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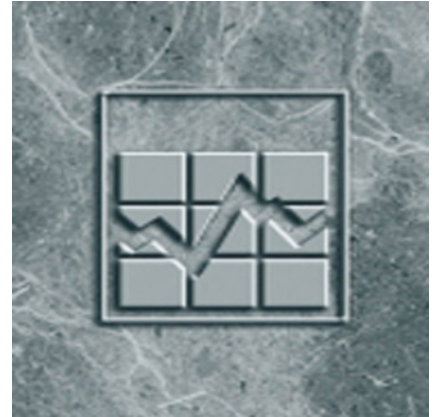
### Household expenditures research paper series

# 2001 Food Expenditure Survey Data quality indicators

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# 2001 Food Expenditure Survey

## Data quality indicators

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### 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.*

## **Abstract**

The Food Expenditure Survey (FES) is a periodic survey collecting data from households on food spending habits. Data are collected mainly using weekly diaries of purchases that the respondents must fill in daily during two consecutive weeks.

The FES, like all surveys, is subject to error despite all the precautions taken at the various stages of the survey to control them. Although there is no exhaustive measure of a survey's data quality, certain quality measures taken at various stages of the survey can provide the user with relevant information to ensure sound data interpretation.

This paper presents, for the 2001 FES, the following quality indicators the coefficients of variation, the non-response rates, the vacancy rates, the slippage rates, the imputation rates as well the impacts of imputation on the estimates.

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# Highlights

## Sampling errors

- The coefficients of variation (CV) of the estimate of total average weekly expenditure per household vary between 1.9% and 3.1% at the regional level (five Canadian regions) and the CV is 1.1% at the national level.
- The coefficients of variation for average weekly expenditures per household by main summary categories of expenditures are generally less than 4% nationally and less than 9% regionally.

## Non-response

- The non-response rate is 28.5%. It is due to refusals (17.0%) and households that could not be contacted (11.4%).
- The final non-response rate tends to increase with the level of urbanization. We observed a non-response rate of 19.2% at the rural level, and 30.0% in urban centres of one million inhabitants or more.
- Analysis of final response rates by strata of high-income and low-income geographic areas drawn from the sample design reveals that the non-response rate in high-income strata (37.2%) is higher than the rate in low-income strata (30.4%) and regular strata (27.8%).

## Coverage errors

- Undercoverage of households is 7.9% at the national level and ranges between 5.0% and 10.4% at the regional level.
- Undercoverage of individuals is 6.9% at the national level, and ranges between 4.6% and 9.2% in each region.
- National slippage rates for children (0 to 6 years and 7 to 17 years) are quite different from the rates for other age groups. As a result, there is overcoverage of children and undercoverage of adults.

## Response errors

- Data collection involves a personal interview with the completion of a paper questionnaire, and two weekly purchasing diaries that the respondent must fill in daily for two consecutive weeks. The estimate of expenditures obtained by the questionnaire is 8.3% higher than that obtained from the diaries.

## Processing errors related to imputation

### i) From the questionnaire (FE2)

- Only two sections are imputed: *Spending habits* (section B) and *Food and beverages while away from home overnight or longer during the previous month* (section C). For section B, 12.1% of the questionnaires are imputed. Most of them have only one or two variables out of five needing imputation. For section C, 4.2% of the questionnaires are imputed.

### ii) From the diary (FE3)

- For each day, only the section *Food and beverages purchased from stores* is imputed. Of the 279,709 food expenditures reported, 2.2% required imputation. Most of the time, the imputation specifies the type of expenditure. For example, the respondent indicates Milk without specifying the type of milk (Fluid whole, low-fat, skim, etc.).

## Introduction

The Food Expenditure Survey (FES) is a periodic survey conducted every four to six years. The survey collects data from Canadian households on food spending habits. Data are collected by a personal interview using a paper questionnaire (FE2), and by two weekly diaries of purchases (FE3) that the respondent must fill in daily during two consecutive weeks. The 2001 Food Expenditure Survey was conducted every month during the 2001 calendar year. The 2001 FES sample consisted of 8,414 households distributed throughout the ten provinces and in the cities of Whitehorse, Yellowknife and Iqaluit.

This survey is used to complete the Survey of Household Spending (SHS)<sup>1</sup> by gathering detailed data on food expenditures that cannot be collected using the SHS methodology. The Food Expenditure Survey and Survey of Household Spending are used to update the weightings used in the Consumer Price Index.

The FES, like all surveys, is subject to error despite all the precautions taken at the various stages of the survey to control them. Although there is no exhaustive measure of a survey's data quality, certain quality measures taken at various stages of the survey can provide the user with relevant information to ensure sound data interpretation.

This paper presents the quality indicators produced for the 2001 Food Expenditure Survey. It includes the usual quality indicators that are generally useful to users in interpreting the data, such as coefficients of variation, non-response rates, slippage rates and imputation rates.

The quality indicators have been classified according to the main types of error that can be found in a survey. Section 1 discusses the sampling errors, that is, errors due to the fact that the inferences made regarding the population as a whole are based on the data collected from a sample of the population and not from the whole population. The subsequent sections cover errors due to factors other than sampling. Non-response and coverage errors are discussed first in Sections 2 and 3. Response errors and processing errors are dealt with in sections 4 and 5 respectively.

This paper focuses on data quality. For a detailed description of the survey's methodology, consult Reference [1].

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1. The SHS is an annual survey in which a sample of Canadian households is asked to report on all expenditures made during a calendar year. The results of the SHS are published in *Spending Patterns in Canada*, Catalogue No. 62-202.



# 1. Sampling errors

Sampling errors arise from the fact that the inferences made from the survey regarding the population as a whole are based on information that is gathered from a sample of the population and not from the whole population. In addition to the survey design and estimation method applied for the Food Expenditure Survey, the size of the sample and the variability of each characteristic are determining factors of sampling error. Characteristics that are rare or which are distributed with high variability in the population will have a larger sampling error than characteristics that are found more frequently or which are distributed with less variability in the population.

## 1.1 Measurement of sampling error

Standard error is a common measure of the sampling error. Standard error corresponds to the degree of variation in the estimate given that a specific sample has been chosen rather than some other from among all of the possible same-size samples under the same sample design. Since the FES uses a complex sample design and estimation method, the standard error is estimated using a resampling method known as the Jackknife technique. See Reference [2] for further details on this method.

The coefficient of variation (CV) is also a frequently used measure of estimate reliability. It simply states the standard error as a percentage of the estimate. Thus, if an estimate  $Y$  is obtained for a certain characteristic and the SE corresponds to the estimated standard error, then the CV will be  $(SE/Y) \times 100$ .

Finally, the standard error or the coefficient of variation can be used to derive another measure of the accuracy of estimates – the confidence interval. This measure indicates the level of confidence there is that the real value of a certain observed characteristic in the population will be found within certain limits. An interval with a confidence level of 95% corresponds to an estimate obtained from the sample with  $\pm 2$  standard errors:  $(Y \pm 2 SE)$ . This means that if the sampling were repeated many times, each sample would provide a different interval and 95% of the intervals would contain the real value of the characteristic. Similarly, if the sampling were repeated, the interval  $Y \pm SE$  would contain the real value in 68% of cases. Note that the confidence interval is also calculated from the CV in a similar manner, namely  $(Y \pm 2 (CV \times Y) / 100)$ .

## 1.2 Coefficients of variation

Estimates of coefficients of variation are calculated for the estimates of several characteristics collected in the FES. The CVs for weekly estimates of average expenditure per household, reporting percentage (proportion in percentage of diaries having expenses for a particular expenditure) and average quantity per household are available at the national and regional level in the publication *Food expenditure in Canada* (see Reference [3]).

It should be noted that CV estimates do not take into account the fact that some data are imputed. Consequently, the CVs presented may underestimate the real

values. For most variables, the imputation rate is relatively low (see Section 5) and the CVs provided represent a good estimate of the real CVs. However, it is important to take into account both the CV and the imputation rate when examining the reliability of detailed food expenditures with a high imputation rate.

Table 1.1 gives an overview of the CVs of the estimates of average weekly expenditure per household at the regional level and at the national level for a few of the summary expenditure categories.

**Table 1.1**  
**Coefficients of variation (%) of average weekly expenditure per household for certain summary categories of expenditure, five Canadian regions and Canada (10 provinces)**

Summary categories of expenditure	Canada (10 prov)	Atlantic	Quebec	Ontario	Prairies	British Columbia
<b>Food purchased in stores</b>	1.0	3.1	1.8	1.9	3.1	2.1
On trips overnight or longer	10.5	22.4	13.6	13.7	35.4	15.3
Locally and on day trips	1.0	2.9	1.8	1.8	2.3	2.1
Meat	1.5	4.5	2.6	2.6	3.9	3.5
Fish and other marine products	3.5	8.2	7.2	6.0	7.3	8.5
Dairy products and eggs	1.2	3.1	2.4	2.3	2.6	2.7
Bakery and other cereal products	1.2	3.0	2.0	2.3	2.5	2.6
Fruits and nuts	1.4	4.4	2.6	2.5	3.0	3.2
Vegetables	1.5	4.0	2.6	2.8	3.3	3.3
Condiments, spices and vinegar	1.9	5.5	3.6	3.6	4.3	4.5
Sugar and sugar preparations	2.3	5.6	5.0	4.2	4.5	5.4
Coffee and tea	2.9	7.1	5.4	5.0	8.3	6.4
Fats and oils	2.7	6.7	5.2	5.2	5.6	7.4
Other foods, materials and food preparations	1.7	5.1	3.3	3.2	4.2	3.7
Non-alcoholic beverages	2.0	5.2	3.8	3.6	4.9	5.3
<b>Food purchased in restaurants</b>	2.2	5.9	4.4	4.4	4.4	4.5
<b>Total of weekly food expenditure</b>	1.1	2.9	1.9	2.0	3.1	2.1

The CVs of the estimate of the total average weekly expenditure per household vary from 1.9% to 3.1% at the regional level and the CV is 1.1% nationally. The category of foods purchased in stores has CVs similar to those of the total, while the CVs of food purchased in restaurants are almost twice as high.

