

# Evaluation of the 2005 Redesigned Consumer Expenditure Survey Diary

Nhien To and Lucilla Tan

A diary is one of two data collection instruments for the Consumer Expenditure Survey (CE). Diary keepers are asked to record their consumer unit's expenses in a weekly diary, for 2 consecutive weeks. Since the Diary Survey requires extended participation by diary keepers, survey managers recognized that simplifying the diary keeper's recording task was critical to improving survey participation rates, which had declined from about 80 percent in 1998 to about 69 percent in 2004. However, data quality could not be compromised in the process of simplifying the recording task. Both these considerations, therefore, were taken into account in the recent efforts to redesign the CE diary to be more user friendly. After several years of research and testing, a new CE diary, the *Redesigned Diary*, was introduced as the new instrument for data collection beginning in January 2005. This article highlights findings from an evaluation of the Redesigned Diary against the old diary. The Redesigned Diary performed better than the old diary on most, but not all, quality measures used to compare the two diaries.

## Background

Beginning in 2000, the CE embarked on a research program to redesign the diary. Three prototypes were developed, cognitively tested, and refined using

feedback from survey diary keepers, field interviewers, and program staff.<sup>1</sup> Based on this feedback, a fourth diary design was developed, the Redesigned Diary, which CE management selected for field testing in 2002. The field test indicated no difference in response rates between the Redesigned Diary and the Production Diary (the data collection instrument in use), however, the Redesigned Diary performed better in collecting item attributes, item details, higher expenditure means, and more detailed item descriptions in 3 of the 4 major expenditure categories.<sup>2</sup> The Redesigned Diary that was field tested was further modified by the addition of cues at the top of the recording pages.<sup>3</sup> In January 2005, the Redesigned Diary became the new data collection instrument for the CE Diary Survey.

**The Redesigned Diary.** The Redesigned Diary was designed to be more user friendly to encourage diary keeper

<sup>1</sup> Stinson, L., et. al., *Creating a "User-Friendly" Expenditure Diary*, Consumer Expenditure Survey Anthology, U.S. Bureau of Labor Statistics Report 967, pp 3-17, April 2003.

<sup>2</sup> Figueroa, E., et. al., *Is a User-Friendly Diary More Effective? Findings from a Field Test*, Consumer Expenditure Survey Anthology, U.S. Bureau of Labor Statistics Report 981, pp 2-8, April 2005.

<sup>3</sup> Cues are examples of goods and/or services in each major expenditure category. To, N., et. al., *The Efficacy of Cues in an Expenditure Diary*, Consumer Expenditure Survey Anthology, U.S. Bureau of Labor Statistics Report 981, pp 9-17, April 2005.

Nhien To and Lucilla Tan are economists in the Branch of Research and Program Development, Division of Consumer Expenditure Surveys, U.S. Bureau of Labor Statistics.

participation and elicit better reporting of purchased items. The following is a summary of the new features of the Redesigned Diary:

1. Redesign of form layout. The Redesigned Diary has a simpler organization. It is smaller in size than the former diary (the diary used for data collection from 1993 through 2004) and is now in portrait, rather than landscape, format. Each diary day consists of four pages, with one page for each major expenditure category:
  - Food and Drinks Away from Home (MLS)
  - Food and Drinks for Home Consumption (FDB)
  - Clothing, Shoes, Jewelry, and Accessories (CLO)
  - All Other Products, Services, and Expenses (OTH)

If diary keepers have more than one page of entries for a major expenditure category, additional pages are available at the end of the diary.

2. Elimination of most sub-category entries within major expenditure categories. In FDB, CLO, and OTH, all subcategories were eliminated in the Redesigned Diary. In MLS, subcategories of vendor type were eliminated, but replaced with vendor-type checkboxes. Differences in expenditure categorization between the Redesigned Diary and the former diary are summarized in table 1.
3. Addition of more checkboxes to solicit detail about items purchased. Checkboxes were added to the MLS recording page for the attributes of meal type, vendor type, and alcohol type. On the CLO recording page, checkboxes for gender and age were added to the CLO recording

page. (Formerly, the diary keeper recorded the gender-age item attribute by selecting a value from a list of coded values for gender and age.)

