

# **The Gemini Project to Redesign the Consumer Expenditure Survey: Redesign Proposal**

**Jennifer Edgar, Dawn V. Nelson, Laura Paszkiewicz, and Adam Safir**

Gemini Design Team

Bureau of Labor Statistics

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## **Executive Summary**

In 2009, the Bureau of Labor Statistics (BLS) Consumer Expenditure Survey (CE) initiated the multi-year Gemini Project for the purpose of researching, developing, and implementing an improved survey design. The objective of the redesign is to improve the quality of the survey estimates through a verifiable reduction in measurement error.

This report, prepared by the Gemini Design Team, presents a comprehensive proposal for the redesigned survey, based on three years of information gathering, inquiry, and synthesis. The design team relied on a broad set of input documents to develop a redesign proposal which meets the Office of Prices and Living Conditions' (OPLC) survey requirements and addresses three key factors believed to affect the survey's ability to collect high quality data, specifically, measurement error, environmental changes, and flexibility. The proposed design is budget neutral for ongoing operations.

The proposed design includes two waves of data collection set 12 months apart. Each wave contains the same interview structure consisting of two visits and a 1-week diary. Visit 1 is an in-person interview made up of two parts. The first part identifies the roster of the household, while the second is a recall interview that collects large, easily-recalled household expenditures. Additionally, Visit 1 incorporates instructions to collect relevant expenditure records for the Visit 2 records-based interview, as well as training for and placement of the electronic, individual diaries. Following Visit 1, the electronic web-based diary (accessible via PC, smartphone, or other mobile device) is maintained for one week by all household members 15 years old and older. Visit 2 is an in-person, records-based expenditure interview on household expenditures that can reasonably be found in records such as receipts, utility bills, and bank statements.

The proposed incentive structure for the new design includes a \$2 prepaid cash incentive per household sent with an advance letter, a \$20 household incentive (debit card) provided after Visit 1, a \$20 individual incentive (debit card) for each member who completes the diary, and a \$20 or \$30 household incentive (debit card) after Visit 2. Pending further research and discussion, the Visit 1 \$20 household incentive may be provided with the advance letter and activated upon completion of the Visit 1 interview.

As part of the redesign process, representatives from the Division of Consumer Prices and Price Indexes (CPI), the Division of Consumer Expenditure Survey (DCES), and the Division of Price and Index Number Research (DPINR) created a set of reconciled survey requirements. These reconciled requirements specified a minimum set of expenditure and non-expenditure data elements that must be collected from each consumer unit (CU),<sup>1</sup> the need for annual expenditure estimates at an aggregate level of total household spending, the need for month of expenditure(s) for each expenditure category, and the need for data to be collected at a minimum of two points in time, one year apart, for each CU, allowing for analysis of change over time.

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<sup>1</sup>A consumer unit is defined as members of a household who are related by blood, marriage, or other legal arrangement OR members of a household that make joint financial decisions. Throughout the report, the term “Consumer Unit” and household are used interchangeably.

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## **1. Gemini Background**

The mission of the Consumer Expenditure Survey program (CE) is to collect, produce, and disseminate information that presents a statistical picture of consumer spending for the Consumer Price Index (CPI), government agencies, and private data users. The mission encompasses analyzing CE data to produce socio-economic studies of consumer spending and providing CE data users with assistance, education, and tools for working with the data. CE supports the mission of the Bureau of Labor Statistics (BLS), and therefore CE data must be of consistently high statistical quality, relevant, timely, and must protect respondent confidentiality. In an effort to improve data quality, the BLS began the Gemini Project in 2009 to redesign the CE survey with the overall mission to improve data quality through a verifiable reduction in measurement error, with a particular focus on under-reporting. The effort to reduce measurement error is to be explored in a manner consistent with combating further declines in response rates (Gemini Project Vision Document, 2012).

### *a. Redesign Motivation*

The design of the CE survey must be updated on an as-needed basis to address the effect that changes in society, technology, new consumer products, and spending methods have on survey estimates. Not making these updates presents a risk that the CE survey will not be able to continue producing high quality expenditure estimates for users.

Surveys today face well-known challenges that affect response rates, such as increasingly busy respondents, confidentiality and privacy concerns, competing surveys, controlled-access residences, and non-English-speaking respondents. In addition to these response rate challenges, the CE survey also faces challenges either related to or that directly impact the quality of the data collected. Presented in order of importance, the three most challenging issues the CE survey faces are (1) evidence of measurement error, (2) environmental changes related to new technology and consumption behaviors, and (3) the need for greater flexibility in the mode of data collection and ability to update data collection strategies. Addressing these issues comprises the main objectives of the survey redesign.

### *b. Report Overview*

To address the challenges facing the CE, with this report the Gemini Design Team presents a redesign proposal that is expected to reduce measurement error, reflect currently available technology and consumer behaviors, and incorporate flexibility needed to regularly update data collection strategies and modes. The design team has reviewed, evaluated, and synthesized numerous reports including recommendations from the National Academies' Committee on National Statistics (CNSTAT) (Dillman and House, 2012) and Westat (Cantor, et. al, 2013), as well as several internal reports on defining data quality (Gonzalez, et. al., 2009) and the data users' needs (Henderson, et. al., 2010). The design team used input from these reports to develop a design that uses

*Through the use of (1) technology to encourage realtime data capture, (2) individual diaries to reduce proxy reporting, (3) shortened interview length and record use to improve data quality, and (4) incentives to address respondent motivation, the proposed design increases the CE's ability to collect high quality data, while maintaining current response rates and costs.*

technology to encourage real-time data capture, individual diaries to reduce proxy reporting, shortened interview length and record use to improve data quality, and incentives to address respondent motivation. The design team is confident the proposed design will increase the CE's ability to collect high quality data, while maintaining current response rates and costs.

### *c. Redesign Evaluation*

CE will evaluate the success of the Gemini Project by the ability of the new survey design to meet the redesign objectives – that is, to (1) result in a quantifiable reduction in measurement error, (2) account for environmental changes, including changes in available technology and consumer spending behaviors, and (3) support a greater operational flexibility, including changes in data collection mode and in data collection strategies. Regarding the first objective, the CE has initiated the development of an ongoing data quality profile and a measurement error evaluation process to track changes in overall data quality and measurement error resulting from the redesign's implementation. The CE will evaluate the success of the second and third objectives by comparing the time necessary to incorporate specific data collection protocol changes before and after the redesign's implementation.

The net analytic value of CE data for researchers and policymakers should also be maintained or improved, both for microeconomic and macroeconomic data users, while improving the overall quality of the data provided. It is also important that the design aims to be reasonably robust to future changes in societal and technological factors and variability in budgetary levels. The design team believes that the survey resulting from this redesign proposal will meet those objectives.

#### *d. Redesign Process*

Since its inception in 2009, the Gemini Project has been managed by a project leader and steering team, with guidance from an executive management group. The Gemini Project includes three stages. Stage 1, which concludes with this report, focused on information gathering and synthesis leading to this redesign proposal. Stage 1 included developing a research project tracking system to make relevant existing research more easily accessible, defining data quality for CE, and coordinating a series of information gathering events (see Appendix 3 for complete list).

Stage 2 of the project will focus on developing a roadmap for testing, evaluation, development, and implementation of the redesign. As part of stage 2, BLS will conduct outreach to data users on the new proposed redesign with the goal of publicizing the proposals and mitigating any large impacts of the new design identified by current CE users. These efforts are expected to continue through 2013, with a final report summarizing the feedback obtained developed in early 2014. Stage 3 comprises the actual implementation of the redesign. It will include feasibility testing, evaluation, piloting, systems development, field staff training, and conducting a bridge test of the new survey (alongside the current survey). At this point, some of the details and intricacies of the design will be addressed as further research is conducted and implementation approaches. Stage 3 is expected to take 10 years to complete, relying heavily on the availability of funding. With a start date in 2014, full implementation of the redesign is expected in 2023.

