Changes in Health Care Use Reporting in the 2^{nd} vs. 1^{st} year: MEPS Household Component Overlapping Panel Design

Emily M. Mitchell[1], Pradip Muhuri[1], and Steve Machlin[1]
[1]Division of Statistical Research and Methods, Center for Financing, Access and Cost Trends, Agency for Healthcare Research and Quality, 5600 Fishers Lane, Rockville, MD 20852

Abstract
The Medical Expenditure Panel Survey Household Component (MEPS-HC) is a nationally representative survey of the U.S. civilian non-institutionalized population, conducted every year since 1996. The MEPS-HC is based on an overlapping panel design that collects data on healthcare utilization and costs for all persons in sampled households. Each participating household is targeted for interview 5 times, and the collected data cumulatively cover a two year period. Due to the amount of detailed information gathered during the interview, participants may ‘learn’ to avoid reporting medical events to reduce the burden of answering additional questions for each event. In this study, we examine whether evidence exists of this ‘respondent fatigue’ by analyzing trends in healthcare reporting. The overlapping panel design provides two avenues for this analysis. We first compare differences in event reporting for a calendar year between the ‘new’ panel in its first year of data collection with the ‘old’ panel in its second year of data collection. Second, within panels we compare event reporting in year 2 to expected levels based on health status characteristics in year 1.

Key Words: Healthcare utilization, expenditure, survey methods, MEPS, panel survey, reporting

1. Introduction

The Agency for Healthcare Research and Quality’s Medical Expenditure Panel Survey (MEPS) is a nationally representative survey of the U.S. civilian non-institutionalized population that has been conducted annually since 1996. While the survey is comprised of three separate components – the Household Component, the Medical Provider Component, and the Insurance Component – this analysis is limited to data collected during the MEPS Household Component. Data collection for this component involves an overlapping panel design. Each household is interviewed five times over the course of 2.5 years, to gather health status and expenditure information covering two calendar years. An illustration of the overlapping design for panels 13 and 14 is provided in Figure 1.

During the interview process, a single member of the household often answers questions about each member’s healthcare use and expenditures. Due to the detailed nature of the survey, each interview can last from 30 minutes to over 3 hours, where the length of the interview is directly correlated to the number of healthcare events reported by the entire household. This is because in addition to requiring extra time due to enumeration of multiple events, each event that is reported also triggers supplementary questions in the survey, such as which conditions were associated with the event, and details concerning the expenditures and source of payment. Figure 2 illustrates an example of the average interview time, based on the number of events reported by the household, for panel 13. For this analysis, events are defined as any office-based medical visits, hospital outpatient department visits, hospital inpatient stays, emergency room visits, or dental visits.

Due to the burden on the respondent for time and effort to complete the interview, there has been concern that respondents tend to learn, over time, that they can reduce the amount of time required for the interview by omitting events. For instance, someone who reports multiple events in their first interview, or round, may realize that they can reduce their interview time by reporting fewer events, and thus in later rounds may not report all of the events incurred during the reference period. Under-reporting of events is an ongoing concern in MEPS due to its potential for resulting in biased estimates and analyses of healthcare utilization and expenditures. Previous research in this area found evidence of reduced reporting in the final round of the MEPS survey as compared with the first four rounds (Zuvekas 2011).

Our goal in this study is to analyze trends to identify any evidence of this learned behavior of reduced reporting over time. To do this, we use the MEPS-HC survey to determine whether respondents are reporting fewer events over time within a MEPS panel, and secondarily, if this is occurring, how it might be affecting MEPS national estimates based on two overlapping panels.

2. Methods

The overlapping panel design of MEPS allows us to look at the data both longitudinally, by following a single panel throughout their 2 years of data, or annually, looking at two panels in a single calendar year, where one panel is ‘experienced’ and the other is new. All analyses use complex survey weights and variance estimates (Machlin et al., 2010), and p-values less than or equal to 0.05 are considered statistically significant.

2.1 Longitudinal Analysis

For the longitudinal component, we follow a single panel across two years of data to see if fewer events are being reported in the second year of MEPS compared with the first year, by comparing the number of events reported in year 2 to year 1, for each person. The analysis is limited to people who complete all five rounds of data collection, so everyone has the same amount of time in which to accrue events. Figure 3 displays a jittered scatterplot of the number of events reported in year 1 vs. year 2 for panel 13. Points on the dashed line indicate the same number of events reported in both years, while points below the line represent people with fewer events in year 2 than year 1, and points above the line represent people with more events in year 2 than year 1. While a reduction in reporting due to learned behavior would show more events below the dashed line, a visual inspection of the graph does not suggest that this is a strong pattern.

