimates could be released 5 months after the quarter | - Fuel estimates could be released 5 months after the quarter | - CVS trip estimates could be released 5 months after the quarter, as currently <br> - But fuel estimates delayed - released 8 months after the quarter | - Fuel estimates could be released 6 months after the quarter <br> - But CVS trip estimates would be delayed released 8 months after the quarter | - Fuel and CVS estimates could be released 6 months after the quarter <br> - Thus CVS estimates are slightly delayed |
| Comparability between trip and fuel data | - Separate trip and fuel samples so comparability between driving patterns and fuel consumption only on a population level | - Separate trip and fuel samples so comparability between driving patterns and fuel consumption only on a population level | - Trip and fuel data collected for the same vehicles but in different quarters (11weeks from the mailing of the trip $\log$ until the mailing of the fuel log) so some comparability | - Trip and fuel data collected for the same vehicles but in different quarters (10weeks from the mailing of the fuel $\log$ until the mailing of the trip log and another 7 weeks until the final mailing of the postcard or short form) so some comparability | - Fuel and trip estimates cover the same period for the same vehicles and so excellent comparability between driving patterns and fuel consumption can be made |
| Cost (detailed costs are provided in Section 10) | - Separate trip and fuel samples so increased costs, especially as many more units to be contacted for the CATI | - Separate trip and fuel samples so increased costs, especially as many more units to be contacted for the CATI | - Same sample for the trip and fuel logs and so less expensive then Options 1 and 2 | - Same sample for the trip and fuel logs and so less expensive then Options 1 and 2 | - Same sample for the trip and fuel logs and only one $\log$ is mailed out so the cheapest option |


|  | Option 1 | Option 2 | Option 3 | Option 4 | Option 5 |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Overall Pros | - No impact on trip data | - No impact on trip data | - Fuel and trip data for the same sample and so the increase in costs is less than for Options 1 and 2 | - Fuel and trip data for the same sample and so the increase in costs is less than for Options 1 and 2 | - Fuel and trip data from the same sample during the same period; thus excellent comparability <br> - Increase in costs compared to the CVS costs, but least expensive option providing both trip and fuel estimates each year <br> - Possibility to improve the response rates with an appropriate follow-up procedure |
| Overall Cons | - Costs are higher than for Options 3, 4 and 5 as there are 2 samples to be contacted <br> - Fuel and trip data for separate samples and so comparability at the population level only | - Costs are higher than for Options 3, 4 and 5 as there are 2 samples to be contacted <br> - Fuel and trip data for separate samples and so comparability at the population level only | - Fuel and trip data for the same sample, but different time periods and so limited comparability <br> - Costs are somewhat higher than for Option 5 due to mailing the logs separately <br> - Lower response rate to the Fuel $\log$ due to response burden of 2 logs <br> - Timeliness of fuel estimates poor | - Fuel and trip data for the same sample, but different time periods and so limited comparability <br> - Costs are somewhat higher than for Option 5 due to mailing the logs separately <br> - Lower response rate to the trip due to response burden of 2 logs <br> - Timeliness of trip estimates poor | - Lower response rate, but this could be increased by an appropriate follow-up procedure <br> - Trip estimates available one month later |

## 9. Sample Sizes

The tables of expected C.V.'s are to be used as a guide in determining the sample size necessary to meet the users' needs, taking into consideration the quality of the estimates that will be produced and the costs involved. A larger sample, for example, will permit the publication of estimates of higher quality for smaller portions of the population (e.g. station wagons, trucks weighing 15 t and over in Prince Edward Island), but may not be feasible in terms of the expected budget. Large samples selected from small population groups also result in a higher response burden and therefore declining response rates over time. Lower response rates due to a higher response burden can have a negative impact on the quality of the estimates.

When estimates for only part of the population are desired, such as for the province of Prince Edward Island or for vehicles of a certain body type, a larger sample will be required so that an adequate number of units in the group of interest are sampled. To assist in determining the required sample size for producing estimates for portions of the population, some examples of domains are given: the largest and smallest provinces, Ontario and PEI, and some examples of vehicle types.

The C.V.'s provided are not associated with estimates from the Fuel Pilot Survey. The statistical methods used to calculate the expected C.V.'s do not guarantee the quality of a single estimate. On average, however, three out of four estimates should be of the determined quality or better as long as the assumptions are met for the required sample sizes shown in the tables. For an in depth description of the methodology of the calculation of the expected C.V.'s, refer to Appendix F.

Tables are provided separately for Options 1,2 and 5 and C.V.'s are given for each of the three vehicle types as follows:
$>$ Light vehicles weighing less than 4.5 t
$>$ Trucks weighing 4.5 t to under 15 t
$>$ Trucks weighing 15 t and over
Note that buses were not included in the Pilot Survey and are not covered by the sample sizes in the following tables.

Tables are not provided for Options 3 and 4 at this time due to the disadvantages of these options, such as lack of timeliness, complex mail out and increased response burden with poor response to the second $\log$ sent, which make them less desirable options for ongoing CVS-Trip and CVS-Fuel surveys. Tables for these options can be prepared upon request.

Table 11. Option 1: Expected C.V.' s for Various Sample Sizes


Table 11 (cont.). Option 1: Expected C.V.' s for Various Sample Sizes

| Domain |  | Period | Estimate | Approximate C.V.'s (\%) for Sample Sizes |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | 10,000 |  | 12,500 | 15,000 | 17,500 | 20,000 |
|  | Canada |  | annual | vehicle-km | 4.2 | 3.7 | 3.4 | 3.1 | 2.9 |
|  |  | fuel |  | 5.9 | 5.2 | 4.8 | 4.4 | 4.1 |
|  |  | quarterly | vehicle-km | 8.3 | 7.4 | 6.8 | 6.3 | 5.9 |
|  |  |  | fuel | 11.7 | 10.5 | 9.6 | 8.9 | 8.3 |
|  | Ontario | annual | vehicle-km | 9.9 | 8.8 | 8.1 | 7.5 | 7.0 |
|  |  |  | fuel | 14.0 | 12.5 | 11.4 | 10.6 | 9.9 |
|  |  | quarterly | vehicle-km | 19.8 | 17.7 | 16.1 | 14.9 | 14.0 |
|  |  |  | fuel | 27.9 | 25.0 | 22.8 | 21.1 | 19.7 |
|  | P.E.I. | annual | vehicle-km | 18.0 | 16.1 | 14.7 | 13.6 | 12.8 |
|  |  |  | fuel | 25.5 | 22.8 | 20.8 | 19.3 | 18.0 |
|  |  | quarterly | vehicle-km | 36.1 | 32.3 | 29.5 | 27.3 | 25.5 |
|  |  |  | fuel | 50.9 | 45.6 | 41.6 | 38.5 | 36.0 |
|  | Straight Trucks (35\% of vehicles weighing 15 t and over) | annual | vehicle-km | 7.0 | 6.3 | 5.7 | 5.3 | 5.0 |
|  |  |  | fuel | 9.9 | 8.9 | 8.1 | 7.5 | 7.0 |
|  |  | quarterly | vehicle-km | 14.0 | 12.6 | 11.5 | 10.6 | 9.9 |
|  |  |  | fuel | 19.8 | 17.7 | 16.2 | 15.0 | 14.0 |

From the above table, we note that to achieve a C.V. of $5 \%$ or less for fuel estimates at the national level for each vehicle weight type a sample size of 12,500 to 15,000 is needed. However the foreseen budget may not be able to cover the cost of this sample size in addition to the CVSTrip sample size of at least 20,000 .

Table 12. Option 2: Expected C.V.' s for Various Sample Sizes


Table 12 (cont.). Option 2: Expected C.V.' s for Various Sample Sizes

| Domain |  | Period | Estimate | Approximate C.V.'s (\%) for Sample Sizes |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | 10,000 |  | 12,500 | 15,000 | 17,500 | 20,000 |
|  | Canada |  | annual | vehicle-km | 4.2 | 3.7 | 3.4 | 3.1 | 4.2 |
|  |  | fuel |  | 5.4 | 4.9 | 4.4 | 4.1 | 5.4 |
|  |  | quarterly | vehicle-km | 8.3 | 7.4 | 6.8 | 6.3 | 8.3 |
|  |  |  | fuel | 10.9 | 9.7 | 8.9 | 8.2 | 10.9 |
|  | Ontario | annual | vehicle-km | 9.9 | 8.8 | 8.1 | 7.5 | 9.9 |
|  |  |  | fuel | 12.9 | 11.6 | 10.6 | 9.8 | 12.9 |
|  |  | quarterly | vehicle-km | 19.8 | 17.7 | 16.1 | 14.9 | 19.8 |
|  |  |  | fuel | 25.9 | 23.1 | 21.1 | 19.5 | 25.9 |
|  | P.E.I. | annual | vehicle-km | 18.0 | 16.1 | 14.7 | 13.6 | 18.0 |
|  |  |  | fuel | 23.6 | 21.1 | 19.3 | 17.8 | 23.6 |
|  |  | quarterly | vehicle-km | 36.1 | 32.3 | 29.5 | 27.3 | 36.1 |
|  |  |  | fuel | 47.2 | 42.2 | 38.5 | 35.7 | 47.2 |
|  | Straight Trucks (35\% of vehicles weighing 15 t and over) | annual | vehicle-km | 7.0 | 6.3 | 5.7 | 5.3 | 7.0 |
|  |  |  | fuel | 9.2 | 8.2 | 7.5 | 6.9 | 9.2 |
|  |  | quarterly | vehicle-km | 14.0 | 12.6 | 11.5 | 10.6 | 14.0 |
|  |  |  | fuel | 18.4 | 16.4 | 15.0 | 13.9 | 18.4 |

From the above table, we note that to achieve a C.V. of $5 \%$ or less for fuel estimates at the national level for each vehicle weight type a sample size of 10,000 to 12,500 is needed. However, as mentioned for Option 1, the foreseen budget may not be able to cover the cost of this sample size in addition to the CVS-Trip sample size of at least 20,000 .

Table 13. Option 5: Expected C.V.' s for Various Sample Sizes

| Domain |  | Period | Estimate | Approximate C.V.'s (\%) for Sample Sizes |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | 20,000 |  | 25,000 | 30,000 | 35,000 |
|  | Canada |  | annual | vehicle-km | 2.2 | 2.0 | 1.8 | 1.7 |
|  |  | passenger-km |  | 2.6 | 2.3 | 2.1 | 1.9 |
|  |  | fuel |  | 3.6 | 3.2 | 3.0 | 2.7 |
|  |  | quarterly | vehicle-km | 4.4 | 4.0 | 3.6 | 3.3 |
|  |  |  | passenger-km | 5.1 | 4.6 | 4.2 | 3.9 |
|  |  |  | fuel | 7.3 | 6.5 | 5.9 | 5.5 |
|  | Ontario | annual | vehicle-km | 5.2 | 4.7 | 4.3 | 4.0 |
|  |  |  | passenger-km | 6.1 | 5.4 | 5.0 | 4.6 |
|  |  |  | fuel | 8.6 | 7.7 | 7.0 | 6.5 |
|  |  | quarterly | vehicle-km | 10.5 | 9.4 | 8.5 | 7.9 |
|  |  |  | passenger-km | 12.1 | 10.9 | 9.9 | 9.2 |
|  |  |  | fuel | 17.2 | 15.4 | 14.0 | 13.0 |
|  | P.E.I. | annual | vehicle-km | 11.0 | 9.8 | 9.0 | 8.3 |
|  |  |  | passenger-km | 12.8 | 11.4 | 10.4 | 9.7 |
|  |  |  | fuel | 18.1 | 16.2 | 14.7 | 13.7 |
|  |  | quarterly | vehicle-km | 22.0 | 19.7 | 18.0 | 16.6 |
|  |  |  | passenger-km | 25.5 | 22.9 | 20.9 | 19.3 |
|  |  |  | fuel | 36.1 | 32.3 | 29.5 | 27.3 |
|  | Cars <br> (57\% of vehicles weighing less than 4.5t) | annual | vehicle-km | 2.9 | 2.6 | 2.4 | 2.2 |
|  |  |  | passenger-km | 3.4 | 3.0 | 2.8 | 2.6 |
|  |  |  | fuel | 4.8 | 4.3 | 3.9 | 3.6 |
|  |  | quarterly | vehicle-km | 5.6 | 5.0 | 4.5 | 4.2 |
|  |  |  | passenger-km | 6.5 | 5.8 | 5.3 | 4.9 |
|  |  |  | fuel | 9.1 | 8.2 | 7.5 | 6.9 |
|  | Station Wagons ( $2.6 \%$ of vehicles weighing less than 4.5t) | annual | vehicle-km | 13.7 | 12.3 | 11.2 | 10.4 |
|  |  |  | passenger-km | 15.9 | 14.2 | 13.0 | 12.0 |
|  |  |  | fuel | 22.5 | 20.1 | 18.4 | 17.0 |
|  |  | quarterly | vehicle-km | 28.5 | 25.5 | 23.3 | 21.6 |
|  |  |  | passenger-km | 33.1 | 29.6 | 27.1 | 25.1 |
|  |  |  | fuel | 46.9 | 41.9 | 38.3 | 35.4 |
|  | Canada | annual | vehicle-km | 4.6 | 4.1 | 3.8 | 3.5 |
|  |  |  | passenger-km | 5.2 | 4.7 | 4.3 | 4.0 |
|  |  |  | fuel | 6.1 | 5.4 | 5.0 | 4.6 |
|  |  | quarterly | vehicle-km | 9.2 | 8.3 | 7.5 | 7.0 |
|  |  |  | passenger-km | 10.5 | 9.4 | 8.6 | 7.9 |
|  |  |  | fuel | 12.2 | 10.9 | 9.9 | 9.2 |
|  | Ontario | annual | vehicle-km | 12.1 | 10.8 | 9.9 | 9.1 |
|  |  |  | passenger-km | 13.7 | 12.3 | 11.2 | 10.4 |
|  |  |  | fuel | 15.9 | 14.3 | 13.0 | 12.1 |
|  |  | quarterly | vehicle-km | 24.2 | 21.6 | 19.8 | 18.3 |
|  |  |  | passenger-km | 27.4 | 24.5 | 22.4 | 20.7 |
|  |  |  | fuel | 31.9 | 28.5 | 26.0 | 24.1 |

Table 13 (cont.). Option 5: Expected C.V.' s for Various Sample Sizes

| Domain |  | Period | Estimate | Approximate C.V.'s (\%) for Sample Sizes |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | 20,000 |  | 25,000 | 30,000 | 35,000 |
| $\stackrel{\text { tr }}{\sim}$ | P.E.I. |  | annual | vehicle-km | 22.5 | 20.1 | 18.3 | 17.0 |
| ¢ |  | passenger-km |  | 25.5 | 22.8 | 20.8 | 19.3 |
| 읃 |  | fuel |  | 29.6 | 26.5 | 24.2 | 22.4 |
| 0 |  | quarterly | vehicle-km | 44.9 | 40.2 | 36.7 | 34.0 |
| 莫 |  |  | passenger-km | 51.0 | 45.6 | 41.6 | 38.5 |
| $\stackrel{\odot}{*}$ |  |  | fuel | 59.2 | 53.0 | 48.4 | 44.8 |
| . | Pickups (27\% of vehicles weighing 4.5 to under 15 t ) | annual | vehicle-km | 8.9 | 8.0 | 7.3 | 6.7 |
| - |  |  | passenger-km | 10.1 | 9.0 | 8.2 | 7.6 |
| 3 |  |  | fuel | 11.7 | 10.5 | 9.6 | 8.9 |
| $\stackrel{\text { ® }}{0}$ |  | quarterly | vehicle-km | 17.8 | 15.9 | 14.5 | 13.4 |
| - |  |  | passenger-km | 20.2 | 18.0 | 16.5 | 15.2 |
|  |  |  | fuel | 23.4 | 21.0 | 19.1 | 17.7 |
|  | Canada | annual | vehicle-km | 5.1 | 4.6 | 4.2 | 3.8 |
|  |  |  | passenger-km | 5.9 | 5.3 | 4.8 | 4.4 |
|  |  |  | fuel | 6.5 | 5.8 | 5.3 | 4.9 |
|  |  | quarterly | vehicle-km | 10.2 | 9.1 | 8.3 | 7.7 |
|  |  |  | passenger-km | 11.8 | 10.5 | 9.6 | 8.9 |
|  |  |  | fuel | 13.1 | 11.7 | 10.7 | 9.9 |
|  | Ontario | annual | vehicle-km | 12.1 | 10.8 | 9.9 | 9.2 |
|  |  |  | passenger-km | 14.0 | 12.5 | 11.4 | 10.6 |
|  |  |  | fuel | 15.5 | 13.9 | 12.7 | 11.7 |
|  |  | quarterly | vehicle-km | 24.2 | 21.7 | 19.8 | 18.3 |
|  |  |  | passenger-km | 28.0 | 25.0 | 22.8 | 21.1 |
|  |  |  | fuel | 31.1 | 27.8 | 25.4 | 23.5 |
|  | P.E.I. | annual | vehicle-km | 22.1 | 19.8 | 18.0 | 16.7 |
|  |  |  | passenger-km | 25.5 | 22.8 | 20.8 | 19.3 |
|  |  |  | fuel | 28.3 | 25.3 | 23.1 | 21.4 |
|  |  | quarterly | vehicle-km | 44.2 | 39.5 | 36.1 | 33.4 |
|  |  |  | passenger-km | 51.0 | 45.7 | 41.7 | 38.6 |
|  |  |  | fuel | 56.7 | 50.7 | 46.3 | 42.8 |
|  | Straight Trucks (35\% of vehicles weighing 15 t and over) | annual | vehicle-km | 8.6 | 7.7 | 7.0 | 6.5 |
|  |  |  | passenger-km | 9.9 | 8.9 | 8.1 | 7.5 |
|  |  |  | fuel | 11.0 | 9.9 | 9.0 | 8.3 |
|  |  | quarterly | vehicle-km | 17.2 | 15.4 | 14.0 | 13.0 |
|  |  |  | passenger-km | 19.9 | 17.8 | 16.2 | 15.0 |
|  |  |  | fuel | 22.1 | 19.7 | 18.0 | 16.7 |

From the above table, we note we note that to achieve a C.V. of $5 \%$ or less for fuel estimates at the national level for each vehicle weight type a sample size of 30,000 to 35,000 is needed. The foreseen budget may not be able to cover the cost of this sample size. A sample size of 25,000 is expected to provide fuel estimates with a C.V of $5 \%$ at the national level for light vehicles and $6 \%$ for heavy vehicles. With the implementation of a follow-up procedure, the response rates would be increased and a smaller sample size would be required.

## 10. Costs

The following tables present cost estimates for all options by selected sample sizes.
Table 14 includes cost estimates for options 1 and 2 in addition to the current CVS cost.
Table 15 presents cost estimates for options 1 and 2 if conducted in alternate years with the current CVS. Increase in cost of Options 1 and 2 in alternate years scenario is due to CVS unit staff who must be retained from year to year.

Table 16 includes cost estimates for option 3, 4 and 5. These estimates include the CVS with a sample size of 20,000 .

Table 14. Annual Costs for Options 1 and 2 in Addition to CVS Costs

| Sample Size | Options |  | CVS |
| :---: | :---: | :---: | :---: |
|  | 1 | 2 |  |
| 10,000 | $\$ 0.70 \mathrm{M}$ | $\$ 0.70 \mathrm{M}$ |  |
| 12,500 | $\$ 0.79 \mathrm{M}$ | $\$ 0.79 \mathrm{M}$ |  |
| 15,000 | $\$ 0.87 \mathrm{M}$ | $\$ 0.87 \mathrm{M}$ |  |
| 17,500 | $\$ 0.96 \mathrm{M}$ | $\$ 0.96 \mathrm{M}$ |  |
| 20,000 | $\$ 1.05 \mathrm{M}$ | $\$ 1.05 \mathrm{M}$ | $\$ 1.16 \mathrm{M}$ |

Table 15 Costs for Options 1 and 2 When Conducted in Alternate Years With CVS

| Sample Size | Options |  |
| :---: | :---: | :---: |
| Alternate years | 1 | 2 |
| 10,000 | $\$ 0.90 \mathrm{M}$ | $\$ 0.90 \mathrm{M}$ |
| 12,500 | $\$ 0.99 \mathrm{M}$ | $\$ 0.99 \mathrm{M}$ |
| 15,000 | $\$ 1.08 \mathrm{M}$ | $\$ 1.08 \mathrm{M}$ |
| 17,500 | $\$ 1.17 \mathrm{M}$ | $\$ 1.17 \mathrm{M}$ |
| 20,000 | $\$ 1.26 \mathrm{M}$ | $\$ 1.26 \mathrm{M}$ |

Table 16. Costs for Options 3, 4 and 5
Prices include CVS with a sample of at least 20,000

| Sample Size | Options |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
|  | 3 | 4 | 5 |  |
| 20,000 | $\$ 1.48 \mathrm{M}$ | $\$ 1.48 \mathrm{M}$ | $\$ 1.44 \mathrm{M}$ |  |
| 25,000 | $\$ 1.68 \mathrm{M}$ | $\$ 1.68 \mathrm{M}$ | $\$ 1.64 \mathrm{M}$ |  |
| 30,000 | $\$ 1.88 \mathrm{M}$ | $\$ 1.88 \mathrm{M}$ | $\$ 1.83 \mathrm{M}$ |  |
| 35,000 | $\$ 2.08 \mathrm{M}$ | $\$ 2.08 \mathrm{M}$ | $\$ 2.03 \mathrm{M}$ |  |

## Notes:

1. The fuel survey with a sample of 20,000 respondents when conducted in alternate years with CVS costs more than the CVS survey because the fuel survey will require additional methodology and systems resources for the first few years.

## 11. Conclusion

In summary, all $\log$ options yielded relatively similar return rates ranging between $32 \%$ to $42 \%$. Although options 3 and 4 recorded higher return rates for the first log, this decreased significantly when coupled with the second $\log$, resulting in a return rate of $20 \%$ for both logs.

In terms of overall response rates, options 3 and 4 recorded higher response rates at $39 \%$ compared to $32 \%$ for Options 1 and 2 and $29 \%$ for Option 5. This higher response is partly due to the significance of follow-up procedures including postcards and short forms. No major differences among the options were noted as to response rates to fuel $\log$ questions and fuel purchase items.

Operationally Options 3 and 4 are very demanding while Options 1, 2 and 5 are more straight forward. Managing the follow-up procedures for the CVS $\log$ and the numerous mail outs is complex and burdensome. As well, it takes a long time for the cycle to be completed and so timeliness of the results is jeopardized. Options 1,2 and 5 can be released between 5 and 6 months after the reference quarter, while Options 3 and 4 can be released as much as 8 months after the reference quarter.

In terms of data comparability, Option 5 yields the only direct comparability between trips and fuel purchase for the same vehicle for the same time period.

We would recommend Option 5 (including the best aspects of the Fuel1 and Fuel2 logs for the fuel portion of the $\log$ ) as the most feasible option both from an operational and financial standpoint. Obtaining trip and fuel information from the same sample at the same time reduces costs and is more manageable. As well, this feature makes Option 5 very rich in data as the fuel information can be directly linked to trip data, thus vehicle use characteristics. Response rates for Option 5 are lower but can be boosted by adding follow-up procedures such as postcards and short forms similar to the current CVS. Despite the added response burden, basic comparison of reported trip data shows no major differences to that reported in the CVS.