## **2. Proposal Development Process**

The Gemini Design team compiled numerous reports and input to create a cohesive redesign proposal that would meet the needs of CE and the goals of the redesign project. Both internal

and external inputs guided the decisions made and assisted in guiding the process of developing the design.

*a. Internal Inputs*

During stage 1 of the Gemini Project, the Steering Team chartered subteams to research various topics and organize information to provide essential input for making redesign decisions. A Research Tracking System Team developed a database for tracking CE method research findings. A Data Quality Definition Team was formed to develop a definition of data quality to be used by the survey. The OPLC Requirements Team reconciled data requirements of internal BLS stakeholders (CPI, CE, and internal researchers) into one set of reconciled expenditure categories and data requirements. The first Gemini sampling team estimated sample sizes required for the CE Diary Survey (CED) and CE Quarterly Interview Survey (CEQ) based on the reconciled expenditure categories. The Gemini Technology Team reviewed the existing literature and made recommendations about the most promising technologies. The design team synthesized this information to develop a final redesign proposal.

*The majority of the promising features identified from the CNSTAT report, Westat proposal, and internal CE survey review have been incorporated into this design proposal.*

In addition to the contributions from these teams, redesign ideas and feedback were solicited from BLS and Census staff. Regular meetings were held with the Gemini Steering Team and Gemini Executive Management Group where redesign ideas were shared. The design team also conducted a web survey to ask CE staff for their input on features to incorporate into the redesign. Field representative (FR) focus groups were conducted on the proposed design to solicit feedback from the interviewers. The design team considered all of these ideas and feedback when finalizing the proposed design.

*b. External Inputs*

To complement the above listed internal initiatives, BLS recognized the need for external expertise in the redesign process. The Gemini Project hosted several events aimed at collecting information from external sources, survey producers, and experts for use during the redesign. These included a survey redesign panel discussion (January 2010), data capture technology



forum (March 2010), respondent records panel discussion (May 2010), data user needs forum (June 2010), and methods workshop (December 2010).

Additionally, to obtain an independent perspective on the redesign, the Gemini Project contracted with two external groups to provide expert recommendations on the redesign proposal and research process.

The first contract was to the National Academies' Committee on National Statistics (CNSTAT), who convened an expert panel to collect additional information about the issues facing the CE and propose redesign options. The panel consisted of experts from a variety of relevant fields, including survey methodology, statistics, psychology, economics, and public policy. The panel reviewed CE documentation and past research, hosted two events with external experts, including other household survey producers (June 2011) and survey methodologists with recommendations on redesign options (October 2011). CNSTAT also contracted with two external vendors to provide independent redesign proposals, which they used in conjunction with their expert opinion to create a report documenting three redesign options for the CE.

*The CNSTAT report validates CE concerns about issues affecting survey data quality, affirms the need for a major redesign, provides expert recommendations for improving the survey, and establishes an imprimatur for CE's redesign plans.*

The output of the panel was a report that synthesized information gathered through the BLS data user needs forum, BLS methods workshop, CNSTAT household survey data producer workshop, CNSTAT CE redesign options workshop, and independent papers into comprehensive design recommendations. The panel was charged with presenting a “menu of comprehensive design options,” rather than a single design, and the final report, “Measuring What We Spend: Toward a New Consumer Expenditure Survey” met the charge fully. The report validates CE concerns about issues affecting survey data quality, affirms the need for a major redesign, provides expert recommendations for improving the survey, and establishes an imprimatur for CE's redesign plans.

The CNSTAT final report contained three individual redesign proposals, each with elements that could be incorporated as presented, or in different combinations (Dillman and House, 2012). Of the designs proposed, the Gemini Design team's proposal is most similar to "Design B," including features such as a single sample design, increased use of technology and records, and use of incentives. The design team used the CNSTAT report as a key input for the redesign proposal, as noted in footnotes throughout this report, and their careful evaluation of design options will be used throughout the next stage of the redesign process.

The second contract, for a second independent redesign proposal, was awarded to Westat, and utilized the primary methodologists who worked on the CNSTAT-commissioned proposals. The contract was for a single, cohesive, budget-neutral survey design addressing the key issues impacting CE data quality (underreporting, changes in technology and society, and flexibility of data collection mode). The contractors based their design on a careful review of the literature and past CE research as well as their own extensive experience in survey design. They also worked to build their current design on the feedback received from their original designs proposed to CNSTAT. BLS and Westat worked together to ensure the final proposal was realistic given a five-year development and testing schedule. The Gemini Design team's proposed design reflects the Westat design in many ways, as noted in footnotes throughout the report, including two waves of data collection, increased use of technology and records, individual diaries, reduced overlap in content between the diary and interview, and use of incentives.

In addition to the redesign proposal, Westat used budget figures from the Census Bureau along with their data collection experience to create a cost estimate for on-going data collection. Finally, they provided a plan to evaluate the design elements. The design development was iterative, with BLS providing feedback on options throughout the process. The output of this contract was three presentations (methodology, cost and evaluation, and a final comprehensive presentation) and a report detailing the proposed design, estimated budget, and evaluation plan (Cantor, Mathiowetz, Schneider and Edwards, forthcoming). The Gemini Process will use the Westat final report as a key input for the next stage of the redesign, as the research roadmap is developed.

### *c. Guiding Principles*

Borrowing the approach from CNSTAT, the Gemini Design team developed a set of principles to use when making decisions. These principles helped the team weigh various design features, and provided criteria to use when there was no obvious choice. The seven guiding principles were:

1. Keep it simple
2. Make sure the design works for all respondents (e.g., have technology options)
3. Increase flexibility in content, modes, and technology
4. Meet OPLC requirements
5. Reduce measurement error
6. Keep costs neutral
7. Have no negative effect on response rates

### *d. Survey Requirements*

As noted above, one of the activities in the redesign was to define a set of minimum survey requirements that meet the needs of the CE, the CPI, and the Division of Price and Index Number Research program offices. The complete requirements can be found in the forthcoming “OPLC Requirements for the Consumer Expenditure Survey” report, to be available for download from the BLS website (Passero, et. al, 2013). The design detailed in this report meets all the requirements specified in the document. Specifically, the design will allow for annual expenditure estimates of total household spending at the aggregate level. It will capture the full list of expenditure and non-expenditure items needed from each consumer unit at the specified level of detail. At the CU level, the design will allow for 3 months of expenditure data collected at two points in time, a year apart, allowing for analysis of change. Additionally, the month of the expense will be collected to meet CPI requirements. Not all data required for all types of analyses are accommodated with the proposed redesign. For example, there is no provision for the additional data needed for poverty thresholds or for analysis of total yearly income and yearly expenditures from a single consumer unit.

Both CPI cost-weights and CE publication tables require all expenditure data for a given calendar quarter. For any given CU, Visit 1 (recall interview) and Visit 2 (records-based

interview) reflect expenditures for the three months prior to the interview, while the reporting diary expenditures reflect the current week. To obtain a complete picture of expenditures in the proposed design, data will be used from different CUs: Visit 1 and Visit 2 reports will be used from one set of CUs, while Diary expenditures will be used from a different set of CUs from the previous quarter, to match the same time period. In the example shown in table 1, CPI and CE Publications would use one month of February expenditures from the recall and records-based interviews conducted with CUs interviewed in March, April, and May, and one week of February expenditures from diaries completed in February (by different CUs).

Microdata users have different needs, requiring all expenditure categories from the same time period to come from a single CU. To do this, interview data for the past three months would be combined with global questions covering the diary expenditure categories (collected in the recall interview and covering the same past three month time period). This approach would provide a complete picture of spending for each CU for the past three months.