Univariable analyses are conducted on longitudinal panels, covering panels 7-13, which correspond to the panels that began the survey in 2002 – 2008 respectively. First, we compare the average difference in reporting from year 1 to year 2 of the survey. Because the distribution of the number of reported events is highly skewed, the average estimates of utilization may be influenced by a small number of respondents. Thus, we also estimate the percentage of people reporting more, fewer, and the same number of events in year 1 compared with year 2 of the survey, in order to provide a categorical characterization of utilization that is more robust to skewness and outliers.

In addition to the univariable analysis, we also conduct a multivariable analysis to adjust for predictors of healthcare utilization that may explain any changes in reporting. Similar to the univariable analyses, for this multivariable analysis we use data from MEPS longitudinal files (panels 7-13) that contain sample persons who completed the survey for all 5 rounds. In addition, we further split the sample into two age groups, defined by adults at least 18 years of age, or children less than 18 years of age. The motivation for this split in the sample is that the available variables that are predictive of health status and utilization are different depending on the age of the respondent. For instance, ever receiving a diagnosis of diabetes is only asked of adult participants, while a diagnosis of attention deficit disorder is only asked of children under 18.

For each of these subpopulations (child or adult) in each panel, the empirical modeling strategy involves a three-step process. First, we build a regression model by regressing the dependent variable, defined as the reported number of events in year 1, on a set of independent variables, measured at year 1 (details are provided below). Second, at the person-level, we predict the value of the dependent variable, defined as the number of events in year 2, based on the values of the independent variables reported in year 2 and the coefficient of the corresponding independent variables in year 1. Finally, we calculate the mean of the difference between the reported number of events and the predicted number of events in year 2 in order to assess whether the respondent reported fewer events in year 2 than year 1 in a given panel.

In the first step, we perform design-based analysis with an ordinary linear regression implemented by the svy command in STATA. Below is the general form of the regression equation.

$$Y_i^{(1)} = \alpha + \boldsymbol{\beta}\mathbf{x}_i^{(1)} + \epsilon_{i,} \qquad \text{(Equation 1)}$$

where $Y_i^{(1)}$ is the sum of office-based, outpatient, inpatient, emergency room and dental care visits for the i^{th} individual in year 1 of a given panel; $\mathbf{x}_i^{(1)}$ is the vector of j independent predictor variables for the i^{th} person in year 1; $\boldsymbol{\beta}$ is the vector of j regression coefficients; α is the regression intercept (i.e., the mean value of the number of events for the overall reference category); ϵ_i is the random error. We assume that the random error for a given value of x is normally and independently distributed with mean zero.

We build separate linear regression models for each of the panels, one for adults (18 years or older) and another for children (0-17 years). While the dependent variable in the adult and child-specific models is the same, there are fewer independent variables in the child model than in the adult model, since some survey questions were not asked about children.

The independent variables in the adult model are defined as follows:

- gender (female vs. male [reference category])
- respondent status (reported by a family member vs. self-reported [reference category]) race/ethnicity (Hispanic, non-Hispanic black, non-Hispanic Asian vs. non-Hispanic others including whites [reference category])
- educational status (high school/GED, bachelor's degree, master's degree or above vs. less than high school/GED [reference category])
- poverty status (poor, near-poor, low income, middle income vs. high income [reference category])

- insurance coverage (any private, public only, Medicare only, Medicare & private, Medicare & other public vs. uninsured [reference category])
- perceived physical health status (fair/ poor vs. excellent/very good/good [reference category])
- perceived mental health status (fair/poor vs. excellent/very good/good [reference category])
- ever been told by a doctor or other health care professional that the person has diabetes, asthma, high blood pressure, coronary heat diseases, stroke, arthritis or joint pain (yes vs. no [reference category] for each condition)
- physical health component summary scores (missing, 0-42, 43-56 vs. ≥57 [reference category]) and mental health component summary scores (missing, 0-43, 44-57 vs. ≥58 [reference category]). Cut points for component summary scores were based on observed percentiles.