## Appendix A: CATI Results

Table A. 1. Response Rates for CATI Questions by Vehicle Type for the $\mathbf{2 , 8 5 8}$ Full and Partial Respondents (1,666 Light, 1,192 Heavy)

| Question |  | Vehicle Type | Response |  | Refusal |  | Don't Know |  | Not Applicable |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Freq. | Percent | Freq. | Percent | Freq. | Percent | Freq. | Percent |
| Q2 | Able to answer questions |  | Light | 1628 | 97.7\% | 38 | 2.3\% | 0 | 0.0\% | 0 | 0.0\% |
|  |  | Heavy | 1151 | 96.6\% | 41 | 3.4\% | 0 | 0.0\% | 0 | 0.0\% |
|  |  | Total | 2779 | 97.2\% | 79 | 2.8\% | 0 | 0.0\% | 0 | 0.0\% |
| Q3 | Still has the vehicle | Light | 1595 | 95.7\% | 38 | 2.3\% | 0 | 0.0\% | 33 | 2.0\% |
|  |  | Heavy | 1130 | 94.8\% | 41 | 3.4\% | 0 | 0.0\% | 21 | 1.8\% |
|  |  | Total | 2725 | 95.3\% | 79 | 2.8\% | 0 | 0.0\% | 54 | 1.9\% |
| ID | VIN | Light | 115 | 6.9\% | 39 | 2.3\% | 0 | 0.0\% | 1512 | 90.8\% |
|  |  | Heavy | 710 | 59.6\% | 41 | 3.4\% | 8 | 0.7\% | 433 | 36.3\% |
|  |  | Total | 825 | 28.9\% | 80 | 2.8\% | 8 | 0.3\% | 1945 | 68.1\% |
| Q4 | Reason does not have vehicle | Light | 5 | 0.3\% | 38 | 2.3\% | 0 | 0.0\% | 1623 | 97.4\% |
|  |  | Heavy | 14 | 1.2\% | 41 | 3.4\% | 0 | 0.0\% | 1137 | 95.4\% |
|  |  | Total | 19 | 0.7\% | 79 | 2.8\% | 0 | 0.0\% | 2760 | 96.6\% |
| Q5 | Vehicle type | Light | 1577 | 94.7\% | 38 | 2.3\% | 3 | 0.2\% | 48 | 2.9\% |
|  |  | Heavy | 1129 | 94.7\% | 41 | 3.4\% | 2 | 0.2\% | 20 | 1.7\% |
|  |  | Total | 2706 | 94.7\% | 79 | 2.8\% | 5 | 0.2\% | 68 | 2.4\% |
| Q5B | Vehicle type other | Light | 11 | 0.7\% | 38 | 2.3\% | 3 | 0.2\% | 1614 | 96.9\% |
|  |  | Heavy | 143 | 12.0\% | 41 | 3.4\% | 2 | 0.2\% | 1006 | 84.4\% |
|  |  | Total | 154 | 5.4\% | 79 | 2.8\% | 5 | 0.2\% | 2620 | 91.7\% |
| Q6 | Fuel type | Light | 1574 | 94.5\% | 38 | 2.3\% | 6 | 0.4\% | 48 | 2.9\% |
|  |  | Heavy | 1113 | 93.4\% | 41 | 3.4\% | 5 | 0.4\% | 33 | 2.8\% |
|  |  | Total | 2687 | 94.0\% | 79 | 2.8\% | 11 | 0.4\% | 81 | 2.8\% |
| Q6A | Partial fill or fill-up | Light | 1561 | 93.7\% | 38 | 2.3\% | 19 | 1.1\% | 48 | 2.9\% |
|  |  | Heavy | 1104 | 92.6\% | 41 | 3.4\% | 14 | 1.2\% | 33 | 2.8\% |
|  |  | Total | 2665 | 93.2\% | 79 | 2.8\% | 33 | 1.2\% | 81 | 2.8\% |
| Q7 | Distance driven last week | Light | 1385 | 83.1\% | 38 | 2.3\% | 195 | 11.7\% | 48 | 2.9\% |
|  |  | Heavy | 970 | 81.4\% | 46 | 3.9\% | 143 | 12.0\% | 33 | 2.8\% |
|  |  | Total | 2355 | 82.4\% | 84 | 2.9\% | 338 | 11.8\% | 81 | 2.8\% |
| Q7B | Typical distance | Light | 1381 | 82.9\% | 38 | 2.3\% | 4 | 0.2\% | 243 | 14.6\% |
|  |  | Heavy | 967 | 81.1\% | 41 | 3.4\% | 3 | 0.3\% | 181 | 15.2\% |
|  |  | Total | 2348 | 82.2\% | 79 | 2.8\% | 7 | 0.2\% | 424 | 14.8\% |
| Q7C | (Light) Used for commuting | Light | 1384 | 83.1\% | 38 | 2.3\% | 1 | 0.1\% | 243 | 14.6\% |
|  |  | Heavy | 0 | 0.0\% | 0 | 0.0\% | 0 | 0.0\% | 1192 | 100.0\% |
|  |  | Total | 1384 | 48.4\% | 38 | 1.3\% | 1 | 0.0\% | 1435 | 50.2\% |
| Q7D | (Light) <br> Trips over 100 km | Light | 1376 | 82.6\% | 38 | 2.3\% | 9 | 0.5\% | 243 | 14.6\% |
|  |  | Heavy | 0 | 0.0\% | 0 | 0.0\% | 0 | 0.0\% | 1192 | 100.0\% |
|  |  | Total | 1376 | 48.1\% | 38 | 1.3\% | 9 | 0.3\% | 1435 | 50.2\% |
| Q7E | (Heavy) <br> City vs. long dist. | Light | 0 | 0.0\% | 0 | 0.0\% | 0 | 0.0\% | 1666 | 100.0\% |
|  |  | Heavy | 954 | 80.0\% | 41 | 3.4\% | 16 | 1.3\% | 181 | 15.2\% |
|  |  | Total | 954 | 33.4\% | 41 | 1.4\% | 16 | 0.6\% | 1847 | 64.6\% |
| Q7F | (Heavy ) Overnight trips | Light | 0 | 0.0\% | 0 | 0.0\% | 0 | 0.0\% | 1666 | 100.0\% |
|  |  | Heavy | 965 | 81.0\% | 41 | 3.4\% | 5 | 0.4\% | 181 | 15.2\% |
|  |  | Total | 965 | 33.8\% | 41 | 1.4\% | 5 | 0.2\% | 1847 | 64.6\% |
| Q7G | Seasonal use | Light | 1384 | 83.1\% | 38 | 2.3\% | 1 | 0.1\% | 243 | 14.6\% |
|  |  | Heavy | 965 | 81.0\% | 41 | 3.4\% | 5 | 0.4\% | 181 | 15.2\% |
|  |  | Total | 2349 | 82.2\% | 79 | 2.8\% | 6 | 0.2\% | 424 | 14.8\% |

Table A.1. (cont.). Response Rates for CATI Questions by Vehicle Type for the 2,858 Full and Partial Respondents (1,666 Light, 1,192 Heavy)

| Question |  | Vehicle <br> Type | Response |  | Refusal |  | Don't Know |  | Not Applicable |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Freq. | Percent | Freq. | Percent | Freq. | Percent | Freq. | Percent |
| Q8 | Used in next 6 weeks |  | Light | 1572 | 94.4\% | 38 | 2.3\% | 8 | 0.5\% | 48 | 2.9\% |
|  |  | Heavy | 1107 | 92.9\% | 41 | 3.4\% | 11 | 0.9\% | 33 | 2.8\% |
|  |  | Total | 2679 | 93.7\% | 79 | 2.8\% | 19 | 0.7\% | 81 | 2.8\% |
| Q8B | Why not in use | Light | 140 | 8.4\% | 38 | 2.3\% | 0 | 0.0\% | 1488 | 89.3\% |
|  |  | Heavy | 185 | 15.5\% | 41 | 3.4\% | 0 | 0.0\% | 966 | 81.0\% |
|  |  | Total | 325 | 11.4\% | 79 | 2.8\% | 0 | 0.0\% | 2454 | 85.9\% |
| Q8C | Rental | Light | 1439 | 86.4\% | 38 | 2.3\% | 1 | 0.1\% | 188 | 11.3\% |
|  |  | Heavy | 931 | 78.1\% | 41 | 3.4\% | 2 | 0.2\% | 218 | 18.3\% |
|  |  | Total | 2370 | 82.9\% | 79 | 2.8\% | 3 | 0.1\% | 406 | 14.2\% |
| Q9 | Frequency of use | Light | 1434 | 86.1\% | 38 | 2.3\% | 4 | 0.2\% | 190 | 11.4\% |
|  |  | Heavy | 922 | 77.3\% | 41 | 3.4\% | 7 | 0.6\% | 222 | 18.6\% |
|  |  | Total | 2356 | 82.4\% | 79 | 2.8\% | 11 | 0.4\% | 412 | 14.4\% |
| Q10 | Odometer reading | Light | 1202 | 72.1\% | 39 | 2.3\% | 235 | 14.1\% | 190 | 11.4\% |
|  |  | Heavy | 647 | 54.3\% | 45 | 3.8\% | 278 | 23.3\% | 222 | 18.6\% |
|  |  | Total | 1849 | 64.7\% | 84 | 2.9\% | 513 | 17.9\% | 412 | 14.4\% |
| Q11 | Oil change | Light | 1395 | 83.7\% | 39 | 2.3\% | 42 | 2.5\% | 190 | 11.4\% |
|  |  | Heavy | 888 | 74.5\% | 43 | 3.6\% | 39 | 3.3\% | 222 | 18.6\% |
|  |  | Total | 2283 | 79.9\% | 82 | 2.9\% | 81 | 2.8\% | 412 | 14.4\% |
| Q11B | Tire pressure | Light | 1409 | 84.6\% | 38 | 2.3\% | 29 | 1.7\% | 190 | 11.4\% |
|  |  | Heavy | 906 | 76.0\% | 42 | 3.5\% | 22 | 1.8\% | 222 | 18.6\% |
|  |  | Total | 2315 | 81.0\% | 80 | 2.8\% | 51 | 1.8\% | 412 | 14.4\% |
| Q11D | Transmission | Light | 1436 | 86.2\% | 38 | 2.3\% | 2 | 0.1\% | 190 | 11.4\% |
|  |  | Heavy | 913 | 76.6\% | 41 | 3.4\% | 16 | 1.3\% | 222 | 18.6\% |
|  |  | Total | 2349 | 82.2\% | 79 | 2.8\% | 18 | 0.6\% | 412 | 14.4\% |
| Q11E | Anti-lock braking system | Light | 1364 | 81.9\% | 38 | 2.3\% | 74 | 4.4\% | 190 | 11.4\% |
|  |  | Heavy | 863 | 72.4\% | 42 | 3.5\% | 65 | 5.5\% | 222 | 18.6\% |
|  |  | Total | 2227 | 77.9\% | 80 | 2.8\% | 139 | 4.9\% | 412 | 14.4\% |
| Q11F | Leased or owned | Light | 1437 | 86.3\% | 38 | 2.3\% | 1 | 0.1\% | 190 | 11.4\% |
|  |  | Heavy | 925 | 77.6\% | 41 | 3.4\% | 4 | 0.3\% | 222 | 18.6\% |
|  |  | Total | 2362 | 82.6\% | 79 | 2.8\% | 5 | 0.2\% | 412 | 14.4\% |
| Q11G | Under warranty | Light | 1425 | 85.5\% | 38 | 2.3\% | 13 | 0.8\% | 190 | 11.4\% |
|  |  | Heavy | 916 | 76.8\% | 41 | 3.4\% | 13 | 1.1\% | 222 | 18.6\% |
|  |  | Total | 2341 | 81.9\% | 79 | 2.8\% | 26 | 0.9\% | 412 | 14.4\% |
| Q11H | Business/ personal use | Light | 1438 | 86.3\% | 38 | 2.3\% | 0 | 0.0\% | 190 | 11.4\% |
|  |  | Heavy | 927 | 77.8\% | 41 | 3.4\% | 2 | 0.2\% | 222 | 18.6\% |
|  |  | Total | 2365 | 82.8\% | 79 | 2.8\% | 2 | 0.1\% | 412 | 14.4\% |
| Q11I | Private/ public business | Light | 131 | 7.9\% | 38 | 2.3\% | 0 | 0.0\% | 1497 | 89.9\% |
|  |  | Heavy | 898 | 75.3\% | 41 | 3.4\% | 3 | 0.3\% | 250 | 21.0\% |
|  |  | Total | 1029 | 36.0\% | 79 | 2.8\% | 3 | 0.1\% | 1747 | 61.1\% |
| Q14 | $\begin{array}{\|l} \hline \begin{array}{l} \text { (Heavy) } \\ \text { Transport } \\ \text { goods } \end{array} \\ \hline \end{array}$ | Light | 0 | 0.0\% | 0 | 0.0\% | 0 | 0.0\% | 1666 | 100.0\% |
|  |  | Heavy | 899 | 75.4\% | 41 | 3.4\% | 2 | 0.2\% | 250 | 21.0\% |
|  |  | Total | 899 | 31.5\% | 41 | 1.4\% | 2 | 0.1\% | 1916 | 67.0\% |
| Q15 |  | Light | 0 | 0.0\% | 0 | 0.0\% | 0 | 0.0\% | 1666 | 100.0\% |
|  |  | Heavy | 898 | 75.3\% | 41 | 3.4\% | 3 | 0.3\% | 250 | 21.0\% |
|  |  | Total | 898 | 31.4\% | 41 | 1.4\% | 3 | 0.1\% | 1916 | 67.0\% |

Table A. 1 (cont.). Response Rates for CATI Questions by Vehicle Type for the 2,858 Full and Partial Respondents (1,666 Light, 1,192 Heavy)

| Question |  | Vehicle <br> Type | Response |  | Refusal |  | Don't Know |  | Not Applicable |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Freq. | Percent | Freq. | Percent | Freq. | Percent | Freq. | Percent |
| Q16 | Main driver |  | Light | 131 | 7.9\% | 38 | 2.3\% | 0 | 0.0\% | 1497 | 89.9\% |
|  |  | Heavy | 927 | 77.8\% | 41 | 3.4\% | 2 | 0.2\% | 222 | 18.6\% |
|  |  | Total | 1058 | 37.0\% | 79 | 2.8\% | 2 | 0.1\% | 1719 | 60.1\% |
| Q17 | Main driver gender | Light | 94 | 5.6\% | 38 | 2.3\% | 0 | 0.0\% | 1534 | 92.1\% |
|  |  | Heavy | 663 | 55.6\% | 41 | 3.4\% | 3 | 0.3\% | 485 | 40.7\% |
|  |  | Total | 757 | 26.5\% | 79 | 2.8\% | 3 | 0.1\% | 2019 | 70.6\% |
| Q18 | Main driver age | Light | 92 | 5.5\% | 38 | 2.3\% | 2 | 0.1\% | 1534 | 92.1\% |
|  |  | Heavy | 642 | 53.9\% | 42 | 3.5\% | 23 | 1.9\% | 485 | 40.7\% |
|  |  | Total | 734 | 25.7\% | 80 | 2.8\% | 25 | 0.9\% | 2019 | 70.6\% |
| H1 | Household size | Light | 1252 | 75.2\% | 73 | 4.4\% | 20 | 1.2\% | 321 | 19.3\% |
|  |  | Heavy | 0 | 0.0\% | 0 | 0.0\% | 0 | 0.0\% | 1192 | 100.0\% |
|  |  | Total | 1252 | 43.8\% | 73 | 2.6\% | 20 | 0.7\% | 1513 | 52.9\% |
| H2 | Info on household members | Light | 1244 | 74.7\% | 44 | 2.6\% | 2 | 0.1\% | 376 | 22.6\% |
|  |  | Heavy | 0 | 0.0\% | 0 | 0.0\% | 0 | 0.0\% | 1192 | 100.0\% |
|  |  | Total | 1244 | 43.5\% | 44 | 1.5\% | 2 | 0.1\% | 1568 | 54.9\% |
| H3 | Number of vehicles in household | Light | 1266 | 76.0\% | 58 | 3.5\% | 21 | 1.3\% | 321 | 19.3\% |
|  |  | Heavy | 0 | 0.0\% | 0 | 0.0\% | 0 | 0.0\% | 1192 | 100.0\% |
|  |  | Total | 1266 | 44.3\% | 58 | 2.0\% | 21 | 0.7\% | 1513 | 52.9\% |
| H4 | Household vehicle use comparison | Light | 897 | 53.8\% | 38 | 2.3\% | 3 | 0.2\% | 728 | 43.7\% |
|  |  | Heavy | 0 | 0.0\% | 0 | 0.0\% | 0 | 0.0\% | 1192 | 100.0\% |
|  |  | Total | 897 | 31.4\% | 38 | 1.3\% | 3 | 0.1\% | 1920 | 67.2\% |
| H5 | Household income | Light | 984 | 59.1\% | 225 | 13.5\% | 136 | 8.2\% | 321 | 19.3\% |
|  |  | Heavy | 0 | 0.0\% | 0 | 0.0\% | 0 | 0.0\% | 1192 | 100.0\% |
|  |  | Total | 984 | 34.4\% | 225 | 7.9\% | 136 | 4.8\% | 1513 | 52.9\% |

Table A.2. Reaction of the $\mathbf{2 , 8 5 8}$ Full and Partial Respondents to the Request for Their Cooperation in Completing a Postcard or Log, by Language (2,509 English, 349 French)

| Question |  | Language | Accept |  | Refuse/ Other |  | Don't Know |  | Not Applicable (not in use) |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Freq. | Percent | Freq. | Percent | Freq. | Percent | Freq. | Percent |
| $\begin{aligned} & \mathrm{Q} 25 \\ & \& \\ & \text { Q29 } \end{aligned}$ | Mail log/p ostcard |  | English | 1977 | 78.8\% | 184 | 7.3\% | 0 | 0.0\% | 348 | 13.9\% |
|  |  | French | 291 | 83.4\% | 13 | 3.7\% | 0 | 0.0\% | 45 | 12.9\% |
|  |  | Total | 2268 | 79.4\% | 197 | 6.9\% | 0 | 0.0\% | 393 | 13.8\% |

Table A. 3. Response Rates for CATI Questions by Language for the 2,858 Full and Partial Respondents (2,509 English, 349 French)

| Question |  | Language | Response |  | Refusal |  | Don't Know |  | Not Applicable |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Freq. | Percent | Freq. | Percent | Freq. | Percent | Freq. | Percent |
| Q2 | Able to answer questions |  | English | 2440 | 97.2\% | 69 | 2.8\% | 0 | 0.0\% | 0 | 0.0\% |
|  |  | French | 339 | 97.1\% | 10 | 2.9\% | 0 | 0.0\% | 0 | 0.0\% |
|  |  | Total | 2779 | 97.2\% | 79 | 2.8\% | 0 | 0.0\% | 0 | 0.0\% |
| Q3 | Still has the vehicle | English | 2392 | 95.3\% | 69 | 2.8\% | 0 | 0.0\% | 48 | 1.9\% |
|  |  | French | 333 | 95.4\% | 10 | 2.9\% | 0 | 0.0\% | 6 | 1.7\% |
|  |  | Total | 2725 | 95.3\% | 79 | 2.8\% | 0 | 0.0\% | 54 | 1.9\% |
| ID | VIN | English | 732 | 29.2\% | 70 | 2.8\% | 7 | 0.3\% | 1700 | 67.8\% |
|  |  | French | 93 | 26.6\% | 10 | 2.9\% | 1 | 0.3\% | 245 | 70.2\% |
|  |  | Total | 825 | 28.9\% | 80 | 2.8\% | 8 | 0.3\% | 1945 | 68.1\% |
| Q4 | Reason does not have vehicle | English | 14 | 0.6\% | 69 | 2.8\% | 0 | 0.0\% | 2426 | 96.7\% |
|  |  | French | 5 | 1.4\% | 10 | 2.9\% | 0 | 0.0\% | 334 | 95.7\% |
|  |  | Total | 19 | 0.7\% | 79 | 2.8\% | 0 | 0.0\% | 2760 | 96.6\% |
| Q5 | Vehicle type | English | 2375 | 94.7\% | 69 | 2.8\% | 5 | 0.2\% | 60 | 2.4\% |
|  |  | French | 331 | 94.8\% | 10 | 2.9\% | 0 | 0.0\% | 8 | 2.3\% |
|  |  | Total | 2706 | 94.7\% | 79 | 2.8\% | 5 | 0.2\% | 68 | 2.4\% |
| Q5B | Vehicle type other | English | 142 | 5.7\% | 69 | 2.8\% | 5 | 0.2\% | 2293 | 91.4\% |
|  |  | French | 12 | 3.4\% | 10 | 2.9\% | 0 | 0.0\% | 327 | 93.7\% |
|  |  | Total | 154 | 5.4\% | 79 | 2.8\% | 5 | 0.2\% | 2620 | 91.7\% |
| Q6 | Fuel type | English | 2357 | 93.9\% | 69 | 2.8\% | 11 | 0.4\% | 72 | 2.9\% |
|  |  | French | 330 | 94.6\% | 10 | 2.9\% | 0 | 0.0\% | 9 | 2.6\% |
|  |  | Total | 2687 | 94.0\% | 79 | 2.8\% | 11 | 0.4\% | 81 | 2.8\% |
| Q6A | Partial fill or fill-up | English | 2337 | 93.1\% | 69 | 2.8\% | 31 | 1.2\% | 72 | 2.9\% |
|  |  | French | 328 | 94.0\% | 10 | 2.9\% | 2 | 0.6\% | 9 | 2.6\% |
|  |  | Total | 2665 | 93.2\% | 79 | 2.8\% | 33 | 1.2\% | 81 | 2.8\% |
| Q7 | Distance driven last week | English | 2074 | 82.7\% | 74 | 2.9\% | 289 | 11.5\% | 72 | 2.9\% |
|  |  | French | 281 | 80.5\% | 10 | 2.9\% | 49 | 14.0\% | 9 | 2.6\% |
|  |  | Total | 2355 | 82.4\% | 84 | 2.9\% | 338 | 11.8\% | 81 | 2.8\% |
| Q7B | Typical distance | English | 2068 | 82.4\% | 69 | 2.8\% | 6 | 0.2\% | 366 | 14.6\% |
|  |  | French | 280 | 80.2\% | 10 | 2.9\% | 1 | 0.3\% | 58 | 16.6\% |
|  |  | Total | 2348 | 82.2\% | 79 | 2.8\% | 7 | 0.2\% | 424 | 14.8\% |
| Q7C | (Light) <br> Used for commuting | English | 1202 | 47.9\% | 32 | 1.3\% | 1 | 0.0\% | 1274 | 50.8\% |
|  |  | French | 182 | 52.1\% | 6 | 1.7\% | 0 | 0.0\% | 161 | 46.1\% |
|  |  | Total | 1384 | 48.4\% | 38 | 1.3\% | 1 | 0.0\% | 1435 | 50.2\% |
| Q7D | (Light) <br> Trips over 100 <br> km | English | 1195 | 47.6\% | 32 | 1.3\% | 8 | 0.3\% | 1274 | 50.8\% |
|  |  | French | 181 | 51.9\% | 6 | 1.7\% | 1 | 0.3\% | 161 | 46.1\% |
|  |  | Total | 1376 | 48.1\% | 38 | 1.3\% | 9 | 0.3\% | 1435 | 50.2\% |
| Q7E | (Heavy) <br> City vs. long dist. | English | 858 | 34.2\% | 37 | 1.5\% | 13 | 0.5\% | 1601 | 63.8\% |
|  |  | French | 96 | 27.5\% | 4 | 1.1\% | 3 | 0.9\% | 246 | 70.5\% |
|  |  | Total | 954 | 33.4\% | 41 | 1.4\% | 16 | 0.6\% | 1847 | 64.6\% |
| Q7F | (Heavy ) <br> Overnight trips | English | 868 | 34.6\% | 37 | 1.5\% | 3 | 0.1\% | 1601 | 63.8\% |
|  |  | French | 97 | 27.8\% | 4 | 1.1\% | 2 | 0.6\% | 246 | 70.5\% |
|  |  | Total | 965 | 33.8\% | 41 | 1.4\% | 5 | 0.2\% | 1847 | 64.6\% |
| Q7G | Seasonal use | English | 2070 | 82.5\% | 69 | 2.8\% | 4 | 0.2\% | 366 | 14.6\% |
|  |  | French | 279 | 79.9\% | 10 | 2.9\% | 2 | 0.6\% | 58 | 16.6\% |
|  |  | Total | 2349 | 82.2\% | 79 | 2.8\% | 6 | 0.2\% | 424 | 14.8\% |