We see that the CVs for food purchased in stores on trips overnight or longer are much higher than the others. At the national level, the CV is 10.5% and at the regional level, they vary between 13.6% and 35.4%.

The quality of the estimates varies depending on the food category. The CVs for the “Fish and other marine products”, “Coffee and tea” and “Fats and oils” categories are around 3% nationally and vary between 5% and 9% regionally. The nine other categories have CVs varying mainly between 1% and 2% at the national level and between 2% and 6% at the regional level.

### 1.3 Model for deriving an approximation of the CV

Estimates for various domains of interest (e.g. by size of area of residence) are available for the summary categories of expenditure in the publication *Food expenditure in Canada* (Reference [3]). Estimates for the various domains of interest for detailed categories of expenditure are also available by request from the Income Statistics Division. For operational reasons, it is not possible to produce the CVs for all the various levels of aggregation that might be of interest to users.

#### 1.3.1 Approximation of the CV for domain estimates

However, it is possible to calculate an approximation of the CV using the relationship of the number of weekly diaries in which expenditures for an item were reported and the CV at an aggregate level. This relationship, based on the CV's tendency to grow proportionately to a decrease in the square root of the number of weekly diaries with a non-zero amount, is illustrated below.

##### ***Formula for approximating the CV for a domain (a sub-group of the population)***

If  $CV(Y)$  represents the CV for the estimate of the average weekly expenditure per household of a certain characteristic for the whole population, then it is possible to calculate an approximation of the CV of the estimate of that characteristics for a domain (which can be considered a sub-group of the population, such as type of household, level of urbanization, etc.) using the following equation:

$$CV(Y_d) = CV(Y) \times \sqrt{\frac{n}{n_d}}$$

where

$n$  = the number of weekly diaries with a non-zero amount for the characteristic

which can be obtained by calculating

$$\frac{\text{the number of weekly diaries} \times \text{the estimate of the percentage reporting}^2}{100}$$

$n_d$  = the number of weekly diaries with a non-zero amount for the characteristic in domain  $d$

which can be obtained by calculating

---

2. Proportion in percentage of diaries with a non-zero amount for the characteristic.

*the number of weekly diaries in domain d x the estimate of the percentage reporting<sup>2</sup> in domain d*

---

100

In general, the CV, the number of weekly diaries and the percentage reporting at the national level are used to calculate approximations for the various domains. In a case where we want to calculate the CV for a domain wholly contained in a single region (e.g. metropolitan area), it is preferable to use these values at the regional level since the regional CVs are published for the 2001 FES (Reference [3]). It is important to remember that the value of the CV obtained by this approach is only an approximation of the CV.

### **1.3.2 Approximation of the CV using microdata files**

Users of microdata files can use another approach to derive an approximation of the CV of estimates, which will generally be more accurate than the one described in the previous section for CVs of detailed categories of expenditure. This approach is described in detail in the documentation accompanying the 2001 microdata files. It can only be used with the microdata files because both the data and the weights for each household are needed to calculate this approximation.

The paper on data quality of the 1997 Survey of Household Spending (Reference [4]) contains the results of the evaluation of the performance of these two methods of CV approximation.

## **1.4 Suppression of unreliable data in tables of estimates**

Since the coefficient of variation is an indicator of data quality, we would like to use it to determine whether the estimates should be published. Estimates for which the CV is estimated at over 33% are not considered sufficiently reliable for publication. To facilitate tabulation, the suppression rule for food expenditure estimates is based on the number of weekly diaries with a non-zero amount for an expenditure category.

Based on the analysis of previous surveys, the CVs are usually below 33% when the number of weekly diaries with a non-zero amount for an item is greater than 40. Since this is an approximation rule, certain estimates may be published even if the CV is higher than 33% (type I error) and others will not be published even with a CV less than 33% (type II error). Table 1.2 below shows the value of these two errors for the CVs of estimates of average weekly expenditure per household for 365 food items.

**Table 1.2**  
**Type I and Type II error (%) using the 40 diaries rule**

Domain	CV = 0	Type I error	Type II error	Number of CVs involved
Canada (10 provinces)	0.0	1.6	0.3	365
Region	0.5	0.6	7.7	1,825
Province	2.9	0.7	14.8	3,650
Metropolitan area	7.0	0.7	18.3	5,840
Level of urbanization	0.8	0.9	10.2	2,555
Household size	0.5	0.5	6.8	1,825
Household composition	3.2	0.9	12.3	2,920

The column "CV = 0" represents the proportion of estimates whose CVs are equal to zero. This occurs mainly because there is no weekly diary with a non-zero amount for the associated estimates.

The column "Type I error" represents the proportion of estimates that would be published under the 40 diaries rule, whose CVs are over 33%. This error is 1.6% at the Canada level and less 1% for the other studied domains<sup>3</sup>.

The column "Type II error" represents the proportion of estimates, that would not be published under the 40 diaries rule, whose CVs are 33% or less.

## 2. Non-response

Errors due to non-response arise from the fact that certain potential respondents do not provide the necessary information or that this information is unusable. When the respondent has failed to respond to certain questions only, it is referred to as a partial non-response. In this case, the missing data are imputed. Errors associated with imputation are presented in Section 5 which deals with processing errors.

There is also another type of partial non-response: respondents who reported only one week of data. For the 10 provinces, there were 252 such cases.

In this section, non-response covers collection non-response, due mainly to an inability to contact the household or the refusal by the members of the household to participate in the survey.

3. This error is higher at the Canada level because of the proportion of published estimates compared to the other domains. This proportion is over 98% at the Canada level, while it is less than 85% for the other domains.

The main impact of non-response on data quality is that it can introduce a bias in the estimates if the characteristics of respondents and non-respondents differ and that difference impacts the characteristics examined. Non-response rates can be easily calculated but they give only an indication of data quality because they cannot be used to measure the size of the bias associated with the estimates. The level of non-response can be considered as an evaluation of the risks of bias in the estimates.

## **2.1 Non-response rates and vacancy rates**

In the FES, because the units selected are dwellings, interviewers must first identify ineligible dwellings, that is, dwellings occupied by persons who are not part of the target population, dwellings that no longer exist (demolished, mobile home moved or dwelling converted into a business) and vacant dwellings (unoccupied, seasonal or under construction).

Among the eligible dwellings, the next step is to evaluate the proportion of households that did not respond to the survey, which is referred to as the collection non-response. This group includes households that refused to participate in the survey and households in which respondents could not be contacted because they were absent or because of special circumstances (language problem, illness or death).

Table 2.1 presents the non-response rates broken down by refusals and non-contacts. It also includes the vacancy rates. These rates are unweighted. They are provided at the national level and the regional level and for the three northern cities, by quarter and for the year.

**Table 2.1**  
**Non-response rates (%) and vacancy rates (%) by quarter and for the year, five Canadian regions, Canada (10 provinces) and three large cities in the Territories**

Quarters		Canada (10 prov)	Atl.	Que.	Ont.	Pr.	B.C.	3 large territory cities	Whitehorse	Yellowknife	Iqaluit
January to December	Vacancy	7.5	12.4	7.4	6.2	8.4	5.8	13.9	16.8	10.7	14.2
	Non-response	28.5	20.4	22.8	33.2	23.6	37.0	32.4	41.1	18.2	39.8
	No contact	11.4	8.2	7.2	14.5	9.2	15.3	14.6	17.3	8.3	19.5
	Refusal	17.0	12.3	15.6	18.7	14.3	21.7	17.8	23.8	9.9	20.3
January to March	Vacancy	8.2	13.1	8.4	7.1	8.2	5.8	18.4	28.8	18.6	4.1
	Non-response	34.7	22.4	29.6	42.1	28.4	45.1	37.8	25.5	31.4	57.8
	No contact	15.0	9.3	10.4	20.4	11.4	19.8	17.5	12.8	7.8	33.3
	Refusal	19.7	13.1	19.2	21.7	17.0	25.3	20.3	12.8	23.5	24.4
April to June	Vacancy	7.7	9.2	7.7	6.0	10.2	7.1	12.8	9.8	13.3	16.3
	Non-response	29.7	20.1	23.6	32.9	30.0	36.8	39.7	55.8	26.3	29.0
	No contact	11.3	6.4	7.8	13.7	10.8	14.7	18.2	21.2	15.8	16.1
	Refusal	18.5	13.7	15.8	19.3	19.3	22.2	21.5	34.6	10.5	12.9
July to September	Vacancy	7.3	11.5	6.5	6.9	8.1	5.3	8.5	9.5	3.3	14.3
	Non-response	27.0	17.3	18.8	31.1	28.1	33.7	28.9	42.1	15.1	28.1
	No contact	10.5	6.1	5.3	12.3	12.4	13.8	13.4	19.3	9.4	9.4
	Refusal	16.5	11.2	13.5	18.9	15.7	19.9	15.5	22.8	5.7	18.8
October to December	Vacancy	6.9	15.3	7.0	4.8	7.2	5.0	15.2	18.3	6.5	23.8
	Non-response	21.3	21.4	18.7	25.9	6.1	31.8	23.1	39.1	2.0	36.0
	No contact	8.3	10.7	5.1	11.1	1.7	12.7	9.1	15.2	2.0	12.0
	Refusal	13.0	10.7	13.6	14.8	4.4	19.1	14.0	23.9	0.0	24.0

The non-response rate for the year in Canada (10 provinces) is 28.5%. This rate includes refusals (17.0%) and households could not be contacted (11.4%). For all regions except the North, regardless of quarter, refusals represent the main reason for non-response. The three northern cities combined have a non-response rate for the year of 32.4%. This rate includes refusals (17.8%) and households that could not be contacted (14.6%). In the case of Yellowknife and Iqaluit, for certain quarters, the main reason for non-response is non-contact.