Looking back to table 1, focusing on CUs interviewed in April, microdata users would receive January, February, and March expenditure data from the recall interview, the records-based interview, and the global categories covering the diary expenditures. This would account for a total picture of spending, covering the past three months, from each CU. The global questions data could be augmented with diary data collected in the subsequent time period. Although the time periods would differ, microdata users would be able to take advantage of the additional detailed information, informing their use of the global questions data.

Table1. Expenditure time period coverage based on Interview month

CUs Interviewed in	Expenditures Occurring In				
	Jan	Feb	Mar	Apr	May
January (Oct. – Dec reference period)					
	Diary				
February (Nov. – Jan. reference period)	Recall				
	Records				
		Diary			
March (Dec. –Feb. reference period)	Recall	Recall			
	Records	Records			
			Diary		
April (Jan. – Mar. reference period)	Recall	Recall	Recall		
	Records	Records	Records		
				Diary	
May (Feb. – April reference period)		Recall	Recall	Recall	
		Records	Records	Records	
					Diary

*e. Proposal Review*

As the design team developed this redesign proposal, continuous feedback was obtained from a variety of sources. The design team shared a preliminary draft of the redesign proposal with senior BLS and Census staff, and held several meetings with the Gemini Project executive management team. Additionally, three focus groups were held with Census FRs to collect their reactions to the redesign proposal, and identify any elements they deemed not feasible in a production setting. Overall, reactions to the proposal were positive, with each stakeholder group agreeing that the design was promising and would likely collect higher quality data while maintaining response rates. In particular, the FRs had a positive reaction to the design. They found many features, such as incentives, having only two waves, and use of technology very exciting. While there were some questions and concerns

*Overall, reactions to preliminary drafts of the proposal have been positive, with stakeholder groups agreeing that the proposed design represents a positive step forward, and has the potential to obtain higher quality data while maintaining response rates.*

about a few design elements, the design team did not consider any of the noted concerns as “show stoppers,” and have considered changes to address those concerns (Edgar, 2013). With the completion of this report, the Gemini project will conduct several additional outreach events through 2013 aimed at sharing the redesign proposal and collecting feedback from other key stakeholders.

### **3. Proposed Design**

#### *a. Design Overview*

As shown in figure 1, the proposed design calls for a single sample of consumer units<sup>2,3</sup> participating in two waves of data collection,<sup>4</sup> 12 months apart. Each wave is comprised of two visits with one CU respondent as well as a one-week<sup>5</sup> electronic diary<sup>6</sup> for every CU member 15 years old and older. A multi-mode survey leverages interviewer skills at collecting certain types of data and building a rapport with the respondent, while also relying on self-administration and proactive diary keeping to obtain other types of information. The two visits will be household-level interviews with reduced content that are shorter in length than the current CEQ, which the design team hopes will maximize survey cooperation.

#### *Visit 1*

During the Visit 1 recall interview, the FR will collect the household roster and household-level expenditures that the CU respondent can reasonably recall using a Computer Assisted Personal Interview (CAPI) instrument. The CAPI instrument will allow either the CU respondent or the FR to modify the order in which expenditures are collected.

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<sup>2</sup> “All three [CNSTAT] prototypes ... feature ... a single sample.” (Dillman and House, 2012, page 98)

<sup>3</sup> “To meet the challenges of minimizing respondent burden while also providing data users with the ability to examine change within CUs, [Westat] recommend[s] using a single sample design that incorporates two waves of in-person interview data collection with a single week of diary maintenance after the first wave of CE interview data collection.” (Cantor et al., 2013, pg. 6)

<sup>4</sup> “By limiting the panel to two interviews, [the] proposed design reduces burden but also reduces the costs of the second interview (due to having already established rapport) as well as potentially improving reporting by either encouraging record maintenance between the first and second interview or encouraging collection of records prior to the second interview.” (Cantor et al., 2013, pg. 10)

<sup>5</sup> “A move to a single week rather than a two-week diary period is based on the limited empirical literature demonstrating a “fall off” in reporting as the length of the diary period increases.” (Cantor et al., 2013, pg 19)

<sup>6</sup> “Research in other data collection projects suggests that replacing paper-based data collection methods with electronic methods may potentially improve data quality.” (Cantor et al., 2013, pg. 20)

All expenditure categories will have a three month reference period, collecting data for the three months prior to the interview month. Depending on the category, questions may ask about the previous quarter, with the month of purchase identified, or they may ask about each of three previous months individually. In addition to the expenditure categories captured during the recall interview, a select number of global questions covering all expenditure categories to be collected from the diary will be included. Global questions will ask respondents to report total spending at a higher level (e.g., clothing) than the more detailed questions likely to be included in the interviews (e.g., pants, shirts, shoes).

After conducting the recall interview, the FR will ask the respondent to collect records<sup>7,8</sup> for select expenditures (e.g., expenditures respondents typically do not accurately know, such as utilities) for the three months prior to the interview to be used in the Visit 2 records-based interview. Lastly, the FR will perform electronic diary training and placement with the CU respondent(s) to prepare for the expenditure diary task. The CU respondent will be expected to train the other CU members, if not present, on how to use the electronic diary. The entire Visit 1 interview is intended to average 45 minutes. Upon successfully completing Visit 1, the FR will give the CU respondent a \$20 incentive in the form of a debit card.

### *Diary Week*

Beginning on the first day following the Visit 1 interview and continuing for seven days, all CU members 15 years of age and older will record their individual expenditures using an electronic diary. A \$20 individual incentive (in the form of a debit card) will be given to every CU member completing the one-week diary.

Respondents will be encouraged to use their own device to access the electronic diary form.<sup>9,10</sup> CU members without their own device will be given a basic mobile device (smartphone or

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<sup>7</sup> “The use of records is extremely important to reporting expenditures and income accurately. The use of records on the current CE is far less than optimal and varies across the population. A redesigned CE would need to include features that maximize the use of records where at all feasible...” (Dillman and House, 2012, pg. 6)

<sup>8</sup> “Encourage respondents to refer to records for the interview... The rationale for asking respondents to refer to records is simply that records are likely to contain precise, accurate information.” (Cantor et al., 2013, pg. 17)

<sup>9</sup> “[Westat] recommend[s] allowing respondents to use their own smart phones, tablets, laptop computers, or desktop computers to enter their expenditure data on the web-based diary.” (Cantor et al., 2013, pg. 29)

<sup>10</sup> “All three of the proposed designs recommend the use of a [mobile] device” (Dillman and House, 2012, pg. 150)

tablet)<sup>11</sup> with the ability to connect to the internet to use for the duration of the diary reference week. At the Visit 2 interview, the devices would be picked up. Any CU member unable or unwilling to complete an electronic diary will be given a paper diary form. This multi-mode diary will allow respondents to use the technology most comfortable to them.

The respondents' electronic diary entries will be monitored during the reference week by Census headquarters or Regional Office staff,<sup>12</sup> who will notify FRs of any issues the CU members are experiencing with the electronic diary. The FR will follow-up with the CU during the reference week to (1) recognize and further encourage those who are reporting expenditures to continue to do so, (2) encourage respondents who are not reporting their expenditures to begin to do so, and (3) address any issues that may be negatively affecting respondents' proper use of the diary. The FR will serve as the primary support contact for the respondents, and a centralized technology help desk will be available for any technical issues they cannot resolve.<sup>13</sup> Any technical issues will be logged with case information so the FR will be able view issues and see the resolution. Keeping track of technical issues will also allow for continuous improvement.

An advantage of individual diaries is that requiring all CU members to keep a one-week diary may stress the importance of the diary task, which may elevate the salience of the diary keeping activity, resulting in an increase in overall expenditure reporting and at the same time reducing the diary keeping burden on a single household respondent.<sup>14</sup> The need for every CU member to complete an individual diary could reduce response, but the individual incentives awarded for successful completion of the diary should counteract this risk.