Table A.3. (cont.). Response Rates for CATI Questions by Language for the 2,858 Full and Partial Respondents (2,509 English, 349 French)

| Question |  | Language | Response |  | Refusal |  | Don't Know |  | Not Applicable |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Freq. | Percent | Freq. | Percent | Freq. | Percent | Freq. | Percent |
| Q8 | Used in next 6 weeks |  | English | 2352 | 93.7\% | 69 | 2.8\% | 16 | 0.6\% | 72 | 2.9\% |
|  |  | French | 327 | 93.7\% | 10 | 2.9\% | 3 | 0.9\% | 9 | 2.6\% |
|  |  | Total | 2679 | 93.7\% | 79 | 2.8\% | 19 | 0.7\% | 81 | 2.8\% |
| Q8B | Why not in use | English | 288 | 11.5\% | 69 | 2.8\% | 0 | 0.0\% | 2152 | 85.8\% |
|  |  | French | 37 | 10.6\% | 10 | 2.9\% | 0 | 0.0\% | 302 | 86.5\% |
|  |  | Total | 325 | 11.4\% | 79 | 2.8\% | 0 | 0.0\% | 2454 | 85.9\% |
| Q8C | Rental | English | 2077 | 82.8\% | 69 | 2.8\% | 3 | 0.1\% | 360 | 14.3\% |
|  |  | French | 293 | 84.0\% | 10 | 2.9\% | 0 | 0.0\% | 46 | 13.2\% |
|  |  | Total | 2370 | 82.9\% | 79 | 2.8\% | 3 | 0.1\% | 406 | 14.2\% |
| Q9 | Frequency of use | English | 2065 | 82.3\% | 69 | 2.8\% | 11 | 0.4\% | 364 | 14.5\% |
|  |  | French | 291 | 83.4\% | 10 | 2.9\% | 0 | 0.0\% | 48 | 13.8\% |
|  |  | Total | 2356 | 82.4\% | 79 | 2.8\% | 11 | 0.4\% | 412 | 14.4\% |
| Q10 | Odometer reading | English | 1638 | 65.3\% | 74 | 2.9\% | 433 | 17.3\% | 364 | 14.5\% |
|  |  | French | 211 | 60.5\% | 10 | 2.9\% | 80 | 22.9\% | 48 | 13.8\% |
|  |  | Total | 1849 | 64.7\% | 84 | 2.9\% | 513 | 17.9\% | 412 | 14.4\% |
| Q11 | Oil change | English | 2001 | 79.8\% | 72 | 2.9\% | 72 | 2.9\% | 364 | 14.5\% |
|  |  | French | 282 | 80.8\% | 10 | 2.9\% | 9 | 2.6\% | 48 | 13.8\% |
|  |  | Total | 2283 | 79.9\% | 82 | 2.9\% | 81 | 2.8\% | 412 | 14.4\% |
| Q11B | Tire pressure | English | 2030 | 80.9\% | 70 | 2.8\% | 45 | 1.8\% | 364 | 14.5\% |
|  |  | French | 285 | 81.7\% | 10 | 2.9\% | 6 | 1.7\% | 48 | 13.8\% |
|  |  | Total | 2315 | 81.0\% | 80 | 2.8\% | 51 | 1.8\% | 412 | 14.4\% |
| Q11D | Transmission | English | 2059 | 82.1\% | 69 | 2.8\% | 17 | 0.7\% | 364 | 14.5\% |
|  |  | French | 290 | 83.1\% | 10 | 2.9\% | 1 | 0.3\% | 48 | 13.8\% |
|  |  | Total | 2349 | 82.2\% | 79 | 2.8\% | 18 | 0.6\% | 412 | 14.4\% |
| Q11E | Anti-lock braking system | English | 1952 | 77.8\% | 70 | 2.8\% | 123 | 4.9\% | 364 | 14.5\% |
|  |  | French | 275 | 78.8\% | 10 | 2.9\% | 16 | 4.6\% | 48 | 13.8\% |
|  |  | Total | 2227 | 77.9\% | 80 | 2.8\% | 139 | 4.9\% | 412 | 14.4\% |
| Q11F | Leased or owned | English | 2071 | 82.5\% | 69 | 2.8\% | 5 | 0.2\% | 364 | 14.5\% |
|  |  | French | 291 | 83.4\% | 10 | 2.9\% | 0 | 0.0\% | 48 | 13.8\% |
|  |  | Total | 2362 | 82.6\% | 79 | 2.8\% | 5 | 0.2\% | 412 | 14.4\% |
| Q11G | Under warranty | English | 2054 | 81.9\% | 69 | 2.8\% | 22 | 0.9\% | 364 | 14.5\% |
|  |  | French | 287 | 82.2\% | 10 | 2.9\% | 4 | 1.1\% | 48 | 13.8\% |
|  |  | Total | 2341 | 81.9\% | 79 | 2.8\% | 26 | 0.9\% | 412 | 14.4\% |
| Q11H | Business/ personal use | English | 2074 | 82.7\% | 69 | 2.8\% | 2 | 0.1\% | 364 | 14.5\% |
|  |  | French | 291 | 83.4\% | 10 | 2.9\% | 0 | 0.0\% | 48 | 13.8\% |
|  |  | Total | 2365 | 82.8\% | 79 | 2.8\% | 2 | 0.1\% | 412 | 14.4\% |
| Q11I | Private/ public business | English | 921 | 36.7\% | 69 | 2.8\% | 3 | 0.1\% | 1516 | 60.4\% |
|  |  | French | 108 | 30.9\% | 10 | 2.9\% | 0 | 0.0\% | 231 | 66.2\% |
|  |  | Total | 1029 | 36.0\% | 79 | 2.8\% | 3 | 0.1\% | 1747 | 61.1\% |
| Q14 | $\begin{aligned} & \text { (Heavy) } \\ & \text { Transport } \\ & \text { goods } \end{aligned}$ | English | 805 | 32.1\% | 37 | 1.5\% | 2 | 0.1\% | 1665 | 66.4\% |
|  |  | French | 94 | 26.9\% | 4 | 1.1\% | 0 | 0.0\% | 251 | 71.9\% |
|  |  | Total | 899 | 31.5\% | 41 | 1.4\% | 2 | 0.1\% | 1916 | 67.0\% |
| Q15 |  | English | 804 | 32.0\% | 37 | 1.5\% | 3 | 0.1\% | 1665 | 66.4\% |
|  |  | French | 94 | 26.9\% | 4 | 1.1\% | 0 | 0.0\% | 251 | 71.9\% |
|  |  | Total | 898 | 31.4\% | 41 | 1.4\% | 3 | 0.1\% | 1916 | 67.0\% |

Table A.3. (cont.). Response Rates for CATI Questions by Language for the 2,858 Full and Partial Respondents (2,509 English, 349 French)

| Question |  | Language | Response |  | Refusal |  | Don't Know |  | Not Applicable |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Freq. | Percent | Freq. | Percent | Freq. | Percent | Freq. | Percent |
| Q16 | Main driver |  | English | 947 | 37.7\% | 69 | 2.8\% | 2 | 0.1\% | 1491 | 59.4\% |
|  |  | French | 111 | 31.8\% | 10 | 2.9\% | 0 | 0.0\% | 228 | 65.3\% |
|  |  | Total | 1058 | 37.0\% | 79 | 2.8\% | 2 | 0.1\% | 1719 | 60.1\% |
| Q17 | Main driver gender | English | 674 | 26.9\% | 69 | 2.8\% | 3 | 0.1\% | 1763 | 70.3\% |
|  |  | French | 83 | 23.8\% | 10 | 2.9\% | 0 | 0.0\% | 256 | 73.4\% |
|  |  | Total | 757 | 26.5\% | 79 | 2.8\% | 3 | 0.1\% | 2019 | 70.6\% |
| Q18 | Main driver age | English | 651 | 25.9\% | 70 | 2.8\% | 25 | 1.0\% | 1763 | 70.3\% |
|  |  | French | 83 | 23.8\% | 10 | 2.9\% | 0 | 0.0\% | 256 | 73.4\% |
|  |  | Total | 734 | 25.7\% | 80 | 2.8\% | 25 | 0.9\% | 2019 | 70.6\% |
| H1 | Household size | English | 1077 | 42.9\% | 63 | 2.5\% | 19 | 0.8\% | 1350 | 53.8\% |
|  |  | French | 175 | 50.1\% | 10 | 2.9\% | 1 | 0.3\% | 163 | 46.7\% |
|  |  | Total | 1252 | 43.8\% | 73 | 2.6\% | 20 | 0.7\% | 1513 | 52.9\% |
| H2 | Info on household members | English | 1070 | 42.6\% | 38 | 1.5\% | 1 | 0.0\% | 1400 | 55.8\% |
|  |  | French | 174 | 49.9\% | 6 | 1.7\% | 1 | 0.3\% | 168 | 48.1\% |
|  |  | Total | 1244 | 43.5\% | 44 | 1.5\% | 2 | 0.1\% | 1568 | 54.9\% |
| H3 | Number of vehicles in household | English | 1090 | 43.4\% | 50 | 2.0\% | 19 | 0.8\% | 1350 | 53.8\% |
|  |  | French | 176 | 50.4\% | 8 | 2.3\% | 2 | 0.6\% | 163 | 46.7\% |
|  |  | Total | 1266 | 44.3\% | 58 | 2.0\% | 21 | 0.7\% | 1513 | 52.9\% |
| H4 | Household vehicle use comparison | English | 767 | 30.6\% | 32 | 1.3\% | 3 | 0.1\% | 1707 | 68.0\% |
|  |  | French | 130 | 37.2\% | 6 | 1.7\% | 0 | 0.0\% | 213 | 61.0\% |
|  |  | Total | 897 | 31.4\% | 38 | 1.3\% | 3 | 0.1\% | 1920 | 67.2\% |
| H5 | Household income | English | 840 | 33.5\% | 204 | 8.1\% | 115 | 4.6\% | 1350 | 53.8\% |
|  |  | French | 144 | 41.3\% | 21 | 6.0\% | 21 | 6.0\% | 163 | 46.7\% |
|  |  | Total | 984 | 34.4\% | 225 | 7.9\% | 136 | 4.8\% | 1513 | 52.9\% |

## Appendix B: Returns

Figures B. 1 through B. 7 present data on the types of responses returned but as percentages of total mailed and total reported.

Figure B. 1. Log Option 1 - Returned Logs, by Type, as of April 18, 2003


Figure B. 2. Log Option 2 - Returned Logs, by Type, as of April 18, 2003


Figure B. 3. Log Option 3 - Returned Logs, by Type, First Log, as of April 18, 2003


A large majority of all returned logs for all log options include reported information. Logs with reported information range between $80.2 \%$ and as high as $92.1 \%$ for all $\log$ options. The fuel2 $\log$ recorded the highest rate of information reported at $92.1 \%$, followed by the second $\log$ of option 4 (CVS logs) and the fuel1 $\log$ of option 1 at $87.8 \%$ and $87.4 \%$, respectively. The combined fuel and trip log contained information in $84.9 \%$ of the returned logs.

Figure B. 4. Log Option 3 - Returned Logs, by Type, Second Log


Figure B. 5. Log Option 4 - Returned Logs, by Type, First Log, as of April 18, 2003


Figures B. 1 to B. 7 also present a further breakdown in information reported in the logs in terms of fuel purchases and trips. Both Fuel1 and Fuel2 logs report a higher response than the CVS trip logs. Of all logs reporting information for Fuell and Fuel2, 90.1\% report fuel purchases for Fuel1 and $85.3 \%$ report fuel purchases for Fuel2. For the CVS logs in options 3 and 4 only $67 \%$ and $54.9 \%$ report trips, respectively. The exception is with the combined $\log$ (option 5) where $84.6 \%$ of the logs containing information report trips and fuel purchases. The fuell $\log$ of option 4 (the first $\log$ mailed) reports fuel purchases in $84.8 \%$ of the logs containing information.

Figure B. 6. Log Option 4 - Returned Logs, by Type, Second Log, as of April 18, 2003


Figure B. 7. Log Option 5 - Returned Logs, by Type


## Appendix C: Item Response Rates of the Fuel Logs

## Response Rates to the General Information Questions

Tables of item response rates are included for each option for the questions on the fuel log. Tables C. 1 - C. 7 are at the vehicle level.

Each vehicle with reported information on a returned fuel or combined $\log$ is included.

Table C. 1. Response Rates to the Question on Owning or Leasing the Vehicle

| Vehicle <br> Weight <br> Type | Type of Response | Option |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | 1 |  | 2 |  | 3 |  | 4 |  | 5 |  |
|  |  | Freq. | \% | Freq. | \% | Freq. | \% | Freq. | \% | Freq. | \% |
| Light | Response | 139 | 92.7\% | 132 | 93.6\% | 82 | 86.3\% | 144 | 92.9\% | 114 | 81.4\% |
|  | Missing | 11 | 7.3\% | 9 | 6.4\% | 13 | 13.7\% | 11 | 7.1\% | 26 | 18.6\% |
|  | Total | 150 | 100.0\% | 141 | 100.0\% | 95 | 100.0\% | 155 | 100.0\% | 140 | 100.0\% |
| Heavy | Response | 96 | 82.8\% | 110 | 87.3\% | 65 | 76.5\% | 116 | 86.6\% | 84 | 84.0\% |
|  | Missing | 20 | 17.2\% | 16 | 12.7\% | 20 | 23.5\% | 18 | 13.4\% | 16 | 16.0\% |
|  | Total | 116 | 100.0\% | 126 | 100.0\% | 85 | 100.0\% | 134 | 100.0\% | 100 | 100.0\% |
| Total | Response | 235 | 88.3\% | 242 | 90.6\% | 147 | 81.7\% | 260 | 90.0\% | 198 | 82.5\% |
|  | Missing | 31 | 11.7\% | 25 | 9.4\% | 33 | 18.3\% | 29 | 10.0\% | 42 | 17.5\% |
|  | Total | 266 | 100.0\% | 267 | 100.0\% | 180 | 100.0\% | 289 | 100.0\% | 240 | 100.0\% |

It is interesting to note that there are cases where the respondents indicated that they owned or leased the vehicle, but then provided a comment under "other reason" why they did not own or lease the vehicle. An examination of the reason given in the other "comment" field showed that most of the time the vehicle was not in use. This was also the case when no selection was made for owning or leasing the vehicle, but the other field for why they did not own or lease the vehicle contained a comment. This suggests that a field for indicating that the vehicle was not in use is needed.

Table C. 2. Response Rates to the Type of Vehicle Question

| Vehicle <br> Weight <br> Type | Type of Response | Option |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | 1 |  | 2 |  | 3 |  | 4 |  | 5 |  |
|  |  | Freq. | \% | Freq. | \% | Freq. | \% | Freq. | \% | Freq. | \% |
| Light | Response | 126 | 84.0\% | 120 | 85.1\% | 71 | 74.7\% | 126 | 81.3\% | 110 | 78.6\% |
|  | Missing | 24 | 16.0\% | 21 | 14.9\% | 24 | 25.3\% | 29 | 18.7\% | 30 | 21.4\% |
|  | Total | 150 | 100.0\% | 141 | 100.0\% | 95 | 100.0\% | 155 | 100.0\% | 140 | 100.0\% |
| Heavy | Response | 77 | 66.4\% | 101 | 80.2\% | 56 | 65.9\% | 96 | 71.6\% | 79 | 79.0\% |
|  | Missing | 39 | 33.6\% | 25 | 19.8\% | 29 | 34.1\% | 38 | 28.4\% | 21 | 21.0\% |
|  | Total | 116 | 100.0\% | 126 | 100.0\% | 85 | 100.0\% | 134 | 100.0\% | 100 | 100.0\% |
| Total | Response | 203 | 76.3\% | 221 | 82.8\% | 127 | 70.6\% | 222 | 76.8\% | 189 | 78.8\% |
|  | Missing | 63 | 23.7\% | 46 | 17.2\% | 53 | 29.4\% | 67 | 23.2\% | 51 | 21.3\% |
|  | Total | 266 | 100.0\% | 267 | 100.0\% | 180 | 100.0\% | 289 | 100.0\% | 240 | 100.0\% |

Table C. 3. Response rates to the Date When the Log was Received

| Vehicle <br> Weight <br> Type | Type of Response | Option |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | 1 |  | 2 |  | 3 |  | 4 |  | 5 |  |
|  |  |  |  | Fuel 1 Log | Fuel 1 Log |  |  |  |
|  |  | Freq. | \% |  |  | Freq. | \% | Freq. | \% | Freq. | \% | Freq. | \% |
| Light | Response | 120 | 80.0\% | 112 | 79.4\% | 71 | 74.7\% | 118 | 76.1\% | 100 | 71.4\% |
|  | Missing | 30 | 20.0\% | 29 | 20.6\% | 24 | 25.3\% | 37 | 23.9\% | 40 | 28.6\% |
|  | Total | 150 | 100.0\% | 141 | 100.0\% | 95 | 100.0\% | 155 | 100.0\% | 140 | 100.0\% |
| Heavy | Response | 86 | 74.1\% | 96 | 76.2\% | 54 | 63.5\% | 102 | 76.1\% | 69 | 69.0\% |
|  | Missing | 30 | 25.9\% | 30 | 23.8\% | 31 | 36.5\% | 32 | 23.9\% | 31 | 31.0\% |
|  | Total | 116 | 100.0\% | 126 | 100.0\% | 85 | 100.0\% | 134 | 100.0\% | 100 | 100.0\% |
| Total | Response | 206 | 77.4\% | 208 | 77.9\% | 125 | 69.4\% | 220 | 76.1\% | 169 | 70.4\% |
|  | Missing | 60 | 22.6\% | 59 | 22.1\% | 55 | 30.6\% | 69 | 23.9\% | 71 | 29.6\% |
|  | Total | 266 | 100.0\% | 267 | 100.0\% | 180 | 100.0\% | 289 | 100.0\% | 240 | 100.0\% |

Table C. 4. Response Rates to the Date When the Log was Returned

| Vehicle <br> Weight <br> Type | Type of Response | Option |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | 1 |  | 2 |  | , |  | 4 |  | 5 |  |
|  |  |  |  | Fuel 1 Log | Fuel 1 Log |  |  |  |
|  |  | Freq. | \% |  |  | Freq. | \% | Freq. | \% | Freq. | \% | Freq. | \% |
| Light | Response | 83 | 55.3\% | 92 | 65.2\% | 49 | 51.6\% | 90 | 58.1\% | 75 | 53.6\% |
|  | Missing | 67 | 44.7\% | 49 | 34.8\% | 46 | 48.4\% | 65 | 41.9\% | 65 | 46.4\% |
|  | Total | 150 | 100.0\% | 141 | 100.0\% | 95 | 100.0\% | 155 | 100.0\% | 140 | 100.0\% |
| Heavy | Response | 59 | 50.9\% | 91 | 72.2\% | 44 | 51.8\% | 79 | 59.0\% | 44 | 44.0\% |
|  | Missing | 57 | 49.1\% | 35 | 27.8\% | 41 | 48.2\% | 55 | 41.0\% | 56 | 56.0\% |
|  | Total | 116 | 100.0\% | 126 | 100.0\% | 85 | 100.0\% | 134 | 100.0\% | 100 | 100.0\% |
| Total | Response | 142 | 53.4\% | 183 | 68.5\% | 93 | 51.7\% | 169 | 58.5\% | 119 | 49.6\% |
|  | Missing | 124 | 46.6\% | 84 | 31.5\% | 87 | 48.3\% | 120 | 41.5\% | 121 | 50.4\% |
|  | Total | 266 | 100.0\% | 267 | 100.0\% | 180 | 100.0\% | 289 | 100.0\% | 240 | 100.0\% |

A noticeable drop in the response rates to the date the $\log$ was returned compared to the date the $\log$ was received is observed. Likely respondents forget to go back to the top of the questionnaire or the beginning of the questionnaire in the case of Option 5, in order to fill out the remaining questions.

Table C. 5. Response Rates to the Odometer Reading When the Log is Received

| Vehicle <br> Weight <br> Type | Type of Response | Option |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | 1 |  | 2 |  | 3 |  | 4 |  | 5 |  |
|  |  |  |  | Fuel 1 Log | Fuel 1 Log |  |  |  |
|  |  | Freq. | \% |  |  | Freq. | \% | Freq. | \% | Freq. | \% | Freq. | \% |
| Light | Response | 116 | 77.3\% | 109 | 77.3\% | 69 | 72.6\% | 112 | 72.3\% | 99 | 70.7\% |
|  | Missing | 34 | 22.7\% | 32 | 22.7\% | 26 | 27.4\% | 43 | 27.7\% | 41 | 29.3\% |
|  | Total | 150 | 100.0\% | 141 | 100.0\% | 95 | 100.0\% | 155 | 100.0\% | 140 | 100.0\% |
| Heavy | Response | 76 | 65.5\% | 93 | 73.8\% | 52 | 61.2\% | 95 | 70.9\% | 65 | 65.0\% |
|  | Missing | 40 | 34.5\% | 33 | 26.2\% | 33 | 38.8\% | 39 | 29.1\% | 35 | 35.0\% |
|  | Total | 116 | 100.0\% | 126 | 100.0\% | 85 | 100.0\% | 134 | 100.0\% | 100 | 100.0\% |
| Total | Response | 192 | 72.2\% | 202 | 75.7\% | 121 | 67.2\% | 207 | 71.6\% | 164 | 68.3\% |
|  | Missing | 74 | 27.8\% | 65 | 24.3\% | 59 | 32.8\% | 82 | 28.4\% | 76 | 31.7\% |
|  | Total | 266 | 100.0\% | 267 | 100.0\% | 180 | 100.0\% | 289 | 100.0\% | 240 | 100.0\% |

Table C. 6. Response Rates to the Odometer Reading When the Log is Returned

|  | Type of Response | Option |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | 1 |  | 2 |  | 3 |  | 4 |  | 5 |  |
|  |  |  |  | Fuel 1 Log | Fuel 1 Log |  |  |  |
|  |  | Freq. | \% |  |  | Freq. | \% | Freq. | \% | Freq. | \% | Freq. | \% |
| Light | Response | 82 | 54.7\% | 91 | 64.5\% | 49 | 51.6\% | 90 | 58.1\% | 78 | 55.7\% |
|  | Missing | 68 | 45.3\% | 50 | 35.5\% | 46 | 48.4\% | 65 | 41.9\% | 62 | 44.3\% |
|  | Total | 150 | 100.0\% | 141 | 100.0\% | 95 | 100.0\% | 155 | 100.0\% | 140 | 100.0\% |
| Heavy | Response | 53 | 45.7\% | 90 | 71.4\% | 44 | 51.8\% | 79 | 59.0\% | 44 | 44.0\% |
|  | Missing | 63 | 54.3\% | 36 | 28.6\% | 41 | 48.2\% | 55 | 41.0\% | 56 | 56.0\% |
|  | Total | 116 | 100.0\% | 126 | 100.0\% | 85 | 100.0\% | 134 | 100.0\% | 100 | 100.0\% |
| Total | Response | 135 | 50.8\% | 181 | 67.8\% | 93 | 51.7\% | 169 | 58.5\% | 122 | 50.8\% |
|  | Missing | 131 | 49.2\% | 86 | 32.2\% | 87 | 48.3\% | 120 | 41.5\% | 118 | 49.2\% |
|  | Total | 266 | 100.0\% | 267 | 100.0\% | 180 | 100.0\% | 289 | 100.0\% | 240 | 100.0\% |

As for the dates, we observe a noticeable drop in the response rates to the odometer reading when the $\log$ was returned compared to the odometer reading when the $\log$ was received. Likely respondents forget to go back to the top of the questionnaire or the beginning of the questionnaire in the case of Option 5, in order to fill out the remaining questions. As well, to answer this question, the respondent must be in the vehicle.

Table C. 7. Fuel Log 2: Response Rates to the Fuel Gauge Reading When the Log is Received and Returned

| Vehicle <br> Weight <br> Type | Type of <br> Response | Option 2 |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Fuel Gauge - LogReceived |  | Fuel Gauge - Log <br> Returned |  |
|  |  | Freq. | \% | Freq. | \% |
| Light | Response | 108 | 76.6\% | 79 | 56.0\% |
|  | Missing | 33 | 23.4\% | 62 | 44.0\% |
|  | Total | 141 | 100.0\% | 141 | 100.0\% |
| Heavy | Response | 90 | 71.4\% | 80 | 63.5\% |
|  | Missing | 36 | 28.6\% | 46 | 36.5\% |
|  | Total | 126 | 100.0\% | 126 | 100.0\% |
| Total | Response | 198 | 74.2\% | 159 | 59.6\% |
|  | Missing | 69 | 25.8\% | 108 | 40.4\% |
|  | Total | 267 | 100.0\% | 267 | 100.0\% |

Once again the response when the $\log$ is returned is lower, probably for the same reasons mentioned in the case of the odometer reading.

## Response Rates to the Fuel Purchase Elements

Tables C. $8-$ C. 17 contain the response rates over all the purchases reported on the fuel log or log portion (option 5). For Table C.10, odometer type is only requested at the time of the first purchase.

The diagrams that follow indicate the results of the tests of statistical hypotheses to compare differences. Options for which the response rates are not significantly different are joined by a line. Pairwise tests are conducted at the $5 \%$ significance level with the result that the group of all pairwise combinations is at a significance level greater than $5 \%$. Refer to Appendix E for more information on the tests of statistical hypotheses. For examples of how to interpret these diagrams, see Figures 2 and 3 in Section 6 of the report.

Table C. 8. Response Rates for the Date of the Fuel Purchase

| Vehicle <br> Weight <br> Type | Type of Response | Option |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | 1 |  | 2 |  | 3 |  | 4 |  | 5 |  |
|  |  | Freq. | \% | Freq. | \% | Freq. | \% | Freq. | \% | Freq. | \% |
| Light | Response | 400 | 99.0\% | 471 | 98.1\% | 237 | 99.2\% | 385 | 97.5\% | 265 | 100.0\% |
|  | Missing | 4 | 1.0\% | 9 | 1.9\% | 2 | 0.8\% | 10 | 2.5\% | 0 | 0.0\% |
|  | Total | 404 | 100.0\% | 480 | 100.0\% | 239 | 100.0\% | 395 | 100.0\% | 265 | 100.0\% |
| Heavy | Response | 293 | 95.4\% | 403 | 95.5\% | 175 | 96.7\% | 367 | 98.4\% | 195 | 100.0\% |
|  | Missing | 14 | 4.6\% | 19 | 4.5\% | 6 | 3.3\% | 6 | 1.6\% | 0 | 0.0\% |
|  | Total | 307 | 100.0\% | 422 | 100.0\% | 181 | 100.0\% | 373 | 100.0\% | 195 | 100.0\% |
| Total | Response | 693 | 97.5\% | 874 | 96.9\% | 412 | 98.1\% | 752 | 97.9\% | 460 | 100.0\% |
|  | Missing | 18 | 2.5\% | 28 | 3.1\% | 8 | 1.9\% | 16 | 2.1\% | 0 | 0.0\% |
|  | Total | 711 | 100.0\% | 902 | 100.0\% | 420 | 100.0\% | 768 | 100.0\% | 460 | 100.0\% |

Figure C. 1. Light Vehicles: Statistical Differences for the Response Rates to the Date


Note: Options for which the response rates are not significantly different according to the Chi-square Test are joined by a line. See Appendix E for more information.

Figure C. 2. Heavy Vehicles: Statistical Differences for the Response Rates to the Date


Note: Options for which the response rates are not significantly different according to the Chi-square Test are joined by a line. See Appendix E for more information.