Non-response rates tend to decrease from one quarter to the next. We note that these rates are especially high in the first quarter in Ontario and British Columbia. They reflect collection problems encountered in the first quarter. The Ontario and British Columbia regions have the highest non-response rates. For the year as a whole, their non-response rates are respectively 33.2% and 37.0%, while the three other regions have non-response rates between 20.4% and 23.6%.

Among the three northern cities, Yellowknife had the lowest non-response rate at 18.2% for the year. Whitehorse and Iqaluit have non-response rates for the year of 41.1% and 39.8% respectively.

The vacancy rates are shown in Table 2.1, but it should be remembered that vacant dwellings do not contribute to the sample bias to the extent that they are correctly identified. The analysis of the vacancy rates can reveal dwelling identification problems associated with collection. The vacancy rate for the 2001 FES is 7.5% for Canada (10 provinces) and 13.9% for all of the three Northern cities.

## **2.2 Non-response according to the level of urbanization**

Non-response varies according to the level of urbanization. The various rates for Canada (10 provinces) are given by level of urbanization, by quarter and for the year in Table 2.2.



**Table 2.2**  
**Non-response rates (%) and vacancy rates (%) by level of urbanization, by**  
**quarter and for the year, Canada (10 provinces)**

Category of urbanization		TOTAL	URBAN	1,000,000 or more	500,000 to 999,999	250,000 to 499,999	100,000 to 249,999	30,000 to 99,999	Less than 30,000	RURAL
January to December	Vacancy	7.5	4.4	3.4	3.4	5.1	5.6	5.0	6.6	22.6
	Non-response	28.5	30.0	36.4	28.5	28.9	22.2	27.9	20.9	19.2
	No contact	11.4	12.2	16.1	11.3	10.8	6.7	10.1	8.0	7.0
	Refusal	17.0	17.8	20.3	17.2	18.0	15.4	17.8	12.8	12.2
January to March	Vacancy	8.2	4.8	4.0	3.6	8.0	5.2	5.4	5.2	23.8
	Non-response	34.7	36.5	45.0	38.2	35.3	24.6	30.5	26.0	24.3
	No contact	15.0	15.8	22.0	17.5	16.3	6.1	9.3	9.2	9.8
	Refusal	19.7	20.6	23.0	20.7	18.9	18.4	21.2	16.8	14.5
April to June	Vacancy	7.7	4.8	4.3	4.1	4.6	8.4	2.1	6.2	21.1
	Non-response	29.7	31.1	36.3	31.3	23.9	28.5	31.6	21.3	22.0
	No contact	11.3	12.1	16.3	10.8	6.1	8.2	11.8	7.9	6.6
	Refusal	18.5	19.0	19.9	20.5	17.8	20.3	19.9	13.4	15.4
July to September	Vacancy	7.3	4.6	2.9	3.1	5.1	5.3	6.8	10.0	20.5
	Non-response	27.0	28.6	31.8	29.0	29.9	19.3	31.4	23.2	16.9
	No contact	10.5	11.1	13.1	11.2	9.1	6.8	14.0	8.2	6.5
	Refusal	16.5	17.5	18.8	17.8	20.7	12.5	17.4	14.9	10.4
October to December	Vacancy	6.9	3.3	2.4	2.7	2.2	4.1	5.9	5.5	24.5
	Non-response	21.3	22.8	32.0	13.0	25.6	16.4	17.5	11.5	11.9
	No contact	8.3	9.0	12.6	4.0	10.8	6.2	5.6	6.5	4.2
	Refusal	13.0	13.8	19.4	9.1	14.8	10.2	11.9	5.0	7.7

The non-response rate for the year tends to increase with the level of urbanization. There is a difference of 17.2% between the categories of 1,000,000 or more (36.4%) and Rural (19.2%). Refusals are the main cause for non-response, except in one case: the less than 30,000 group in the last quarter.

An examination of vacancy rates by level of urbanization reveals that the vacancy rate is higher in the rural regions (22.6%) than in low population urban areas (6.6%). This same phenomenon is also found in the Labour Force Survey (LFS) and is no doubt due to the large number of seasonal dwellings in rural settings. Since the FES sample is more concentrated in high population urban areas than the LFS, we can expect to see a national vacancy rate slightly lower than that of the LFS. Effectively, the 2001 FES has a vacancy rate of 7.5% while the rate for the LFS for the same year is 12%. For further details on the LFS methodology, see Reference [5].

## 2.3 Non-response by income strata

It is impossible to compare non-response rates by income level because this information is not given by the non-respondents. However, the LFS sample design used for the FES was designed in part to establish, in nine major cities, strata of geographical areas where the average household income exceeds \$100,000 and in seven major cities, strata composed of apartments inhabited by households with an average income below \$20,000. This is a small number of strata and it accounts for only a small number of dwellings in the FES sample (about 530 and 75 for high-income and low-income strata respectively, or slightly more than 6% of the sample).

**Table 2.3**  
**Comparison of non-response rates (%) and vacancy rates (%) of high income and low income strata in relation to other strata, by quarter and for the year, Canada (10 provinces)**

Type of stratum by income		TOTAL	High income	Regular	Low income
January to December	Vacancy	7.5	3.2	7.8	6.7
	Non-response	28.5	37.2	27.8	30.4
	No contact	11.4	16.0	11.1	13.0
	Refusal	17.0	21.2	16.7	17.4
January to March	Vacancy	8.2	5.6	8.4	0.0
	Non-response	34.7	44.3	34.0	28.6
	No contact	15.0	24.2	14.4	0.0
	Refusal	19.7	20.1	19.6	28.6
April to June	Vacancy	7.7	0.8	8.2	5.3
	Non-response	29.7	41.0	28.8	38.9
	No contact	11.3	18.0	10.8	5.6
	Refusal	18.5	23.0	18.0	33.3
July to September	Vacancy	7.3	3.3	7.4	15.8
	Non-response	27.0	35.7	26.4	25.0
	No contact	10.5	13.4	10.2	25.0
	Refusal	16.5	22.3	16.3	0.0
October to December	Vacancy	6.9	2.5	7.2	4.3
	Non-response	21.3	25.6	20.9	28.6
	No contact	8.3	6.0	8.4	19.0
	Refusal	13.0	19.7	12.6	9.5

Looking at the year, the highest non-response rate is in the high-income strata (37.2%), followed by the low-income strata (30.4%) and regular strata (27.8%). This same order occurs for non-contacts and for refusals. The main cause of non-response is refusals.

Still looking at the year, the highest vacancy rate is found among the regular strata (7.8%).

In the quarters, non-response rates vary from quarter to quarter. In particular, refusal rates in the first two quarters are highest in the low-income strata.

## **2.4 Adjustment for non-response**

To offset non-response, the FES weights are increased by the inverse of the weighted response rate within certain defined groups in each region by quarter. The defined groups in each region include mainly the high-income strata, certain metropolitan areas and the various levels of urbanization. The weighted rates differ from the rates presented in this section because they take into account the design weight of each household. An algebraic description of the adjustment for non-response is given in Appendix A.

The adjustment of the weights for non-response makes it possible to take into account differences in the level of non-response by defined group, and will also reduce the bias to the extent that the characteristics of the respondents and non-respondents are similar for a given group.

## **3. Coverage errors**

The population in question, referred to as the target population, was defined during the survey's design. It is important to reiterate the definition of this target population for the FES because a good understanding of the target population is necessary for a sound interpretation of the survey data. It is important to point out that the FES uses the survey frame of the Labour Force Survey (LFS).

### *Target population*

The target population corresponds to individuals living in private households in Canada in the ten provinces and the cities of Whitehorse, Yellowknife and Iqaluit. Persons living full-time in institutions, such as prisons, chronic care hospitals and residences for senior citizens, and persons who are members of religious and other communal colonies, members of the Armed Forces living in military camps, and individuals living full-time in hotels or rooming houses are excluded. Also excluded are official representatives of foreign countries living in Canada and their families, and persons living on Indian reserves and crown lands.

We did not collect data from persons temporarily living away from their families (for example, students at university) because the data would be gathered from their families if selected in the sample.