The independent variables in the child model are as follows: gender, race/ethnicity, poverty status, insurance coverage, and the presence of asthma (as defined for the adult model). In addition, there are two dummy variables in the child model: special healthcare needs (yes vs. no [reference category]), and whether the child gets sick easily (yes vs. no [reference category]).

In the second step, we obtain predictions for observations in year 2 using Equation 2 below.

$$\hat{Y}_i^{(2)} = \hat{\alpha}^{(\mathbf{1})} + \hat{\boldsymbol{\beta}}^{(1)}\,\mathbf{x}_i^{(2)} \qquad \text{(Equation 2)}$$

where $\hat{Y}_i^{(2)}$ is the predicted total number of office-based, outpatient, inpatient, emergency room and dental care visits corresponding to the i^{th} individual in year 2 of a given panel; $\mathbf{x}_i^{(2)}$ is the vector of predictor variables for the i^{th} individual in year 2; $\hat{\boldsymbol{\beta}}^{(1)}$is the estimated vector of regression coefficients from Equation 1; $\hat{\alpha}^{(\mathbf{1})}$ is the regression intercept (i.e., the mean value of the number of events for the overall reference category) estimated from Equation 1.

In the third step, we calculate the difference (d_i) by subtracting the predicted number of events, $\hat{Y}_i^{(2)}$, from the reported number of events, $Y_i^{(2)}$, for the i^{th} individual in year 2 using Equation 3 below.

$$d_i = Y_i^{(2)} - \hat{Y}_i^{(2)} \qquad \text{(Equation 3)}$$

We then perform design-based mean analysis of the difference, d_i using the svy command in STATA.

2.2 Annual Analysis

In addition to looking at the data longitudinally, we analyze the data annually. MEPS data is released to the public annually, where each annual file contains survey participants that started in that year (rounds 1-3), as well as those that are in the second year of the interview (rounds 3-5) from the preceding panel. Typically, national estimates of healthcare utilization and expenditures are derived from these annual files. Thus, we assess the potential effect of any learned incentive to underreport on the national estimates by examining any differences in the ‘new’ vs. ‘experienced’ panels in a given year.

Similar to the longitudinal analysis, we limit this portion of the study to persons who completed all interviews during that year. Unlike the longitudinal portion, however, the annual analysis includes persons that were not in the study for the entire two years. For instance, a person who was born in 2009 would not be in the dataset for the 2009 analysis, but would be in the dataset for the 2010 analysis. This person would not have been included in the longitudinal portion of this study, since they were not in-scope for the entirety of the five rounds.

For the annual analysis, we compare reported numbers of events across panels in the same year for each year from 2002-2009. If persons in the first year of data collection report more events on average than those in the second year of data collection (the 'experienced' participants), that would be suggestive of a potential learned behavior of reduced reporting. This annual version is robust against time-sensitive policy changes that may impact healthcare utilization or expenditures, since all persons in this analysis are 'at risk' during the same time period. Person weights were applied to the data so that each panel is representative of the U.S. civilian non-institutionalized population (Machlin et al., 2010). We compare the percentage of persons that report at least one event in year 1 vs. year 2 of data collection, as well as the average number of events reported, among persons that report at least one event. Finally, we compare the total number of events estimated based on each panel (experienced vs. new).

3. Results

3.1 Longitudinal Analysis

3.1.1 Univariable Analysis

In the first component of the longitudinal analysis, we provide estimates of the average difference in the number of reported events for persons in their first vs. second year of the survey. Table 1 gives the average number of reported events in year 1 vs. year 2 along with corresponding standard errors, for panels 7-13. P-values of the difference between the two years are also given in the table, where only one year (panel 10) indicates a statistically-significant difference at the 0.05 level, between the average reported number of events in year 1 vs. year 2. In addition, the average number of reported events does not consistently decrease from year 1 to year 2 across panels, as would be expected if respondents were intentionally reducing reporting for later rounds of the survey. In fact, in three of the panels (panels 7, 11, and 12), the average number of reported events actually increases in year 2 compared with year 1. Thus, when comparing the average number of events reported for year 1 vs. year 2 within panel, there is no apparent evidence of reduced reporting due to learned behavior in the household component of MEPS.