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<sup>11</sup> "Respondents can then use their own technology or borrow a [mobile] device to access the diary." (Cantor et al., 2013, pg. 5)

<sup>12</sup> "The centralized facility would be able to monitor and intervene if households do not enter data regularly or if there is evidence of poor data quality." (Dillman and House, 2012, page 103)

<sup>13</sup> "The field representatives' role will still be important in directly collecting data, but their role [should] grow to also provide support in additional ways." (Dillman and House, 2012, pg. 92) and "The field representative's role changes radically..., from being the prime interviewer and data recorder to being the facilitator who encourages, trains, and monitors in support of the respondent's thoughtful and accurate data entry." (Dillman and House, 2012, pg. 104)

<sup>14</sup> "A limited body of empirical research [e.g. Grootaert 1986; Edgar, et al. 2006] suggests that reducing reliance on a single CU reporter for the diary may improve reports of expenditures." (Cantor et al., 2013, pg 34)



### *Visit 2*

The Visit 2 interview will occur after the diary week is complete, one week after the Visit 1 interview. During the Visit 2 records-based interview, the FR will review the Diaries and check with the CU respondent to capture any additional expenses that were missed by members during the diary week. Then the FR will again use a CAPI instrument to collect expenditures that are best collected via the records that the respondent was asked to collect. The Visit 2 interview will collect the expenditures covering the three months prior to the Visit 1 interview month. Asking for specific records a week in advance should increase their use during this second interview, resulting in improved data quality. However, we recognize the task of gathering records may have the adverse effect of reducing response rates at Visit 2.

As with Visit 1, Visit 2 is intended to average 45 minutes, and the CU respondent or the FR can modify the order in which expenditures are collected. Also, as with Visit 1, a \$20 household debit card incentive is given upon successful completion of the CAPI interview unless the respondent used records to report expenditure amounts; in which case the incentive is increased to \$30.<sup>15</sup>

### *Wave 2*

Twelve months later, each CU will repeat the full process. The second wave of data collection will follow the same structure as the first, with a Visit 1 recall interview, individual one-week diaries, and a Visit 2 records-based interview. The incentive structure will also remain the same with \$2 cash included in the advance letter, a \$20 debit card given after Visit 1, a \$20 debit card for each member who completes the diary, and a \$20 or \$30 debit card after Visit 2.

When compared to the status quo, a clear advantage of a design comprised of only two waves (each 12 months apart) is a reduction in overall household level burden; however, after a year, there is a risk of losing the rapport that was developed by the FR during the first wave. To help offset this, the CU household will be sent a “Respondent Engagement” mailing following the first wave to help maintain rapport and encourage their participation in the second wave of data collection. These mailings are envisioned to be a postcard or e-mail thanking them for their

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<sup>15</sup> The criteria by which the respondent will qualify for the increased incentive will be explained in advance of the interview.

participation, reiterating the importance of their participation, and reminding them of the next wave.

### *Incentives*

Each wave begins with an advance mailing that describes the survey and explains the importance of their participation (similar to the CE current design's Wave 1 advance letters). The letter will also include a token \$2 cash incentive and information about the promised incentives for successfully completing the household interview and diary components.<sup>16,17</sup>

The incentives will be individual-level and performance-based.<sup>18</sup> A single household CU respondent receives \$20 for completing the Visit 1 recall interview and \$20 or \$30 for the completion of the Visit 2 records-based interview, depending on whether or not records were used. Each CU member, including the household CU respondent, will receive \$20 for successfully completing the one-week diary. All momentary incentives are repeated for Wave 2, and the final incentive is a non-monetary "Respondent Experience" brochure package, awarded after the second wave of data collection.

After the second wave is completed, a non-monetary "Respondent Experience" incentive will be mailed within one week to the CU household respondent. This brochure package will contain a personalized graph showing the household's Wave 1 expenditures compared to national averages, and an information sheet listing helpful government websites.

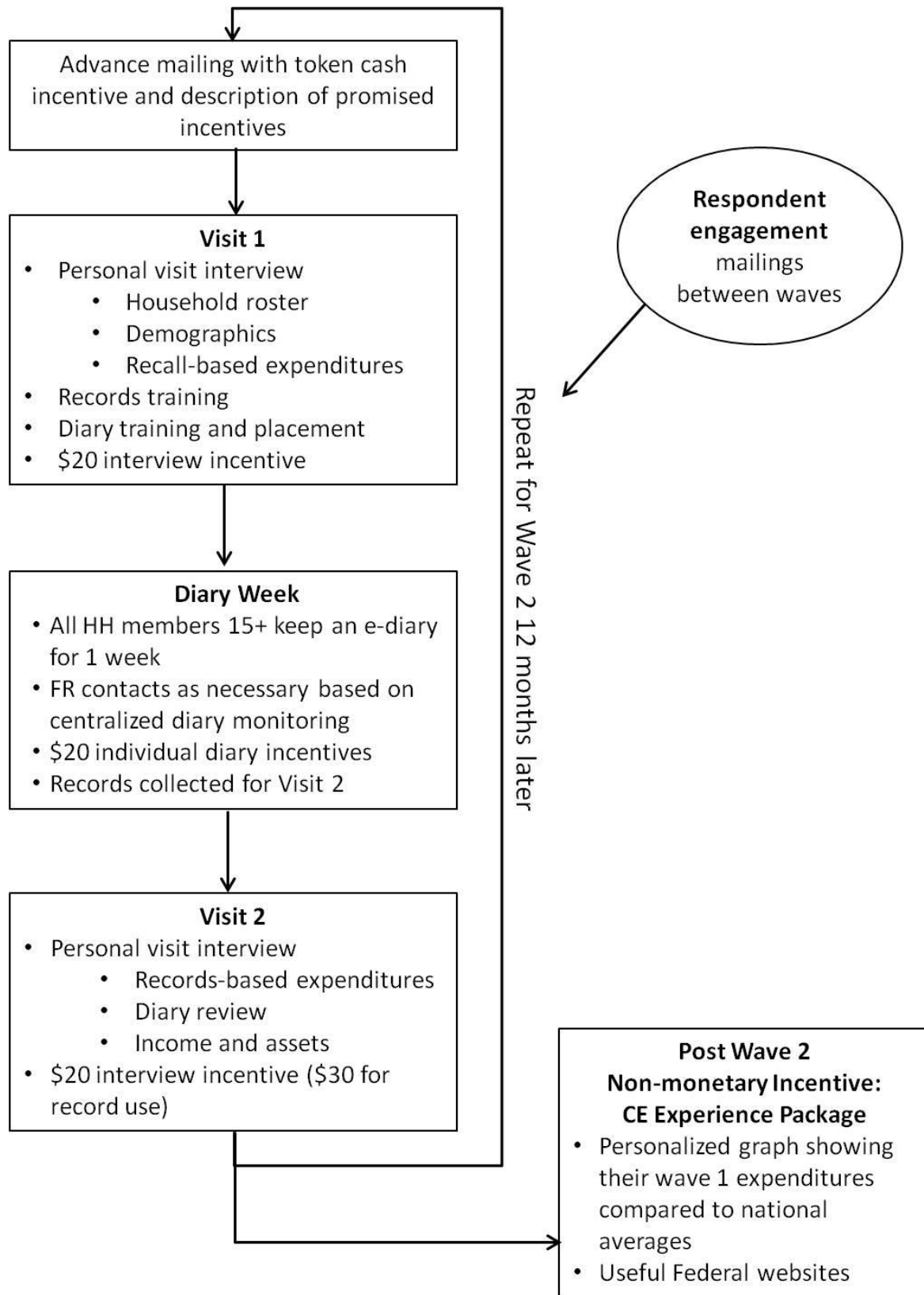
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<sup>16</sup> "Another key element of the prototypes is the use of incentives to motivate respondents to complete data collection and provide accurate data. The panel recommends an appropriate incentive program be a fundamental part of the future CE program." (Dillman and House, 2012, pg. 10)

<sup>17</sup> "Incorporate incentives at all stages of the CE data collection – prepaid small incentives in the advance letter, for the CE interview respondent, and for every diarist in the CU. Utilize incentives to both improve response rates and motivate reporting." (Cantor et al., 2013, pg. 36)

<sup>18</sup> The debit card will be given at the start of the task and the pin provided at the successful completion of the task.