Furthermore, in 2001, for practical reasons mainly related to the fact that the size of the sample was much smaller than in previous surveys, households residing in dwellings located in remote areas were excluded from the survey. These regions, which are sparsely populated for the most part, are located mainly in the northern parts of certain provinces. They are difficult to contact and data collection is very costly for these households.

The survey therefore covers about 97% of the population in the 10 provinces. In the Yukon, Northwest Territories and Nunavut, the survey covers only the cities of Whitehorse, Yellowknife and Iqaluit, which represent 62%, 44% and 17% of the population of their respective territories based on the 1996 Census.

Coverage errors are the result of inadequate representation of the target population from the units of the survey frame. Certain units of the target population may be omitted from the survey frame, which creates a situation of undercoverage. Other units that are not in the target population may be included by mistake or certain units may be included more than once. These units are responsible for overcoverage.

### **3.1 Undercoverage and overcoverage: slippage rates**

In the FES, the selection of the sample is done using a list of dwellings in each selected cluster. The omission of dwellings during the creation of the list, new dwellings that are added between the creation of the list and the visit of the interviewers (mainly in developing areas), and the incorrect classification of vacant dwellings contribute to undercoverage. Including dwellings that would not be within the parameters of the cluster is a source of overcoverage. Similarly, errors can slip in during the gathering of the data, when identifying persons who are members of the selected household. These errors also contribute to undercoverage and overcoverage.

A good representation of the target population is essential to producing realistic estimates of expenditures. The number of people per household is also an important characteristic in the estimate of average household expenditure. It is therefore necessary for the sample not only to properly represent the individuals in the target population, but also the distribution of households by size.

In general, there is net undercoverage of the number of people and the number of households in the FES that is corrected by an adjustment of the weights using auxiliary data, which are based on post-censal demographic estimates. The slippage rate (see algebraic description in Appendix A) is a measure of the percentage of difference between the estimates from these auxiliary data and the estimates from the survey calculated using weights not adjusted with these data.<sup>4</sup> Slippage rates by age group at the national and regional level are presented in

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4. Sub-weights are used, which are design weights adjusted for non-response (see Appendix A).

Table 3.1, while slippage rates by size of household are found in Table 3.2. A positive rate corresponds to overcoverage of the number of people or households in the survey.

**Table 3.1**  
**Slippage rates (%) by age group, five Canadian regions and Canada (10 provinces)**

Age	Canada (10 provinces)	Atlantic	Quebec	Ontario	Prairies	British Columbia
0-6 yrs	4.7	5.5	8.6	3.0	6.1	0.9
7-17 yrs	1.5	2.2	-3.9	2.7	0.9	7.4
18-34 yrs	-13.9	-19.8	-10.7	-17.9	-5.7	-15.3
35-54 yrs	-7.7	-7.7	-11.0	-7.2	-4.9	-6.4
55-64 yrs	-6.5	-19.7	1.0	-7.3	-6.4	-11.1
65 yrs and +	-8.9	-6.6	-6.4	-5.8	-16.1	-15.0
Total	-6.9	-9.2	-6.6	-7.3	-4.6	-7.6

For the 2001 FES, the rate of undercoverage of the population is 6.9%. An analysis of Table 3.1 at the age group level reveals that, both nationally and regionally, the slippage rates for children (0 to 6 years and 7 to 17 years) are very different from those of the other age groups. In fact, among children, we find overcoverage or slight undercoverage, while among adults, there is always undercoverage, except in Quebec for the 55 to 64 age group.

The highest undercoverage rate at the national level is found in the 18 to 34 age group (13.9%). At the regional level, excluding the Prairies, this group has a high undercoverage rate. We also find a high undercoverage rate in the 35 to 54 age group in Quebec (11.0%), in the 55 to 64 age group for the Atlantic region (19.7%), and in the 65 and older age group in the Prairies and British Columbia (16.1% and 15.0% respectively).

**Table 3.2**  
**Slippage rates (%) by size of household, five Canadian regions and Canada (10 provinces)**

Geography	Households	One-person households	Two-person households	Three or more person households
<b>Canada (10 provinces)</b>	-7.9	-16.9	-3.3	-5.8
Atlantic	-8.2	-13.8	2.9	-14.0
Quebec	-7.4	-17.2	0.4	-6.1
Ontario	-8.5	-16.5	-5.1	-6.5
Prairies	-5.0	-14.1	-2.4	-1.6
British Columbia	-10.4	-22.2	-9.9	-3.1

At the national level, undercoverage of the number of households was 7.9%. This slippage rate is 1 percentage point higher than the slippage rate for the population which is 6.9%, see table 3.1.

At the regional level, the undercoverage rate varies between 5.0% and 10.4% for the number of households. With the exception of the Atlantic Region, the undercoverage rate is much higher among households with one person than among households with two or three or more persons. In the case of the Atlantic region, households with one person and those with three or more persons have similar undercoverage rates, specifically 13.8% and 14.0% respectively.

### **3.2 Adjustment for the coverage error at the population and household levels**

To correct the problem of the sample's representativeness shown in Table 3.1 and to reduce the resulting bias, the survey data is adjusted during weighting using demographic estimates for the age groups defined in this table, for each Canadian region. This adjustment considerably reduces the bias caused by coverage errors but it does not eliminate the bias entirely if the characteristics of the individuals omitted or non-respondents differ from those respondents included for the same age group in a given region.

It should also be noted that the effectiveness of the coverage adjustment using demographic estimates depends largely on the quality of those demographic estimates and their accuracy in representing the survey's target population. The demographic estimates are not free from error. They are post-censal estimates based on the 1996 census population counts, adjusted for net undercoverage and which take into account recent statistics on migration, births, mortality, etc. These demographic estimates are adjusted to reflect certain exclusions specific to household surveys, such as persons living in institutions. Conceptually, they differ slightly from the FES target population by including persons living in collective households that are not institutions, such as members of communal colonies and individuals living full-time in hotels or rooming houses. However, this difference is considered negligible because these individuals represent less than 0.4% of the Canadian population.

To correct the problem of the sample's representativeness in terms of the number of households by size, shown in Table 3.2, the survey's data are adjusted using auxiliary data. To offset the bias caused by inadequate representation of households, the FES weights are adjusted to reflect post-censal estimates of the number of households by size for each Canadian region. However, this does not necessarily eliminate the bias if the characteristics of the households not interviewed (omitted or non-respondent) differ from those of the respondent households of the same size. As with the demographic estimates of population, the effectiveness of the adjustment depends on the quality of the auxiliary data on the number of households.

In addition to the demographic estimates mentioned earlier, two other sets of auxiliary data are used to adjust the survey data during weighting in order to improve representativeness. The first set of data is used to control the number of

children and adults in certain large cities. The second is designed to control the number of single-parent households and couples with children households by Canadian region.

For further information on the methodology of the adjustment, including that for northern cities, see Reference [1].

## 4. Response errors

Response errors correspond to inaccurate responses to questions. They can be attributed to a variety of factors including a questionnaire that needs improving, incorrect interpretation of questions by interviewers or respondents, and errors in respondents reported data.

Respondents are required to record their expenditures on an ongoing basis in the two weekly diaries given to them. However, errors can occur when respondents make transcription errors, do not use the right terms for products or guess the amounts when there is no price sticker or quantity of a product.

The survey has a number of features to help respondents give information that is as accurate as possible. During personal visits, the interviewer gives indications of how to properly complete the diary. Sometimes, he helps the respondent record missing data. In addition, for 2001, the respondents were strongly encouraged to attach their receipts to the page in the diary corresponding to the date of the purchase. There is another new element in 2001, namely, the notebook. All members of the household aged 10 years and older were given a small notebook to carry around at all times in which to record products at the time of purchase.

It is also felt that the burden imposed on the respondent, which consists mainly of reporting a wide variety of items over a two-week period, may lead to respondent fatigue and may affect the quality of the responses obtained. Due to this burden related to the diary (FE3), we make the assumption that the estimate of food purchased in stores according to the questionnaire is more reliable than the corresponding estimate from the diary.

In 2001, the estimate of expenditures obtained from the questionnaire (FE2) is 8.3% higher than that obtained from the diary data (FE3). Based on the assumption mentioned above, the values for food purchased in stores locally and on one-day trips in each household were multiplied by an adjustment factor of 1.083.

Although response errors are considered an important source of error, they remain the aspect of data quality that is the most difficult to measure. It is generally necessary to undertake costly special studies to try to measure them. We try to reduce them by implementing different procedures during the processing such as editing for example.

## 5. Processing errors

Errors can arise at all steps of data processing. The main stages of data processing are coding, data entry, editing, imputation of partial non-response and weighting. In the FES different procedures are applied at each stage in order to minimize processing errors and the survey estimates are compared with other data sources prior to release. Errors related to the adjustments made at the weighting stage have been described in sections 2 and 3. The other types of processing errors are covered in this section.

Coding is an important step in the FES. All the described items bought must be coded. This is done at the head office of Statistics Canada by coders using a software developed in the Income Statistics Division to help them to choose the appropriate food codes. During coding, each questionnaire and diary goes through a series of manual edits and imputation. Some automated edits are also present during the coding, such as those identifying inconsistencies between codes and units of measure. Also, some questionnaires selected randomly are verified by the senior coders.

In terms of data entry, the workload for a keyer is defined as 20 questionnaires split in 4 batches of 5. A batch is selected randomly. If the data quality of the batch is acceptable, then the workload is accepted, if not then the 3 other batches are checked.