Table 1: Average Number of Reported Events Per Person, Year 1 vs. Year 2.

	Mean (SE)		
Panel	Year 1	Year 2	p-value
7	7.18 (0.122)	7.28 (0.130)	0.33
8	6.98 (0.141)	6.96 (0.141)	0.80
9	7.39 (0.171)	7.21 (0.157)	0.08
10	7.06 (0.142)	6.84 (0.144)	0.03
11	6.98 (0.143)	7.08 (0.141)	0.34
12	6.43 (0.144)	6.53 (0.144)	0.41
13	6.91 (0.149)	6.86 (0.151)	0.68

However, as mentioned previously, the skewed nature of the distribution of reported events may mask any evidence of reduced reporting, since a small number of extreme values could impact the average number of reported events. Thus, we also consider a more discrete analysis, by looking at the percentage of people that report more, fewer, and the same number of events in the second year compared with the first year of the survey. Under the hypothesis of reduced reporting, we would expect that the percentage of people reporting fewer events would be higher than the percentage of people reporting more events in the second vs. first year of the survey. Table 2 provides estimates of these percentages along with corresponding standard errors.

Table 2: Percent of People with More, Fewer, and the Same Number of Reported Events in Year 2 vs. Year 1.

	Percent of People Reporting (SE)		
Panel	More Events in Year 2	Fewer Events in Year 2	Same number of events in both years
7	40.1 (0.55)	43.0 (0.56)	16.9 (0.41)
8	38.9 (0.53)	43.6 (0.54)	17.6 (0.42)
9	39.1 (0.59)	43.4 (0.58)	17.5 (0.46)
10	38.9 (0.53)	43.0 (0.56)	18.0 (0.42)
11	40.1 (0.50)	42.0 (0.52)	18.0 (0.41)
12	39.3 (0.63)	41.7 (0.63)	19.0 (0.47)
13	38.7 (0.56)	42.7 (0.56)	18.5 (0.46)

This analysis partially supports our hypothesis that, on average, fewer events are being reported for respondents in the second vs. the first year. Across panels, around 42-43% of persons have fewer reported events in year 2, while around 39-40% have more reported events in year 2. While all of these differences are statistically significant at the 0.05 level, the difference of approximately 3 percentage points is small, and may not appreciably affect national estimates of healthcare utilization. The next section provides results from the multivariable component of the longitudinal analysis, in order to compare reporting in year 2 vs. year 1, after adjusting for potential predictors of utilization.

3.1.2 Multivariable Analysis

Given the variables included in the adult model, the intercept or the overall reference category includes males, non-Hispanic others including whites and the uninsured who self-reported in the survey and also had the following characteristics:

- lower than higher school education
- high income (≥ 400% of the poverty level)
- excellent/very good/good physical and mental health condition(s),
- physical component scores of ≥ 57
- mental component scores of ≥ 58
- did not report having any of the following conditions: diabetes, asthma, high blood pressure, coronary heat disease, stroke, arthritis or joint pain

Adults in this overall reference category have an estimated mean number of visits (5 types combined) of 1.3, -0.3, 0.6, 0.4, 1.4, 0.1, and 0.8 in panels 7 through 13, respectively.

Given the variables included in the child model, the intercept or the overall reference category includes males, non-Hispanic others including whites, and the uninsured who

- were in the high income category
- were prone to sickness easily
- did not report having asthma or special health care needs

Children in this reference category have an estimated mean number of visits (5 types combined) of 3.5, 3.4, 4.2, 3.1, 3.1, 3.2, and 2.6 in panels 7 through 13, respectively.

Since all predictors in the model are categorical, the coefficient of a given predictor category can be interpreted as the difference in the mean number of visits in that category, conditional on other covariates, and the associated reference category. On average, in year 1, fewer visits are reported for females than males in the adult model; there are no significant gender differences in the mean number of visits in the child model. Estimated visits are fewer for sample adults when a member other than the sample adult provides the information. In both child and adult models, the estimated mean number of visits is lower for Hispanics, non-Hispanic blacks, and non-Hispanic Asians than for non-Hispanic others including whites. Estimated visits are also lower for persons in poor, near-poor, low income, and middle income categories than for those in high income categories. On average, adults who completed high school, college, or a higher degree have more healthcare visits than those with less than a high school education. In the adult model, having health insurance coverage, namely, 'public only', 'Medicare only', or 'Medicare & Private', and 'physical health summary scores of 0-42' are all associated with more visits. Results are similar for children classified into the same categories of insurance coverage except that the 'Medicare & Private' category does not apply to this subpopulation. The mean number of visits is estimated at higher levels in adults with fair/poor perceived health status reported than in those with excellent/very good/good status. On average, adults with diabetes, asthma, high blood pressure, coronary heat diseases, stroke, arthritis or joint pain as well as children with asthma, and special healthcare needs, or those prone to sickness easily are all associated with increased use of health care.