Table C. 9. Response Rates to the Odometer Reading at the Time of the Fuel Purchase

| Vehicle <br> Weight <br> Type | Type of Response | Option |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | 1 |  | 2 |  | 3 |  | 4 |  | 5 |  |
|  |  | Freq. | \% | Freq. | \% | Freq. | \% | Freq. | \% | Freq. | \% |
| Light | Response | 395 | 97.8\% | 468 | 97.5\% | 237 | 99.2\% | 370 | 93.7\% | 265 | 100.0\% |
|  | Missing | 9 | 2.2\% | 12 | 2.5\% | 2 | 0.8\% | 25 | 6.3\% | 0 | 0.0\% |
|  | Total | 404 | 100.0\% | 480 | 100.0\% | 239 | 100.0\% | 395 | 100.0\% | 265 | 100.0\% |
| Heavy | Response | 274 | 89.3\% | 391 | 92.7\% | 163 | 90.1\% | 352 | 94.4\% | 190 | 97.4\% |
|  | Missing | 33 | 10.7\% | 31 | 7.3\% | 18 | 9.9\% | 21 | 5.6\% | 5 | 2.6\% |
|  | Total | 307 | 100.0\% | 422 | 100.0\% | 181 | 100.0\% | 373 | 100.0\% | 195 | 100.0\% |
| Total | Response | 669 | 94.1\% | 859 | 95.2\% | 400 | 95.2\% | 722 | 94.0\% | 455 | 98.9\% |
|  | Missing | 42 | 5.9\% | 43 | 4.8\% | 20 | 4.8\% | 46 | 6.0\% | 5 | 1.1\% |
|  | Total | 711 | 100.0\% | 902 | 100.0\% | 420 | 100.0\% | 768 | 100.0\% | 460 | 100.0\% |

Figure C. 3. Light Vehicles: Statistical Differences for the Response Rates to the Odometer Reading


Note: Options for which the response rates are not significantly different according to the Chi-square Test are joined by a line. See Appendix E for more information.

Figure C. 4. Heavy Vehicles: Statistical Differences for the Response Rates to the Odometer Reading


Note: Options for which the response rates are not significantly different according to the Chi-square Test are joined by a line. See Appendix E for more information.

The odometer reading at the time of purchase is an important variable for calculating the fuel consumption rate and so it is positive to note that it is provided for most fuel purchases. Option 5 is significantly different from Options 1 and 2 for both heavy and light vehicles. Perhaps filling out the trip portion at the same time makes them more aware of filling out the purchases information.

Table C. 10. Response Rates for the Unit of the Odometer Reading (the First Fuel Purchase)

| Vehicle <br> Weight <br> Type | Type of Response | Option |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | 1 |  | 2 |  | 3 |  | 4 |  | 5 |  |
|  |  | Freq. | \% | Freq. | \% | Freq. | \% | Freq. | \% | Freq. | \% |
| Light | Response | 93 | 70.5\% | 94 | 77.7\% | 52 | 74.3\% | 97 | 78.2\% | 0 | 0.0\% |
|  | Missing | 39 | 29.5\% | 27 | 22.3\% | 18 | 25.7\% | 27 | 21.8\% | 97 | 100.0\% |
|  | Total | 132 | 100.0\% | 121 | 100.0\% | 70 | 100.0\% | 124 | 100.0\% | 97 | 100.0\% |
| Heavy | Response | 64 | 75.3\% | 70 | 72.2\% | 33 | 67.3\% | 79 | 77.5\% | 35 | 61.4\% |
|  | Missing | 21 | 24.7\% | 27 | 27.8\% | 16 | 32.7\% | 23 | 22.5\% | 22 | 38.6\% |
|  | Total | 85 | 100.0\% | 97 | 100.0\% | 49 | 100.0\% | 102 | 100.0\% | 57 | 100.0\% |
| Total | Response | 157 | 72.4\% | 164 | 75.2\% | 85 | 71.4\% | 176 | 77.9\% | 35 | 22.7\% |
|  | Missing | 60 | 27.6\% | 54 | 24.8\% | 34 | 28.6\% | 50 | 22.1\% | 119 | 77.3\% |
|  | Total | 217 | 100.0\% | 218 | 100.0\% | 119 | 100.0\% | 226 | 100.0\% | 154 | 100.0\% |

Figure C. 5. Light Vehicles: Statistical Differences for the Response Rates for the Unit of the Odometer


Note: Options for which the response rates are not significantly different according to the Chi-square Test are joined by a line. See Appendix E for more information.

Figure C. 6. Heavy Vehicles: Statistical Differences for the Response Rates for the Unit of the Odometer


Note: Options for which the response rates are not significantly different according to the Chi-square Test are joined by a line. See Appendix E for more information.

The odometer unit is less well reported than the odometer reading itself. That no light vehicles reported the odometer unit for Option 5 remains to be investigated further; however the odometer unit could also be determined from the trip portion of the log. Otherwise there are no real differences in reporting among the options. Contrary to the odometer reading, Option 5 has the lowest response rate to the odometer unit.

Table C. 11. Response Rates for the Fuel Gauge Reading Before the Fuel Purchase

|  | Type of Response | Option |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | 1 |  | 2 |  | 3 |  | 4 |  | 5 |  |
|  |  | Freq. | \% | Freq. | \% | Freq. | \% | Freq. | \% | Freq. | \% |
| Light | Response | 390 | 96.5\% |  |  | 231 | 96.7\% | 364 | 92.2\% | 256 | 96.6\% |
|  | Missing | 14 | 3.5\% |  |  | 8 | 3.3\% | 31 | 7.8\% | 9 | 3.4\% |
|  | Total | 404 | 100.0\% |  |  | 239 | 100.0\% | 395 | 100.0\% | 265 | 100.0\% |
| Heavy | Response | 283 | 92.2\% |  |  | 154 | 85.1\% | 347 | 93.0\% | 180 | 92.3\% |
|  | Missing | 24 | 7.8\% |  |  | 27 | 14.9\% | 26 | 7.0\% | 15 | 7.7\% |
|  | Total | 307 | 100.0\% |  |  | 181 | 100.0\% | 373 | 100.0\% | 195 | 100.0\% |
| Total | Response | 673 | 94.7\% |  |  | 385 | 91.7\% | 711 | 92.6\% | 436 | 94.8\% |
|  | Missing | 38 | 5.3\% |  |  | 35 | 8.3\% | 57 | 7.4\% | 24 | 5.2\% |
|  | Total | 711 | 100.0\% |  |  | 420 | 100.0\% | 768 | 100.0\% | 460 | 100.0\% |

Figure C. 7. Light Vehicles: Statistical Differences for the Response Rates for the Fuel Gauge Reading Before the Fuel Purchase


Note: Options for which the response rates are not significantly different according to the Chi-square Test are joined by a line. See Appendix E for more information.

Figure C. 8. Heavy Vehicles: Statistical Differences for the Response Rates for the Fuel Gauge Reading Before the Fuel Purchase


Note: Options for which the response rates are not significantly different according to the Chi-square Test are joined by a line. See Appendix E for more information.

For the fuel gauge reading before the fuel purchase, we have different results for light and heavy vehicles. For light vehicles, Option 4 has a significantly lower response rate, despite being the same $\log$ as Option 1 and the first of the 2 logs to be received. On the other hand, Option 3 has the lowest response rate among heavy vehicles. As the second log, it is reasonable to expect that respondents are tired and perhaps careless when filling out the log.

Table C. 12. Response Rates for the Type of Fuel Purchased

|  | Type of Response | Option |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | 1 |  | 2 |  | 3 |  | 4 |  | 5 |  |
|  |  | Freq. | \% | Freq. | \% | Freq. | \% | Freq. | \% | Freq. | \% |
| Light | Response | 390 | 96.5\% | 474 | 98.8\% | 237 | 99.2\% | 375 | 94.9\% | 256 | 96.6\% |
|  | Missing | 14 | 3.5\% | 6 | 1.3\% | 2 | 0.8\% | 20 | 5.1\% | 9 | 3.4\% |
|  | Total | 404 | 100.0\% | 480 | 100.0\% | 239 | 100.0\% | 395 | 100.0\% | 265 | 100.0\% |
| Heavy | Response | 294 | 95.8\% | 420 | 99.5\% | 172 | 95.0\% | 363 | 97.3\% | 195 | 100.0\% |
|  | Missing | 13 | 4.2\% | 2 | 0.5\% | 9 | 5.0\% | 10 | 2.7\% | 0 | 0.0\% |
|  | Total | 307 | 100.0\% | 422 | 100.0\% | 181 | 100.0\% | 373 | 100.0\% | 195 | 100.0\% |
| Total | Response | 684 | 96.2\% | 894 | 99.1\% | 409 | 97.4\% | 738 | 96.1\% | 451 | 98.0\% |
|  | Missing | 27 | 3.8\% | 8 | 0.9\% | 11 | 2.6\% | 30 | 3.9\% | 9 | 2.0\% |
|  | Total | 711 | 100.0\% | 902 | 100.0\% | 420 | 100.0\% | 768 | 100.0\% | 460 | 100.0\% |

Figure C. 9. Light Vehicles: Statistical Differences for the Response Rates for the Type of Fuel Purchased


Note: Options for which the response rates are not significantly different according to the Chi-square Test are joined by a line. See Appendix E for more information.

Figure C. 10. Heavy Vehicles: Statistical Differences for the Response Rates for the Type of Fuel Purchased


Note: Options for which the response rates are not significantly different according to the Chi-square Test are joined by a line. See Appendix E for more information.

This variable is very well reported overall. Option 2 achieves higher response rates than does Option 1 for the type of fuel purchased. Somewhat surprisingly, Option 3 does significantly better than all options except for Option 2 among light vehicles despite the Fuel log being the second $\log$ received.

Table C. 13. Response Rates for the Quantity of Fuel Purchased

| Vehicle Weight Type | Type of Response | Option |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | 1 |  | 2 |  | 3 |  | 4 |  | 5 |  |
|  |  | Freq. | \% | Freq. | \% | Freq. | \% | Freq. | \% | Freq. | \% |
| Light | Response | 340 | 84.2\% | 406 | 84.6\% | 191 | 79.9\% | 304 | 77.0\% | 212 | 80.0\% |
|  | Missing | 64 | 15.8\% | 74 | 15.4\% | 48 | 20.1\% | 91 | 23.0\% | 53 | 20.0\% |
|  | Total | 404 | 100.0\% | 480 | 100.0\% | 239 | 100.0\% | 395 | 100.0\% | 265 | 100.0\% |
| Heavy | Response | 253 | 82.4\% | 385 | 91.2\% | 150 | 82.9\% | 341 | 91.4\% | 186 | 95.4\% |
|  | Missing | 54 | 17.6\% | 37 | 8.8\% | 31 | 17.1\% | 32 | 8.6\% | 9 | 4.6\% |
|  | Total | 307 | 100.0\% | 422 | 100.0\% | 181 | 100.0\% | 373 | 100.0\% | 195 | 100.0\% |
| Total | Response | 593 | 83.4\% | 791 | 87.7\% | 341 | 81.2\% | 645 | 84.0\% | 398 | 86.5\% |
|  | Missing | 118 | 16.6\% | 111 | 12.3\% | 79 | 18.8\% | 123 | 16.0\% | 62 | 13.5\% |
|  | Total | 711 | 100.0\% | 902 | 100.0\% | 420 | 100.0\% | 768 | 100.0\% | 460 | 100.0\% |

Figure C. 11. Light Vehicles: Statistical Differences for the Response Rates for the Quantity of Fuel Purchased


Note: Options for which the response rates are not significantly different according to the Chi-square Test are joined by a line. See Appendix E for more information.

Figure C. 12. Heavy Vehicles: Statistical Differences for the Response Rates for the Quantity of Fuel Purchased


Note: Options for which the response rates are not significantly different according to the Chi-square Test are joined by a line. See Appendix E for more information.

Among heavy vehicles, Options 1 and 3 achieve significantly lower response rates. Response rates are generally lower among the light vehicles, whose drivers likely pay more attention to the total amount spent and the price of fuel, rather than the quantity purchased.

Table C. 14. Response Rates for the Unit of the Quantity of Fuel Purchased

| Vehicle <br> Weight <br> Type | Type of Response | Option |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | 1 |  | 2 |  | 3 |  | 4 |  | 5 |  |
|  |  | Freq. | \% | Freq. | \% | Freq. | \% | Freq. | \% | Freq. | \% |
| Light | Response | 317 | 78.5\% | 363 | 75.6\% | 181 | 75.7\% | 285 | 72.2\% | 195 | 73.6\% |
|  | Missing | 87 | 21.5\% | 117 | 24.4\% | 58 | 24.3\% | 110 | 27.8\% | 70 | 26.4\% |
|  | Total | 404 | 100.0\% | 480 | 100.0\% | 239 | 100.0\% | 395 | 100.0\% | 265 | 100.0\% |
| Heavy | Response | 249 | 81.1\% | 369 | 87.4\% | 130 | 71.8\% | 315 | 84.5\% | 168 | 86.2\% |
|  | Missing | 58 | 18.9\% | 53 | 12.6\% | 51 | 28.2\% | 58 | 15.5\% | 27 | 13.8\% |
|  | Total | 307 | 100.0\% | 422 | 100.0\% | 181 | 100.0\% | 373 | 100.0\% | 195 | 100.0\% |
| Total | Response | 566 | 79.6\% | 732 | 81.2\% | 311 | 74.0\% | 600 | 78.1\% | 363 | 78.9\% |
|  | Missing | 145 | 20.4\% | 170 | 18.8\% | 109 | 26.0\% | 168 | 21.9\% | 97 | 21.1\% |
|  | Total | 711 | 100.0\% | 902 | 100.0\% | 420 | 100.0\% | 768 | 100.0\% | 460 | 100.0\% |

Figure C. 13. Light Vehicles: Statistical Differences for the Response Rates for the Unit of the Quantity of Fuel Purchased


Note: Options for which the response rates are not significantly different according to the Chi-square Test are joined by a line. See Appendix E for more information.

Figure C. 14. Heavy Vehicles: Statistical Differences for the Response Rates for the Unit of the Quantity of Fuel Purchased


Note: Options for which the response rates are not significantly different according to the Chi-square Test are joined by a line. See Appendix E for more information.

Among heavy vehicles, Option 3 has a significantly lower response rate and the rates for Options 1 and 2 are significantly different. For light vehicles, the only difference observed is that Option 4 has a lower response rate than Option1 despite being the same log.

Table C. 15. Response Rates for the Amount Spent (\$) on the Fuel Purchase

| Vehicle <br> Weight <br> Type | Type of <br> Response | Option |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | 1 |  | 2 |  | 3 |  | 4 |  | 5 |  |
|  |  | Freq. | \% | Freq. | \% | Freq. | \% | Freq. | \% | Freq. | \% |
| Light | Response | 340 | 84.2\% | 450 | 93.8\% | 199 | 83.3\% | 315 | 79.7\% | 216 | 81.5\% |
|  | Missing | 64 | 15.8\% | 30 | 6.3\% | 40 | 16.7\% | 80 | 20.3\% | 49 | 18.5\% |
|  | Total | 404 | 100.0\% | 480 | 100.0\% | 239 | 100.0\% | 395 | 100.0\% | 265 | 100.0\% |
| Heavy | Response | 218 | 71.0\% | 305 | 72.3\% | 116 | 64.1\% | 110 | 29.5\% | 109 | 55.9\% |
|  | Missing | 89 | 29.0\% | 117 | 27.7\% | 65 | 35.9\% | 263 | 70.5\% | 86 | 44.1\% |
|  | Total | 307 | 100.0\% | 422 | 100.0\% | 181 | 100.0\% | 373 | 100.0\% | 195 | 100.0\% |
| Total | Response | 558 | 78.5\% | 755 | 83.7\% | 315 | 75.0\% | 425 | 55.3\% | 325 | 70.7\% |
|  | Missing | 153 | 21.5\% | 147 | 16.3\% | 105 | 25.0\% | 343 | 44.7\% | 135 | 29.3\% |
|  | Total | 711 | 100.0\% | 902 | 100.0\% | 420 | 100.0\% | 768 | 100.0\% | 460 | 100.0\% |

Figure C. 15. Light Vehicles: Statistical Differences for the Response Rates for the Amount Spent (\$) on the Fuel Purchase


Note: Options for which the response rates are not significantly different according to the Chi-square Test are joined by a line. See Appendix E for more information.

Figure C. 16. Heavy Vehicles: Statistical Differences for the Response Rates for the Amount Spent (\$) on the Fuel Purchase


Note: Options for which the response rates are not significantly different according to the Chi-square Test are joined by a line. See Appendix E for more information.

The response rate among light vehicles for Option 2 is greater than for any other option. Option 2 reports the highest response rate among heavy vehicles as well, but it is only significantly greater Options 3 and 5 which likely show the most respondent fatigue. The response rates were lower for heavy vehicles;

Table C. 16. Response Rates for the Price of the Fuel Purchased

|  | Type of Response | Option |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | 1 |  | 2 |  | 3 |  | 4 |  | 5 |  |
|  |  | Freq. | \% | Freq. | \% | Freq. | \% | Freq. | \% | Freq. | \% |
| Light | Response | 341 | 84.4\% | 441 | 91.9\% | 198 | 82.8\% | 312 | 79.0\% | 211 | 79.6\% |
|  | Missing | 63 | 15.6\% | 39 | 8.1\% | 41 | 17.2\% | 83 | 21.0\% | 54 | 20.4\% |
|  | Total | 404 | 100.0\% | 480 | 100.0\% | 239 | 100.0\% | 395 | 100.0\% | 265 | 100.0\% |
| Heavy | Response | 231 | 75.2\% | 325 | 77.0\% | 115 | 63.5\% | 281 | 75.3\% | 123 | 63.1\% |
|  | Missing | 76 | 24.8\% | 97 | 23.0\% | 66 | 36.5\% | 92 | 24.7\% | 72 | 36.9\% |
|  | Total | 307 | 100.0\% | 422 | 100.0\% | 181 | 100.0\% | 373 | 100.0\% | 195 | 100.0\% |
| Total | Response | 572 | 80.5\% | 766 | 84.9\% | 313 | 74.5\% | 593 | 77.2\% | 334 | 72.6\% |
|  | Missing | 139 | 19.5\% | 136 | 15.1\% | 107 | 25.5\% | 175 | 22.8\% | 126 | 27.4\% |
|  | Total | 711 | 100.0\% | 902 | 100.0\% | 420 | 100.0\% | 768 | 100.0\% | 460 | 100.0\% |

Figure C. 17. Light Vehicles: Statistical Differences for the Response Rates for the Price of the Fuel Purchased


Note: Options for which the response rates are not significantly different according to the Chi-square Test are joined by a line. See Appendix E for more information.

Figure C. 18. Heavy Vehicles: Statistical Differences for the Response Rates for the Price of the Fuel Purchased


Note: Options for which the response rates are not significantly different according to the Chi-square Test are joined by a line. See Appendix E for more information.

Option 2 achieves the highest response rate among both vehicle types, but only for light vehicles is the response rate significantly different from all other options. Options 3 and 5, showing the most respondent fatigue, are significantly less respondent to among heavy vehicles. As for the amount spent, the price is less well reported among heavy vehicles.

Table C. 17. Response Rate for the Fuel Gauge Reading or Fill-up Indicator (Option 2) After the Fuel Purchase

|  | Type of Response | Option |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | 1 |  | 2 |  | 3 |  | 4 |  | 5 |  |
|  |  | Freq. | \% | Freq. | \% | Freq. | \% | Freq. | \% | Freq. | \% |
| Light | Response | 344 | 85.1\% | 439 | 91.5\% | 201 | 84.1\% | 319 | 80.8\% | 212 | 80.0\% |
|  | Missing | 60 | 14.9\% | 41 | 8.5\% | 38 | 15.9\% | 76 | 19.2\% | 53 | 20.0\% |
|  | Total | 404 | 100.0\% | 480 | 100.0\% | 239 | 100.0\% | 395 | 100.0\% | 265 | 100.0\% |
| Heavy | Response | 259 | 84.4\% | 397 | 94.1\% | 136 | 75.1\% | 330 | 88.5\% | 188 | 96.4\% |
|  | Missing | 48 | 15.6\% | 25 | 5.9\% | 45 | 24.9\% | 43 | 11.5\% | 7 | 3.6\% |
|  | Total | 307 | 100.0\% | 422 | 100.0\% | 181 | 100.0\% | 373 | 100.0\% | 195 | 100.0\% |
| Total | Response | 603 | 84.8\% | 836 | 92.7\% | 337 | 80.2\% | 649 | 84.5\% | 400 | 87.0\% |
|  | Missing | 108 | 15.2\% | 66 | 7.3\% | 83 | 19.8\% | 119 | 15.5\% | 60 | 13.0\% |
|  | Total | 711 | 100.0\% | 902 | 100.0\% | 420 | 100.0\% | 768 | 100.0\% | 460 | 100.0\% |

Figure C. 19. Light Vehicles: Statistical Differences for the Response Rate to the Fuel Gauge Reading or Fill-up Indicator (Option 2) After the Fuel Purchase


Note: Options for which the response rates are not significantly different according to the Chi-square Test are joined by a line. See Appendix E for more information.

Figure C. 20. Heavy Vehicles: Statistical Differences for the Response Rate to the Fuel Gauge Reading or Fill-up Indicator (Option 2) After the Fuel Purchase


Note: Options for which the response rates are not significantly different according to the Chi-square Test are joined by a line. See Appendix E for more information.

Among light vehicles, Option 2 is the most well reported, significantly different from all other options. This is due in part to the question being easier to answer as Option 2 asks only whether or not the purchase was a fill-up and not for a fuel gauge reading after the purchase. Among heavy vehicles, Option 2 also does significantly better than all options, except for Option 5. Option 3 is significantly different from all other options among heavy vehicles.

## Appendix D: Data Quality of the Logs

## Quality of the Fuel Data

In order to calculate the fuel consumption and cost, the following variables from the fuel purchase information are needed: the odometer reading, fuel type, two of price or amount or quantity and quantity type, and the gauge reading/fill-up indicator after the purchase. Thus a fuel purchase is termed complete if these variables were reported.

Figure D. 1. Number of Fuel Purchases Reported With Complete or Incomplete Information as Purchase Number 1-5 (all options)


From Figure D.1, we observe that as respondents provide more fuel purchases there is a decrease in the percentage of purchases with complete information.

Figure D. 2. Option 1: Number of Fuel Purchases, Fill-up or Not, Reported as Purchase Number 1-5


Figure D. 3. Option 2: Number of Fuel Purchases, Fill-up or Not, Reported as Purchase Number 1-5


Option 1 requested that the log be returned after 2 fill-ups, 5 purchases or 4 weeks had passed. This is reflected in the noticeable drop in reported purchases from purchase number 2 to number 3 in Figure D.2. The more constant number of purchases for each purchase number in Figure D. 3 reflects that for Option 2 respondents were requested to return the log after 5 purchases or 4 weeks had passed. As well, the percentage of purchases that are fill-ups remains relatively the same across the five purchase numbers for Option 2 (Figure D.3) whereas the percentage of fillups drops after the first two purchases for Option 1 (Figure D.2) as those with 2 fill-ups send the log back.

The diagrams that follow indicate the results of the tests of statistical hypotheses to compare differences. Options for which the percentages are not significantly different are joined by a line. Pairwise tests are conducted at the $5 \%$ significance level with the result that the group of all pairwise combinations is at a significance level greater than $5 \%$. Refer to Appendix E for more information on the tests of statistical hypotheses. For examples of how to interpret these diagrams, see Figures 2 and 3 in Section 6 of the report.

Table D. 1. Percentage of Reported Fuel Purchases With Complete Purchase Information

| Vehicle <br> Weight <br> Type | Purchase Reported | Option |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | 1 |  | 2 |  | 3 |  | 4 |  | 5 |  |
|  |  | Freq. | \% | Freq. | \% | Freq. | \% | Freq. | \% | Freq. | \% |
| Light | Complete | 318 | 78.7\% | 428 | 89.2\% | 197 | 82.4\% | 289 | 73.2\% | 202 | 76.2\% |
|  | Incomplete | 86 | 21.3\% | 52 | 10.8\% | 42 | 17.6\% | 106 | 26.8\% | 63 | 23.8\% |
|  | Total | 404 | 100.0\% | 480 | 100.0\% | 239 | 100.0\% | 395 | 100.0\% | 265 | 100.0\% |
| Heavy | Complete | 196 | 63.8\% | 303 | 71.8\% | 98 | 54.1\% | 260 | 69.7\% | 119 | 61.0\% |
|  | Incomplete | 111 | 36.2\% | 119 | 28.2\% | 83 | 45.9\% | 113 | 30.3\% | 76 | 39.0\% |
|  | Total | 307 | 100.0\% | 422 | 100.0\% | 181 | 100.0\% | 373 | 100.0\% | 195 | 100.0\% |
| Total | Complete | 514 | 72.3\% | 731 | 81.0\% | 295 | 70.2\% | 549 | 71.5\% | 321 | 69.8\% |
|  | Incomplete | 197 | 27.7\% | 171 | 19.0\% | 125 | 29.8\% | 219 | 28.5\% | 139 | 30.2\% |
|  | Total | 711 | 100.0\% | 902 | 100.0\% | 420 | 100.0\% | 768 | 100.0\% | 460 | 100.0\% |

Figure D. 4.Light Vehicles: Statistical Differences for the Percentage of Reported Fuel Purchases With Complete Purchase Information


Note: Options for which the response rates are not significantly different according to the Chi-square Test are joined by a line. See Appendix E for more information.

Figure D. 5. Heavy Vehicles: Statistical Differences for the Percentage of Reported Fuel Purchases With Complete Purchase Information


Note: Options for which the response rates are not significantly different according to the Chi-square Test are joined by a line. See Appendix E for more information.