As mentioned previously, during coding the questionnaires and diaries are subjected to manual and automated edits and manual imputation. An automated edit process is carried out after each questionnaire and diary passes these manual steps.

This automated edit process still identified some data that need to be imputed, most of which was missing data. An example of missing data on the questionnaire (FE2) is having an expenditure for restaurants while away from home overnight or longer during the previous month but the number of meals purchased is missing. An example of missing data on the diary (FE3) is having raspberries as a purchased item, but the type of packaging (fresh, frozen, etc.) is missing. The imputation at this stage is automated. More than one method of imputation is used, but the basic one in 2001 is the nearest neighbour method.

This technique involves forming groups of similar households based on certain criteria (e.g., province of residence, quarter of data collection). Within those groups, each household requiring imputation (recipient) is matched to a household that has a complete questionnaire (donor) and resembles the other most closely with respect to certain characteristics (e.g. income, household size, etc.). The donor's data are imputed to the recipient as long as they satisfy the edit requirement for consistency with the data reported by the recipient. For example, if the recipient has indicated the buying of prepared food then the imputed expenditures for this variable must be greater than zero.

If a donor cannot be found for some recipients during this first step, then the donor imputation method is repeated without including the household income



criteria, which is considered less significant than the other criterion. Many donor imputation steps are required to be able to impute all recipients. For a few cases, the most significant condition, which is the quarter, is also dropped to find a donor for the left over cases. For more details on the different donor imputation steps, see Reference [6].

In the case of the questionnaire (FE2), two sections are imputed: *Spending habits* (section B) and *Food and beverages while away from home overnight or longer during the previous month* (section C). These sections are imputed independently since they are considered fairly independent from each other. The nearest neighbour approach is used for section B, but for section C, it is sometimes necessary to use other methods due to the difficulty in finding an appropriate donor. For example, some respondents have reported expenditures in restaurants but not the number of meals purchased or vice versa. These cases are imputed using the mean imputation method. The imputed mean used is the one at the national level.

In the case of the diary (FE3), for each day, only the section *Food and beverages purchased from stores* is imputed. To impute this section, independent imputation runs are carried out based on the grouping of missing information needing imputation. Generally the imputation is done at the entry level but in some cases it is done at the day level. These cases occur when the respondent has only listed the total expenditures on food purchased from stores on a given day.

To impute at the entry level, the respondent must have provided additional information. For example, the respondent has purchased beef without specifying which kind of beef: ground, stewing, etc. In this case, the unit price is considered the most important matching criteria in finding a donor. If the unit price is missing then total expenditure is used along with other variables for matching.

Some reported entries are broad such as *Vegetables* for example. For the first time, in 2001, these entries are coded and imputed using the nearest neighbour method. Sometimes, a donor cannot be found for some recipients because of a high expenditure reported with the entry. To impute them, we sum for each potential donor all the expenditures in a day with the appropriate food entries (all vegetables for example). When a donor is found with the sum of expenditures matching the recipient expenditures, then all its appropriate food entries are assigned to the recipient.

When the respondent has only listed the total expenditures on food purchased from stores in any day, the imputation is done at the day level. The recipient day's expenditure is matched to the donor total day's expenditure. Only those days are considered as donors if they do not have any imputation at the entry level. All entries of a selected donor's day are assigned to the recipient record. The recipient total expenditures will be overwritten with the donor total expenditures when the two numbers do not match exactly.

Finally, note that households providing only one week of data are not imputed for the week they did not report.

The bias caused by imputation of partial non-response is difficult to evaluate. It depends on the differences between respondents and non-respondents as well as the ability of the imputation method to produce unbiased estimates. However, the percentages of households having imputed data and the imputation rates indicate the importance of partial non-response. The impact of imputation is a good indicator of the potential bias of estimates. These quality indicators are presented in the following section.

## 5.1 Quality indicators coming from imputation

A preliminary indication of the magnitude of partial non-response is the proportion of households requiring imputation and the number of variables imputed by household. Other preliminary indications are the imputation rates and the impact of imputation. This impact is defined as a measure of the impact of the imputed values on the estimates. An algebraic description of the impact of imputation is given in Appendix A.

The households' responses can be divided into two categories: those collected from the questionnaire (FE2) and those collected from the diaries (FE3). The different quality indicators for the questionnaire (FE2) are presented in the next sub-section and for the diaries (FE3) in the following sub-section.

### 5.1.1 Questionnaire (FE2)

Only two sections are imputed on the FE2: *Spending habits* (section B) and *Food and beverages while away from home overnight or longer during the previous month* (section C). There are up to five variables that can be imputed in section B (questions 1 to 4 and 4.1) and up to 50 in section C (questions 1 to 6).

The percentage of respondent households<sup>5</sup> that required imputation for section B is presented in Table 5.1 at the regional and national levels. The table is broken down by the number of imputed variables (out of 5) for a household.

**Table 5.1**  
**Percentage of imputed households for Section B in the questionnaire (FE2), five Canadian regions and Canada (10 provinces)**

Geography	Number of variables imputed			Total
	1	2	3 to 5	
Canada (10 provinces)	0.8	10.8	0.6	12.1
Atlantic	0.4	8.4	0.0	8.8
Quebec	0.5	3.6	0.0	4.1
Ontario	0.6	15.4	0.7	16.6
Prairies	1.2	13.0	1.2	15.5
British Columbia	1.1	11.4	0.8	13.3

5. Respondent households correspond to all households living in eligible dwellings, excluding households who could not be contacted, or who refused to participate in the survey.

Table 5.1 indicates that nearly 88% of the households at the Canada level do not need imputation in section B. Most of the households requiring imputation have two variables to be imputed, usually questions 4 and 4.1 which ask for information about prepared food expenditures for occasions. The regions of Ontario (16.6%), Prairies(15.5%) and British Columbia (13.3%) have the highest percentages while in Quebec the percentage is the lowest (4.1%).

The impacts of imputation calculated for the 4 quantitative variables in section B are presented in Table 5.2 at the regional and national levels. This impact of imputation is defined as the total weighted imputed values divided by the total weighted values (including the imputed and non-imputed values).

**Table 5.2**  
**Impacts of imputation (%) for Section B in the questionnaire (FE2), five Canadian regions and Canada (10 provinces)**

Geography	Food and other groceries (Question 1)	Non-food (Question 2)	Bulk (Question 3)	Prepared food for occasions (Question 4.1)
Canada (10 provinces)	0.8	1.0	0.0	12.2
Atlantic	0.4	0.7	0.0	23.9
Quebec	0.2	0.3	0.0	1.2
Ontario	0.7	0.7	0.0	15.5
Prairies	1.6	2.5	0.0	14.5
British Columbia	1.8	0.9	0.0	4.5

Table 5.2 indicates that the variable “Prepared food expenditures for occasions” (Question 4.1) is the one having the highest impact. It is the variable in this section having the highest imputation rate and also very few households have reported such expenditures. At the Canada level, this variable has an impact of imputation of 12.2% while the three other variables have an impact of imputation of less than 1.0%. At the regional level, if we examine only the impact of imputation for “Prepared food expenditures for occasions”, the Atlantic region (23.9%) has the highest one followed by Ontario (15.5%) and the Prairies (14.5%). Quebec has the lowest impact of imputation with 1.2%.

The percentage of respondent households that required imputation for section C is presented in Table 5.3 at the regional and national level. The table is broken down by the number of imputed variables (out of 50) for a household.

**Table 5.3**  
**Percentage of imputed households for Section C in the questionnaire (FE2), five Canadian regions and Canada (10 provinces)**

Geography	Number of variables imputed					Total
	1 to 10	11 to 20	21 to 30	31 to 40	41 to 50	
Canada (10 provinces)	1.6	0.0	2.1	0.0	0.4	4.2
Atlantic	1.3	0.0	1.8	0.0	0.0	3.1
Quebec	0.9	0.0	1.3	0.0	0.2	2.3
Ontario	0.9	0.1	2.1	0.0	0.8	3.9
Prairies	2.9	0.0	2.6	0.0	0.4	5.8
British Columbia	2.0	0.0	3.1	0.1	0.3	5.6

Table 5.3 indicates that at the Canada level, more than 95% of households do not require imputation in section C. Half of the households needing imputation have 21 to 30 variables to be imputed (mainly question 4 asking the food and non-alcoholic beverages purchased from restaurant while away from home overnight or longer involving 28 items to report) and most of the other half has 1 to 10 variables to be imputed. At the regional level, nearly 6% of the households in the Prairies and in British Columbia need imputation. Quebec has the lowest percentage, which is 2.3%.

The impacts of imputation calculated for the 31 quantitative variables excluding question 1 and 2<sup>6</sup> in section C is presented in Table 5.4 at the regional and national levels. Since there is a high number of variables instead of presenting the impact of imputation for each of them, the number of variables by category of impact of imputation (%) is presented.