For both child and adult models, the null hypothesis that none of the independent variables are significantly related to the dependent variable is rejected even at the 0.001 level of significance. The R-squared value ranges from 11 to 15 percent in child models and is around 20 percent in the adult models.

Table 3 presents the mean of differences between reported number of visits and the predicted number of visits, and the 95% confidence interval for children and adults. A negative value indicates that, on average, there were fewer visits reported than predicted by the model in year 2 (i.e., reduced reporting on average). A positive value suggests that, on average, there were more visits reported than predicted in year 2 (i.e., greater reporting on average). For most panels, mean differences are in the negative direction, but are not significantly different from 0 at the 0.05 level. In summary, these results provide no strong evidence of reduced reporting of visits in year 2, compared to year 1 in MEPS.

Table 3: Mean of Differences between Reported and Predicted Number of Reported Events in Year 2 and 95% Confidence Interval (CI)

Panel	Child Model Mean of Difference (CI)	Adult Model Mean of Difference (CI)
7 (2002-2003)	-0.042 (-0.283, 0.200)	0.182 (-0.080, 0.444)
8 (2003-2004)	-0.181 (-0.486, 0.124)	-0.052 (-0.347, 0.243)
9 (2004-2005)	-0.329 (-0.571, -0.087)	-0.303 (-0.626, 0.019)
10 (2005-2006)	-0.301 (-0.613, 0.012)	-0.236 (-0.517, 0.044)
11 (2006-2007)	-0.061 (-0.381, 0.259)	0.040 (-0.216, 0.303)
12 (2007-2008)	0.005 (-0.291, 0.301)	-0.061 (-0.364, 0.242)
13 (2008-2009)	-0.019 (-0.367, 0.330)	-0.216 (-0.530, 0.099)

3.2 Annual Analysis

While comparing the average number of reported events in year 1 vs. year 2 using a longitudinal analysis did not provide any strong evidence of reduced reporting, we now turn to the annual analysis to determine to what extent any reduced reporting might affect national estimates of healthcare utilization.

Estimates of total healthcare utilization are a function of the number of people reporting any events, as well as the average number of events reported for each person that reports at least 1 event. Thus, we consider estimates for each of these components when examining the annual analysis. National estimates are given for the 'new' vs. 'experienced' panels, where the 'new' is denoted as 'Year 1', as they are in the first year of the survey, and the experienced respondents, from the panel that begin in the previous year, are denoted as 'Year 2', since they are in the second year of the survey.

Table 4 provides the percentage of people reporting at least 1 event, as well as the average number of reported events among those persons with at least 1 event reported, for persons in year 1 vs. year 2 of the survey. P-values are based on the test for equality of proportions and means, respectively.

When considering the percentage of people reporting at least one event, slightly fewer people report events in the second year of the interview than the first year. This decrease is statistically significant for 6 of the 8 years considered. However, the lower percentage in the second year is only around 3 percentage points lower on average than in the first year. With respect to the average number of events reported, only one year indicated a statistically significant difference, and that difference was in the opposite direction of what would be expected under the reduced reporting hypothesis.

Table 4: Percentage of Persons Reporting at Least 1 Event and Average Number of Events Reported per Person.