4. Clarification of instructions to diary keepers. Instructions, rules, and definitions were clarified; a greater variety of examples was added with important recording instructions highlighted. Additionally, *Frequently Asked Questions* (FAQs) were introduced. The FAQs and examples are printed on flaps of the diary cover for easy access. These flaps can also serve as bookmarks, to help diary keepers mark their place.
5. Visual enhancement of the diary form. Photographs and additional color are used in the Redesigned Diary, to give the diary a contemporary and less-intimidating look.

### Evaluation of the 2005 Redesigned Diary

Data collected in January through December of 2005 in the Redesigned Diary were compared with data collected over the same months of 2004 in the former diary. Evaluation was based on approximately 14,000 completed diaries for each type of diary. Ideally, comparison would be based on data collected from the Redesigned Diary and the former diary fielded over the same time period so data collection conditions—such as economic climate and consumer confidence—would be the same for both instruments; and, therefore, any differences found could be more directly attributed to changes in the format. However, the former diary was retired when the Redesigned Diary was released for data collection.

Since the evaluation was based on comparing data from two time periods, time-sensitive measures, such as expenditures and the relative shares of each major expenditure category of total expenditures, are not reported here, since such data could be biased by changes in economic conditions

across the years. For that reason, the focus in the evaluation is on measures which reflect how entries are recorded, since these measures can be primarily associated with form design.

**Measures.** Form designers hoped that the smaller, more attractive questionnaire with its simplified layout would encourage more diary keepers to participate in the survey. It was decided that the Redesigned Diary would be an improvement over the former diary, if the Redesigned Diary improved response rates and collected higher quality data (that is, more complete and detailed recording of purchased items).<sup>4</sup> Variances for statistical tests to measure significant differences between estimates from the Redesigned Diary and the former diary were computed using the method of random groups. (See appendix A.)

### A. Participation Rates

Completion response rates and attrition rates are two measures of participation. Completion response rate measures the proportion of all diaries successfully placed with eligible households and completed.<sup>5</sup> Completed cases are cases where the household completed the weekly diary or where the household was temporarily absent for the week.<sup>6</sup>

<sup>4</sup> An underlying assumption of the Consumer Expenditure Surveys is that surveys are subject to significant recall error [Silberstein, A., *Recall Effects in the U.S. Consumer Expenditure Survey*, Journal of Official Statistics 5 (2) 1989, pp. 125-142.]. Therefore, a result at higher levels of reporting is “better” and closer to the true value.

<sup>5</sup> Eligible housing units are those in the designated sample, less housing vacancies, housing units under construction, housing units with temporary residents, destroyed or abandoned housing, and units converted to nonresidential use

<sup>6</sup> The U.S. Bureau of Labor Statistics counts cases that will be temporarily absent for the entire data collection period as completed cases for the Diary survey. The parallel Consumer Expenditure Quarterly Interview Survey (a second household expenditure survey conducted by the CE to obtain large and infrequent expenditure items) collects data for diary keepers who are away from home on trips. Since Diary and Interview data are later merged, this practice avoids double-counting the same set of expenditures.

Attrition rate measures the proportion of eligible diaries successfully placed and completed in the first week, but not in the second week. (That is, diary keepers dropped out of the survey after the first week.)

## B. Data Quality Measures

Data quality is measured by the extent to which purchased items are reported with the required amount of detail, and can be used, as reported, without further editing. Editing refers to the various processes of *cleaning* originally recorded diary data that were misclassified, recorded with inadequate detail, or the requested item attributes failed to be reported.

### 1. *Entry misclassification rate.*

Entry or item misclassification occurs when the diary keeper records an entry in the wrong major expenditure category of the diary. For example, the diary keeper recorded “disposable diapers” in the All Other Products, Services, and Expenses (OTH) section; and the correct major expenditure category for the entry is Clothing, Shoes, Jewelry, and Accessories (CLO). The entry disposable diapers has been misclassified in OTH, and will be moved to CLO during data processing. If the diary layout has been effectively simplified and the recording instructions improved, we should expect a lower item misclassification rate in the Redesigned Diary.