Figure 1. Proposed design



*b. Survey Content*

To address the OPLC data requirements, the design team reviewed the full list of required expenditure and non-expenditure data elements and determined which were best collected via recall, records, or a diary.<sup>19</sup> The design team identified 36 expenditure categories to be collected via recall during the first in-person interview, 68 categories to be collected in the diary, and the remaining 36 categories to be collected via records during the second in-person interview. These designations will be tested and evaluated to ensure the correct collection method is selected. Consult appendix 1 for the full list of 140 expenditure and non-expenditure categories classified by data collection approach.<sup>20</sup>

Although the design team has proposed a data collection approach for each required element, the team acknowledges additional work will be needed before finalizing the approach used to collect each data element. Research will also need to address the level of aggregation at which each question should be asked in order to collect data comprehensive of the required categories.

For example, the category for education expenses may be asked as a single question: *What did your household spend on education expenses in the past X months?*

or as multiple questions: *In the past X months, what did your household spend on ...*  
*college tuition?*  
*on tutoring and test preparation?*  
*on educational books and supplies?*

The level of aggregation required to collect some expenditure categories may result in some lower-level questions collected in the recall interview and some in the records-based interview, spreading the category across both surveys.

The guidelines the design team used to make the decision on the best data collection approach for each expenditure category follows:

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<sup>19</sup> “Both [recall and records interviewing] have real drawbacks, and a new design will need to draw from the best (or least problematic) aspects of both methods.” (Dillman and House, 2012, pg. 4)

<sup>20</sup> Appendix 1 is based on an initial list, dated October 31, 2012 of reconciled expenditure categories. The exact survey content will be based on research using the final list of expenditure categories provided in the OPLC Requirements Document (Passero et al., 2013).

### Visit 1 Recall Interview

- Big ticket items that can be easily recalled (e.g., vehicles, major appliances)
- Items that respondents would be able to report for other household members (e.g., college tuition, catered affairs)
- Infrequent purchases not likely to be collected with sufficient sample size in a one-week diary (e.g., professional medical services)
- Average survey duration of 45 minutes

### Diary

- Small, frequent expenses not easily recalled (e.g., food)
- Items that people may be more willing to report privately (e.g., alcohol, tobacco)
- Items an individual proxy respondent would not know for all household members (e.g., recreational goods)

### Visit 2 Records-Based Interview

- Items that respondents likely do not accurately know but could easily obtain from records (e.g., payroll deductions, mortgage interest and charges)
- Items that respondents may know but may be more accurately reported using records (e.g., electricity, water, sewer, and trash collection)
- Average survey duration of 45 minutes

### *c. Data Collection Methodology*

To collect the data described above, a variety of methods will be used. CAPI instruments will be created for the Visit 1 and Visit 2 interviews. They will be developed to maximize flexibility; interviewers will be able to move through the expenditure sections in the order that best suits the respondents (e.g., in order of the records they have available, in order of respondent interest).

Recognizing that keeping a diary is a burdensome task, this design attempts to overcome that challenge with reducing the reporting task from two weeks to one week, including incentives and simplifying the reporting process as much as possible. The reporting tasks will be divided

among the individual household members, minimizing the burden for any one respondent. Using a mobile-optimized web diary for the individual diaries will make data entry by respondents simpler. The electronic diary will be designed with a new simplified format (open-ended to capture all expenditures) and will be accessible from multiple points (i.e., personal computer, personal mobile device, or government-provided mobile device). This should help respondents enter expenditures in real time, as purchases are made. To capture data and create records in the diary, respondents will be encouraged to make use of available device functionality such as cameras, receipt scanners, bar code scanners, or handwriting-to-text software. An additional benefit to web-based collection is the ability to monitor results in real time, allowing the FRs to target CUs that need encouragement or assistance in reporting expenditures.

*d. Sample Design and Proposed Sample Size*

As mentioned above, the proposed design calls for a single rolling sample of CUs participating in two waves of data collection. The proposed design also calls for the same sample size across all expenditure categories with every household receiving the same survey content. An advantage of this design is that it will be straightforward to program and implement.

The CE sample size requirement states that CE must be able to produce “reliable annual estimates for the required level of expenditure detail both nationally and for standard one-way tables currently produced” (Passero, et. al, 2013). To identify the minimum sample size needed to meet this requirement, the design team worked with CE Statistical Methods Division (SMD) staff. The criterion was for the smallest published subpopulation<sup>21</sup> a coefficient of variation<sup>22</sup> (CV) of less than 25 percent was expected to be obtained for a majority of the expenditure categories intended for publication.

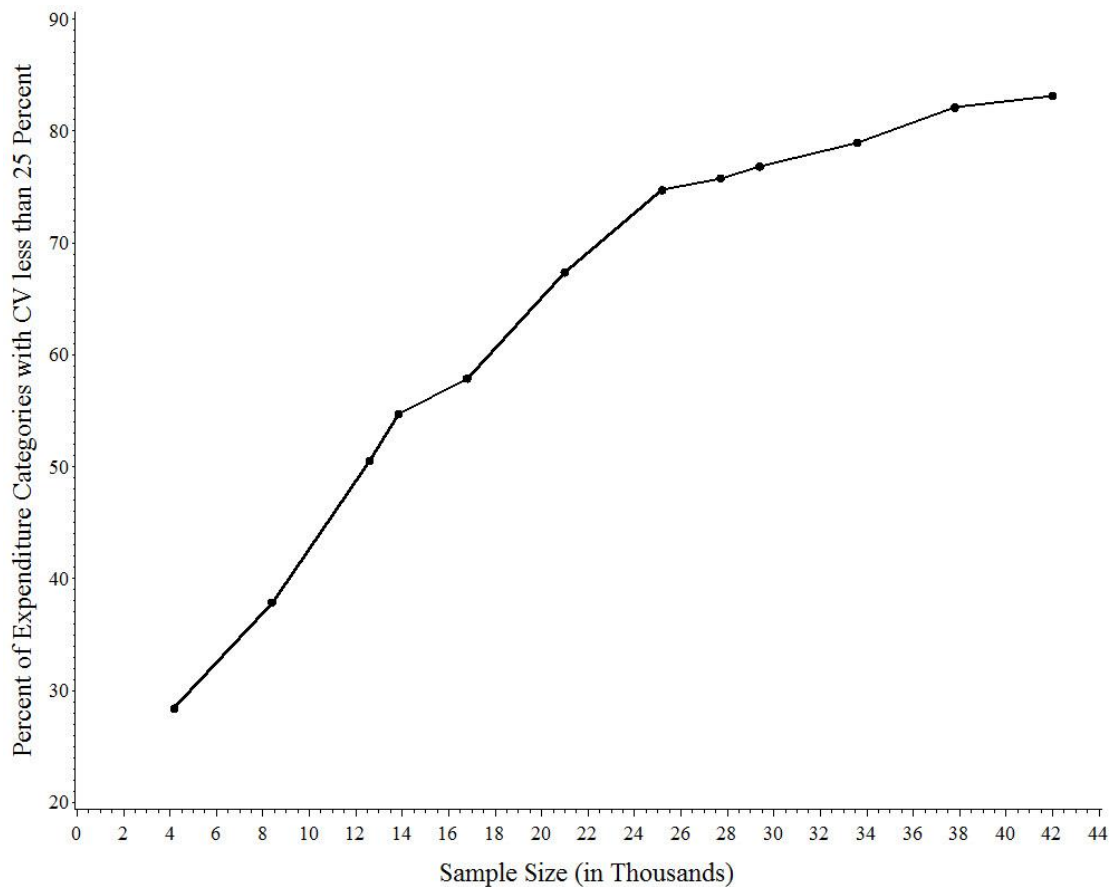
Using three years of CE integrated data from 2009 – 2011 and combinations of existing expenditure categories, simulations were run to identify the percent of reconciled expenditure categories that met the 25-percent CV threshold at various sample sizes (see figure 2).