	Percent of People with at Least 1 Reported Event (SE)			Average Number of Events Reported per person (SE)		
Year	Year 1	Year 2	p-value	Year 1	Year 2	p-value
2002	84.5 (0.44)	82.1 (0.45)	<0.001	8.53 (0.14)	8.47 (0.13)	0.72
2003	83.7 (0.46)	82.8 (0.49)	0.146	8.39 (0.15)	8.67 (0.16)	0.13
2004	83.8 (0.48)	80.8 (0.52)	<0.001	8.79 (0.18)	8.48 (0.15)	0.15
2005	83.0 (0.51)	81.7 (0.51)	0.046	8.51 (0.16)	8.66 (0.17)	0.52
2006	83.6 (0.47)	80.8 (0.54)	<0.001	8.33 (0.14)	8.33 (0.16)	0.98
2007	82.5 (0.53)	82.3 (0.51)	0.805	7.75 (0.16)	8.45 (0.15)	0.002

2008	83.6 (0.41)	79.9 (0.60)	<0.001	8.26 (0.15)	8.02 (0.16)	0.28
2009	83.2 (0.45)	81.1 (0.50)	<0.001	8.09 (0.14)	8.39 (0.16)	0.15

Table 5 provides estimates of the total number of healthcare events for the U.S. civilian non-institutionalized population, for each year from 2002 – 2009, based on respondents in the first year of the survey vs. second year of the survey. Estimates of total utilization vary between 1.87 to 2.09 billion events, depending on the year and panel from which the totals were estimated. However, estimates from respondents in year 2 of the survey are not consistently lower than those from respondents in year 1 of the survey, as we would expect under the hypothesis of reduced reporting. In fact, in 4 of the 8 years the estimated total number of healthcare events in year 2 was equal to or greater than the number of events estimated using respondents in year 1 of the survey.

Table 5: National Estimates for the Total Number of Events Reported, Based on Panels in Year 1 vs. Year 2 of the MEPS Survey.

	Total Number of Events Reported in Billions (SE)		
Year	Year 1	Year 2	p-value
2002	2.02 (0.035)	1.95 (0.033)	0.087
2003	1.98 (0.038)	2.03 (0.040)	0.357
2004	2.09 (0.047)	1.95 (0.038)	0.007
2005	2.03 (0.042)	2.03 (0.044)	0.962
2006	2.02 (0.040)	1.96 (0.042)	0.202
2007	1.87 (0.042)	2.04 (0.040)	0.005
2008	2.04 (0.039)	1.89 (0.041)	0.009
2009	2.00 (0.039)	2.03 (0.043)	0.650

Thus, similar to the conclusions drawn under the longitudinal analysis, comparing estimates from persons in year 2 vs. year 1 of the survey using an annual approach showed some evidence of reduced reporting when considering the percentage of persons reporting at least 1 event. However, national estimates of total utilization and average number of events reported per person showed no evidence that reduced reporting over time is impacting these estimates.

4. Conclusion

In conclusion, our study did not uncover any glaring reasons to be concerned about reduced reporting over time in the MEPS household component. In the longitudinal analysis, a slightly higher percentage of people reported fewer events in year 2 compared with people who reported more events in year 2. Similarly, in the annual analysis, a slightly higher percent (around 3 percentage points) of people in the first year of the interview reported at least one event, compared with the percentage of people reporting at least one event in the second year of the interview. However, for both of these analyses, no differences were evident when looking at the average or total number of events reported, even after adjusting for multiple predictors of healthcare utilization, under the multiple linear regression model in the longitudinal component. In addition, statistical significance was defined at the 0.05 level without adjusting for multiple comparisons. Re-evaluating the results after adjusting for multiple comparisons would only serve to reduce the number of significant differences detected in our analysis, resulting in even less evidence of an effect of reduced reporting.

Several avenues remain for a more detailed investigation of this topic. For instance, this analysis treated the number of events reported per person, when in fact, the ‘exposure’ of interest is the number of events reported per household, since the burden on the respondent (often the same person responding for each member of the household), is determined by the total number of events that he or she must report during the interview. In addition, we considered the longitudinal component broken up by year, rather than by round, in order to maintain consistency when comparing results to the annual analysis. A more specific analysis would consider evaluating reporting trends across rounds. However, this analysis would require standardizing the number of reported events by the length of the round (i.e. the number of days since the last interview, or ‘time at risk’). A round-based analysis could also illuminate additional issues that could be affecting reporting behavior. For instance, the final interview (round 5), is typically a couple of months later than the end of the reference period for that round. Thus, recall error may be more of a factor in reducing the number of reported events, rather than an intentional omission of events solely to reduce the interview time.