2. *Allocation rate.* If the description of an item is recorded with inadequate detail, the item’s reported expenditure will be allocated among related items.<sup>7</sup> The allocation rate of entries in a major expenditure category was measured as the proportion

<sup>7</sup> An example of a description with inadequate detail is “groceries.” Instead, the diary keeper should have recorded the items purchased that make up groceries.

of the number of entries needing allocation to the total number of entries in the major expenditure category. The recording task in the Redesigned Diary was simplified by eliminating expenditure subcategories that served as cues for the universe of products to be reported on the recording page, as well as lessening the level of detail to report. Additionally, with the Redesigned Diary, diary keepers write in entries on a more free-form page. The elimination of subcategories in the Redesigned Diary was expected to have the following effects:

- Increase the allocation rate in FDB in the Redesigned Diary. FDB was the major expenditure category with the highest number of subcategories (15), and the eliminated FDB subcategories were not replaced with checkboxes. Furthermore, the subcategories in FDB were also cues to the level of reporting detail requested from the diary keeper. (For example, *beef, pork, poultry, other meats* were four subcategories in FDB that tell the diary keeper it is not sufficient to record an entry as “meat.”) (See appendix B.)
- Decrease the allocation rate in MLS with the replacement of vendor type subcategories with checkboxes and the addition of new cues (checkboxes) for meal type.
- The loss of subcategories in CLO and OTH was expected to have a less-severe impact on reporting detail in CLO and OTH than in FDB. This is because—like MLS—the subcategories in CLO and OTH served as cues to the universe of products relevant for reporting, and not as cues to the level of reporting detail, as in FDB.

### 3. *Item attribute imputation rate.*

Imputation in the CE Diary is performed only on item attributes, not on expenditures. Item attributes collected by the CE Diary are:

- type of meal purchased, in MLS
- type of vendor from whom meal was purchased, in MLS
- type of alcohol purchased with meal (if any), in MLS
- type of item packaging, in FDB
- gender-age for whom item was purchased, in CLO

The imputation rate for each attribute is measured by the proportion of entries in each major category that are missing the attribute that should have been reported.<sup>8</sup> Item attributes collected in the diary are described below:

- *Meal attribute in MLS.* In the former diary, classification of the type of meal purchased (*breakfast, lunch, dinner, or snack/other*) was dependent on the diary keeper’s written description. If the diary keeper failed to specify the meal type in the entry, that detail was lost. In the Redesigned Diary, checkboxes for each meal type are provided as a cue to the diary keeper that we want that detail. (The imputation rate for meal type was expected to be lower in the Redesigned Diary.)
- *Vendor attribute in MLS.* Diary keepers are asked to specify the type of vendor from whom a meal was purchased. To simplify the diary keeper’s recording task in the Redesigned Diary, the vendor type subcategories of the former diary were eliminated and replaced with four vendor type checkboxes. (See appendix C.)

<sup>8</sup> The missing value is indicated by an ‘invalid blank’ flag.

In the former diary, if the diary keeper made an entry in the MLS section of the diary, the entry would have had to be written in one of the vendor subcategories, so the vendor type was always reported. In the Redesigned Diary, a diary keeper can make an MLS entry and omit marking off a vendor type checkbox, so the vendor attribute can be missing. Thus, the reporting of vendor attribute is not directly comparable between the former diary and the Redesigned Diary.

- *Alcohol attribute in MLS.* In the former diary, there was a *Yes/No* screener alcohol purchase question for whether alcohol was purchased with the meal, but there was no question asked for the type of alcohol purchased. (See technical note C.) In the Redesigned Diary, the screener alcohol purchase question has been eliminated; instead, diary keepers are asked to indicate the type of alcohol purchased with the meal, by marking one or more of the three types of alcohol (*wine, beer, or other*) checkboxes. Thus, reporting of the alcohol attribute is not directly comparable between the former diary and the Redesigned Diary.
- *Package type attribute in FDB.* Checkboxes indicating an item's package type (*fresh, frozen, bottled/canned; other*) in the *Food and Drinks for Home Consumption* section are identical in the Redesigned Diary and the former diary. Thus, we did not expect much difference in the imputation rate of an item's package type in the FDB expenditure category.
- *Gender-age attribute in CLO.* On the *Clothing, Shoes, Jewelry, and Accessories* recording page, the diary keeper is asked to indicate the gender and age group of the person for whom the item