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<sup>21</sup> The Asian subpopulation

<sup>22</sup> For this analysis, the CV was calculated by dividing the standard error by the mean.

Figure 2. The number of reconciled expenditure categories, intended to be published, meeting the 25-percent CV threshold for the Asian subpopulation at given sample sizes



The design team evaluated the findings and recommends a sample size of 28,000 completed cases per year. That is the point where additional cases do not significantly increase the number of categories meeting the threshold. It is also important to note that even with a much larger sample size than recommended, e.g. 42,000, more than double the current production sample size, there are a number of categories which do not meet the required threshold. This mimics the current production design, in which a number of collected expenditure categories do not meet a 25-percent CV threshold.

The CPI has independent sample size requirements, also documented in the OPLC Requirements Document (Passero, et. al, 2013). They require the sample size be sufficient to “produce reliable monthly expenditure estimates as needed for the C-CPI-U” and “allow the CPI to replace its cost weights every two years for national and sub-national indexes.”

Work is ongoing to identify the minimum sample sizes needed to meet the CPI requirements. When available, the CE required sample size and CPI required sample size will be reconciled, likely using the larger of the two to ensure all requirements are met. The final sample size is expected to be in the range of the current sample size, which means: (1) as is currently the case, the desired level of accuracy may not be reached for some expenditure categories; and (2) also as with the current sample, there may be a larger sample size than needed for some expenditure categories.

*e. Expected Cost*

The start-up costs of the redesigned survey should be reasonable because of the use of currently available technology, a straightforward design, and the Census Bureau having done previous development work that can be leveraged (e.g., the American Community Survey web-based data collection instrument). As for ongoing costs, there are some elements of the proposed design that will increase costs, while other elements will decrease cost. For example, the increased use of technology will likely result in new costs (e.g., technology help desk for respondents) and the individual diaries may increase processing costs (adding a new requirement to integrate the individual diaries); however, there should be overall cost savings from the use of a single sample with fewer waves as well as a reduction in the keying of diary data.

The use of monetary incentives will be expensive (with a maximum of \$132 per wave for a four-person household), but research suggests (Lavrakas, 2008) that incentives will reduce the cost of the first contact. Further, the use of a debit card (with pin given when respondent successfully completes the interview or diary) may result in cost savings from any un-cashed cards.

In a January 18, 2013 email to the Census Bureau, the design team provided an overview of the basic design, including the chart in figure 1 and requested a cost estimate for the proposal. The overall survey and sample design, amount and structure of incentives, survey mode, expected response rate (70 percent), and technology (basic smartphone with wireless technology) were provided. For cost estimation purposes, a sample size of 35,000 was specified. The Census Bureau estimate for ongoing data collection of this design was in line with current production costs, meeting one of the goals of the redesign.



Additionally, as part of their contract, Westat estimated costs for conducting a survey with very similar design and sample size, and also concluded that the ongoing collection cost would be in line with current production costs (Cantor, et. al., forthcoming 2013).

*f. Future Decisions*

There remain a number of design decisions that have not yet been addressed, most due to the need for additional information or research. The following topics will need to be addressed during the redesign research development process as more information becomes available:

- i. *Mobile diary device application type*: Whether to use a mobile-optimized web survey or a native application (app). For the purposes of this report, a native app is being defined as a local application designed to run on a specific device, versus a web application that is run within a browser. The advantages of a mobile-optimized web option over a native app includes ease of version maintenance, reduced respondent security concerns, respondent access without installing, and access on a desktop computer. The advantages of using a native app over a mobile-optimized web option include a more consistent appearance, offline access, and greater speed.
- ii. *Use of records as data input*: Explore options to use an app or other software to capture and code information directly from records and input that information into the diary and/or interview. Interviewers could then identify missing or unclear data elements and interview only on those as needed in Visit 2.
- iii. *Acceptance of annotated grocery receipts*: Explore issues associated with allowing respondents to provide grocery receipts in lieu of recording those expenses in the diary.
- iv. *Incentive amounts and structure*: The current Census protocol and logistical issues associated with individual-level and performance-based incentives should be explored. Additionally, the effectiveness of all planned incentives will be evaluated.

- v. *Exact survey content:* The division of content between the recall interview, records-based interview, and diary needs to be developed. This also includes the use of global questions, focus of the diary and householder versus individual diaries.
- vi. *Government provided technology:* The goal of providing government technology is to increase the number of respondents using the electronic diary, to improve data quality, and to reduce data entry costs. During the development period, the percent of respondents without their own access to the internet will be weighed against the cost of providing technology and any other risks or logistical issues to determine the benefit of providing technology in lieu of simply using a paper diary for respondents without internet access.
- vii. *Length of Visit 1 and Visit 2:* As the survey content and field procedures (e.g., diary placement, use of records) are finalized, the amount of time an interviewer is with the respondent in each visit will be estimated. The goal is to have each visit average 45 minutes. Careful evaluation of task length will have to be done.
- viii. *Respondent Experience mailing:* The current proposal recommends sending the Respondent Experience brochure after Wave 2. The advantage of this timing is the confidence that the mailing does not change respondents' spending behavior, and ensures the Wave 1 data have been processed and can be included in the mailing. The disadvantage is that the promise of the brochure is likely to be less effective in combating Wave 2 attrition than the actual material would be.
- ix. *Collection of outlet information:* Explore collecting information required for the CPI's Telephone Point of Purchase Survey (TPOPS) in the CE. For example, the TPOPS requires outlet (i.e. store) name, location, and price. This information could potentially be collected from records and receipts during the Visit 2 records-based interview, and/or via the diary.

#### 4. Future Enhancements

With the “Keep It Simple” guiding principle in mind, the design team aimed to create a survey design that will allow for development and implementation in the short term, and ongoing improvement in the long term, after implementation. Below is a list of design features that the team identified as promising, including adaptive design, gold standard interviews, split questionnaire methods, increased use of technology, self-administered interviews, extended longitudinal component, and collection of outlet information. The list can be viewed as a starting point for the prioritization of future research and development efforts.

##### *a. Adaptive Design*

Adaptive survey design attempts to break up methods and processes for survey data collection into manageable, observable, trackable pieces. It considers different indicators of progress (frame data, effort measures, cost measures, response data and response propensity estimates), measures them continuously and tailors data collection approaches to case characteristics. In short, adaptive design is the use of empirical data to facilitate intelligent business decisions prior to and during data collection.

Potential adaptive design benefits for CE are:

- Improvement in response through tailored field procedures based on contact history or respondent characteristics.
- Reduction of respondent burden without negatively affecting key estimates through tailoring the collection of select expenditure categories (e.g., not asking questions for expenditures where we have already achieved sufficient sample).

*Potential future enhancements include*

- *adaptive design,*
- *gold standard interviews,*
- *split questionnaire design,*
- *increased use of technology,*
- *self-administered interviews,*
- *extended longitudinal component, and*
- *the collection of outlet information.*

##### *b. Gold Standard Interviews*

In many federal surveys, one can assess the quality of data by comparisons with other sources of information. One of the difficulties in evaluating the quality of CE data is that there is no “gold

standard” with which to compare the estimates. Instead of comparing to an external source, one could conduct an intensive interview with a subsample of the main sample. This intensive interview could employ techniques such as the extensive use of records, financial software, and budget balancing to establish accurate measurements of expenditures, income, and assets at the household level. It could be conducted as part of an ongoing research sample or as a one-time effort.