**Table 5.4**  
**Impacts of imputation (%) for Section C in the questionnaire (FE2), five Canadian regions and Canada (10 provinces)**

Geography	Number of variables by range of imputation impact (%) for Section C in the FE2					
	0 to 5%	5 to 10%	10 to 15%	15 to 25%	25 to 35%	35% or over
Canada (10 provinces)	8	15	5	2	1	0
Atlantic	13	8	5	2	1	2
Quebec	22	4	2	3	0	0
Ontario	15	4	7	1	3	1
Prairies	12	8	3	3	2	3
British Columbia	12	3	6	8	2	0

Table 5.4 indicates at the Canada level that 23 out of 31 variables have an impact of imputation of less than 10%. There are only 3 variables that have

6. The impact of imputation was calculated only for variables representing food expenditures or numbers of meals.

impacts over 15% and these all fall under the category “Other” in question 4: these are for *Lunches* (33.3%), *Dinners* (22.5%) and *Breakfasts* (21.7%). At the regional level, British Columbia is the region having the highest number of variables (10) with impacts of imputation of over 15% followed by the Prairies with 8 variables. Quebec has the lowest impacts.

### 5.1.2 Diary (FE3)

For each day, only the section *Food and beverages purchased from stores* is imputed on the FE3.

Of the 5,999 responding households, 279,709 expenditures are reported and 2.2% of them required imputation. Most of the time, the imputation specifies the type of expenditure. For example, if the respondent indicates Milk, without specifying the type of milk, this entry will be imputed through either Fluid whole milk, Low-fat milk (1%), Low-fat milk (2%), Fluid skim milk or Specialty milk products.

The percentage of respondent households that required imputation for the type of expenditure in the diaries (FE3) is presented in Table 5.5 at the regional and national levels. These proportions are high (38% at the national level) because each household has to list a large number of entries during the two-week reporting period. Any household having an imputation in any of these entries is considered to be an imputed household.

**Table 5.5**  
**Percentage of imputed households in the diaries (FE3), five Canadian regions and Canada (10 provinces)**

Geography	Number of imputations required			Total
	1	2	3 or more	
Canada (10 provinces)	13.1	8.3	16.6	38.0
Atlantic	14.0	6.0	9.5	29.5
Quebec	16.1	10.8	18.8	45.6
Ontario	12.3	9.2	21.9	43.4
Prairies	11.6	6.5	12.3	30.5
British Columbia	11.9	7.4	14.8	34.2

Table 5.5 indicates at the national level that 38.0% of households have some imputed data in their diaries. It is worth noting, however, that a third of these households involve only one imputed entry while the average number of entries per household is 49. This average is based only on those households that reported expenses in diaries. At the regional level Quebec (45.6%) and Ontario (43.4%) have the highest percentages, but for households with 3 imputations or more, Ontario has a percentage of imputed households higher than Quebec. Atlantic has the lowest household percentage with 29.5%.

The type of food for each of the 279,709 reported expenditures is coded. This coding for the FES 2001 produced 205 different codes. The imputation rates and

the impacts of imputation for the 11 most reported expenditures are presented in Table 5.6 and Table 5.7 respectively. These imputation rates and impacts of imputation are calculated by type of expenditure. Both tables are at the regional and national levels. The tables are ordered by having the most frequently reported expenditures listed first.

**Table 5.6**  
**Imputation rates (%) in the diaries (FE3), five Canadian regions and Canada**  
**(10 provinces) for the 11 most frequently reported expenditures**

Food description	Canada (10 prov)	Atlantic	Quebec	Ontario	Prairies	British Columbia
Bread	3.0	0.5	2.1	4.2	4.3	2.4
Carbonated beverages	1.6	0.1	1.4	2.1	3.2	0.1
Unsweetened rolls and buns	2.8	1.0	2.1	3.4	4.3	1.4
Bananas and plantains - fresh	3.7	0.7	3.5	5.2	4.4	2.4
Low-fat milk (2%)	15.6	15.6	13.8	19.9	14.7	11.7
Chicken (including fowl) - fresh or frozen	5.3	0.7	4.2	8.5	4.4	4.6
Cookies and sweet biscuits	4.0	0.6	2.2	7.5	4.9	2.1
Breakfast cereal (except infant cereal)	2.1	0.4	1.2	2.4	4.4	1.3
Soup - chilled, frozen or canned	2.2	0.3	2.2	2.5	3.6	1.0
Tomatoes - fresh	6.5	0.0	5.6	11.3	5.8	2.9
Eggs	2.1	0.4	2.2	2.2	3.5	1.4

At the Canada level, table 5.6 indicates that most of these expenditures have an imputation rate lower than 5%. The highest imputation rate is for 2% Low-fat milk with 15.6%. The imputation of this type of expenditure occurs most of the time with respondents that have reported an expenditure for milk but not specified the type of milk.

At the regional level, the highest imputation rates for these various expenditures are in Ontario and the Prairies. The Atlantic region is the one having the lowest rates, which are 1% or less, if we exclude the 2% Low-fat milk expenditure.

In Table 5.6, Quebec is one of the regions having low imputation rates for the 11 most reported expenditures even though it had the highest percentage of imputed households requiring at least one imputation rate as shown in Table 5.5. This can be explained by the distribution of the respondents' missing data. Quebec has more respondents missing at least one piece of information in their diaries, but this missing information is spread across the various types of expenditures to a larger degree in Quebec than in the other regions.

**Table 5.7**  
**Impacts of imputation (%) on the expenditure variable in the diaries (FE3),**  
**five Canadian regions and Canada (10 provinces) for the 11 most frequently**  
**reported expenditures**

Food description	Canada (10 prov)	Atlantic	Quebec	Ontario	Prairies	British Columbia
Bread	3.6	0.4	2.0	5.7	4.3	2.8
Carbonated beverages	2.0	0.1	1.3	3.2	2.4	0.1
Unsweetened rolls and buns	3.9	1.5	1.8	5.8	5.0	1.2
Bananas and plantains - fresh	4.6	1.1	4.0	6.0	4.9	3.8
Low-fat milk (2%)	16.9	14.0	13.6	21.1	16.7	13.2
Chicken (including fowl) - fresh or frozen	7.5	0.3	2.9	13.4	4.2	4.2
Cookies and sweet biscuits	5.5	1.9	2.1	10.2	5.1	1.6
Breakfast cereal (except infant cereal)	2.1	0.6	1.1	2.7	3.9	1.1
Soup - chilled, frozen or canned	2.4	0.6	2.0	3.8	2.9	0.4
Tomatoes - fresh	11.6	0.0	7.0	20.6	5.5	3.1
Eggs	2.5	0.6	1.8	2.8	4.2	2.1

Table 5.7 indicates that at the Canada level, 7 of these expenditures have an impact of imputation based on the expenditure variable lower than 5%, 2 have impacts between 5% and 8% and 2 have impacts of 11% and 17%. At the regional level, the highest impacts of imputation are found mostly in Ontario. The impacts of imputation for the Atlantic region, Quebec and British Columbia are all below the national figures.

For more detailed information on the imputation, see Reference [6].

## Bibliography

- [1] Auger, S., Khan, K. and Tremblay J. (2004), *Methodology of the Food Expenditure Survey*, Catalogue no. 62F0026MIE-2005004, Household Survey Methods Division, Statistics Canada.
- [2] Wolter, K.M. (1985), *Introduction to Variance Estimation*, Springer-Verlag New-York Inc.
- [3] *Food Expenditure in Canada (2001)*, Catalogue no. 62-554-XIE.
- [4] *1997 Survey of Household Spending – Data Quality Indicators*, Household Survey Methods Division, Internal Document, Statistics Canada.
- [5] *Methodology of the Canadian Labour Force Survey*, Catalogue no. 71-526-XPB.
- [6] Khan, K. (2002), *Imputation of the 2001 Food Expenditure Survey*, Household Survey Methods Division, Internal Document, Statistics Canada.



# Appendix A

## Algebraic Notation

### 1. Adjustment for non-response

The sub-weight (i.e. the design weight adjusted for non-response) of a household  $k$ , written  $w_k^{NR}$ , is

$$w_k^{NR} = \pi_k^{-1} * \frac{1}{rate_g} \quad \text{with} \quad rate_g = \frac{\sum_{k \in s_{g,r}} \pi_k^{-1}}{\sum_{k \in s_{g,r}} \pi_k^{-1} + \sum_{k \in s_{g,nr}} \pi_k^{-1}}$$

where

$s_{g,r}$  is the set of respondent households in non-response group  $g$ ,

$s_{g,nr}$  is the set of non-respondent households (refusals, no contacts) in non-response group  $g$ , and

$\pi_k^{-1}$  is the design weight assigned to household  $k$  ( $\pi_k$  being the sampling fraction).

### 2. Calculation of the slippage rate

The slippage rate for a control group  $c$ , written  $rate_c$ , is

$$rate_c = 100 * \frac{\left( \sum_{k \in s_{c,r}} w_k^{NR} \right) - t_c}{t_c}$$

where

$s_{c,r}$  is the set of respondent households in control group  $c$ ,

$w_k^{NR}$  is the sub-weight for household  $k$  (see definition of  $w_k^{NR}$  above), and

$t_c$  is the total of the auxiliary data for control group  $c$ .

### 3. Calculation of the impact of imputation

The impact of imputation for an expenditure type a, written  $imp\_e_a$ , is

$$imp\_e_a = \frac{\sum_{k \in s_{i,r}} w_k^f * e_{a,k}}{\sum_{k \in s_{i,r}} w_k^f * e_{a,k} + \sum_{k \in s_{ni,r}} w_k^f * e_{a,k}}$$

where

$s_{i,r}$  is the set of respondent households having the type of expenditure a imputed,

$s_{ni,r}$  is the set of respondent households having the type of expenditure a not imputed,

$w_k^f$  is the final weight assigned to household k, and

$e_{a,k}$  is the amount for the type of expenditure a for household k.