The more complete the fuel purchase information is, the less imputation will have to take place. As noted in the previous section, heavy vehicles had lower response rates to variables such as the amount of fuel purchased and the price and this is reflected by the lower percentages of complete information observed. For both vehicle types, Option 2 has the highest rate of complete purchase information and is significantly different from Option 1.

Table D. 2. Percentage of Reported Fuel Purchases that are Fill-ups

| Vehicle <br> Weight <br> Type | Purchase Reported | Option |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | 1 |  | 2 |  | 3 |  | 4 |  | 5 |  |
|  |  | Freq. | \% | Freq. | \% | Freq. | \% | Freq. | \% | Freq. | \% |
| Light | Fill-up | 262 | 64.9\% | 304 | 63.3\% | 155 | 64.9\% | 238 | 60.3\% | 154 | 58.1\% |
|  | Partial | 142 | 35.1\% | 176 | 36.7\% | 84 | 35.1\% | 157 | 39.7\% | 111 | 41.9\% |
|  | Total | 404 | 100.0\% | 480 | 100.0\% | 239 | 100.0\% | 395 | 100.0\% | 265 | 100.0\% |
| Heavy | Fill-up | 221 | 72.0\% | 366 | 86.7\% | 115 | 63.5\% | 304 | 81.5\% | 177 | 90.8\% |
|  | Partial | 86 | 28.0\% | 56 | 13.3\% | 66 | 36.5\% | 69 | 18.5\% | 18 | 9.2\% |
|  | Total | 307 | 100.0\% | 422 | 100.0\% | 181 | 100.0\% | 373 | 100.0\% | 195 | 100.0\% |
| Total | Fill-up | 483 | 67.9\% | 670 | 74.3\% | 270 | 64.3\% | 542 | 70.6\% | 331 | 72.0\% |
|  | Partial | 228 | 32.1\% | 232 | 25.7\% | 150 | 35.7\% | 226 | 29.4\% | 129 | 28.0\% |
|  | Total | 711 | 100.0\% | 902 | 100.0\% | 420 | 100.0\% | 768 | 100.0\% | 460 | 100.0\% |

Figure D. 6. Light Vehicles: Statistical Differences for the Percentage of Reported Fuel Purchases that are Fill-ups


Note: Options for which the response rates are not significantly different according to the Chi-square Test are joined by a line. See Appendix E for more information.

Figure D. 7. Heavy Vehicles: Statistical Differences for the Percentage of Reported Fuel Purchases that are Fill-ups


Note: Options for which the response rates are not significantly different according to the Chi-square Test are joined by a line. See Appendix E for more information.

Fuel consumption without modeling can be calculated when two consecutive fill-ups are reported. The greater number of vehicles reporting two consecutive fill-ups, the better the quality of thefuel consumption estimates. Heavy vehicles report higher percentages of their purchases as fill-ups: Options 2 and 5 report $87 \%$ and $91 \%$, respectively, and are not significantly different from each other. Among light vehicles, however, at most $65 \%$ of the purchases are reported to be fill-ups.

The following tables are at the vehicle level for vehicles reporting fuel purchases.

Table D. 3. Number of Vehicles Reporting 2 or More Fuel Purchases

| Vehicle <br> Weight <br> Type | Number of Purchases | Option |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | 1 |  | 2 |  | 3 |  | 4 |  | 5 |  |
|  |  | Freq. | \% | Freq. | \% | Freq. | \% | Freq. | \% | Freq. | \% |
| Light | 0 or 1 | 13 | 9.8\% | 9 | 7.4\% | 6 | 8.3\% | 9 | 7.1\% | 16 | 16.5\% |
|  | 2 or more | 120 | 90.2\% | 112 | 92.6\% | 66 | 91.7\% | 117 | 92.9\% | 81 | 83.5\% |
|  | Total | 133 | 100.0\% | 121 | 100.0\% | 72 | 100.0\% | 126 | 100.0\% | 97 | 100.0\% |
| Heavy | 0 or 1 | 7 | 8.2\% | 11 | 11.2\% | 6 | 12.2\% | 9 | 8.8\% | 10 | 17.2\% |
|  | 2 or more | 78 | 91.8\% | 87 | 88.8\% | 43 | 87.8\% | 93 | 91.2\% | 48 | 82.8\% |
|  | Total | 85 | 100.0\% | 98 | 100.0\% | 49 | 100.0\% | 102 | 100.0\% | 58 | 100.0\% |
| Total | 0 or 1 | 20 | 9.2\% | 20 | 9.1\% | 12 | 9.9\% | 18 | 7.9\% | 26 | 16.8\% |
|  | 2 or more | 198 | 90.8\% | 199 | 90.9\% | 109 | 90.1\% | 210 | 92.1\% | 129 | 83.2\% |
|  | Total | 218 | 100.0\% | 219 | 100.0\% | 121 | 100.0\% | 228 | 100.0\% | 155 | 100.0\% |

Figure D. 8. Light Vehicles: Statistical Differences for the Percentage of Vehicles Reporting 2 or More Fuel Purchases


Note: Options for which the response rates are not significantly different according to the Chi-square Test are joined by a line. See Appendix E for more information.

Figure D. 9. Heavy Vehicles: Statistical Differences for the Percentage of Vehicles Reporting 2 or More Fuel Purchases


Note: Options for which the response rates are not significantly different according to the Chi-square Test are joined by a line. See Appendix E for more information.

Table D. 4. Number of Vehicles Reporting 2 or More Fuel Purchases with Complete Purchase Information

| Vehicle <br> Weight <br> Type | Number of Complete Purchases | Option |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | 1 |  | 2 |  | 3 |  | 4 |  | 5 |  |
|  |  | Freq. | \% | Freq. | \% | Freq. | \% | Freq. | \% | Freq. | \% |
| Light | 0 or 1 | 37 | 27.8\% | 19 | 15.7\% | 16 | 22.2\% | 37 | 29.4\% | 37 | 38.1\% |
|  | 2 or more | 96 | 72.2\% | 102 | 84.3\% | 56 | 77.8\% | 89 | 70.6\% | 60 | 61.9\% |
|  | Total | 133 | 100.0\% | 121 | 100.0\% | 72 | 100.0\% | 126 | 100.0\% | 97 | 100.0\% |
| Heavy | 0 or 1 | 30 | 35.3\% | 34 | 34.7\% | 26 | 53.1\% | 33 | 32.4\% | 26 | 44.8\% |
|  | 2 or more | 55 | 64.7\% | 64 | 65.3\% | 23 | 46.9\% | 69 | 67.6\% | 32 | 55.2\% |
|  | Total | 85 | 100.0\% | 98 | 100.0\% | 49 | 100.0\% | 102 | 100.0\% | 58 | 100.0\% |
| Total | 0 or 1 | 67 | 30.7\% | 53 | 24.2\% | 42 | 34.7\% | 70 | 30.7\% | 63 | 40.6\% |
|  | 2 or more | 151 | 69.3\% | 166 | 75.8\% | 79 | 65.3\% | 158 | 69.3\% | 92 | 59.4\% |
|  | Total | 218 | 100.0\% | 219 | 100.0\% | 121 | 100.0\% | 228 | 100.0\% | 155 | 100.0\% |

Figure D. 10. Light Vehicles: Statistical Differences for the Percentage of Vehicles Reporting 2 or More Fuel Purchases with Complete Purchase Information


Note: Options for which the response rates are not significantly different according to the Chi-square Test are joined by a line. See Appendix E for more information.

Figure D. 11. Heavy Vehicles: Statistical Differences for the Percentage of Vehicles Reporting 2 or More Fuel Purchases with Complete Purchase Information


Note: Options for which the response rates are not significantly different according to the Chi-square Test are joined by a line. See Appendix E for more information.

Table D. 5. Number of Vehicles Reporting 2 or More Fill-ups

| Vehicle <br> Weight <br> Type | Number of Fill-ups | Option |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | 1 |  | 2 |  | 3 |  | 4 |  | 5 |  |
|  |  | Freq. | \% | Freq. | \% | Freq. | \% | Freq. | \% | Freq. | \% |
| Light | 0 or 1 | 49 | 36.8\% | 45 | 37.2\% | 23 | 31.9\% | 50 | 39.7\% | 50 | 51.5\% |
|  | 2 or more | 84 | 63.2\% | 76 | 62.8\% | 49 | 68.1\% | 76 | 60.3\% | 47 | 48.5\% |
|  | Total | 133 | 100.0\% | 121 | 100.0\% | 72 | 100.0\% | 126 | 100.0\% | 97 | 100.0\% |
| Heavy | 0 or 1 | 24 | 28.2\% | 21 | 21.4\% | 21 | 42.9\% | 22 | 21.6\% | 15 | 25.9\% |
|  | 2 or more | 61 | 71.8\% | 77 | 78.6\% | 28 | 57.1\% | 80 | 78.4\% | 43 | 74.1\% |
|  | Total | 85 | 100.0\% | 98 | 100.0\% | 49 | 100.0\% | 102 | 100.0\% | 58 | 100.0\% |
| Total | 0 or 1 | 73 | 33.5\% | 66 | 30.1\% | 44 | 36.4\% | 72 | 31.6\% | 65 | 41.9\% |
|  | 2 or more | 145 | 66.5\% | 153 | 69.9\% | 77 | 63.6\% | 156 | 68.4\% | 90 | 58.1\% |
|  | Total | 218 | 100.0\% | 219 | 100.0\% | 121 | 100.0\% | 228 | 100.0\% | 155 | 100.0\% |

Figure D. 12. Light Vehicles: Statistical Differences for the Percentage of Vehicles Reporting 2 or More Fill-ups


Note: Options for which the response rates are not significantly different according to the Chi-square Test are joined by a line. See Appendix E for more information.

Figure D. 13. Heavy Vehicles: Statistical Differences for the Percentage of Vehicles Reporting 2 or More Fill-ups


Note: Options for which the response rates are not significantly different according to the Chi-square Test are joined by a line. See Appendix E for more information.

Fuel consumption without modeling can be calculated when two consecutive fill-ups are reported. The greater number of vehicles reporting two consecutive fill-ups, the better the quality of the fuel consumption estimates. From the above, fuel consumption could be calculated directly for fewer than $70 \%$ of the light vehicles reporting fuel purchases and fewer than $80 \%$ of the heavy vehicles reporting fuel purchases. For light vehicles, Option 5 has the fewest vehicles with two or more fill-ups. This is likely related to the fewer purchases reported by light vehicles in Option 5, perhaps as they mail back the log as soon as the 7-day trip portion is completed. Among heavy vehicles, Option 3 is significantly different from Options 4 and 2.

Table D. 6. Number of Vehicles Reporting 2 or More Fill-ups With Complete Purchases Information

| Vehicle <br> Weight <br> Type | Number of Complete Fill-ups | Option |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | 1 |  | 2 |  | 3 |  | 4 |  | 5 |  |
|  |  | Freq. | \% | Freq. | \% | Freq. | \% | Freq. | \% | Freq. | \% |
| Light | 0 or 1 | 54 | 40.6\% | 46 | 38.0\% | 23 | 31.9\% | 56 | 44.4\% | 52 | 53.6\% |
|  | 2 or more | 79 | 59.4\% | 75 | 62.0\% | 49 | 68.1\% | 70 | 55.6\% | 45 | 46.4\% |
|  | Total | 133 | 100.0\% | 121 | 100.0\% | 72 | 100.0\% | 126 | 100.0\% | 97 | 100.0\% |
| Heavy | 0 or 1 | 35 | 41.2\% | 39 | 39.8\% | 30 | 61.2\% | 38 | 37.3\% | 29 | 50.0\% |
|  | 2 or more | 50 | 58.8\% | 59 | 60.2\% | 19 | 38.8\% | 64 | 62.7\% | 29 | 50.0\% |
|  | Total | 85 | 100.0\% | 98 | 100.0\% | 49 | 100.0\% | 102 | 100.0\% | 58 | 100.0\% |
| Total | 0 or 1 | 89 | 40.8\% | 85 | 38.8\% | 53 | 43.8\% | 94 | 41.2\% | 81 | 52.3\% |
|  | 2 or more | 129 | 59.2\% | 134 | 61.2\% | 68 | 56.2\% | 134 | 58.8\% | 74 | 47.7\% |
|  | Total | 218 | 100.0\% | 219 | 100.0\% | 121 | 100.0\% | 228 | 100.0\% | 155 | 100.0\% |

Figure D. 14. Light Vehicles: Statistical Differences for the Percentage of Vehicles Reporting 2 or More Fill-ups With Complete Purchases Information


Note: Options for which the response rates are not significantly different according to the Chi-square Test are joined by a line. See Appendix E for more information.

Figure D. 15. Heavy Vehicles: Statistical Differences for the Percentage of Vehicles Reporting 2 or More Fill-ups With Complete Purchases Information


Note: Options for which the response rates are not significantly different according to the Chi-square Test are joined by a line. See Appendix E for more information.

## Quality of the Trip Data

It is desired to maintain the quality of the CVS-Trip data. A decrease in the response rate will affect the quality of the estimates and introduce a greater potential for biased estimates. The amount and type of data reported may also be affected by the addition of the CVS-Fuel. In order to compare the reported trip data of Options 3,4 and 5 with the reported trip data of the current CVS, a crude comparison of the provided data was performed to give an idea of the effect of the fuel component on the quality of the trip data reported.

The Fuel Pilot Survey data was that which was received and captured on or before April 16, 2003, and did not go through an edit and imputation process. Some basic editing was done to correct for obvious errors in the dates of trips and glaring inconsistencies between odometer readings. Only those vehicles for which information was provided were included for each analysis. The CVS data used is that for the first 8 weeks of quarter 4, 2002, for vehicles registered in the provinces of Ontario and New Brunswick, excluding buses. The CVS data used has not gone through the edit and imputation process, but the basic editing done for the Fuel Pilot Survey data has been performed. When the number of days accounted for was available, the values were prorated so as to represent 7 days of reporting. T

The details of the analysis are found in Appendix D in the Section Quality of the Trip Quality.
The diagrams that follow indicate the results of the tests of statistical hypotheses to compare differences. Options for which the values are not significantly different are joined by a line. The group of all pairwise tests is at a significance level of $5 \%$. Refer to Appendix E for more information on the tests of statistical hypotheses. For examples of how to interpret these diagrams, see Figures 2 and 3 in Section 6 of the report.

Figure D. 16. Light Vehicles: Statistical Differences for the Number of Days Not In Use


Note: Options for which the number of days not in use are not significantly different according to the Tukey Multiple Comparison Procedure are joined by a line. See Appendix E for more information.

Figure D. 17. Heavy Vehicles: Statistical Differences for the Number of Days Not In Use


Note: Options for which the number of days not in use are not significantly different according to the Tukey Multiple Comparison Procedure are joined by a line. See Appendix E for more information.

There are no statistical differences in the number of days reported as not in use among the light vehicles. Among heavy vehicles, Options 4 and 5 are statistically different from each other, but not from the CVS.

Figure D. 18. Light Vehicles: Statistical Differences for the Distance Traveled


Note: Options for which the distances traveled are not significantly different according to the Tukey Multiple Comparison Procedure are joined by a line. See Appendix E for more information.

Figure D. 19. Heavy Vehicles: Statistical Differences for the Distance Traveled


Note: Options for which the distances traveled are not significantly different according to the Tukey Multiple Comparison Procedure are joined by a line. See Appendix E for more information.

There appears to be no statistical differences between the distances reported by light or heavy vehicles among the different options

Figure D. 20. Light Vehicles: Statistical Differences for the Number of Trips Reported


Note: Options for which the number of trips reported are not significantly different according to the Tukey Multiple Comparison Procedure are joined by a line. See Appendix E for more information.

Figure D. 21. Heavy Vehicles: Statistical Differences for the Number of Trips Reported


Note: Options for which the number of trips reported are not significantly different according to the Tukey Multiple Comparison Procedure are joined by a line. See Appendix E for more information.

Vehicles in Options 5 report significantly different number of trips than in CVS. Option 5 would tend to have more trips reported if the respondent reports a trip as being finished at the time of a fuel purchase, when in the CVS-Trip log the trip would have stopped at a later time. This would need further investigation.

Figure D. 22. Light Vehicles: Statistical Differences for the Cost of the Fuel Purchases Reported


Note: Options for which the costs of the fuel purchases reported are not significantly different according to the Tukey Multiple Comparison Procedure are joined by a line. See Appendix E for more information.

Figure D. 23. Heavy Vehicles: Statistical Differences for the Quantity of the Fuel Purchases Reported


Note: Options for which the quantities of the fuel purchases reported are not significantly different according to the Tukey Multiple Comparison Procedure are joined by a line. See Appendix E for more information.

The data reported for the fuel question of the trip $\log$ (not on the combined $\log$ of Option 5) for Options 3 and 4 CVS-Trip logs was compared to that of the CVS. In the case of light vehicles, the highest average cost was reported for Option 4 and was significantly different from the CVS. For heavy vehicles, the highest average quantity reported was for Option 3 and was significantly different from the CVS.

## Appendix E: Description of Tests of Statistical Hypotheses

Tests of statistical hypotheses were conducted in order to determine if the response rates were significantly different among the options and if differences in the trip data reported were significant.

## Pearson Chi-square Test

The Pearson chi-square statistic can be thought of as a test of difference between two proportions. The null hypothesis of no association was tested. This was used to compare response rates.

## Tukey Multiple Comparison Procedure

This procedure considers the set of all pairwise comparisons among the options of interest and utilizes the studentized range distribution. Since the sample sizes are not equal among the options, the procedure is conservative. In other words, the significance level for the group of comparisons is less than that used.

The significance level of the test denoted the probability of rejecting the null hypothesis, that of no difference (equality) and accepting the alternative hypothesis when the null hypothesis is true. A significance level of $5 \%$ was used for the tests. Alternately we can say that the confidence coefficient (1-the significance level) is $95 \%$. As multiple comparisons were made using the Chisquare Test, each at the $5 \%$ significance level, then the findings of all the comparisons combined is at a level of significance greater than $5 \%$, or a confidence coefficient less than $95 \%$.

The results of these tests are indicated by diagrams in which options for which the response rates or variable values are not significantly different are joined by a line. Figures 2 and 3 in Section 6 of the report are examples of these diagrams and are explained thoroughly as examples of how to interpret the diagrams.

Note: Failure to reject the null hypothesis implies that the difference between population means, if any, is not large enough to be detected with the given sample size and not that the null hypothesis is indeed true.

## Appendix F: Description of the Calculation of the Estimated C.V.'s

In order to calculate the expected C.V's, a formula for determining the approximate sample size necessary for a certain level of precision was determined. This formula was then used to calculate the expected C.V.'s for a given sample size.

The sample size required depends on the characteristics of interest, the desired precision of their estimates, the population level at which these estimates are required, and the variability of these characteristics in the population. When estimates for portions of a population are desired, a larger sample will be required so that an adequate number of units in the group of interest are sampled. Formulae are known for calculating the sample size required in order to achieve a certain level of precision when a simple random sample (SRS) from the entire population is to be selected. For the CVS and the Fuel Pilot Survey, however, the survey design is more complex due to stratification, sample allocation and estimation strategies; it is therefore necessary to adjust the sample size under SRS to take these factors into account.

The current CVS design was compared to a SRS of vehicles and vehicle-days across the Canadian provinces (note that territories were excluded). The design effect, a measure of the effectiveness of a design in comparison to a SRS, was produced. The design of the CVS, trip portion, for options 3,4 and 5 is the same as the current CVS design and so the current CVS design effects were used as an approximation in the estimated C.V.'s calculation.

To simulate a design for the fuel survey, a SRS stratified by province, vehicle type (light vehicles weighing less than 4.5 t , trucks weighing 4.5 t to under 15 t , and trucks weighing 15 t and over) and vehicle age was assumed. This was done as there is no need for individual daily observations to estimate the fuel consumed and the distance traveled for the CVS-Fuel. A comparison was then made between the assumed stratified SRS to a SRS within each vehicle type to calculate the design effects. The design effects calculated were used to approximate the design of a fuel purchase log for a one-month period similar to that used in NaPVUS. This was done using CVS data

The sample size under SRS was further adjusted to account for the fact that not all sampled vehicles will provide sufficient information (nonresponse). The response rates achieved by the Fuel Pilot Survey were used to establish the sample sizes. Furthermore, to calculate fuel consumption without the use of a model, two consecutive fill-ups must be provided for the vehicle and so not all responses would be deemed usable. This is equivalent to a lower response rate. In this case, extra units would have to be sampled to compensate for the additional loss of responses.

The levels of precision are expressed by the coefficient of variation (C.V.), which is a measure of the relative error of the estimate. The formulae used to calculate the sample size, can then be used to calculate the estimated C.V.'s, given a sample size.

When both the CVS and the Fuel Survey occur at the same time in order to collect both trip and fuel information, an increase in the quality of some of the estimates, such as vehicle-kilometers (by vehicle characteristics), would likely be achieved by combining the information from both parts of the survey. But that is not taken into account in the scenarios examined.

Note that the approximate sample sizes provided are for vehicles registered in the ten provinces as the territories are excluded. Furthermore, the sample sizes provided do not guarantee the expected level of precision, but should ensure that three-quarters of the estimates are of the expected quality or better.

The following sections describe in detail the procedure used to produce the tables of expected C.V.'s. In particular the formula used to calculate the sample size for a simple random sample and how this was adjusted to compensate for nonresponse as well as the complexity of the survey designs that will be used for the CVS-Fuel are described. This formula is then used to calculate the expected C.V.'s for a given sample size.

## Equations for Sample Size Calculations

In order to calculate the sample size necessary to control the relative error in the estimated population mean (or total) under a SRS, we have the following, assuming that the sample mean is normally distributed:

$$
n_{S R S}=\left(\frac{t S}{r \bar{Y}}\right)^{2} /\left[1+\frac{1}{N}\left(\frac{t S}{r \bar{Y}}\right)^{2}\right]
$$

where:
$n_{S R S} \quad$ is the sample size for a SRS
$\mathrm{N} \quad$ is the population size
r is the 'accepted' relative error
$\bar{Y} \quad$ is the population mean
$\alpha \quad$ is the probability that the relative error in the estimated population total is greater than r
$t \quad$ is the abscissa of the normal curve that cuts off an area of size $\alpha$ at the tails of the normal distribution
$y_{i} \quad$ is the value for a unit in the population
S is the population standard error where $S^{2}=\frac{\sum_{1}^{N}\left(y_{i}-\bar{Y}\right)^{2}}{N-1}$

When the N is large so that the sampling fraction is small, we can approximate the sample size by

$$
n_{o}=\left(\frac{t S}{r \bar{Y}}\right)^{2}=\frac{C V^{2}}{c v^{2}}
$$

where:
$n_{0} \quad$ is the approximate sample size for a SRS when N is large
$C V^{2}$ is the population coefficient of variation (C.V.)
$c v^{2}$ is the C.V. desired from the sample

To estimate the sample size required for a sampling plan other than SRS, the modified design effect (Deff) is applied (a discussion of the modified design effect follows). The response rate (R) is taken into account as well so that, when N is large, we have the following formula to estimate the sample size:

$$
n=\operatorname{Deff}\left(\frac{1}{R}\right)\left(\frac{C V^{2}}{c v^{2}}\right)
$$

It is important to note that the sample size as calculated above is an estimate and does not guarantee the desired C.V.

To calculate the expected C.V., $c v_{E}^{2}$ for a given sample size we have:

$$
c v_{E}^{2}=\operatorname{Deff}\left(\frac{1}{R}\right)\left(\frac{1}{n}\right) C V^{2}
$$

## The Modified Design Effect

The design effect is typically defined as the ratio of the variance of the estimate obtained from the actual sample (of a more complex design) to the variance of the estimate obtained from a SRS of the same number of units. The design effect is used to evaluate the efficiency of more complex sampling plans and in estimating the necessary sample size.
For the purpose of estimating the sample size required for the CVS-Fuel, modified design effects (Deff) were used. The design effects were modified by the squared ratio of the estimate from a SRS to the estimate from the more complex design. This reflects the differences in the size of the estimates. The modified design effects were calculated as follows:

$$
\operatorname{Deff}=\left(\frac{V_{C}}{V_{S R S}}\right)\left(\frac{E_{S R S}}{E_{C}}\right)^{2}=\left(\frac{C V_{C}}{C V_{S R S}}\right)^{2}
$$

where:
$V_{C} \quad$ is the variance of the estimate obtained under the complex design
$V_{S R S}$ is the variance of the estimate obtained under a SRS of the same number of units
$E_{C} \quad$ is the estimate obtained under the complex design
$E_{S R S}$ is the estimate obtained under a SRS of the same number of units
$C V_{C}$ is the C.V. of the estimate obtained under the complex design
$C V_{S R S}$ is the C.V. of the estimate obtained under a SRS of the same number of units
The modified design effects for the CVS-Trip were calculated based on the CVS data for both the fourth quarter of 2000 and the first quarter of 2001 in comparison to a SRS within each vehicle type. To model the CVS-Fuel of the survey, the CVS data was assumed to be a stratified (by province, vehicle type and vehicle age) SRS of vehicles and vehicle-weeks and this was compared to a SRS within each vehicle type. For each vehicle type and type of estimate, a
conservative value (the $75^{\text {th }}$ percentile) of the modified design effects was chosen and the average for the two periods was taken.