Reduced reporting over time is distinct from general under-reporting. General under-reporting occurs whenever a respondent fails to report certain healthcare events, which can occur in any round for a variety of reasons, such as recall error, or misunderstanding the scope of the survey. Reduced reporting, on the other hand, is the reduction of reported events in later rounds of the survey, which may be partially due to the learned behavior that omitting events will reduce respondent burden. While general under-reporting is still a concern in MEPS, our results suggest that under-reporting does not worsen in later rounds. We are currently investigating methods for exploiting data from the Medical Provider Component of MEPS to assess the potential magnitude of under-reporting in the MEPS Household Component.

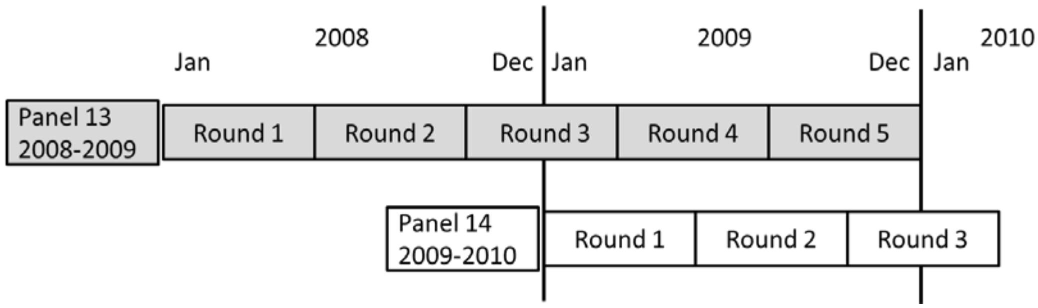

Figure 1: Example of panel design in years 2008-2009. Round refers to reference period of collected data. Actual data collection occurs after the end of each reference period.

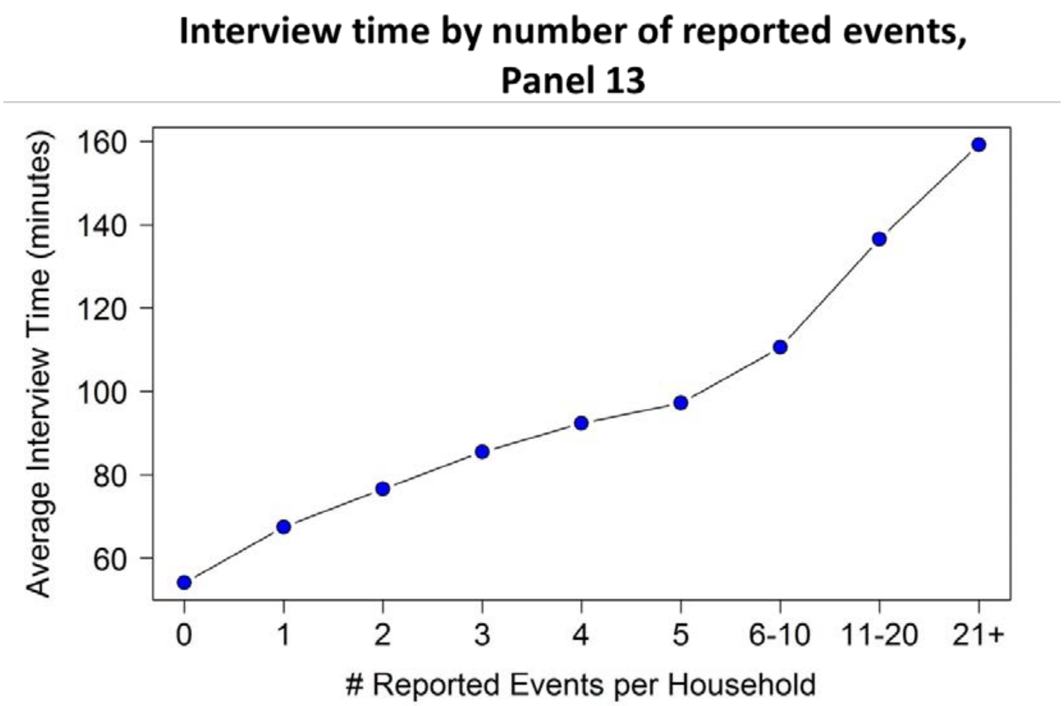

Figure 2: Number of reported events per household and average interview time, panel 13.