Data from a gold standard interview could be used in several ways:

1. Data adjustment
2. Evaluate measurement error in the base sample
3. Measure the extent and organization of household record keeping to inform how better to collect expenditures in the ongoing survey
4. Provide an opportunity to collect data for more demanding research needs

*c. Split Questionnaire Design*

Split questionnaire is a form of matrix sampling of survey questions in which several distinct forms of the survey are constructed (thus modules are sampled, rather than questions) and respondents are randomly (although not necessarily with equal probability) assigned to one survey form in order to reduce respondent burden by shortening the survey. Split questionnaire designs reduce the length of the survey while collecting the necessary information from at least some of the sample members, but they also result in missing data. The goal is to minimize the amount of information lost relative to the complete questionnaire. Appropriate decisions must be made at various phases of the survey process to aid optimal implementation and estimation.

The BLS has devoted considerable attention to the potential use of split questionnaire design and preliminary simulation results indicate that split questionnaire designs for the CE can reduce survey length by at least 50 percent, with the impact on variances “varying” depending on the type of expenditure category (Gonzalez, 2012). However, additional research is needed to determine the optimal length of a shortened survey, composition of questionnaire splits (in terms of their statistical properties and impact on respondent processes/errors), and dataset construction and analysis methods.

*d. Increased Use of Technology*

One goal of the redesign was to improve flexibility of the design to allow for updates as society or technology changes. This proposal uses a smartphone or other mobile device as the data collection device, but we recognize that over the next decade technology will advance and other options may become more feasible, efficient, cost effective, or otherwise attractive. This design allows for the incorporation of technology, either in place of the smartphone, or in addition to it, as technology advances.

In addition to data collection, technology may be added to the survey design in other ways. Mobile devices could be given to the respondent during the interview to view the questions, information booklet or other survey aids, in conjunction with questions asked by the interviewer.

*e. Self-Administered Interviews*

A potential avenue for cost savings is incorporating more self-administration into the interview process since personal visit interviews are the most costly mode of data collection. There have been attempts to administer complex questionnaires in self-administered formats. For example, the National Institutes of Health has been developing an instrument for conducting a 24 hour dietary recall (e.g., Thompson, et al, 2010; Subar, et al., 2010). This is a computerized interview available on the internet that is designed to conduct large-scale nutritional studies. Going forward with self-administration would require additional research to identify (1) protocols to promote recall (e.g., cues, frames of reference, visual displays), (2) composition of self-administered modules, and (3) interviewer follow-up procedures when self-administered responses indicate cursory or lack of effort in the response (e.g., missing data; low levels of expenditures; sections completed in atypical short lengths of time).

*f. Extended Longitudinal Component*

Budget permitting, additional interview waves could be added across years (for example, three interview waves 12 months apart) or within years (for example, three interview waves, four months apart) to increase the data's value to researchers interested in longitudinal analysis.

## **5. Next Steps**

With this proposed design, the Gemini Project has met a significant milestone, but a large volume of redesign-related activity remains. In July 2013, the redesign proposal will be presented publically at the CE Methods Symposium. That will begin the task of sharing the design with stakeholders and data users and identifying user impact. As the design team concludes, new teams will take its place to contribute to the ongoing work necessary to complete the project; for example, the Data User Impact team and Survey Content team will be chartered. CE will be doing outreach with data users throughout 2013 and will consider their feedback in developing the next iteration of the redesign. This is an iterative process and user feedback and future research may result in changes to the proposal.

Research required to resolve outstanding design decisions and to finalize the design itself will take place over a five-year period, beginning in 2014. During this period, the design and exact survey content will be finalized. In parallel to the research related to the design, CE will continue efforts on developing metrics to evaluate measurement error. CE will continue to share information with users during this period; for example, documents detailing what data will and will not be available in the new survey. The subsequent five-year period will see logistical details, materials, and codebooks finalized and systems established. CE's goal is to implement a fully redesigned CE survey by 2023.

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## Appendix 1. Proposed Survey Content and Source

The division of content between the recall interview, records-based interview and diary needs to be further studied and developed. The diary is currently designed to be open-ended, with the intent of getting sufficient responses to accurately estimate the expenditure amounts listed in the table.

OPLC Requirement Category <sup>23</sup>	Recall		Records
	Interview	Diary	Interview
Airline Fares	X		
Appliances	X		
Boats, RVs, and Other Recreational Vehicles	X		
Catered Affairs	X		
CE All Other Gifts	X		
CE Support for College Students	X		
Child Care	X		
College Tuition	X		
Floor Coverings	X		
Funeral Expenses	X		
Furniture	X		
Household Operations	X	X	
Legal Fees and Financial Expenses	X		
Lodging Away from Home	X		
Maintenance and Repair Supplies	X	X	
Meals as Pay	X		
Medical Equipment and Supplies	X	X	

<sup>23</sup> Appendix 1 is based on an initial list, dated October 31, 2012 of reconciled expenditure categories. The exact survey content will be based on research using the final list of expenditure categories provided in the OPLC Requirements Document (Passero et al., 2013).



<b>OPLC Requirement Category<sup>23</sup></b>	<b>Recall</b>		<b>Records</b>
	<b>Interview</b>	<b>Diary</b>	<b>Interview</b>
Motor Vehicle Fees	X	X	
Motor Vehicle Maintenance and Repair	X	X	
Movie, Theater, Sporting Event and Other Admissions	X	X	
Occupational Expenses	X	X	
Other Food Away from Home	X	X	
Other Household Equipment and Furnishings	X	X	
Other Housing Expenses	X		
Other Medical Services	X		
Other School Tuition, Tutoring, and Test Preparation	X		
Owners' Equivalent Rent of Primary Residence	X		
Owners' Equivalent Rent of Vacation/Second Residence	X		
Pets, Pet Products and Services	X	X	
Photography	X	X	
Professional Medical Services	X		
Recreation Services	X	X	
Rent as Pay	X		
School Meals	X	X	
Unpriced Maintenance and Repair Services	X	X	
Video and Audio	X	X	X
Amount Car or Truck Sold or Reimbursed			X
Amount Motorcycle Sold or Reimbursed			X
Amount Recreational Vehicle Sold or Reimbursed			X
CE Alimony, Child Support and Support for College Students			X

<b>OPLC Requirement Category<sup>23</sup></b>	<b>Recall</b>		<b>Records</b>
	<b>Interview</b>	<b>Diary</b>	<b>Interview</b>
CE Assets and Liabilities			X
CE Cash Contrib. To Charities, Educ. and Other Organizations			X
CE Deductions for Social Security			X
CE Finance Charges Excl. Mortgage and Vehicle			X
CE Life and Other Personal Insurance			X
CE Non-Payroll Deductions To Retirement Plans			X
CE Payroll Deductions To Retirement Plans			X
CE Vehicle Finance Charges			X
Commercial Health Insurance			X
Electricity			X
Fuel Oil and Other Fuels			X
Hospital and Related Services			X
Household Insurance			X
Internet Services			X
Leased and Rented Vehicles			X
Long Term Care Insurance			X
Medicare Payments			X
Mortgage Interest and Charges			X
Motor Vehicle Insurance			X
Motorcycles			X
Natural Gas			X
New Cars and Trucks			X
Personal Property Taxes			X

<b>OPLC Requirement Category<sup>23</sup></b>	<b>Recall Interview</b>	<b>Diary</b>	<b>Records Interview</b>
Property Taxes			X
Rent of Primary Residence			X
Telephone Services			X
Trade In Allowance, Leased Vehicles			X
Trade In Allowance, New Cars and Trucks			X
Trade In Allowance, New Motorcycles			X
Used Cars and Trucks			X
Water, Sewer and Trash Collection Services			X
Adult Care		X	
Bakery Products		X	
Beef and Veal		X	
Beer, Wine and Other Alcoholic Beverages Away from Home		X	
Beer, Wine, and Other Alcoholic Beverages at Home		X	
Beverage Materials Including Coffee		X	
Breakfast, Brunch, Snacks and Nonalcoholic Beverages Away from Home		X	
Cereal and Cereal Products		X	
Children's Apparel		X	
Dairy and Related Products		X	
Dinner Away from Home		X	
Educational Books and Supplies		X	
Eggs		X	
Fats and Oils		X	