Table F. 1: Modified Design Effects

| Modified Design Effects | Vehicle Type |  |  |  |
| :--- | :---: | :---: | :---: | :---: |
|  | Less than 4.5t | 4.5 to under <br> 15 t | 15 t and over |  |
| Vehicle counts | 1.3 | 1.1 | 1.2 |  |
| CVS-Fuel | Vehicle-km by vehicle <br> characteristics | 1.4 | 1.2 | 1.3 |
|  | Fuel | 3.9 | 1.3 | 1.5 |
|  | Vehicle-km by vehicle <br> characteristics | 4.2 | 4.5 |  |
|  | Fuel | 2.4 | 3 | 3.1 |
|  | Passenger-km and vehicle-km <br> by trip characteristics | 2.5 | 3 | 3.4 |

## Response Rates

The response rate has an impact on the necessary sample size. The lower the response rate, the larger the sample size that is required so that a sufficient number of responding units is obtained.

The response rates used to calculate the expected C.V.'s are the response rates observed for the Fuel Pilot Survey. At the vehicle level (vehicle-km) the response rate is higher as information can be obtained from CATI without the completion of a trip or fuel log which require more effort on the respondent's part. Information such as fuel use and passenger-km require the completion of the trip or fuel log which have lower response rates as they constitute a heavier response burden.

Table F. 2: Response Rates

| Level of Estimate | Vehicle Type | Option |  |  |
| :---: | :---: | :---: | :---: | :---: |
|  |  | 1 | 2 | 5 |
| Vehicle Level (vehicle-km by vehicle charac.) | Less than 4.5 t | 61\% | 61\% | 61\% |
|  | 4.5 t to under 15 t | 54\% | 54\% | 54\% |
|  | 15 t and over | 53\% | 53\% | 53\% |
| Log Level (passenger-km, fuel) | Less than 4.5 t | 33\% | 31\% | 29\% |
|  | 4.5 t to under 15 t | 32\% | 34\% | 30\% |
|  | 15 t and over | 32\% | 34\% | 30\% |

Table F. 3: Percentage of Reported Logs With 2 or More Fill-ups

| Vehicle Type | Option |  |  |
| :---: | :---: | :---: | :---: |
|  | $\mathbf{1}$ | $\mathbf{2}$ | $\mathbf{5}$ |
| Less than 4.5t | $63 \%$ | $63 \%$ | $48 \%$ |
| 4.5t to under 15t | $72 \%$ | $79 \%$ | $74 \%$ |
| 15t and over | $72 \%$ | $79 \%$ | $74 \%$ |

## Population Coefficient of Variation

Since the C.V. of the population is unknown, a value of 1 is used to estimate the sample size for the CVS-Fuel as this represents the worse case scenario. In fact, the CVS has attained this upper bound on several occasions.

Appendix G: Schedule of Mail Out Activities

Table G. 1. Mail Out Schedule for the CVS and the 5 Options


Notes:
Week 1 is the first week after the end of the quarter. It is the latest possible week for mailing out the first log for each quarterly sample.
The final possible mail out (worst case) for each option is shown in bold.
An additional two months are required after the final mail out to receive all returns and produce the estimates
Option 5 includes the postcard/short form that are part of the follow-up procedure expected to be implemented

# Appendix H: Logs for the Pilot Survey 

Fuell Log - Options 1, 3 and 4 Fuel2 Log - Option 2
Combined Log for Light Vehicles - Option 5
Combined Log for Heavy Vehicles - Option 5


Confidential once completed
Collected under the authority of the Statistics Act, Revised Statutes of Canada, 1985, Chapter S19.
Si vous préférez ce questionnaire en français, veuillez nous appeler au numéro de téléphone indiqué ci-dessous.

## Survey Objective

The purpose of this survey is to help Transport Canada to monitor fuel consumption and the impact of vehicle usage on the environment.

## Instructions

Please verify that the information on the label on page 2 is correct and write any corrections on the label.

## Please report only for the vehicle identified on the label.

As soon as you receive the questionnaire, please record the date and the current odometer reading.
Please answer the questions and report all fuel purchases made for the reporting period indicated on the label.
Please return the questionnaire as soon as you have recorded two fill-ups (by fill-up, we mean that the gas tank was full after your purchase). If you do not fill-up twice, please return the questionnaire after making five fuel purchases or when the return date indicated on the label has passed. Record the date and the odometer reading before returning the questionnaire.
Please seal the questionnaire and return by mail. No stamp is required.

## Definitions

The odometer is the instrument on the front dash or panel of your vehicle which measures the distance that your vehicle has been driven to date.
Please provide the odometer reading at the time of the fuel purchase. It is not necessary to report the tenths.
The fuel gauge is the instrument on the front dash or panel of your vehicle that indicates the amount of fuel left in the fuel tank. Please indicate the amount of fuel in the fuel tank just prior to your fuel purchase and again after your fuel purchase by putting an X in the box that best describes the amount of fuel indicated by the gauge.
You may record the quantity of fuel purchased by either indicating the volume pumped (number of litres or gallons) or the total price.

## Federal Agreement

To avoid duplication in surveys, Statistics Canada has entered into an agreement under Section 12 of the Statistics Act with the Federal Department of Transport for the sharing of information from this survey. Under Section 12 of the Statistics Act, you may refuse to share your information with the Federal Department of Transport by writing to the Chief Statistician and returning your letter of objection along with the completed questionnaire.

While participation in this survey is voluntary, your cooperation is very important.

Thank you very much for your cooperation.

## Place label here

## General Information

1. Do you still own or lease the vehicle described above?
$\bigcirc$ Yes $\bigcirc$ Never owned or leased the identified vehicle
O No $\rightarrow$ Was this vehicle, (please check where applicable and record the date in the box provided)

Mailing instructions: $>1$. Please remove paper strip. 2. Fold flap and seal onto the back cover. 3. Mail.



## General Information

2. Which of the following best describes this vehicle?


| Enter quantity purchased | Enter amount spent | Price per litre/gallon | Fuel gauge after purchase |
| :---: | :---: | :---: | :---: |
| $\square$ . ]. litres US gallons other | \$ | . $\square$ $\phi$ | $\bigcirc$ full <br> $7 / 8$ full <br> $3 / 4$ full $5 / 8$ full 1/2 full $3 / 8$ full 1/4 full $1 / 8$ full |
| $\square$ . litres US gallons other $\qquad$ | \$ $\square$ <br> . | $\square$ $\phi$ | $\bigcirc$ full <br> $7 / 8$ full <br> $3 / 4$ full <br> $5 / 8$ full <br> $1 / 2$ full <br> $3 / 8$ full <br> $1 / 4$ full <br> 1/8 full |
| $\square$ litres US gallons other | \$ | . $\square$ $\phi$ | $\bigcirc$ full <br> $7 / 8$ full <br> $3 / 4$ full <br> 5/8 full <br> $1 / 2$ full <br> $3 / 8$ full <br> $1 / 4$ full <br> ${ }_{1 / 8}$ full |
| $\square$ . litres US gallons other | \$ $\square$ <br> . | , $\square$ $\phi$ | $\bigcirc$ full <br> $7 / 8$ full <br> $3 / 4$ full <br> $5 / 8$ full <br> $1 / 2$ full <br> $3 / 8$ full <br> $1 / 4$ full 1/8 full |
| $\square$ . litres US gallons other | \$ | . $\square$ $\phi$ | $\bigcirc$ full <br> $7 / 8$ full <br> $3 / 4$ full <br> 5/8 full <br> $1 / 2$ full <br> $3 / 8$ full <br> $1 / 4$ full <br> $1 / 8$ full |



Confidential once completed
Collected under the authority of the Statistics Act, Revised Statutes of Canada, 1985, Chapter S19.
Si vous préférez ce questionnaire en français, veuillez nous appeler au numéro de téléphone indiqué ci-dessous.

## Survey Objective

The purpose of this survey is to help Transport Canada to monitor fuel consumption and the impact of vehicle usage on the environment.

## Instructions

Please verify that the information on the label on page 2 is correct and write any corrections on the label.

## Please report only for the vehicle identified on the label.

As soon as you receive the questionnaire, please record the date, the current odometer reading and the fuel gauge.
Please answer the questions and report all fuel purchases made for the reporting period indicated on the label.
Please return the questionnaire after making five fuel purchases or when the return date indicated on the label has passed. Record the date, the odometer reading and the fuel gauge before returning the questionnaire.
Please seal the questionnaire and return by mail. No stamp is required.

## Definitions

The odometer is the instrument on the front dash or panel of your vehicle which measures the distance that your vehicle has been driven to date.
Please provide the odometer reading at the time of the fuel purchase. It is not necessary to report the tenths.

The fuel gauge is the instrument on the front dash or panel of your vehicle that indicates the amount of fuel left in the fuel tank.
You may record the quantity of fuel purchased by either indicating the volume pumped (number of litres or gallons) or the total price.

## Federal Agreement

To avoıd duplıcatıon in surveys, Statistıcs Canada has entered into an agreement under Section 12 of the Statistics Act with the Federal Department of Transport for the sharing of information from this survey. Under Section 12 of the Statistics Act, you may refuse to share your information with the Federal Department of Transport by writing to the Chief Statistician and returning your letter of objection along with the completed questionnaire.
While participation in this survey is voluntary, your cooperation is very important.

Thank you very much for your cooperation.
5-5400-150.1: 2002-07-11 STC/TRA-400-75335
Statistics
Statistique
Canada

## Place label here

## General Information

1. Do you still own or lease the vehicle described above?
$\bigcirc$ Yes $\bigcirc$ Never owned or leased the identified vehicle
ONo $\rightarrow$ Was this vehicle, (please check where applicable and record the date in the box provided)
Mailing instructions: > 1. Please remove paper strip. 2. Fold flap and seal onto the back cover. 3. Mail.
 reading and the fuel gauge.

| $\bigcirc 7 / 8$ full | $\bigcirc 3 / 8$ full |
| :---: | :---: |
| $3 / 4$ full | $\bigcirc 1 / 4$ full |
| $5 / 8$ full | 〇 $1 / 8$ full |
| $\mathbf{1} / \mathbf{2}$ full | empty |


|  | Enter date of fuel purchase | Enter odometer reading at time of purchase | Type of fuel |
| :---: | :---: | :---: | :---: |
| 1 |  | Odometer <br> kilometres <br> miles | regular gasoline mid-grade gasoline premium gasoline ethanol blend diesel other $\qquad$ |
| 2 |  | Odometer | regular gasoline mid-grade gasoline premium gasoline ethanol blend diesel other $\qquad$ |
| 3 |  | Odometer | regular gasoline mid-grade gasoline premium gasoline ethanol blend diesel other $\square$ |
| 4 |  | Odometer | regular gasoline mid-grade gasoline premium gasoline ethanol blend diesel other $\qquad$ |
| 5 |  | Odometer | regular gasoline mid-grade gasoline premium gasoline ethanol blend diesel other $\qquad$ |

## General Information

2. Which of the following best describes this vehicle?


| Enter quantity purchased | Enter amount spent | Price per litre/gallon | Fill up indicator |
| :---: | :---: | :---: | :---: |
| $\square$ <br> . litres US gallons other $\qquad$ | $\$$ $\square$ | . $\square$ $\phi$ | Was this purchase a fill up? yes no |
| $\square$ . $\square$ litres US gallons other | \$ $\square$ | - $\square$ $\phi$ | Was this purchase a fill up? yes no |
| . $\square$ litres US gallons other | $\$$ <br> . | - $\square$ $\phi$ | Was this purchase a fill up? yes no |
| $\square$ <br> . $\square$ litres US gallons other | $\$$ . $\square$ | $\square$ . $\square$ $\phi$ | Was this purchase a fill up? yes no |
| . $\square$ litres US gallons other $\qquad$ | \$ $\square$ . $\square$ | - $\square$ $\phi$ | Was this purchase a fill up? yes no |



Canadian Vehicle Survey - Trip and Fuel Log


Confidential once completed
Collected under the authority of the Statistics Act, Revised Statutes of Canada, 1985, Chapter S19.
Si vous préférez ce carnet des activités de conduite en français, veuillez nous appeler au numéro de téléphone indiqué ci-dessous.

## Survey Objective

The purpose of the survey is to help Transport Canada improve road safety, monitor fuel consumption and deal with the impact of vehicle usage on the environment. The information you give us will be combined with other data already available to provide a better picture of the total distance travelled by vehicles, safety issues, and fuel purchases. The information you are asked to provide in this trip and fuel log covers:

- Starting and ending time of each trip - to see when traffic is on the road.
- Odometer readings for each trip - to measure distance travelled.
- Purpose of each trip - to see why people are travelling.
- Number of passengers on each trip and types of roads driven - to provide information related to safety.
- Driver's sex and age group - to obtain a profile of drivers.
- Fuel purchases - to get information about any purchases in this period.


## For more background information about specific questions, please see the inside back cover.

Reporting procedure
Please complete the trip and fuel log for the first week of the period stated on the label on page 2. Then continue to complete the fuel portion of the log for the remainder of the period stated on the label or until you have recorded two fill-ups or made five fuel purchases.

Any questions or concerns?
1-800-647-0642

Thank you very much for your cooperation.

## Place label here

## Please read this first

## Please do not complete this log while driving.

1. Please verify that the vehicle information on the label above is correct and write any corrections on the label.
2. Please report only for the vehicle identified on the label.

## General Information

1. Do you still own or lease the vehicle described on the label?YesNever owned or leased the identified vehicleNo $\rightarrow$ Was this vehicle, (please check where applicable and record the date in the box provided)
Sold/tradedscrappedreturned (end of lease)leased to someone else
other: please specify: $\qquad$

Note: If you do not own or lease this vehicle, please mail back the trip log at this point.
2. Which of the following best describes this vehicle?

Ocarstation wagonbus
van
sport utility (Bronco, sport utility (Bronco,
Blazer, Jeep, Pathfinder)

pick-up
3. What kind of fuel does this vehicle use?

gasoline
diesel
natural gas
propaneother
(please specify)

## Federal Agreement

To avoid duplication in surveys, Statistics Canada has entered into an agreement under section 12 of the Statistics Act with the Federal Department of Transport for the sharing of information from this survey. Under section 12 of the Statistics Act you may refuse to share your information with the Federal Department of Transport by writing to the Chief Statistician and returning your letter of objection along with the completed questionnaire.

While participation in this survey is voluntary, your cooperation is very important.

Based on our tests, most people have found that it is easier to complete the trip and fuel log if it is kept in the vehicle.

All drivers using this vehicle should complete the trip log.
In order to get an accurate measurement of fuel purchases, please do NOT change your usual pattern of fuel purchases.
For trip purposes, if this vehicle was not "in use" during the reporting period, please provide the date(s) in the table below.


## Odometer Reading

## As soon as you receive this log, please record the date and the current odometer reading.

Please record the date and odometer reading before returning this log.


## Instructions For Completing the Trip and Fuel Log

Listed below are the instructions for completing the trip and fuel log. Please read them carefully and if you have any questions, contact us at the toll-free number shown on the front cover.
Odometer
The odometer is the instrument on the front dash or panel of your vehicle which measures the distance that your vehicle has been driven to date.

## Odometer Reading

For trip purposes please provide the odometer reading at the beginning and at the end of each trip to the nearest kilometre. For fuel purposes please provide the odometer reading at the time of the fuel purchase. It is not necessary to report the tenths.

The fuel gauge is the instrument on the front dash or panel of your vehicle that indicates the amount of fuel left in the fuel tank. Please indicate the amount of fuel in the fuel tank just prior to your fuel purchase and again after your fuel purchase by putting an $X$ in the box that best describes the amount of fuel indicated by the gauge.
You may record the quantity of fuel purchased by either indicating the volume pumped (number of litres or gallons) or the total price.

## Trip /Trip Purpose

A trip is defined as your travel from one location to another for a specific purpose such as to or from work or school (the types of trip purpose are listed in question 9). Report a separate trip if there is:

- a change in the main trip purpose - for instance, if you leave your home to go shopping and then you travel to a social function, report this as two trips (see detailed examples 1 and 3 on pages 4 and 5).


## Or

- a stop of more than 30 minutes - for instance, if you leave home to go to work or school and you stay there more than 30 minutes, report this as two trips, since we need to know when the vehicle is actually on the road (see detailed examples 1 and 2 on pages 4 and 5).


## or

- a change of driver


## Picking up or delivering dangerous goods

If you are transporting products regulated under the Transportation of Dangerous Goods Regulations, please check the dangerous goods box.

## Fuel

If you purchase fuel during a trip, please record fuel log on page 26 and 27.

Note:

Flip out this page.
It has the written description for the three examples.

The completed trip logs, for these examples, are on pages 4 and 5.
Example 1 - No change in the main trip purpose.
John is a male driver who is 36 years old. On September 8, John and his wife (who is 32 years old) leave their home at 7:05 a.m. to go to work (he should enter 1 passenger in Question 3). On the way, they stop to buy $\$ 22.00$ in gas and they also stop to pick up a coffee. John then stops to drop his wife off at her office and arrives at his work at 7:45 (he checks off "none" for the number of passengers in Question 6, since his wife is not in the car at the end of the trip). The odometer at the beginning of the trip reads 74,836 kilometres and the odometer reading at the end of the trip reads 74,851 kilometres. Of the total distance driven (15 kilometres) approximately 7 kilometres were driven on roads with a posted speed limit of $80 \mathrm{~km} / \mathrm{h}$ or more.
This would be considered as one trip because no stop is greater than 30 minutes and the main purpose of the trip is to go to work. John's return trip home from work would be reported as a separate trip since he will be at work for more than 30 minutes and we need to know when the vehicle is actually on the road.

## Example 2 - Same trip purpose but all stops are less than 30 minutes.

Mary is a female driver, 45 years old, who works for a delivery company. On November 5, she leaves the warehouse at 8:00 a.m. and makes 20 deliveries during the day, never stopping for more than 30 minutes on any delivery, until she returns to the warehouse at 4:37 p.m. The odometer reading when she leaves the warehouse reads 122,223 kilometres and the odometer reading when she returns to the warehouse reads 122,373 kilometres. Of the total distance driven (150 kilometres), 90.5 kilometres were driven on roads with a posted speed limit of $80 \mathrm{~km} / \mathrm{h}$ or more.
This would be considered as one trip because the main purpose has not changed throughout all these deliveries, and none of the stop times were ever greater than 30 minutes. However, if she had stopped for any reason for over 30 minutes, then this trip would end, and a separate trip should be entered.

## Example 3 - Two trips due to a change in the main trip purpose.

On October 8, Myrna, a 33 year old female driver, leaves her home with her three children at 4:10 p.m. to go to the dentist office, where her two elder children (ages 10 and 7) and herself have scheduled appointments. On the way to the mall she drops off the youngest child (age 3) at her parents' house and stays for only 5 minutes. They arrive at the mall at 4:37 p.m. The odometer at the beginning of the trip reads 33,245 kilometres and the odometer reading at the end of the trip reads 33,257 kilometres. Of the total distance driven (12 kilometres), 10 kilometres were driven on roads with a posted speed limit of $80 \mathrm{~km} / \mathrm{h}$ or more. At 5:57 p.m. Myrna and her two children leave the dentist to go to a birthday party and arrive there at $6: 15 \mathrm{p} . \mathrm{m}$. The odometer at the beginning of the trip reads 33,257 kilometres and the odometer reading at the end of the trip reads 33,264 kilometres. Of the total distance driven ( 7 kilometres), none was on roads with a posted speed limit of $80 \mathrm{~km} / \mathrm{h}$ or more. This would be considered as two trips because the main purpose of the trip has changed from traveling to do errands to traveling to a recreational or social event.

Flip out this page for quick reference.

Beginning with the date on the label on page 2 of this log - please complete the trip and fuel log for the first week only and then only the fuel portion of the log for the remainder of the period.

What if this vehicle isn't used much or at all?


This survey wants to measure how much Canadians are using or not using their vehicles.

For our studies - a vehicle not in use is just as important as one that is.

Days that the vehicle is not in use should be recorded on page 3.

Please mail back this log if you no longer own this vehicle.

All kilometres or miles travelled during the first 7 days should be accounted for.


A new trip should be started if:

1. You stop longer than 30 minutes.
2. The main trip purpose changes.
3. The driver changes.

For examples of different trip situations, please see pages 4 and 5.

For Question 7, please select only one "Purpose of Trip". (i.e. should be the main purpose)


## Mailing Instructions:

When log is completed, please remove paper strip on outer flap, fold flap and seal onto the back cover - then mail.

## Thank you very much for your time and participation.

For a written description of these examples please see the "flip-out" page.


## Example 3 - trip 1

1. Date / Time trip started:
date

| $\mathbf{8}$ | $\mathbf{1 0}$ |
| :---: | :---: |
| dd | mm |

4:10
a.m.
a p.m.
24hr

3. Number of passengers (excluding driver) in each age group at beginning of trip. Check if none.

6. Number of passengers (excluding driver) in each age group at end of trip. Check if none

| None $\bigcirc$ | Under <br> 5 years |
| :--- | :--- |
| 5 to 14 |  |
| years |  |$\quad \mathbf{2} \quad$| 15 years |
| :--- |
| and over |

7. Why are you making this trip? (check one purpose only)
O To go home
O To go to work or school
$\varnothing$ To do shopping or errands (such as personal or family appointments)
O To go to a recreational or social activityTo go somewhere else (specify)
Driving as part of the job
O picking up or delivering goods $\bigcirc$ dangerous goods
O to or from service call
O other work purpose

8. Did you travel on any roads with posted speeds of $80 \mathrm{~km} / \mathrm{h}$ ( $50 \mathrm{~m} . \mathrm{p} . \mathrm{h}$.) or more during this trip?
-Yes $\varnothing$ $\square$
No $\square$
$\rightarrow$ If yes, what was the estimated distance travelled on roads with posted speeds of $80 \mathrm{~km} / \mathrm{h}$ ( $50 \mathrm{~m} . \mathrm{p.h}$.) or more during this trip?

9. Fuel purchased during this trip?
(1) No

O Yes, go to page 26

Example 3 - trip 2

1. Date / Time trip started:
date

| $\mathbf{8}$ | $\mathbf{1 0}$ |
| :---: | :---: |
| dd | mm |

5:57
2. Odometer reading at start:

3. Number of passengers (excluding driver) in each age group at beginning of trip. Check if none.

4. Date / Time trip ended:

6. Number of passengers (excluding driver) in each age group at end of trip. Check if none.

| None $\bigcirc$ | Under <br> 5 years |
| :--- | :--- |
| 15 years |  |
| and over |  |$\quad \square$

7. Why are you making this trip? (check one purpose only)
O To go home
To go to work or school
O To do shopping or errands (such as personal or family appointments)
© To go to a recreational or social activityTo go somewhere else (specify)
Driving as part of the job
O picking up or delivering goods O dangerous goods
O to or from service call
O other work purpose
8. Driver's sex

O Male
$\phi$ Female
9. Driver's age group
O under 20
O 55 to 64
65 to 74
20 to
(2) 25 to 34
35 to 44
45 to 54
10. Did you travel on any roads with posted speeds of $80 \mathrm{~km} / \mathrm{h}$ ( 50 m.p.h.) or more during this trip?
Yes $\bigcirc$
No $\varnothing$
If yes, what was the estimated distance travelled on roads with posted speeds of $80 \mathrm{~km} / \mathrm{h}$ ( $50 \mathrm{~m} . \mathrm{p} . \mathrm{h}$.) or more during this trip?

11. Fuel purchased during this trip? © No
O Yes, go to page 26

## Questions? Please see instructions on page 3 and examples on pages 4 and 5 .




## Questions? Please see instructions on page 3 and examples on pages 4 and 5 .




## Questions? Please see instructions on page 3 and examples on pages 4 and 5 .




## Questions? Please see instructions on page 3 and examples on pages 4 and 5 .




## Questions? Please see instructions on page 3 and examples on pages 4 and 5 .




## Questions? Please see instructions on page 3 and examples on pages 4 and 5 .




## Questions? Please see instructions on page 3 and examples on pages 4 and 5 .




## Questions? Please see instructions on page 3 and examples on pages 4 and 5 .




## Questions? Please see instructions on page 3 and examples on pages 4 and 5 .




## Detailed Information For Your Interest

## Purpose of the survey

It is the goal of this survey to provide annual estimates of the amount of road travel, broken down by types of vehicle, age and sex of driver, time of day and season. Transport Canada sponsors the survey and uses the information in conjunction with other data to monitor how vehicle use changes over time and how use affects safety, fuel consumption and the environment. The results are also the prime source of road vehicle use information for researchers and interested members of the public. Prior to this survey, there was no valid, comprehensive source for this information in Canada, even though about ninety percent of all travel in Canada is by road.

## Why this vehicle was chosen

Your vehicle was one of those that was selected in your province/territory so that we can find out how you use it over the stated time period. To save money, we are keeping the number of vehicles sampled to a minimum, so it is important that we get your response. Your response is not analysed in any way that identifies you or your vehicle - it is only useful to us when combined with all the other responses. We get a representative picture by picking vehicles at random from the official vehicle registration files, in order to cover the entire country and all types of vehicles and we cover the whole year by picking new ones every week. Once the completed forms are returned, we combine them to build up a profile of the average kilometres for vehicles during the year, then multiply the average by the total number of registered vehicles in the country to obtain total kilometres in the year.