was purchased. In the former diary, diary keepers were asked to assign a code to each reported item by selecting from a list of five gender-age combinations (*Male 16 or over, Female 16 or over, Male 2 through 15, Female 2 through 15, Under 2 years*). In the Redesigned Diary, the list of gender-age combinations was replaced by two sets of checkboxes, one checkbox to indicate gender, and another checkbox to indicate age (*Under 2, 2–15, 16 & Over*). (See technical note D.) Age and gender attributes are then combined during data processing to form the five gender-age categories from the former diary. We expected the use of the checkboxes in the Redesigned Diary to improve the recording of gender-age attributes, as checkboxes simplify the recording task.

In summary, only the imputation rates for the attributes of meal type, package type, and gender age are comparable between the Redesigned Diary and the former diary.

4. *Number of entries recorded.* If the Redesigned Diary were more effective in soliciting participation and reporting, we anticipated more entries in the Redesigned Diary (other factors being equal). However, since we are comparing data from the Redesigned Diary and the former diary using two time periods, we must be cautious in attributing differences in the number of recorded entries solely to differences in diary format.

## Findings

*Participation rates.* The diary completion response rate was statistically significantly higher in the Redesigned Diary (71.0 percent vs. 68.9 percent). The proportion of eligible diary keepers who completed diaries for both weeks was also higher in the Redesigned Diary (66.6 percent vs. 64.5 per-

cent). However, the refusal rate was not significantly different between the Redesigned Diary and the former diary (12.2 percent vs. 11.7 percent). (See table 2.)

*Entry misclassification rate.* Overall, the proportion of misclassified entries was higher for the Redesigned Diary (2.1 percent vs. 1.5 percent). By major expenditure category, the Redesigned Diary contained higher rates of misclassified entries in CLO (8.0 percent vs. 4.8 percent) and OTH (3.5 percent vs. 1.5 percent), but a lower misclassification rate in MLS (0.4 percent vs. 0.7 percent).

*Allocation rate.* Overall, the allocation rate in the Redesigned Diary was significantly lower (8.5 percent vs. 11.7 percent). However, the allocation rate was significantly higher in FDB (9.9 percent vs. 7.8 percent), and significantly lower in MLS (5.9 percent vs. 34.8 percent) and OTH (7.7 percent vs. 8.3 percent), as anticipated. The much lower allocation rate in MLS probably reflects the effectiveness of the additional checkboxes in the Redesigned Diary. The higher allocation rate in FDB in the Redesigned Diary probably reflects the loss of detailed cueing through subcategories that was eliminated in the Redesigned Diary.

*Item attribute imputation rate.* Among the three attributes where imputation rates could be compared, the imputation rates for *meal type* (4.7 percent vs. 33.1 percent) and *age-gender* (16.1 percent vs. 23.7 percent) were significantly lower in the Redesigned Diary. This is probably due to the effectiveness of the additional checkboxes introduced in the Redesigned Diary. The imputation rate for package type was significantly higher in the Redesigned Diary (6.6 percent vs. 5.7 percent). Since both diaries had identical package-type checkboxes, it is not possible to attribute the increase in imputation rate to changes in form design. One possible explanation may simply be that the comparison is between data collected in 2 different years.

*Number of entries.* Overall, there was no significant difference in the number of entries. The Redesigned Diary had a significantly higher number of entries in MLS, CLO and OTH, but a significantly lower number of entries in FDB. As with the worsening in the allocation rate of entries in FDB, the lower number of entries in FDB probably reflects the loss of detailed cueing through the elimination of subcategories in the Redesigned Diary.

### **Conclusion**

In summary, the Redesigned Diary appears effective in most areas. In soliciting respondent participation, the Redesigned Diary had higher completion rate, but was similar to the Former Diary in refusal and attrition rates. The Redesigned Diary also performed better in two of the three comparable imputation rates for missing attributes. However, results were mixed for comparisons of entry misclassifications, allocation rates, and entry misclassifications.