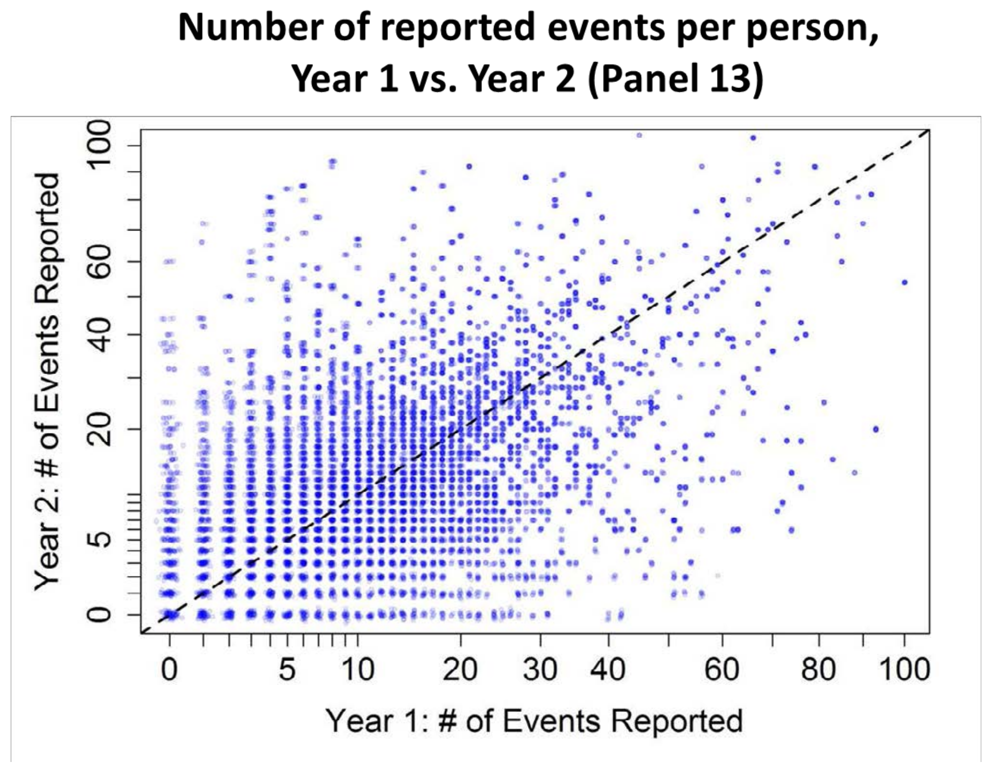

Figure 3: Scatterplot of number of events reported in year 1 vs. year 2, for panel 13

References

Cohen, J. *Design and Methods of the Medical Expenditure Panel Survey Household Component*. MEPS Methodology Report No. 1. AHCPR Pub. No. 97-0026. Rockville, MD. Agency for Healthcare Policy and Research, 1997. http://www.meps.ahrq.gov/mepsweb/data_files/publications/mr1/mr1.pdf

Ezzati-Rice, T.M., Rohde, F., Greenblatt, J., *Sample Design of the Medical Expenditure Panel Survey Household Component, 1998-2007.* Methodology Report No. 22. March 2008. Agency for Healthcare Research and Quality, Rockville, MD. http://www.meps.ahrq.gov/mepsweb/data_files/publications/mr22/mr22.pdf

Machlin S.R., Chowdhury S.R., Ezzati-Rice T., DiGaetano R., Goksel H., Wun L.-M., Yu W., Kashihara D. *Estimation Procedures for the Medical Expenditure Panel Survey Household Component*. Methodology Report No. 24. September 2010. Agency for Healthcare Research and Quality, Rockville, MD. http://www.meps.ahrq.gov/mepsweb/data_files/publications/mr24/mr24.shtml

Stagnitti, M.N., Beauregard, K., and Solis, A. *Design, Methods, and Field Results of the Medical Expenditure Panel Survey Medical Provider Component (MEPS MPC) - 2006 Calendar Year Data.* Methodology Report No. 23. November 2008. Agency for Healthcare Research and Quality, Rockville, MD. http://www.meps.ahrq.gov/mepsweb/data_files/publications/mr23/mr23.pdf

Zuvekas, S. *The effects of recall length and reporting aids on household reporting of health care events in the medical expenditure panel survey*. Journal of Economic and Social Measurement. January 2011. 36(4): 321-43.