The profile created from the sample includes average kilometres per vehicle for each day of the week, and each hour within the day, by sex and age group of drivers, by trip purpose, and by highways and other roads. Each of these characteristics is then multiplied by the total number of vehicles to obtain the total vehicle-kilometres during the year in each group.

The recorded number of passengers at the beginning and ending of each trip are used to calculate average vehicle occupancy, which is multiplied by vehicle-kilometres to give the total person-kilometres of travel in a year. "Person-kilometres" is the main measure used to compare travel by different means of transport - for example the extent of car travel versus travel by plane, train, intercity bus or urban transit.

## How we use each question

Questions 2 and 5 are the most important of all, allowing us to know the kilometres traveled each trip, and total traveled by the vehicle during the survey days. These are essential to calculating the amount of travel in the country each year.

Questions 1 and 4 tell us when trips start and finish, so we can show, for example, how much travel is on weekdays compared to weekends, in the morning and evening rush-hours compared to the middle of the day, or in the middle of the night. This data can be used to show how staggered working hours are spreading the peaks, whether Sunday shopping is shifting traffic from weekdays, whether changes in night-time accidents involving alcohol are partly due to changes in night-time traffic and so on. These questions also give us the trip duration in hours and minutes, which helps us determine how much of total travel is made up of very short local trips and how much of long intercity trips. We can also compare the duration of trips to the kilometres traveled to estimate average speeds, in order to see whether speeds are tending to fall over the years through congestion.

Questions 3 and 6 ask for the number of passengers carried, excluding the driver, at the beginning and ending of each trip which lets us calculate vehicle occupancy. The details of passengers by age-group are primarily for safety analyses because of the particular concerns over safety of infants and other children. Multiplying the number of passengers carried by vehicle-kilometres we produce person-kilometres, the best indicator of the extent of personal travel, and its breakdown by time of day, trip purpose, etc. This information allows for comparisons of car travel to travel by public transport - showing for instance, how the share of total long-distance travel by plane is rising, while shares by train and intercity bus are declining; or how the share of short-distance travel by public transit is declining. Average occupancies by type of vehicle, trip purpose and time of day are very important to measuring trends in congestion, fuel consumption and vehicle emissions.

Question 7 gives trip purpose. It is important to know why you are travelling by road for the people who plan urban land use, or plan public transit, air, bus, and bus services. It also lets us know, whether leisure travel is growing faster than commuting, or whether people are travelling longer distances to do their shopping.

Questions 8 and 9 asks the driver's sex and age group, particularly for computation of accident rates by each group. The age categories listed are those normally used by safety agencies in compiling accident reports, so the estimates of kilometres traveled by age group can be combined with records of accident involvement, to give accidents per vehicle-kilometre.

Question 10 attempts to distinguish between travel on urban streets, and that on highways or in rural conditions. We are attempting to do this by asking you how much of each trip is on roads with posted speed limits of $80 \mathrm{~km} / \mathrm{h}$ or more, which we will use as an approximation of highway or rural conditions. This is an important distinction since safety, fuel consumption and emissions differ greatly between urban streets, and highways or rural conditions. But it is a difficult distinction to make, because people often don't know whether they are in an urban or a rural area, or whether the road they are on is classified as a street or a highway. The clearest difference that most people are aware of is the speed limit. Of course, we realise many drivers will not know exactly how many kilometres they drive on roads with posted speed limits of $80 \mathrm{~km} / \mathrm{h}$ or more during a trip, so we expect only the best approximate answer the driver is able to provide.

Question 11 asks if any fuel was purchased during the trip. The answers are not directly used to try to assess the fuel consumption of your vehicle, but instead to calculate the average amount of fuel bought per day by all the vehicles in the sample that are similar to yours (in type, engine size and model year according to the vehicle registration files). From the daily averages we can estimate annual amounts of fuel used nationally by vehicles similar to your group. These are useful to monitor trends in fuel use - for example to see how much of the increase in national fuel use is due to the shift from cars to vans and utility vehicles; or to see how fuel use changes by age of vehicle. Total fuel purchases by each type of vehicle can be compared to annual vehicle-kilometres for that type, to give their average fuel consumption.
Comments about the trip and fuel log

|  | Fuel Purchases |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
|  | Enter date of fuel purchase | Enter odometer reading at time of purchase | Fuel gauge before purchase | Type of fuel |
| E <br> X <br> $A$ <br> $M$ <br> $P$ <br> L | $$ | Odometer <br> 1/10 kilometres miles | 7/8 full 3/4 full 5/8 full $1 / 2$ full 3/8 full 1/4 full 1/8 full empty | regular gasoline mid-grade gasoline premium gasoline ethanol blend diesel other $\square$ |
| 1 | Month Day $\mid$ <br> $(01-12)$ $(01-31)$ | Odometer | 7/8 full 3/4 full 5/8 full $1 / 2$ full 3/8 full 1/4 full 1/8 full empty | regular gasoline mid-grade gasoline premium gasoline ethanol blend diesel other $\square$ |
| 2 |  | Odometer | 7/8 full 3/4 full 5/8 full 1/2 full 3/8 full 1/4 full 1/8 full empty | regular gasoline mid-grade gasoline premium gasoline ethanol blend diesel other $\square$ |
| 3 |  | Odometer | 7/8 full 3/4 full 5/8 full $1 / 2$ full 3/8 full 1/4 full 1/8 full empty | regular gasoline mid-grade gasoline premium gasoline ethanol blend diesel other $\square$ |
| 4 |  | Odometer | 7/8 full 3/4 full 5/8 full $1 / 2$ full 3/8 full 1/4 full 1/8 full empty | regular gasoline mid-grade gasoline premium gasoline ethanol blend diesel other $\square$ |
| 5 |  | Odometer | 7/8 full 3/4 full 5/8 full $1 / 2$ full 3/8 full 1/4 full 1/8 full empty | regular gasoline mid-grade gasoline premium gasoline ethanol blend diesel other $\square$ |




Confidential once completed
Collected under the authority of the Statistics Act, Revised Statutes of Canada, 1985, Chapter S19.
Si vous préférez ce carnet des activités de conduite en français, veuillez nous appeler au numéro de téléphone indiqué ci-dessous.

## Survey Objective

The purpose of this survey is to help Transport Canada improve road safety, monitor fuel consumption and deal with the impact of vehicle usage on the environment. The information you provide will be combined with other data already available to provide Transport Canada with a better picture of the total distance travelled by vehicles and fuel purchases. The information you are asked to provide in this trip and fuel log covers:

- Starting and ending time of trip - to see when traffic is on the road.
- Starting and ending odometer readings for each trip - to measure the distance travelled.
- Number of passengers on each trip and types of roads driven - to provide information related to safety.
- Trip purpose - to determine the type of trips.
- Truck configuration - to see what types of configurations are being used.
- Driver's sex and age group - to obtain a profile of drivers.
- Fuel purchases - to get an idea of how much fuel is purchased during the period.


## For more background information about specific questions, please see the inside back cover.

## Reporting procedure

Please complete the trip and fuel log for the first week of the period stated on the label on page 2. Then continue to complete the fuel portion of the log for the remainder of the period stated on the label or until you have recorded two fill-ups or made five fuel purchases.

[^3]
## Thank you very much for your cooperation.

5-5400-152.1: 2002-08-06 STC/TRA-400-75335
Statistics Statistique
Canada
Canada

## PLACE LABEL HERE

## Please read this first

## Please do not complete this log while driving.

1. Only report for the vehicle identified on the label above.
2. Please verify that the vehicle information is correct and make any corrections on the label.

## General Information

1. Do you still own or lease the vehicle described on the label above?

Y Yes (Please go to question 2)
O Never owned or leased the identified vehicle
$\bigcirc$ No $\longrightarrow$ Was this vehicle, (please check where applicable and record the date in the box provided)

sold/tradedscrappedreturned (end of lease)leased to someone else
date:
other: please specify:

Note: If you do not own or lease the vehicle, please mail back the trip log at this point.
2. Which of the following best describes this vehicle?

| O | car |
| :--- | :--- |
| O | station wagon |
| O | van |
| vport utility (Bronco, Blazer, Jeep, |  |
| sphfinder) |  |
| Pap |  |
| pick-up |  |

busstraight truck
truck tractor
other vehicle: please specify:
pick-up
3. Type of activity

Please indicate whether this vehicle is currently being used by
a for-hire trucking carrier (includes contract trucking)
$\bigcirc$ a person, company or agency whose main business is not truckingan owner operator whose main business

other is trucking
4. What kind of fuel does this vehicle use?
$\bigcirc$
gasoline
natural gas
$\bigcirc$ diesel
$\bigcirc$ propaneother, please specify:

The information for this log could be taken from company records, or you could send us copies of the driver logs, or it can be filled in by the driver(s). If for some reason you are not able to provide information for a particular trip, please explain in the comments section below.

Please fill in the Driver Information section on the fold-out page for all drivers using this vehicle.

If this vehicle was not "in use" for any days during the first seven days of the reporting period, please provide the date(s) in the section below.


## Odometer Reading

As soon as you receive this log, please record the date and the current odometer reading.


Please record the date and odometer reading before returning this log.


## Comments about the trip and fuel log

$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$

## Instructions For Completing the Trip and Fuel Log

Listed below are the instructions for completing the trip and fuel log. Please read them carefully and if you have any questions, contact us at the telephone number shown on the front cover.

Please complete the trip and fuel log for the first week of the period stated on the label on page 2 . Then continue to complete the fuel portion of the log for the remainder of the period stated on the label or until you have recorded two fill-ups or made five fuel purchases. This information can be taken from company records for the first week of the reporting period, or you could send us copies of the driver logs.

## Examples

Please refer to the Examples on pages 24 to 31 for help in completing the log.
Trip
A trip is defined as travelling from one location to another for a specific purpose or use such as carrying goods, going to or from work, or using the vehicle for personal use. This information will enable us to know what times of day the vehicle is on the road. Report a separate trip if there is:

- a change of purpose or use
or
- a stop of more than $\mathbf{3 0}$ minutes
or
- a change in the truck configuration
or
- a change in the status of the load from loaded to empty or the reverse
or
- a change of drivers

Date/time of departure and date/time of arrival
Please indicate the day of the month and time of departure and the day of the month and time of arrival for each trip.

Examples of how to complete this log are shown on pages 24 to 31 .
Example 1. A change in the status of the load from empty to loaded-pages $\mathbf{2 4}$ and 25.
Example 2. A change in the trip purpose and a stop of more than 30 minutes - pages 26 and 27.
Example 3. A change in the truck configuration - pages 28 and 29.
Example 4. A change of drivers and two stops over 30 minutes - pages 30 and 31.
Example 5. A fuel purchase - pages 34 and 35.

## Note:

Fold out this page.
It has the codes for the Truck Configuration and a section to be completed and used for Driver Information

Truck Configuration Section
Please enter the following codes in the proper columns (I, II and III) of the truck configuration section of the log.

| Truck Configuration Column I | Trailer Type Column II | Connection Type Column III |
| :---: | :---: | :---: |
| Code <br> 1-Straight truck <br> 2 - Tractor only <br> 3 - Tractor and 1 trailer <br> 4-Straight truck and trailer <br> 5 - Tractor and 2 trailers <br> 6 - Tractor and 3 trailers <br> 7 - Other <br> (please specify) | Code <br> 1-Not applicable <br> 2 - Van <br> 3 - Flatbed <br> 4 - Tanker <br> 5 - Dump <br> 6- Other $\qquad$ <br> (please specify) | Code <br> 1-Not applicable <br> 2-"B" Train <br> 3-Other $\qquad$ (please specify) |

## Driver Information

For each driver of this vehicle, please complete the driver information below. Provide each driver's sex and age group. The column for driver's initials is for your use only so that you can easily identify which driver code belongs to which driver. Enter the appropriate driver code for each trip in the Driver column on the log.

| Driver's initials | Driver Code | Driver's sex | Driver's age-group |
| :---: | :---: | :---: | :---: |
|  | A | Male <br> Female | $\bigcirc$ Under 20 $\bigcirc 45$ to 54 <br> 20 to 24 $\bigcirc 55$ to 64 <br> 25 to 34 $\bigcirc 65$ and over <br> 35 to 44  |
|  | B | Male <br> Female | O Under 20 $\bigcirc 45$ to 54 <br> 20 to 24 $\bigcirc 55$ to 64 <br> 25 to 34 $\bigcirc 65$ and over <br> 35 to 44  |
|  | C | Male Female | Under 20 45 to 54 20 to 24 55 to 64 25 to 34 65 and over 35 to 44 |
|  | D | Male Female | Onder 20 $\bigcirc 45$ to 54 <br> 20 to 24 $\bigcirc 55$ to 64 <br> 25 to 34 $\bigcirc 55$ and over <br> 35 to 44  |
|  | $E$ | Male Female | Under 20 45 to 54 20 to 24 55 to 64 25 to 34 65 and over 35 to 44 |

[^4]Trip Log
Please read the instructions on page 4 and on the "fold-out" page before completing the trip log.


Please refer to the examples on pages 24 to 31.

| Code Purpose of trip <br> 1 -Driving to or from service call <br> 2 -Carrying goods or equipment (if applicable, please also check if carrying dangerous goods) <br> 3 -Empty (unladen of goods) <br> 4 -Other work purpose <br> 5 -Driving to work <br> 6 -Driving to home <br> 7 - Other (please describe the purpose) |  | Truck configuration <br> (please use codes on "fold-out page") |  |  | Driver, Code <br> (please use codes on "fold-out" page) <br> Code | Trip type <br> Code <br> $1-$ within province <br> $2-$ between provinces <br> $3-$ across Canada - <br> U.S. border <br> $4-$ outside Canada | Road type <br> Did you travel on any roads with posted speeds of $80 \mathrm{~km} / \mathrm{h}$ ( $50 \mathrm{~m} . \mathrm{p} . \mathrm{h}$.) or more during this trip? | Fuel purchased? <br> (either purchased or from company supplies) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | 1 | II |  |  |  |  |  |
| $\bigcirc_{1} \bigcirc_{2}$ dangerous 7 Other | 4 <br> 5 $6$ |  |  |  |  | $\bigcirc 1$ <br> $\bigcirc 2$ <br> $\bigcirc 3$ <br> $\bigcirc 4$ | $\ulcorner$ Yes $\bigcirc$ No If yes, what was the estimated distance travelled on roads with posted speeds of $80 \mathrm{~km} / \mathrm{h}$ ( 50 m.p.h.) or more during this trip? | No Yes, go to page 34. |
| $\bigcirc_{1} \bigcirc_{2}$ dangerous 7 Other | 4 |  |  |  |  | $\bigcirc 1$ <br> $\bigcirc 2$ <br> $\bigcirc 3$ <br> $\bigcirc 4$ |  | No Yes, go to page 34. |
| $\bigcirc_{1} \bigcirc_{2}$ dangerous 7 Other | $\bigcirc_{4} \bigcirc_{5} \bigcirc_{6}$ |  |  |  |  | $\bigcirc 1$ <br> $\bigcirc 2$ <br> ○ 3 <br> $\bigcirc 4$ | Yes <br> No <br> If yes, what was the estimated distance travelled on roads with posted speeds of $80 \mathrm{~km} / \mathrm{h}$ ( 50 m.p.h.) or more during this trip? | No Yes, go to page 34. |
| $\bigcirc_{1} \bigcirc_{2}$ dangerous 7 Other | 4 |  |  |  | $\square$ | $\bigcirc 1$ <br> $\bigcirc 2$ <br> $\bigcirc 3$ <br> $\bigcirc 4$ |  | No Yes, go to page 34. |
| Please record times in a 24 H format. <br> i.e. $6: 00 \mathrm{PM}=1800$, <br> $10: 30 \mathrm{PM}=2230$. | Please select only one "Purpose of Trip". <br> (i.e. should be the main purpose) <br> For examples of different trip situations, please see pages 24-31. | All kilometres or miles <br> travelled during the 7 <br> days should be <br> accounted for.$\quad$Any fu <br> Pleas <br> purch |  |  |  | fuel purchases? <br> ase record chases on page 34. | number of passengers sh spare drivers but not the <br> y you very much fo participation. | uld include tual driver. <br> your time |

Trip Log
Please read the instructions on page 4 and on the "fold-out" page before completing the trip log.


Please refer to the examples on pages 24 to 31.

| Code Purpose of trip <br> 1 -Driving to or from service call <br> 2 -Carrying goods or equipment (if applicable, please also check if carrying dangerous goods) <br> 3 -Empty (unladen of goods) <br> 4 -Other work purpose | Truck configuration <br> (please use codes on "fold-out page") |  |  | Driver, Code <br> (please use codes on "fold-out page") | Trip type <br> Code <br> 1 - within province <br> 2 - between provinces <br> 3 - across Canada U.S. border <br> 4 - outside Canada | Road type <br> Did you travel on any roads with posted speeds of $80 \mathrm{~km} / \mathrm{h}$ ( $50 \mathrm{~m} . \mathrm{p} . \mathrm{h}$.) or more during this trip? | Fuel purchased? <br> (either purchased or from company supplies) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 5 -Driving to work <br> 6 - Driving to home <br> 7 - Other (please describe the purpose) | I | II |  | Code |  |  |  |
| $\bigcirc_{1} \bigcirc_{2} \bigcirc_{3} \bigcirc_{4} \bigcirc_{5} \bigcirc_{6}$ dangerous goods 7 Other $\qquad$ |  |  |  |  | $\bigcirc 1$ <br> $\bigcirc 2$ <br> $\bigcirc 3$ <br> $\bigcirc 4$ | $\downarrow$ 〇 Yes $\bigcirc$ No If yes, what was the estimated distance travelled on roads with posted speeds of $80 \mathrm{~km} / \mathrm{h}$ ( 50 m.p.h.) or more during this trip? | No Yes, go to page 34. |
| $\bigcirc_{1} \bigcirc_{2} \bigcirc_{3} \bigcirc_{4} \bigcirc_{5} \bigcirc_{6}$ dangerous goods 7 Other $\qquad$ |  |  |  |  | $\bigcirc 1$ <br> $\bigcirc 2$ <br> $\bigcirc 3$ <br> $\bigcirc 4$ |  | No Yes, go to page 34. |
| $\bigcirc_{1} \bigcirc_{2} \bigcirc_{3} \bigcirc_{4} \bigcirc_{5} \bigcirc_{6}$ dangerous goods 7 Other $\qquad$ |  |  |  |  | $\bigcirc 1$ <br> $\bigcirc 2$ <br> $\bigcirc 3$ <br> $\bigcirc 4$ |  | No Yes, go to page 34. |
| $\bigcirc_{1} \bigcirc_{2} \bigcirc_{3} \bigcirc_{4} \bigcirc_{5} \bigcirc_{6}$ dangerous goods 7 Other $\qquad$ |  |  |  |  | $\bigcirc 1$ <br> $\bigcirc 2$ <br> $\bigcirc 3$ <br> $\bigcirc 4$ |  | No Yes, go to page 34. |
| $\bigcirc_{1} \bigcirc_{2} \bigcirc_{3} \bigcirc_{4} \bigcirc_{5} \bigcirc_{6}$ dangerous goods 7 Other $\qquad$ | - |  |  |  | $\bigcirc 1$ <br> $\bigcirc 2$ <br> $\bigcirc 3$ <br> $\bigcirc 4$ |  | No Yes, go to page 34. |

Trip Log
Please read the instructions on page 4 and on the "fold-out" page before completing the trip log.


Please refer to the examples on pages 24 to 31.

| Code Purpose of trip <br> 1 -Driving to or from service call <br> 2 -Carrying goods or equipment (if applicable, please also check if carrying dangerous goods) <br> 3 -Empty (unladen of goods) <br> 4 - Other work purpose | Truck configuration <br> (please use codes on "fold-out page") |  |  | Driver, Code <br> (please use codes on "fold-out page") | Trip type <br> Code <br> 1 - within province <br> 2 - between provinces <br> 3 - across Canada U.S. border <br> 4 - outside Canada | Road type <br> Did you travel on any roads with posted speeds of $80 \mathrm{~km} / \mathrm{h}$ ( $50 \mathrm{~m} . \mathrm{p} . \mathrm{h}$.) or more during this trip? | Fuel purchased? <br> (either purchased or from company supplies) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 5 -Driving to work <br> 6 - Driving to home <br> 7 - Other (please describe the purpose) | Column |  | III | Code |  |  |  |
| $\bigcirc_{1} \bigcirc_{2} \bigcirc_{3} \bigcirc_{4} \bigcirc_{5} \bigcirc_{6}$ dangerous goods 7 Other $\qquad$ |  |  |  |  | $\bigcirc 1$ <br> $\bigcirc 2$ <br> $\bigcirc 3$ <br> $\bigcirc 4$ | $\downarrow$ 〇Yes $\bigcirc$ No <br> If yes, what was the estimated distance travelled on roads with posted speeds of $80 \mathrm{~km} / \mathrm{h}$ ( 50 m.p.h.) or more during this trip? | No Yes, go to page 34. |
| $\bigcirc_{1} \bigcirc_{2} \bigcirc_{3} \bigcirc_{4} \bigcirc_{5} \bigcirc_{6}$ dangerous goods 7 Other $\qquad$ |  |  |  |  | $\bigcirc 1$ <br> $\bigcirc 2$ <br> $\bigcirc 3$ <br> $\bigcirc 4$ | $\checkmark$ 〇Yes $\bigcirc$ No <br> If yes, what was the estimated distance travelled on roads with posted speeds of $80 \mathrm{~km} / \mathrm{h}$ ( 50 m.p.h.) or more during this trip? | No Yes, go to page 34. |
| $\bigcirc_{1} \bigcirc_{2} \bigcirc_{3} \bigcirc_{4} \bigcirc_{5} \bigcirc_{6}$ dangerous goods 7 Other $\qquad$ |  |  |  | $\square$ | $\bigcirc 1$ <br> $\bigcirc 2$ <br> $\bigcirc 3$ <br> $\bigcirc 4$ |  | No Yes, go to page 34. |
| $\bigcirc_{1} \bigcirc_{2} \bigcirc_{3} \bigcirc_{4} \bigcirc_{5} \bigcirc_{6}$ dangerous goods 7 Other $\qquad$ |  |  |  | $\square$ | $\bigcirc 1$ <br> $\bigcirc 2$ <br> $\bigcirc 3$ <br> $\bigcirc 4$ |  | No Yes, go to page 34. |
| 1 <br> 2 <br> 3 <br> 4 5 <br> dangerous goods 7 Other $\qquad$ | $\square$ |  | $\square$ |  | $\bigcirc 1$ <br> $\bigcirc 2$ <br> $\bigcirc 3$ <br> $\bigcirc 4$ |  | No Yes, go to page 34 . |

Trip Log
Please read the instructions on page 4 and on the "fold-out" page before completing the trip log.


Please refer to the examples on pages 24 to 31.


Trip Log
Please read the instructions on page 4 and on the "fold-out" page before completing the trip log.


Please refer to the examples on pages 24 to 31.

| Code Purpose of trip <br> 1 -Driving to or from service call <br> 2 -Carrying goods or equipment (if applicable, please also check if carrying dangerous goods) <br> 3 -Empty (unladen of goods) <br> 4 - Other work purpose | Truck configuration <br> (please use codes on "fold-out page") |  |  | Driver, Code <br> (please use codes on "fold-out page") | Trip type <br> Code <br> 1 - within province <br> 2 - between provinces <br> 3 - across Canada U.S. border <br> 4 - outside Canada | Road type <br> Did you travel on any roads with posted speeds of $80 \mathrm{~km} / \mathrm{h}$ ( $50 \mathrm{~m} . \mathrm{p} . \mathrm{h}$.) or more during this trip? | Fuel purchased? <br> (either purchased or from company supplies) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 5 -Driving to work <br> 6 - Driving to home <br> 7 - Other (please describe the purpose) | Column |  | III | Code |  |  |  |
| $\bigcirc_{1} \bigcirc_{2} \bigcirc_{3} \bigcirc_{4} \bigcirc_{5} \bigcirc_{6}$ dangerous goods 7 Other $\qquad$ |  |  |  |  | $\bigcirc 1$ <br> $\bigcirc 2$ <br> $\bigcirc 3$ <br> $\bigcirc 4$ | $\downarrow$ 〇Yes $\bigcirc$ No <br> If yes, what was the estimated distance travelled on roads with posted speeds of $80 \mathrm{~km} / \mathrm{h}$ ( 50 m.p.h.) or more during this trip? | No Yes, go to page 34. |
| $\bigcirc_{1} \bigcirc_{2} \bigcirc_{3} \bigcirc_{4} \bigcirc_{5} \bigcirc_{6}$ dangerous goods 7 Other $\qquad$ |  |  |  |  | $\bigcirc 1$ <br> $\bigcirc 2$ <br> $\bigcirc 3$ <br> $\bigcirc 4$ | $\checkmark$ 〇Yes $\bigcirc$ No <br> If yes, what was the estimated distance travelled on roads with posted speeds of $80 \mathrm{~km} / \mathrm{h}$ ( 50 m.p.h.) or more during this trip? | No Yes, go to page 34. |
| $\bigcirc_{1} \bigcirc_{2} \bigcirc_{3} \bigcirc_{4} \bigcirc_{5} \bigcirc_{6}$ dangerous goods 7 Other $\qquad$ |  |  |  | $\square$ | $\bigcirc 1$ <br> $\bigcirc 2$ <br> $\bigcirc 3$ <br> $\bigcirc 4$ |  | No Yes, go to page 34. |
| $\bigcirc_{1} \bigcirc_{2} \bigcirc_{3} \bigcirc_{4} \bigcirc_{5} \bigcirc_{6}$ dangerous goods 7 Other $\qquad$ |  |  |  | $\square$ | $\bigcirc 1$ <br> $\bigcirc 2$ <br> $\bigcirc 3$ <br> $\bigcirc 4$ |  | No Yes, go to page 34. |
| 1 <br> 2 <br> 3 <br> 4 5 <br> dangerous goods 7 Other $\qquad$ | $\square$ |  | $\square$ |  | $\bigcirc 1$ <br> $\bigcirc 2$ <br> $\bigcirc 3$ <br> $\bigcirc 4$ |  | No Yes, go to page 34 . |

Trip Log
Please read the instructions on page 4 and on the "fold-out" page before completing the trip log.