The improvement in completion rate should be qualified, as there was a targeted effort to encourage field interviewers to obtain better response rates for the CE Diary, in 2005. The completion rate, therefore, will be monitored to see if the improved rate for the Redesigned Diary will be sustained in the future. That no improvements were seen in the Redesigned Diary's refusal and attrition rates is probably a reflection of the unchanged nature of the underlying task of reporting all of a household's expenses for 2 weeks—even with a more user-friendly redesign.

The addition of checkboxes to elicit item attribute detail appears effective, as two of the three comparable imputation rates for missing attributes were significantly lower in the Redesigned Diary.

The diary form simplification and data quality tradeoff was most evident in FDB in the Redesigned Diary. The elimination of subcategories that served as cues to the product universe and for the level of reporting detail expected in

the Redesigned Diary probably largely accounts for the higher allocation rate and lower number of entries.

*Possible future research:* The data suggest that many respondents may not understand how to record *alcohol only* purchases in MLS. While the present layout provides the necessary prompts, it does so at a high burden on processing, as well as with the apparent potential for respondent confusion. To handle this situation, options for consideration are the use of an alcohol-only checkbox as an additional meal-type checkbox on the MLS recording page, or the addition of a separate instruction.

The reporting of gifts in CLO and OTH, and the purchase of alcohol with meals, fell in the Redesigned Diary; and these types of reporting coincide with the replacement of the *Yes/No* checkboxes with a *Yes* only checkbox in the Redesigned Diary. We may want to further investigate the effect of this aspect of form design. ■



Table 1. Comparison of main expenditure categories and subcategories

Former diary	Redesigned diary
<p><b>Part 1. Food Away From Home (MLS)</b></p> <p>Fast Food, Take-out, Delivery, Concession Stands, Buffet and Cafeteria</p> <p>Full-Service Meals, Snacks, Drinks</p> <p>Vending Machines and Mobile Vendors</p> <p>Employer and School Cafeteria</p> <p>Board or Meal Plan Food</p> <p>Catered Affairs</p>	<p><b>Part 1. Food and Drinks Away from Home (MLS)</b></p> <p><i>Vendor type subcategories changed to checkboxes</i></p> <p><i>Meal type checkboxes added</i></p>
<p><b>Part 2. Food for Home Consumption (FDB)</b></p> <p>Flour, Cereal, and Other Grain Products</p> <p>Bakery Products</p> <p>Beef</p> <p>Pork</p> <p>Poultry</p> <p>Other Meats</p> <p>Fish and Seafood</p> <p>Fats, Oils and Dressings</p> <p>Eggs and Dairy Products</p> <p>Fruits and Fruit Juices</p> <p>Sugar, Sugar Substitutes and Sweets</p> <p>Vegetables and Vegetable Juices</p> <p>Other Food Items</p> <p>Non-Alcoholic Beverages</p> <p>Alcoholic Beverages</p>	<p><b>Part 2. Food and Drinks for Home Consumption (FDB)</b></p> <p><i>Gift purchases subcategory changed to a checkbox</i></p> <p><i>All other subcategories eliminated</i></p>
<p><b>Part 3. Food and Beverages Purchased as Gifts (FDB)</b></p>	<p><b>Food and Beverages Purchased as Gifts (FDB)</b></p> <p><i>Eliminated as a category</i></p>
<p><b>Part 4. Clothing, Shoes and Jewelry (CLO)</b></p> <p>Casual, Sportswear, Formal</p> <p>Undergarments and Sleepclothes</p> <p>Outdoor, Work, School, Costumes</p> <p>Shoes</p> <p>Sports – Team Clothes and Sport Shoes</p> <p>Jewelry, Accessories, and Sewing Items</p> <p>Clothing Services</p>	<p><b>Part 3. Clothing, Shoes, Jewelry, and Accessories (CLO)</b></p> <p><i>All subcategories eliminated</i></p>
<p><b>Part 5. All Other Purchases and Expenses (OTH)</b></p> <p>Tobacco and Smoking Supplies</p> <p>Gasoline, Oil, and Additives</p> <p>Medicines, Medical Supplies and Services</p> <p>Personal Care Products and Services</p> <p>Housekeeping Supplies and Services</p> <p>Housewares and Small Household Appliances</p> <p>Home Furnishings, Decorative Items, Linens, and Major Appliances</p> <p>Home Maintenance, Hardware, Lawn Supplies and Services</p> <p>Housing Expenses</p> <p>Entertainment/Amusements and Sports/Recreation</p> <p>Transportation Expenses</p> <p>School Expenses</p> <p>All Other Expenses</p>	<p><b>Part 4. All Other Products, Services, and Expenses (OTH)</b></p> <p><i>All subcategories eliminated</i></p>