<b>OPLC Requirement Category<sup>23</sup></b>	<b>Recall Interview</b>	<b>Diary</b>	<b>Records Interview</b>
Fish and Seafood		X	
Food Prepared By Cu On Out of Town Trips		X	
Footwear		X	
Fresh Fruits		X	
Fresh Vegetables		X	
Household Textiles		X	
Housekeeping Supplies		X	
Infant and Toddler Apparel		X	
Information and Information Processing Other Than Internet Services		X	
Jewelry and Watches		X	
Juices and Nonalcoholic Drinks		X	
Lunch Away from Home		X	
Medicare Prescription Drug Payments		X	
Medicinal Drugs		X	
Men's Apparel		X	
Misc. Personal Services		X	
Miscellaneous <sup>24</sup>		X	
Miscellaneous Personal Goods		X	
Motor Fuel		X	
Motor Vehicle Parts and Equipment		X	
Other Apparel Services		X	

<sup>24</sup> Includes miscellaneous fees; lotteries and parimutuel losses; and maintenance, repairs, and utilities for other properties

<b>OPLC Requirement Category<sup>23</sup></b>	<b>Recall Interview</b>	<b>Diary</b>	<b>Records Interview</b>
Other Foods		X	
Other Household Products		X	
Other Meats		X	
Other Public Transportation		X	
Other Recreational Goods		X	
Personal Care Products		X	
Personal Care Services		X	
Pork		X	
Postage and Delivery Services		X	
Poultry		X	
Processed Fruits and Vegetables		X	
Recreational Reading Materials		X	
Sewing		X	
Sporting Goods		X	
Sugar and Sweets		X	
Tobacco and Smoking Products		X	
Tools, Hardware, Outdoor Equipment and Supplies		X	
Women's Apparel		X	
	Number of Categories Collected	36	68
			36

## Appendix 2. Comparison of Current and Proposed Surveys

<b>Design Dimension</b>	<b>Current</b>	<b>Proposed</b>
<b>Sample Design</b>	<ul style="list-style-type: none"> <li>- Two independent samples for interview and diary</li> <li>- Rolling sample implementation</li> </ul>	<ul style="list-style-type: none"> <li>- Single sample, all households complete interview and diary</li> <li>- Rolling sample implementation</li> </ul>
<b>Interview</b>	<ul style="list-style-type: none"> <li>- Single interview designed to collect large and reoccurring expenditures, but collects a basically comprehensive range of categories</li> <li>- All categories use a three month reference period</li> </ul>	<p><u>Recall Interview:</u></p> <ul style="list-style-type: none"> <li>- Large, easily recalled expenditures</li> <li>- Respondent or FR able to change section order</li> </ul> <p><u>Records-Based Interview:</u></p> <ul style="list-style-type: none"> <li>- Expenditure categories where records are likely available</li> <li>- Respondent able to report for different periods to match records</li> </ul>
<b>Diary</b>	<ul style="list-style-type: none"> <li>- Single paper diary per household</li> <li>- Open-ended, collecting four main categories of expenditures</li> <li>- In-person pickup and placement</li> </ul>	<ul style="list-style-type: none"> <li>- Electronic one-week diary with paper backup</li> <li>- Individual diary for all household members 15 years old and older</li> <li>- Open-ended, collecting all expenses</li> <li>- In-person pickup and placement</li> <li>- Respondent to use their device functionality to capture data (such as photos or voice messages), which will create a record in the diary for later completion</li> </ul>
<b>Waves</b>	<ul style="list-style-type: none"> <li>- 5 waves, three months apart</li> </ul>	<ul style="list-style-type: none"> <li>- 2 waves, one year apart</li> </ul>
<b>Sample Size</b>	<ul style="list-style-type: none"> <li>- 28,000 completed interviews per year</li> <li>- 14,000 completed diaries per year</li> <li>- Sample size the same across all categories</li> </ul>	<ul style="list-style-type: none"> <li>- Goal of 28,000 completed cases (interviews and diaries) per year</li> <li>- Sample size the same across all categories</li> </ul>

<b>Design Dimension</b>	<b>Current</b>	<b>Proposed</b>
<b>Modes</b>	<ul style="list-style-type: none"> <li>- In-person and telephone interviews</li> <li>- Paper Diaries</li> </ul>	<ul style="list-style-type: none"> <li>- In-person interview survey</li> <li>- Multi-mode diary               <ul style="list-style-type: none"> <li>o Web</li> <li>o Mobile device</li> <li>o Paper (backup)</li> </ul> </li> </ul>
<b>Records</b>	<ul style="list-style-type: none"> <li>- Record use encouraged, with variable success</li> </ul>	<ul style="list-style-type: none"> <li>- Records-based interview at Visit 2               <ul style="list-style-type: none"> <li>o Specific records (e.g., mortgage statement, paystub, utility bills) referred to during Visit 2, after respondent receives FR instructions regarding records at the end of Visit 1</li> </ul> </li> </ul>
<b>Content</b>	<ul style="list-style-type: none"> <li>- Overlapping of content between diary and interview due to open-ended diary design</li> <li>- Interview is relatively comprehensive</li> </ul>	<ul style="list-style-type: none"> <li>- Overlapping of content between diary and interview due to open-ended diary design</li> <li>- Recall and Records interview limited content to reduce overlap with diary</li> <li>- See Appendix 1 for content division</li> </ul>
<b>Role of Interviewer</b>	<ul style="list-style-type: none"> <li>- Conduct interviews</li> <li>- Interviewer as a trainer for diary placement</li> <li>- Place and pick up diaries, with some mid-week calling to check on respondent</li> </ul>	<ul style="list-style-type: none"> <li>- Conduct interviews as done currently for Visit 1 and Visit 2</li> <li>- Interviewer as a trainer for diary placement and records request</li> <li>- Interviewer contacts respondent to encourage reporting as necessary, as prompted by Census headquarters or regional office reports</li> <li>- Interviewer serves as main support contact, interviewer will contact main tech help desk for technical issues</li> </ul>
<b>Incentives</b>	<ul style="list-style-type: none"> <li>- None</li> </ul>	<ul style="list-style-type: none"> <li>- Monetary incentives (\$132 total per wave for a four person household)</li> <li>- Household-level non-monetary “Respondent Experience” incentive</li> </ul>

### **Appendix 3. Design Research, Discussion, and Outreach Events**

2013

- July – CE Survey Methods Symposium

2012

- December – FESAC Meeting
- October – CNSTAT Report Workshop
- July – CE Survey Methods Symposium

2011

- October – Redesign Options Workshop
- June – Household Survey Producers Workshop
- February – 1<sup>st</sup> CNSTAT Panel Meeting

2010

- December – Methods Workshop
- June – Data Users' Needs Forum
- May – AAPOR Panel Presentations: Utilizing Respondent Records
- March – Data Capture Technology Forum
- January – WSS/DC-AAPOR Survey Redesign Panel

2009

- July – CRIW-NBER Conference On Improving Consumption Measurement



## **Appendix 4. Project Team Membership**

### Gemini Steering Team

- Kathy Downey, formerly at BLS
- Jennifer Edgar
- Steve Henderson
- Bill Passero
- Laura Paszkiewicz
- Carolyn Pickering, formerly at BLS
- Adam Safir
- David Swanson
- Jay Ryan

### Gemini Executive Management

- Rob Cage
- Bob Eddy
- John Eltinge
- Thesia Garner
- Mike Horrigan
- John Layng
- Jay Ryan

### Gemini Design Team

- Kathy Downey, formerly at BLS
- Jennifer Edgar
- Dawn V. Nelson
- Laura Paszkiewicz
- Adam Safir