Please refer to the examples on pages 24 to 31.


Trip Log
Please read the instructions on page 4 and on the "fold-out" page before completing the trip log.


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| Code Purpose of trip <br> 1 -Driving to or from service call <br> 2 -Carrying goods or equipment (if applicable, please also check if carrying dangerous goods) <br> 3 -Empty (unladen of goods) <br> 4 - Other work purpose | Truck configuration <br> (please use codes on "fold-out page") |  |  | Driver, Code <br> (please use codes on "fold-out page") | Trip type <br> Code <br> 1 - within province <br> 2 - between provinces <br> 3 - across Canada U.S. border <br> 4 - outside Canada | Road type <br> Did you travel on any roads with posted speeds of $80 \mathrm{~km} / \mathrm{h}$ ( $50 \mathrm{~m} . \mathrm{p} . \mathrm{h}$.) or more during this trip? | Fuel purchased? <br> (either purchased or from company supplies) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 5 -Driving to work <br> 6 - Driving to home <br> 7 - Other (please describe the purpose) | Column |  | III | Code |  |  |  |
| $\bigcirc_{1} \bigcirc_{2} \bigcirc_{3} \bigcirc_{4} \bigcirc_{5} \bigcirc_{6}$ dangerous goods 7 Other $\qquad$ |  |  |  |  | $\bigcirc 1$ <br> $\bigcirc 2$ <br> $\bigcirc 3$ <br> $\bigcirc 4$ | $\downarrow$ 〇Yes $\bigcirc$ No <br> If yes, what was the estimated distance travelled on roads with posted speeds of $80 \mathrm{~km} / \mathrm{h}$ ( 50 m.p.h.) or more during this trip? | No Yes, go to page 34. |
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| $\bigcirc_{1} \bigcirc_{2} \bigcirc_{3} \bigcirc_{4} \bigcirc_{5} \bigcirc_{6}$ dangerous goods 7 Other $\qquad$ |  |  |  | $\square$ | $\bigcirc 1$ <br> $\bigcirc 2$ <br> $\bigcirc 3$ <br> $\bigcirc 4$ |  | No Yes, go to page 34. |
| $\bigcirc_{1} \bigcirc_{2} \bigcirc_{3} \bigcirc_{4} \bigcirc_{5} \bigcirc_{6}$ dangerous goods 7 Other $\qquad$ |  |  |  | $\square$ | $\bigcirc 1$ <br> $\bigcirc 2$ <br> $\bigcirc 3$ <br> $\bigcirc 4$ |  | No Yes, go to page 34. |
| 1 <br> 2 <br> 3 <br> 4 5 <br> dangerous goods 7 Other $\qquad$ | $\square$ |  | $\square$ |  | $\bigcirc 1$ <br> $\bigcirc 2$ <br> $\bigcirc 3$ <br> $\bigcirc 4$ |  | No Yes, go to page 34 . |

Trip Log
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Please refer to the examples on pages 24 to 31.

| Code Purpose of trip <br> 1 -Driving to or from service call <br> 2 -Carrying goods or equipment (if applicable, please also check if carrying dangerous goods) <br> 3 -Empty (unladen of goods) <br> 4 - Other work purpose | Truck configuration <br> (please use codes on "fold-out page") |  |  | Driver, Code <br> (please use codes on "fold-out page") | Trip type <br> Code <br> 1 - within province <br> 2 - between provinces <br> 3 - across Canada U.S. border <br> 4 - outside Canada | Road type <br> Did you travel on any roads with posted speeds of $80 \mathrm{~km} / \mathrm{h}$ ( $50 \mathrm{~m} . \mathrm{p} . \mathrm{h}$.) or more during this trip? | Fuel purchased? <br> (either purchased or from company supplies) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
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| 1 <br> 2 <br> 3 <br> 4 5 <br> dangerous goods 7 Other $\qquad$ | $\square$ |  | $\square$ |  | $\bigcirc 1$ <br> $\bigcirc 2$ <br> $\bigcirc 3$ <br> $\bigcirc 4$ |  | No Yes, go to page 34 . |

Trip Log
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Please refer to the examples on pages 24 to 31.

| Code Purpose of trip <br> 1 -Driving to or from service call <br> 2 -Carrying goods or equipment (if applicable, please also check if carrying dangerous goods) <br> 3 -Empty (unladen of goods) <br> 4 - Other work purpose | Truck configuration <br> (please use codes on "fold-out page") |  |  | Driver, Code <br> (please use codes on "fold-out page") | Trip type <br> Code <br> 1 - within province <br> 2 - between provinces <br> 3 - across Canada U.S. border <br> 4 - outside Canada | Road type <br> Did you travel on any roads with posted speeds of $80 \mathrm{~km} / \mathrm{h}$ ( $50 \mathrm{~m} . \mathrm{p} . \mathrm{h}$.) or more during this trip? | Fuel purchased? <br> (either purchased or from company supplies) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 5 -Driving to work <br> 6 - Driving to home <br> 7 - Other (please describe the purpose) | Column |  | III | Code |  |  |  |
| $\bigcirc_{1} \bigcirc_{2} \bigcirc_{3} \bigcirc_{4} \bigcirc_{5} \bigcirc_{6}$ dangerous goods 7 Other $\qquad$ |  |  |  |  | $\bigcirc 1$ <br> $\bigcirc 2$ <br> $\bigcirc 3$ <br> $\bigcirc 4$ | $\downarrow$ 〇Yes $\bigcirc$ No <br> If yes, what was the estimated distance travelled on roads with posted speeds of $80 \mathrm{~km} / \mathrm{h}$ ( 50 m.p.h.) or more during this trip? | No Yes, go to page 34. |
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| $\bigcirc_{1} \bigcirc_{2} \bigcirc_{3} \bigcirc_{4} \bigcirc_{5} \bigcirc_{6}$ dangerous goods 7 Other $\qquad$ |  |  |  | $\square$ | $\bigcirc 1$ <br> $\bigcirc 2$ <br> $\bigcirc 3$ <br> $\bigcirc 4$ |  | No Yes, go to page 34. |
| 1 <br> 2 <br> 3 <br> 4 5 <br> dangerous goods 7 Other $\qquad$ | $\square$ |  | $\square$ |  | $\bigcirc 1$ <br> $\bigcirc 2$ <br> $\bigcirc 3$ <br> $\bigcirc 4$ |  | No Yes, go to page 34 . |

Trip Log-Examples

| Start of trip |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| End of trip |  |  |  |  |  |  |  |
| Date | Time | Odometer <br> reading | Number of <br> passengers <br> (excluding <br> current driver) | Date | Time | Odometer <br> reading | Number of <br> passengers <br> (excluding <br> current driver) |

## Example 1. Two trips due to a change in load from empty to loaded

On September 21, a farmer drove his empty straight truck to pick up a load of fertilizer. The odometer reading was 80795 kilometres when he left his house at 7:00. When he arrived at his destination at 7:30, the odometer reading was 80825 kilometres.

The fertilizer is loaded and he leaves for his farm at 7:50 a.m. that same morning and arrives back at 8:22 a.m. The odometer reading was 80857.



The farmer is a 47 year old male. This information would be completed on the fold out page. On the trip log, the driver code would be " A ".
Since the whole trip took place within the same province, it would be coded as "within the province".
There were no fuel purchases.

Note: The trip information could be taken from company records, or you could send us copies of the driver logs, or it could be filled in by the driver(s).


Trip Log - Examples - Continued

| Start of trip |  |  | End of trip |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Date | Time | Odometer <br> reading | Number of <br> passengers <br> (excluding <br> current driver) | Date | Time | Odometer <br> reading | Number of <br> passengers <br> (excluding <br> current driver) |

## Example 2. Three trips due to a change in trip purpose and one stop over 30 minutes

On February 19, the driver of a straight truck left his home in Ontario at 6:43 a.m. to go to the terminal of a local broker. The odometer reading was 105296 miles at the start of his trip. He arrived at the terminal at $7: 15$. The odometer reading was 105310.

At the terminal, he picked up a load and left the terminal at 8:30 a.m. to go to Montreal, where he made 3 short stops for deliveries, none of which was more than thirty minutes. He completed his last delivery at 12:20. The odometer reading was 105550.


| Code Purpose of trip <br> 1 -Driving to or from service call <br> 2 -Carrying goods or equipment (if applicable, please also check if carrying dangerous goods) <br> 3 -Empty (unladen of goods) <br> 4 - Other work purpose <br> 5 -Driving to work <br> 6 -Driving to home <br> 7 - Other (please describe the purpose) | Truck configuration <br> (please use codes on "fold-out page") |  |  | Driver, Code | Trip type <br> Code | Road type | Fuel purchased? |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | (please use codes on "fold-out page") | 1 - within province <br> 2 - between provinces <br> 3 - across Canada - | Did you travel on any roads with posted speeds of $80 \mathrm{~km} / \mathrm{h}$ ( $50 \mathrm{~m} . \mathrm{p} . \mathrm{h}$.) or more during this trip? | (either purchased or from company supplies) |
|  | Column |  |  | Code | 4 - outside Canada |  |  |
|  | I | II | III |  |  |  |  |

He then stopped for lunch for 45 minutes and returned home. When he arrived home, it was $6: 15 \mathrm{p} . \mathrm{m}$. and the odometer reading was 105793 .
The driver is a 35 year old male. This information would be completed on the fold out page. On the trip log, the driver code would be " A ".
Since the first trip took place within the same province, it would be coded as "within the province".
The trip to Montreal and the trip home would be coded as "between provinces". There was one fuel purchase.
Note: The trip information could be taken from company records, or you could send us copies of the driver logs, or it could be filled in by the driver(s).


Trip Log - Examples - Continued

| Start of trip |  |  |  | End of trip |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 24 hour clock (00:00 to 23:59) |  |  |  |  |  |  |  |
| Date | Time | Odometer reading | Number of passengers (excluding current driver) | Date | Time | Odometer reading | Number of passengers (excluding current driver) |

## Example 3. Two trips due to a change the truck configuration

A road tractor leaves Halifax for Fredericton on November 16 at $15: 39$ with two van trailers carrying paper, joined by a "B" connector. The odometer reading is 204583 kilometres at the start of the trip. The truck arrives in Fredericton at 21:52 and delivers one of the trailers. The odometer reading was 205058. The unit then leaves Fredericton at 22:47 for Moncton where the second trailer is delivered. When the truck arrives at 00:50, the odometer reading is 205258.


| Code Purpose of trip <br> 1 -Driving to or from service call | Truck configuration |  |  | Driver, Code | Code | Road type | Fuel purchased? |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 2 -Carrying goods or equipment (if applicable, please also check if carrying dangerous goods) <br> 3 -Empty (unladen of goods) <br> 4 -Other work purpose | (please use codes on "fold-out page") |  |  | (please use codes on "fold-out page") | 1 - within province <br> 2 - between provinces <br> 3 - across Canada - | Did you travel on any roads with posted speeds of $80 \mathrm{~km} / \mathrm{h}$ ( $50 \mathrm{~m} . \mathrm{p} . \mathrm{h}$.) or more during this trip? | (either purchased or from company supplies) |
| 5 -Driving to work | Column |  |  | Code | 4 - outside Canada |  |  |
| 7 - Other (please describe the purpose) | \| | II | III |  |  |  |  |

The driver is 54 year old male. This information would be completed on the fold out page. On the trip log, the driver code would be "A".
The first trip would be recorded as "between provinces" (Nova Scotia to New Brunswick) while the second trip was "within the province" (New Brunswick).

There was one fuel purchase.
Note: The trip information could be taken from company records, or you could send us copies of the driver logs, or it could be filled in by the driver(s).

| $\bigcirc_{1}$ <br> $\nabla_{2}$ <br> $\mathrm{O}_{4}$ 5 dangerous goods 7 Other $\qquad$ | 5 | 2 | 2 | A | $\bigcirc 1$ <br> (1) 2 <br> ○ 3 <br> $\bigcirc 4$ | If yes, what was the estimated distance travelled on roads with posted speeds of $80 \mathrm{~km} / \mathrm{h}$ ( 50 m.p.h.) or more during this trip? | No Yes, go to page 26 . |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\bigcirc_{1}$ <br> $\nabla_{2}$ <br> 4 dangerous goods 7 Other $\qquad$ | 3 | 2 | 1 | A | (1) 1 <br> ○ 2 <br> $\bigcirc 3$ <br> $\bigcirc 4$ |  | (1) No Yes, go to page 26. |
| $\bigcirc_{1} \bigcirc_{2} \bigcirc_{3} \bigcirc_{4} \bigcirc_{5} \bigcirc_{6}$ dangerous goods 7 Other $\qquad$ |  |  |  | $\square$ | $\bigcirc 1$ <br> $\bigcirc 2$ <br> $\bigcirc 3$ <br> $\bigcirc 4$ |  | No Yes, go to page 26. |
| 1 <br> 2 <br> 3 <br> 4 <br> dangerous goods 7 Other $\qquad$ |  |  |  |  | $\bigcirc 1$ <br> $\bigcirc 2$ <br> $\bigcirc 3$ <br> $\bigcirc 4$ | $\downarrow$ 〇 Yes $\bigcirc$ No <br> If yes, what was the estimated distance travelled on roads with posted speeds of $80 \mathrm{~km} / \mathrm{h}$ ( 50 m.p.h.) or more during this trip? | No Yes, go to page 26. |

Trip Log - Examples - Concluded

| Start of trip |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| End of trip |  |  |  |  |  |  |  |
| Date | Time | Odometer <br> reading | Number of <br> passengers <br> (excluding <br> current driver) | Date | Time | Odometer <br> reading | Number of <br> passengers <br> (excluding <br> current driver) |

## Example 4. Multiple trips due to driver changes and two stops.

A straight truck leaves Calgary at $21: 13$ for Seattle on December 15, carrying automobile tires. The odometer reading is 83527 kilometres.
Driver " A " is a 48 year old male and driver " B " is a 33 year old female. This information would be recorded on the fold-out page.
The truck arrives at $10: 45$ the next day. The final odometer reading is 84497 . The drivers take turns driving. A new trip is recorded each time there is a driver change. In addition to the driver changes there are two stops, each over 30 minutes between the time the truck leaves Calgary


| Code Purpose of trip <br> 1 -Driving to or from service call <br> 2 -Carrying goods or equipment (if applicable, please also check if carrying dangerous goods) <br> 3 -Empty (unladen of goods) <br> 4 -Other work purpose <br> 5 -Driving to work <br> 6 -Driving to home <br> 7 - Other (please describe the purpose) | Truck configuration |  |  | Driver, Code | Trip type | Road type | Fuel purchased? |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  | Code <br> 1 - within province <br> 2 - between provinces <br> 3 - across Canada U.S. border |  |  |
|  | (please use codes on "fold-out page") |  |  | (please use codes on "fold-out page") |  | Did you travel on any roads with posted speeds of $80 \mathrm{~km} / \mathrm{h}$ ( $50 \mathrm{~m} . \mathrm{p} . \mathrm{h}$.) or more during this trip? | (either purchased or from company supplies) |
|  | Column |  |  | Code | 4 - outside Canada |  |  |
|  |  | II | III |  |  |  |  |

and the time it arrives in Seattle. The first stop is at $23: 47$ to $01: 05$ for a meal while the second stop is from $04: 12$ to $05: 34$ due to a minor accident.

The first trip takes place entirely in Alberta. The second trip crosses into British Columbia. The third trip takes place entirely in British Columbia and the truck crosses the U.S. border during the final trip. There were two fuel purchases.

Note: The trip information could be taken from company records, or you could send us copies of the driver logs, or it could be filled in by the driver(s).


## Detailed Information For Your Interest

## Purpose of the survey

It is the goal of this survey to provide annual estimates of the amount of road travel, broken down by types of vehicle, age and sex of driver, time of day and season. Transport Canada sponsors the survey and uses the information in conjunction with other data to monitor how vehicle use changes over time and how use affects safety, fuel consumption and the environment. The results are also the prime source of road vehicle use information for researchers and interested members of the public. Prior to this survey, there was no valid, comprehensive source for this information in Canada, even though about ninety percent of all travel in Canada is by road.

## Why this vehicle was chosen

Your vehicle was one of those that was selected in your province/territory so that we can find out how you use it over the stated time period. To save money, we are keeping the number of vehicles sampled to a minimum, so it is important that we get your response. Your response is not analysed in any way that identifies you or your vehicle - it is only useful to us when combined with all the other responses. We get a representative picture by selecting vehicles at random from the official vehicle registration files, in order to cover the entire country and all types of vehicles and we cover the whole year by selecting new ones every week. Once the completed forms are returned, we combine them to build up a profile of the average kilometres for a vehicle during the year, then multiply the average by the total number of registered vehicles in the country to obtain total kilometres in the year.

The profile created from the sample includes average kilometres per vehicle for each day of the week, and each hour within the day, by sex and age group of drivers and by type of vehicles. Each of these characteristics is then multiplied by the total number of vehicles to obtain the total vehicle-kilometres during the year in each group.

## How we use each question

The odometer readings are the most important of all, allowing us to know the kilometres traveled for each trip, and the total travelled by the vehicle during the survey days. These are essential to calculating the amount of kilometres driven in the country each year.

Date and time of departure and arrival tell us when trips start and finish, so we can show, for example, how much travel is on weekdays compared to weekends, in the morning and evening rush-hours compared to the middle of the day, or in the middle of the night. These questions also give us the trip duration in hours and minutes, which helps us determine how much of total travel is made up of very short local trips and how much of long intercity trips. We can also compare the duration of trips to the kilometres traveled to estimate average speeds, in order to see whether speeds are tending to fall over the years through congestion.

Number of passengers carried, including any spare drivers but excluding the current driver, at the beginning and ending of each trip which lets us calculate vehicle occupancy. Multiplying the number of passengers carried by vehicle-kilometres we produce person-kilometres.

## Detailed Information For Your Interest

Purpose of trip Because the trucks we are surveying can be used for so many different purposes, we want to be able to describe them in broad categories, for example how many trucks are being used by small businessmen or farmers carrying equipment for their own operations, how many by larger businesses distributing their own goods or carrying them between plants, and how many by for-hire or contract carriers carrying for others. And to estimate those we also need to know how many are running empty, and how many are used for personal purposes (meaning not in the course of business).

The Driver Information is asked to provide driver's age group and sex, particularly for computation of accident rates by each group. The age categories listed are those normally used by safety agencies in compiling accident reports, so the estimates of kilometres travelled by age group can be combined with records of accident involvement, to give accidents per vehicle-kilometre.

Truck configuration, is asked because this questionnaire is being used for registered trucks or truck tractors with a gross weight of $4,500 \mathrm{~kg}(10,000 \mathrm{lbs})$ or more, and in actual use any vehicle might be used with different numbers and types of trailers. We are interested in knowing when, where and for which purposes different configurations are used, and in monitoring changes in configurations over time (e.g. shifts to doubles from tractor-semis). The question asks for the configuration to be described in detail, including the types of any trailers and connections used for them.

Type of road attempts to distinguish between travel on urban streets, and that on highways or in rural conditions. We are attempting to do this by asking you how much of each trip is on roads with posted speed limits of $80 \mathrm{~km} / \mathrm{h}$ or more, which we will use as an approximation of highway or rural conditions. This is an important distinction since safety, fuel consumption and emissions differ greatly between urban streets, and highways or rural conditions. But it is a difficult distinction to make, because people often don't know whether they are in an urban or a rural area, or whether the road they are on is classified as a street or a highway. The clearest difference that most people are aware of is the speed limit. Of course, we realise it is difficult to know exactly how many kilometres are driven on roads with posted speed limits of $80 \mathrm{~km} / \mathrm{h}$ or more during a trip, so we expect only the best estimated answer you are able to provide.

Fuel Purchased asks for the quantity of fuel purchased or pumped into the vehicle from company supplies. The answers are not directly used to try to assess the fuel consumption of the vehicle, but instead to calculate the average amount of fuel bought per day by all the vehicles in the sample that are similar (in type, engine size and model year according to the vehicle registration files). From the daily averages we can estimate annual amounts of fuel used nationally by vehicles similar to your group. These are useful to monitor trends in fuel use - for example to see how fuel use changes by age of vehicle. Total fuel purchases by each type of vehicle can be compared to annual vehicle-kilometres for that type, to give their average fuel consumption.

## Federal Agreement

To avoid duplication in surveys, Statistics Canada has entered into an agreement under section 12 of the Statistics Act with the Federal Department of Transport for the sharing of information from this survey. Under section 12 of the Statistics Act you may refuse to share your information with the Federal Department of Transport by writing to the Chief Statistician and returning your letter of objection along with the completed questionnaire.

While participation in this survey is voluntary, your cooperation is very important.

Fuel Log


| Enter quantity purchased | Enter amount spent | Price per litre/gallon | Fuel gauge after purchase |
| :---: | :---: | :---: | :---: |
| 1 <br> 62 $\square$ <br> litres US gallons other $\qquad$ | \$ <br> . $\square$ |  6 7 | $\phi$ full $1 / 2$ full $7 / 8$ full $3 / 8$ full $3 / 4$ full 1/4 full 5/8 full 1/8 full |
| . $\square$ litres US gallons other | \$ | $\square$ . $\square$ $\phi$ | $\bigcirc_{\text {full }}$ $\bigcirc_{1 / 2 \text { full }}$ <br> $\bigcirc_{7 / 8}$ full $\bigcirc_{3 / 8 \text { full }}$ <br> $\bigcirc_{3 / 4}$ full $\bigcirc_{1 / 4}$ full <br> $\bigcirc_{1 / 8}$ full $\bigcirc_{1 / 8}$ full |
| $\square$ $\square$ <br> . litres US gallons other $\qquad$ | $\$$ | . $\square$ $\phi$ | $\bigcirc_{\text {full }}$ $\bigcirc_{1 / 2 \text { full }}$ <br> $\bigcirc_{7 / 8}$ full $\bigcirc_{3 / 8 \text { full }}$ <br> $\bigcirc_{3 / 4}$ full $\bigcirc_{1 / 4}$ full <br> $\bigcirc_{5 / 8}$ full $\bigcirc_{1 / 8}$ full |
| . [ $\square$ litres US gallons other $\qquad$ | \$ | $\square$ $\phi$ | $\bigcirc_{\text {full }}$ $\bigcirc_{1 / 2}$ full <br> $\bigcirc_{7 / 8}$ full $\bigcirc_{3 / 8}$ full <br> $\bigcirc_{3 / 4}$ full $\bigcirc_{1 / 4 \text { full }}$ <br> $\bigcirc_{5 / 8}$ full $\bigcirc_{1 / 8}$ full |
| $\square$ . $\square$ litres US gallons other | $\$$ | $\square$ . $\square$ $\phi$ | $\bigcirc_{\text {full }}$ $\bigcirc_{1 / 2 \text { full }}$ <br> $\bigcirc_{7 / 8}$ full $\bigcirc_{3 / 8}$ full <br> $\bigcirc_{3 / 4}$ full $\bigcirc_{1 / 4}$ full <br> ${ }_{5 / 8}$ full $\bigcirc_{1 / 8}$ full |
| . $\square$ litres US gallons other $\qquad$ | \$ | . $\square$ $\phi$ | $\bigcirc_{\text {full }}$ $\bigcirc_{1 / 2}$ full <br> $\bigcirc_{7 / 8}$ full $\bigcirc_{3 / 8}$ full <br> $\bigcirc_{3 / 4}$ full $\bigcirc_{1 / 4}$ full <br> $\bigcirc_{5 / 8}$ full $\bigcirc_{1 / 8}$ full |

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[^0]:    Note of appreciation
    Canada owes the success of its statistical system to a long-standing partnership between Statistics Canada, the citizens of Canada, its businesses, governments and other institutions. Accurate and timely statistical information could not be produced without their continued cooperation and goodwill.

[^1]:    ${ }^{1}$ There is only one mail out to respondents in options 1,2 and 5 . There are two logs mailed out to respondents in options 3 and 4.

[^2]:    ${ }^{2}$ We currently record any CVS $\log$ as returned as soon as it arrives, without any immediate review of the information on the log, in order to prevent sending out a reminder letter, postcard or short form to someone who has already returned his log. In Options 3 and 4, we would need to be able to distinguish whether a returned $\log$ was the first $\log$ mailed and there would be a subsequent mailout of the other $\log$, or the second $\log$ and there would be no further mail outs. In addition, we need to immediately review each returned first log to verify that the respondent still owns the vehicle and did not refuse to do the survey prior to sending out the second log.

[^3]:    Any questions or concerns?
    1-800-647-0642

[^4]:    5-5400-152.1