Table 2. Comparison of data from the 2004 former diary and the 2005 Redesigned Diary

	Former diary	Redesigned diary
<b>A. Participation</b>		
Eligible CUs	21,369	21,309
<i>Response rate</i>		
Percent completed diaries *	68.9	71.0
Percent eligible CUs who did not participate because:		
- Refused	11.7	12.2
- Not home	3.3	2.5
- Other	3.9	4.8
<i>Participation across both weeks:</i>		
Percent completed diaries in both weeks *	64.5	66.6
Percent completed diary in Week 1 but not in Week 2	2.5	2.6
<b>B. Data quality - Recording of entries</b>		
<b>Entry misclassification rate (percent)</b>		
Overall *	1.5	2.1
Clothing, Shoes, Jewelry, and Accessories (CLO) *	4.8	8
Food and Drinks for Home Consumption (FDB) *	1.4	1.4
Food and Drinks away from Home (MLS) *	0.7	0.4
All Other Products, Services, and Expenses (OTH)*	1.5	3.5
<b>Allocation rate - proportion of entries recorded with insufficient detail (percent)</b>		
Overall *	11.7	8.5
Clothing, Shoes, Jewelry, and Accessories (CLO)	8.8	9.4
Food and Drinks for Home Consumption (FDB) *	7.8	9.9
Food and Drinks away from Home (MLS) *	34.8	5.9
All Other Products, Services, and Expenses (OTH) *	8.3	7.7
<b>Missing attributes - proportion of entries requiring imputation (percent)</b>		
Type of packaging *	5.7	6.6
Type of vendor	na <sup>1</sup>	4.9
Type of meal *	33.1	4.7
Type of alcohol	na <sup>2</sup>	11.4
Age-gender *	23.7	16.1
<b>Number of entries</b>		
Overall	500,672	498,458
Clothing, Shoes, Jewelry, and Accessories *	17,270	20,333
Food and Drinks for Home Consumption *	261,961	243,570
Food and Drinks away from home *	69,551	81,168
All Other Products, Services, and Expenses *	151,890	153,387

\* Indicates statistically significant difference ( $p < 0.05$ ) was found between the two diaries.

<sup>1</sup> In the former diary, there was no imputation of the vendor attribute, because the diary keeper could only record an entry on the MLS page by writing it in one of the vendor subcategories. In the Redesigned Diary, a diary keeper can make an MLS entry and omit marking off a vendor-type checkbox. Thus, the imputation rate of the vendor attribute between the former diary and the Redesigned Diary are not comparable.

<sup>2</sup> In the former diary, there was no imputation of the alcohol type attribute, because there was not an explicit prompt for alcohol type. Instead, there was an alcohol purchase screener question (Yes/No checkbox). In 2004, there were 6.5 percent invalid blanks for the alcohol-purchase screener question.

# Technical note A: Variance computation

The Consumer Expenditure (CE) Survey has a complex sample design, and the Balanced Repeated Replication (BRR) method of variance estimation is used to calculate variances. However, as the 2005 Redesigned Diary evaluation is based on data gathered early in the data processing cycle, replicate weights were not yet available at the time the evaluation was conducted. Instead, variances were computed using the random groups method.<sup>9</sup> All CUs in the former diary sample and the Redesigned Diary sample were randomly assigned into one of 10 groups (called replicates), with each replicate containing approximately 10 percent of the universe. For each statistic of interest, the statistic was computed separately for each replicate, as well as for the full sample.