# Appendix B 2001 Food Expenditure Survey Questionnaire (FE2)



## Food Expenditure Survey in 2001 Questionnaire

FE2

Confidential when completed

Collected under the authority  
of the *Statistics Act*, Revised  
Statutes of Canada 1985,  
Chapter S19.

Français au verso

001					002	003	004
Stratum	Type	Cluster	Rot.	List	M	Month	N.I.
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Record of drop-off and pick-ups				
Visit	Day	Month	Began	Ended
Drop-off diaries	005 <input type="text"/>	006 <input type="text"/>	007 <input type="text"/> : <input type="text"/>	008 <input type="text"/> : <input type="text"/>
Pick up first diary	009 <input type="text"/>	010 <input type="text"/>	011 <input type="text"/> : <input type="text"/>	012 <input type="text"/> : <input type="text"/>
Pick up second diary	013 <input type="text"/>	014 <input type="text"/>	015 <input type="text"/> : <input type="text"/>	016 <input type="text"/> : <input type="text"/>

OC

Record of Visits			
Visit Number	Date	Time	Comments

Interviewer's Name (Please print)	Interviewer No.
<input style="width: 95%;" type="text"/>	040 <input type="text"/>

8-5400-14: 2000-07-14      STC/SD-045-60119

Statistics Canada    Statistique Canada



**Detach and destroy after processing**

Listing Address <hr/> <hr/> <hr/>	Household Contact: <hr/> Telephone No. <input style="width: 100%;" type="text"/> (Area code)
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## A. Household composition

<p><b>1. What are the first names of all members of your household?</b>  <i>List the household reference person first (see definition). Ask all questions in Section A for each member of the household that you have listed.</i></p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p><b>Household Reference Person:</b> The member of the household mainly responsible for its financial maintenance (i.e., pays the rent, mortgage, property taxes or electricity, etc.). This person can be either male or female. In cases where members share equal financial responsibility, choose one to be the household reference person.</p> </div>	<p>001</p> <p style="text-align: center;"><b>Person</b> <span style="border: 1px solid black; padding: 2px 5px;">0</span> <span style="border: 1px solid black; padding: 2px 5px;">1</span></p> <div style="border: 1px solid black; padding: 5px; margin-top: 5px;"> <p style="text-align: center;">First Name</p> </div>	<p>011</p> <p style="text-align: center;"><b>Person</b> <span style="border: 1px solid black; padding: 2px 5px;"> </span> <span style="border: 1px solid black; padding: 2px 5px;"> </span></p> <div style="border: 1px solid black; padding: 5px; margin-top: 5px;"> <p style="text-align: center;">First Name</p> </div>
<p><b>2. What is _____'s relationship to the household reference person?</b></p>	<p>002</p> <p>1 <input checked="" type="radio"/> Reference Person</p>	<p>012</p> <p>2 <input type="radio"/> Spouse</p> <p>3 <input type="radio"/> Son/Daughter</p> <p>4 <input type="radio"/> Other relative</p> <p>5 <input type="radio"/> Not related</p>
<p><b>3. In what month and year was _____ born?</b>  <i>(If born in 1900 or earlier, enter 1900.)</i></p>	<p>003</p> <p style="text-align: center;">M M Y Y Y Y</p> <div style="display: flex; justify-content: space-around; width: 100%;"> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> </div>	<p>013</p> <p style="text-align: center;">M M Y Y Y Y</p> <div style="display: flex; justify-content: space-around; width: 100%;"> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> </div>
<p><b>4. Is _____ male or female?</b></p>	<p>004</p> <p>1 <input type="radio"/> Male</p> <p>2 <input type="radio"/> Female</p>	<p>014</p> <p>1 <input type="radio"/> Male</p> <p>2 <input type="radio"/> Female</p>
<p><b>5. What is _____'s marital status?</b></p> <p style="margin-top: 5px;"><i>Mark one circle.</i></p>	<p>005</p> <p>1 <input type="radio"/> Married spouse of a household member</p> <p>2 <input type="radio"/> Common-law spouse of a household member</p> <p>3 <input type="radio"/> Never married (single)</p> <p>4 <input type="radio"/> Other (separated, divorced or widowed)</p>	<p>015</p> <p>1 <input type="radio"/> Married spouse of a household member</p> <p>2 <input type="radio"/> Common-law spouse of a household member</p> <p>3 <input type="radio"/> Never married (single)</p> <p>4 <input type="radio"/> Other (separated, divorced or widowed)</p>
<p><b>6. Economic Family Code</b></p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p><b>Economic Family:</b> Two or more persons who live in the same dwelling and are related to each other by blood, marriage, adoption or common-law. Unrelated roommates would have different codes.</p> </div>	<p>006</p> <p style="text-align: center;"><i>Enter Code</i></p> <div style="border: 1px solid black; width: 30px; height: 20px; margin: 5px auto; text-align: center;">A</div>	<p>016</p> <p style="text-align: center;"><i>Enter Code</i></p> <div style="border: 1px solid black; width: 30px; height: 20px; margin: 5px auto;"></div>

**Check household membership**  
*After listing members of the household ask:*

- Does anyone else live at this address?
- Are there any persons away who could be considered as living at this address?

## A. Household composition

021 Person <input type="text"/> <input type="text"/> First Name <input type="text"/>	031 Person <input type="text"/> <input type="text"/> First Name <input type="text"/>	041 Person <input type="text"/> <input type="text"/> First Name <input type="text"/>	051 Person <input type="text"/> <input type="text"/> First Name <input type="text"/>
022 <input type="radio"/> Spouse <input type="radio"/> Son/Daughter <input type="radio"/> Other relative <input type="radio"/> Not related	032 <input type="radio"/> Spouse <input type="radio"/> Son/Daughter <input type="radio"/> Other relative <input type="radio"/> Not related	042 <input type="radio"/> Spouse <input type="radio"/> Son/Daughter <input type="radio"/> Other relative <input type="radio"/> Not related	052 <input type="radio"/> Spouse <input type="radio"/> Son/Daughter <input type="radio"/> Other relative <input type="radio"/> Not related
023 M M Y Y Y Y <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	033 M M Y Y Y Y <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	043 M M Y Y Y Y <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	053 M M Y Y Y Y <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
024 <input type="radio"/> Male <input type="radio"/> Female	034 <input type="radio"/> Male <input type="radio"/> Female	044 <input type="radio"/> Male <input type="radio"/> Female	054 <input type="radio"/> Male <input type="radio"/> Female
025 <input type="radio"/> Married spouse of a household member <input type="radio"/> Common-law spouse of a household member <input type="radio"/> Never married (single) <input type="radio"/> Other (separated, divorced or widowed)	035 <input type="radio"/> Married spouse of a household member <input type="radio"/> Common-law spouse of a household member <input type="radio"/> Never married (single) <input type="radio"/> Other (separated, divorced or widowed)	045 <input type="radio"/> Married spouse of a household member <input type="radio"/> Common-law spouse of a household member <input type="radio"/> Never married (single) <input type="radio"/> Other (separated, divorced or widowed)	055 <input type="radio"/> Married spouse of a household member <input type="radio"/> Common-law spouse of a household member <input type="radio"/> Never married (single) <input type="radio"/> Other (separated, divorced or widowed)
026 Enter Code <input type="text"/>	036 Enter Code <input type="text"/>	046 Enter Code <input type="text"/>	056 Enter Code <input type="text"/>

### Notes and Comments

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## B. Spending habits

Excluding purchases made while away from home overnight or longer, in the last four weeks . . .	Total Cost
1. How much do you estimate this household spent on food and other groceries purchased from stores (including farmer stalls and home delivery)? • <b>Exclude</b> bulk purchases of food. (See Q.3)	001 \$ <input type="text"/>
2. How much of this amount was for <b>non-food items</b> such as paper products, household supplies, pet food, alcoholic beverages, etc.?	002 \$ <input type="text"/>
3. What amount was spent for bulk purchases of food, e.g. meat IN EXCESS of 25 kg. (55 lbs.); bulk quantities of fruit or vegetables for canning, freezing, etc.? • <b>Include</b> charges for cutting, wrapping and freezing.	003 \$ <input type="text"/>
4. Did this household buy any prepared food or non-alcoholic beverages from stores for parties, weddings and other occasions not reported in Q. 1 or Q. 3 above? • <b>Exclude</b> restaurants and caterers.	004 1 <input type="radio"/> Yes → <i>Continue</i> 2 <input type="radio"/> No → <i>Go to Q. 5</i>
4.1. What amount was spent?	005 \$ <input type="text"/>

5. Looking at the scale, what is your best estimate of the <b>total</b> income from all sources, <b>before</b> deductions, of <b>all</b> household members during the past <b>12 months</b> ?	006 5 <input type="radio"/> Less than \$5,000 6 <input type="radio"/> \$5,000 - \$9,999 7 <input type="radio"/> \$10,000 - \$14,999 8 <input type="radio"/> \$15,000 - \$19,999 9 <input type="radio"/> \$20,000 - \$29,999 10 <input type="radio"/> \$30,000 - \$39,999 11 <input type="radio"/> \$40,000 - \$49,999 12 <input type="radio"/> \$50,000 - \$59,999 13 <input type="radio"/> \$60,000 - \$69,999 14 <input type="radio"/> \$70,000 - \$79,999 15 <input type="radio"/> \$80,000 - \$99,999 16 <input type="radio"/> \$100,000 or more 17 <input type="radio"/> Don't know 18 <input type="radio"/> Refused
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Notes and Comments
<hr/> <hr/> <hr/>



**C. Food and beverages while away from home overnight or longer during the previous month**

1. Were any household members away from home overnight or longer during the month of \_\_\_\_\_ ? 001 1  Yes → Continue  
*(Interviewer: Indicate previous month )* 2  No → End

2. For each absence from home overnight or longer during the previous month indicate the number of persons away and the number of nights per person.