Then, the variance for the statistic was estimated by:

$$Var(\bar{x}) = \frac{\sum_{r=1}^{10} (\bar{x}_r - \bar{x})^2}{10(10-1)}$$

where  $\bar{x}$  = the full sample statistic of interest, and  $\bar{x}_r$  = the statistic for the  $r^{\text{th}}$  replicate.<sup>10</sup>

The standard error is estimated by

$$SE(\bar{x}) = \sqrt{Var(\bar{x})}$$

<sup>9</sup> See Sharon Lohr (1999), Chpt 9.2 in *Sampling: Design and Analysis, Sampling Techniques 3rd Edition*.

<sup>10</sup> When the full sample statistic of interest is a count, the following modification is made: First, divide the full sample count by 10, then take the square difference of replicate count and (full sample count/10).

To determine if the statistic of interest was significantly different between the former diary ( $\bar{x}_F$ ) and Redesigned Diary ( $\bar{x}_R$ ) samples, z-scores (Z) that allow a statement of statistical significance were calculated using the following formula:

$$Z = \frac{[\bar{x}_R - \bar{x}_F]}{\sqrt{Var(\bar{x}_F) + Var(\bar{x}_R)}}$$

where  $Var(\bar{x}_R)$  and  $Var(\bar{x}_F)$  are the variance of the Redesigned Diary sample and former diary sample statistics, respectively.

If the absolute value of the z-score is greater than 2, the statistic of interest is significantly different between the former diary sample and the Redesigned Diary sample at 5 percent.



# Technical note B: FDB layout

## Former Diary

FORM CE-801 (11-1-99) Page 12

### FIRST DAY - Continued

a Line number	PROCESSING USE	b Describe item purchased	c Is this item - Mark (X) one				d Total cost Do not include sales tax	
			Fresh	Frozen	Bottled or canned	Other	Dollars	Cents
<b>Part 2 - Food for Home Consumption</b>								
		<b>FLOUR, CEREAL and OTHER GRAIN PRODUCTS</b> (Flour, cake mixes, cereal, rice, cornmeal, spaghetti, and other pasta, etc.)						
201			1	2	3	4		
202			1	2	3	4		
203			1	2	3	4		
204			1	2	3	4		
205			1	2	3	4		
206			1	2	3	4		
207			1	2	3	4		
		<b>BAKERY PRODUCTS</b> (White bread, other bread, cakes, cookies, pies, frozen waffles, etc.)						
208			1	2	3	4		
209			1	2	3	4		
210			1	2	3	4		
211			1	2	3	4		
212			1	2	3	4		

  

a Line number	PROCESSING USE	b Describe item purchased	c Is this item - Mark (X) one				d Total cost Do not include sales tax	
			Fresh	Frozen	Bottled or canned	Other	Dollars	Cents
<b>Part 2 - Food for Home Consumption - Cont.</b>								
		<b>PORK</b> (Bacon, pork chops, ham, sausage, pork roasts, etc.)						
222			1	2	3	4		
223			1	2	3	4		
224			1	2	3	4		
225			1	2	3	4		
		<b>POULTRY</b> (Whole chicken, turkey parts, other poultry, etc.)						
226			1	2	3	4		
227			1	2	3	4		
228			1	2	3	4		
229			1	2	3	4		
		<b>OTHER MEATS</b> (Frankfurters, bologna, liverwurst, salami, lamb, game, organ meats, etc.)						
230			1	2	3	4		
231			1	2	3	4		
232			1	2	3	4		

## Redesigned Diary (2005)

<b>SUN</b>	<b>MON</b>	<b>TUE</b>	<b>WED</b>	<b>THU</b>	<b>FRI</b>	<b>SAT</b>	<b>Day 1</b>
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### 2. Food and Drinks for Home Consumption

**Examples:**    eggs    cereal    tea    beer    apple juice    ground beef    chicken parts    fish  
                   whole milk    white bread    cola    liquor    tomato juice    bacon    whole chicken    shellfish  
                   sugar    cooking oil    ground coffee    oranges    carbonated water    lettuce    baby food    pet food

**Please unfold the RIGHT FLAP to see Frequently Asked Questions**

	What did you buy or pay for? <i>(see examples above and on the flap)</i>				Is this item: Mark (X) one				Total Cost without tax	Mark (X) If purchased for someone not on your list
	fresh	frozen	bottled/ canned	other	fresh	frozen	bottled/ canned	other		
201					1	2	3	4		
202					1	2	3	4		
203					1	2	3	4		
204					1	2	3	4		
205					1	2	3	4		
					1	2	3	4		

# Technical note C: MLS layout

## Former Diary

FIRST DAY							
		1 <input type="checkbox"/> None 2 <input type="checkbox"/> TR		PROCESSING USE		3 <input type="checkbox"/> BD 4 <input type="checkbox"/> VC	
a	PROCESSING USE	b	c		d		e
Line number		List all meals, snacks, and beverages purchased	Total cost Include tax and tip		Were alcoholic beverages included in total cost? Mark (X) one		If "YES" – How much?
		<b>Part 1 – Food Away From Home</b>	Dollars	Cents	Yes	No	Dollars Cents
		<b>FAST FOOD, TAKE-OUT, DELIVERY, CONCESSION STANDS, BUFFET and CAFETERIA – You pay BEFORE eating/drinking.</b>					
101					1	2	
102					1	2	
103					1	2	
104					1	2	

## Redesigned Diary (2005)

Day 1		SUN	MON	TUE	WED	THU	FRI	SAT						
<b>1. Food and Drinks Away from Home</b>														
<b>Examples:</b>		breakfast buffet carry-out lunch dinner & cocktails at restaurant	pizza delivery Chinese takeout child's school lunch	beer at happy hour pretzels at ballgame wine at tavern	croissant from café ice cream from truck wedding reception caterer	soda from vending machine hot dog from convenience store popcorn and soda at movies	Please unfold the LEFT FLAP to see Additional Examples							
Mark (X) one that best describes the type of meal		Description (see examples above and on the flap)	Mark (X) one that best describes where you made this purchase				Total Cost with tax & tip	If alcoholic beverages included, mark (X) all that apply			Enter the total cost of the alcohol			
breakfast	lunch		dinner	snack/other	Fast-Food Take-out Delivery Concession	Full Service Places		Vending Machines or Mobile Vendors	Employer or School Cafeteria	wine		beer	other	
1	2	3	4	1	2	3	4			1	2	3		
101														
1	2	3	4	1	2	3	4			1	2	3		
102														
1	2	3	4	1	2	3	4			1	2	3		
103														
1	2	3	4	1	2	3	4			1	2	3		

# Technical note D: CLO layout

Former Diary

a Line number	PROCESSING USE	b Describe item purchased	c Total cost <i>Do not include sales tax</i>		d Was this bought for someone outside your consumer unit? <i>Mark (X) one</i>		e For whom was this item purchased? 1 - Male 16 or over 2 - Female 16 or over 3 - Male 2 through 15 4 - Female 2 through 15 5 - Under 2 years <i>Enter code</i>
			Dollars	Cents	Yes	No	
		<b>Part 4 - Clothing, Shoes, and Jewelry</b>					
401		CASUAL, SPORTSWEAR, FORMAL (Suit, shirt, dress, shorts, pants, sweater, etc.)			1	2	
402					1	2	
403					1	2	
404					1	2	
405					1	2	
406					1	2	
407					1	2	
408					1	2	
409		UNDERGARMENTS and SLEEP CLOTHES (Socks, pajamas, lingerie, hosiery, etc.)			1	2	
410					1	2	

Redesigned Diary (2005)

Day 1	SUN	MON	TUE	WED	THU	FRI	SAT	
<b>3. Clothing, Shoes, Jewelry, and Accessories</b>								
<p>Examples: shirt sweater shorts suit dress pants sandals sneakers shoe repairs soccer cleats team uniform ski boots gloves slippers dance costume watch necklace belt pajamas lingerie socks coat jacket windbreaker</p> <p>← Please unfold the LEFT FLAP to see Additional Examples</p>								
	What did you buy or pay for? <i>(see examples above and on the flap)</i>	Total Cost without tax	Was the item for:		Age			Mark (X) if purchased for someone not on your list
			male	female	Under 2	2-15	16 & Over	
301			1	2	1	2	3	
302			1	2	1	2	3	
303			1	2	1	2	3	