	Absence No. 1	Absence No. 2	Absence No. 3	Absence No. 4	Absence No. 5
Number of persons away	002 <input type="text"/>	004 <input type="text"/>	006 <input type="text"/>	008 <input type="text"/>	010 <input type="text"/>
Nights away	003 <input type="text"/>	005 <input type="text"/>	007 <input type="text"/>	009 <input type="text"/>	011 <input type="text"/>

3. While away, how much board, if any, was paid to a private household by members of this household? 020 \$

4. For all these absences, I need some information about the food and non-alcoholic beverages PURCHASED FROM RESTAURANTS.

- **Include** tips and taxes as well as purchases made for guests.
- **Exclude** expenses which were reimbursed or part of a package.

		Table service restaurants	Fast food restaurants	Cafeterias	Other
Breakfasts	Number of meals	021 <input type="text"/>	023 <input type="text"/>	025 <input type="text"/>	027 <input type="text"/>
	Expenditures	022 \$ <input type="text"/>	024 \$ <input type="text"/>	026 \$ <input type="text"/>	028 \$ <input type="text"/>
Lunches	Number of meals	029 <input type="text"/>	031 <input type="text"/>	033 <input type="text"/>	035 <input type="text"/>
	Expenditures	030 \$ <input type="text"/>	032 \$ <input type="text"/>	034 \$ <input type="text"/>	036 \$ <input type="text"/>
Dinners	Number of meals	037 <input type="text"/>	039 <input type="text"/>	041 <input type="text"/>	043 <input type="text"/>
	Expenditures	038 \$ <input type="text"/>	040 \$ <input type="text"/>	042 \$ <input type="text"/>	044 \$ <input type="text"/>
Between-meal food, snacks, non-alcoholic beverages	Expenditures	045 \$ <input type="text"/>	046 \$ <input type="text"/>	047 \$ <input type="text"/>	048 \$ <input type="text"/>

Note: "Other" restaurants include refreshment stands, snack bars, vending machines, mobile canteens, chip wagons, caterers, coffee wagons, etc.

5. How much did this household spend on food and non-alcoholic beverages PURCHASED FROM STORES while away from home overnight or longer during the previous month? For example, snack food purchased from gasoline stations, food purchased from grocery stores, etc. 050 \$

6. How many meals were received free, reimbursed, or part of a package trip (e.g., business, dinner at friends)? 051

## D. Diary follow-up report

<i>Interviewer: Please complete after each diary pick-up.</i>	Week 1	Week 2
<b>1. a)</b> During or after the follow-up, did you or the respondent enter any items in the FOOD FROM STORES section of the diary?	001 1 <input type="radio"/> Yes, <b>all</b> of the items → <b>Go to Q. 2</b> 2 <input type="radio"/> Yes, <b>some</b> items <i>Please estimate the value of these items.</i> \$ <input style="width: 80px;" type="text"/> → <b>Go to Q. 2</b> 3 <input type="radio"/> No → <b>Continue</b>	009 1 <input type="radio"/> Yes, <b>all</b> of the items → <b>Go to Q. 2</b> 2 <input type="radio"/> Yes, <b>some</b> items <i>Please estimate the value of these items.</i> \$ <input style="width: 80px;" type="text"/> → <b>Go to Q. 2</b> 3 <input type="radio"/> No → <b>Continue</b>
<b>b)</b> If nothing was entered, what was the reason?	003 1 <input type="radio"/> The respondent had already recorded all purchases 2 <input type="radio"/> The respondent did not make any purchases from stores 3 <input type="radio"/> Other <i>Please comment in Q.5</i>	011 1 <input type="radio"/> The respondent had already recorded all purchases 2 <input type="radio"/> The respondent did not make any purchases from stores 3 <input type="radio"/> Other <i>Please comment in Q.5</i>
<b>2. a)</b> During or after the follow-up, did you or the respondent enter any items in the FOOD FROM RESTAURANTS section of the diary?	004 1 <input type="radio"/> Yes, <b>all</b> of the items → <b>Go to Q. 3</b> 2 <input type="radio"/> Yes, <b>some</b> items <i>Please estimate the value of these items.</i> \$ <input style="width: 80px;" type="text"/> → <b>Go to Q. 3</b> 3 <input type="radio"/> No → <b>Continue</b>	012 1 <input type="radio"/> Yes, <b>all</b> of the items → <b>Go to Q. 3</b> 2 <input type="radio"/> Yes, <b>some</b> items <i>Please estimate the value of these items.</i> \$ <input style="width: 80px;" type="text"/> → <b>Go to Q. 3</b> 3 <input type="radio"/> No → <b>Continue</b>
<b>b)</b> If nothing was entered, what was the reason?	006 1 <input type="radio"/> The respondent had already recorded all purchases 2 <input type="radio"/> The respondent did not make any purchases from restaurants 3 <input type="radio"/> Other <i>Please comment in Q.5</i>	014 1 <input type="radio"/> The respondent had already recorded all purchases 2 <input type="radio"/> The respondent did not make any purchases from restaurants 3 <input type="radio"/> Other <i>Please comment in Q.5</i>
<b>3.</b> What is the final completion status of the FOOD FROM STORES section of the diary?	007 1 <input type="radio"/> Complete 2 <input type="radio"/> Incomplete	015 1 <input type="radio"/> Complete 2 <input type="radio"/> Incomplete
<b>4.</b> What is the final completion status of the FOOD FROM RESTAURANTS section of the diary?	008 3 <input type="radio"/> Complete 4 <input type="radio"/> Incomplete	016 3 <input type="radio"/> Complete 4 <input type="radio"/> Incomplete



5. Please comment on any sections that were incomplete, or any problems that were encountered in completing the diaries.

**Week 1**

020

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**Week 2**

021

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**Notes and comments**

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# Appendix C

## 2001 Food Expenditure Survey Diary (FE3) — Example for one day

Please unfold the flaps to refer to the notes

Attach receipts here

**Day 1**

Check (✓) the appropriate day:

MON  TUE  WED  THUR  FRI  SAT  SUN

### Food and beverages purchased from STORES

Check (✓) here if no purchases made this day . . . .

Describe the item purchased  • Give a <b>complete</b> description of each item of food bought  • <b>Avoid</b> abbreviations and print clearly  • <b>Include</b> bulk purchases	Was this product . . . ?	Purchased at . . .	Number of . . .	Weight or volume per item	Total cost	Office use only
	A = Fresh B = Frozen C = Canned/ bottled/plastic container D = Dried E = Other Enter code letter	A = Supermarket B = Food specialty store or market C = Convenience store D = Other Enter code letter	Cans, bottles, cartons, bags, boxes, packages, bunches, heads, dozens, etc. Enter quantity	Examples: 1.2 kg 2.5 litres 5.0 lbs 19 oz head dozen bunch	Exclude all taxes  \$   ¢	
<i>Example: COLA</i>	C	A	24	355 ML	6   99	

Please unfold the flaps to refer to the notes

**Day 1** continued

**Food and beverages purchased from STORES**

Describe the item purchased  • Give a <b>complete</b> description of each item of food bought  • <b>Avoid</b> abbreviations and print clearly  • <b>Include</b> bulk purchases	Was this product . . . ?	Purchased at . . .	Number of . . .	Weight or volume per item	Total cost		Office use only
	A = Fresh B = Frozen C = Canned/ bottled/plastic container D = Dried E = Other  Enter code letter	A = Supermarket B = Food specialty store or market C = Convenience store D = Other  Enter code letter	Cans, bottles, cartons, bags, boxes, packages, bunches, heads, dozens, etc.  Enter quantity	Examples: 1.2 kg 2.5 litres 5.9 lbs 19 oz head dozen bunch	Exclude all taxes		
<i>Example:</i> GREEN ONIONS	A	B	1	BUNCH	\$	79	

**Food and beverages purchased from RESTAURANTS**

Check (✓) here if no purchases made this day . . .

Whose meal or snack?	Meal type:	Number of meals purchased	Restaurant type:	Total cost	
Include: • food from restaurants, cafeterias, take-outs, vending machines, canteens, etc. • snacks, non-alcoholic beverages, ice cream, candy, etc. • meals bought for guests  Exclude alcoholic beverages	A = Breakfast B = Lunch C = Dinner D = Between-meal snack and other food  Enter code letter	Enter "0" if snacks or other food	A = Table service B = Fast food C = Cafeteria D = Other  Enter code letter	Include all taxes and tips on food and non-alcoholic beverages  Exclude taxes and tips on alcoholic beverages	
<i>Example:</i> FATHER AND SON'S LUNCH	B	2	B	\$	69

If there is insufficient space to enter your purchases made this day, use pages 20 to 23, "ADDITIONAL PAGE".